

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Educational Administration: Theses, Dissertations,  
and Student Research

Educational Administration, Department of

---


Spring 4-20-2015

# Developing an Understanding of How College Students Experience Interactive Instructional Technology: A UX Perspective

Adam Wagler

University of Nebraska-Lincoln, adamwagler@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/cehsedaddiss>

 Part of the [Communication Technology and New Media Commons](#), [Educational Assessment, Evaluation, and Research Commons](#), [Higher Education and Teaching Commons](#), [Instructional Media Design Commons](#), and the [Scholarship of Teaching and Learning Commons](#)

---

Wagler, Adam, "Developing an Understanding of How College Students Experience Interactive Instructional Technology: A UX Perspective" (2015). *Educational Administration: Theses, Dissertations, and Student Research*. 228.  
<https://digitalcommons.unl.edu/cehsedaddiss/228>

This Article is brought to you for free and open access by the Educational Administration, Department of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Educational Administration: Theses, Dissertations, and Student Research by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

DEVELOPING AN UNDERSTANDING OF HOW COLLEGE STUDENTS  
EXPERIENCE INTERACTIVE INSTRUCTIONAL TECHNOLOGY:  
A UX PERSPECTIVE

by

Adam Wagler

A DISSERTATION

Presented to the Faculty of  
The Graduate College at the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Philosophy

Major: Educational Studies  
(Instructional Technology)

Under the Supervision of Professor Allen Steckelberg

Lincoln, Nebraska

March, 2015

DEVELOPING AN UNDERSTANDING OF HOW COLLEGE STUDENTS  
EXPERIENCE INTERACTIVE INSTRUCTIONAL TECHNOLOGY:

A UX PERSPECTIVE

Adam Wagler, Ph.D.

University of Nebraska, 2015

Adviser: Allen Steckelberg

Technology is increasingly mobile and social, resulting in dynamic digital and interactive environments. The ubiquitous nature of interactive instructional technology presents new paradigms for higher education, creating challenges for instructors to compete for time and attention as students are bombarded by information in a digital, media rich world. The problem being studied, with all of these technological advancements, is how instructors can approach these challenges from a user experience (UX) perspective. A macro level view sees college students taking multiple courses at a time, over many semesters, and using different interactive instructional technology that mix with other forms of online media consumption. The purpose of this qualitative case study is to describe the experiences with interactive instructional technology from the perspective of college students at a large Midwestern university. A combination of cognitive load theory, communications strategy, and UX perspective is used to provide a structure that higher education faculty and administrators can use to approach content strategies, technological advances, and student perceptions throughout their college education. Focus groups with college students found communication is the number one priority when using interactive instructional technology. However, as more social media

is adopted, the line between personal and professional lives is being blurred for better or worse. Technological advances introduce layers of separation between student and faculty, as well as student and course content, which all impact motivation. Students want faculty to be comfortable with the technology to build trust and confidence with their interactions. There will always be technology problems, but students now need to actively solve problems when technology isn't working. The significance of this study informs educators of issues they could expect when teaching with technology and offer ideas to integrate it in appropriate ways. Students offer a number of suggestions and UX tools are provided to improve student experiences with interactive instructional technology.



## Table of Contents

Abstract.....	ii
Table of Contents.....	iv
Figures and Tables.....	ix
<b>Chapter 1 – Introduction</b> .....	<b>1</b>
Rationale for the Study.....	4
Rationale for Qualitative Methods.....	6
Statement of Problem.....	6
Research Questions.....	7
<b>Chapter 2 – Literature Review</b> .....	<b>9</b>
What is User Experience?.....	9
Cognitive Processes and UX.....	14
Attention.....	15
Cognitive Load.....	16
Cognitive UX Interplay with Affective Theories.....	19
Interactive Instructional Technology in Higher Education.....	21
Moving Forward with a UX Perspective.....	24
<b>Chapter 3 – Methodology</b> .....	<b>28</b>
Case Selection and Participant Sampling.....	30

Data Collection .....	30
Focus groups. ....	31
Learning environment observation. ....	33
Institutional resources. ....	34
Data Analysis .....	34
Validity.....	35
Reflexivity.....	35
<b>Chapter 4 – Findings</b> .....	<b>37</b>
Communication as the Number One Priority.....	38
Prioritizing communication. ....	38
Follow through.....	40
Professors don’t use tech the same way students do.....	41
Line between Personal and Professional Lives .....	43
Line between personal and professional. ....	43
Setting boundaries.....	44
Part of our everyday lives. ....	45
You need to <i>Twitter</i> . ....	46
Interactive Instructional Technology Creates Layers of Separation.....	50
Layers of separation.....	50
Zero interactivity.....	51

Three hours long, that is absurd.....	53
Couldn't have done it at my house. ....	55
Educating each other.....	56
Familiarity with the Interactive Instructional Technology Used.....	58
Be familiar with tech you are using.....	58
More motivation if tech works.....	60
Don't fake it.....	61
One experience is all it takes.....	63
Ask for help.....	63
Building Trust with Interactive Instructional Technology.....	65
How can I trust you?.....	65
It is 2014.....	66
Structured organization.....	67
You have to sacrifice a lamb.....	70
Be consistent.....	72
Interactive Instructional Technology Always has Problems.....	73
Always tech problems.....	73
Must figure things out.....	74
That isn't the simplest way, I am figuring out something else.....	75
It is going to be okay.....	77

<b>Chapter 5 – Discussion</b> .....	79
Evolving environments. ....	82
New technology, new skills. ....	84
Next steps.....	85
Suggestions from Students .....	86
UX Tools for Faculty.....	90
UX Teaching Model .....	92
Future Research .....	94
Limitations .....	95
Final Thoughts .....	98
References.....	100
Appendices.....	109
Appendix A: Literature Map .....	109
Appendix B: Participant Screening Questions.....	110
Appendix C: Recruitment Letter .....	111
Appendix D: Consent Form.....	112
Appendix E: Demographic, Technology and Media Usage Survey.....	113
Appendix F: Participant Demographics Summary .....	116
Appendix G: Media Usage Survey Responses .....	117
Appendix H: Focus Group Protocol.....	119

Appendix I: Observational Protocol.....	120
Appendix J: Sample Transcription .....	121
Appendix K: Participant Good and Bad Sketches Overview .....	122
Appendix L: Participant Good and Bad Sketching Examples .....	123
Appendix M: Summary of Findings.....	126

**Figures and Tables**

Figure 2.1: Mooney and Rollins' (2008) purchasing fish model.....	12
Figure 2.2: Mishra and Koehler TPACK Model.....	26
Figure 3.1: Multiple-case design.....	29
Figure 3.2: Data types and sources collected.....	31
Figure 5.1: UX Teaching Model.....	92

## **CHAPTER 1**

### **Introduction**

Spend any amount of time outside a college lecture hall as class finishes, at a campus bus stop, or in a student hangout and you will see heads down, elbows in, and thumbs typing away. This is a common sight across campuses in the United States, which speaks to the connectedness of students. In 2014, mobile usage surpassed desktop usage making it the go-to device for digital media (comScore, 2014). As of September 2012, 119 million Americans aged 13 and older own a smartphone and multi-device ownership is becoming commonplace (Fredericks & Besnoy, 2012). Furthermore, many higher education faculty in the United States allow the use of laptops and smartphones in the classroom and faculty continue to use social media both professionally and personally (Bart, 2011). Students can now gather information and access educational materials whenever and wherever it is convenient. The personal aspects of mobile technology and the amount of time many students spend with their devices make it prime space for self-regulated, informal learning experiences. A study on perceptions of technology in higher education suggests students are ready to use their mobile devices as part of their education and look to institutions and instructors for opportunities and guidance to get started (Dahlstrom, Walker & Dziuban, 2013). As technology becomes increasingly mobile and social, the power of a computer becomes handheld. This increase in usage and rapid adoption of interactive technology is no longer the domain of what Rogers' (2003) diffusion of innovations calls the early adopters. Digital media types create new environments for educators. Over the years, there has been debate about the importance of media and technology in multimedia learning and cognitive literature (Mayer, 2009;

Clark and Feldon, 2005; Kozma, 1994). Given these new challenges, this study re-examines the discussion regarding the role media and technology play in higher education learning as media become more interactive.

A theoretical framework grounded in cognitive load theory, mass communications theory, and user experience theory is used to outline the integration of interactive instructional technology in higher education. Over the years, cognitive load theory (CLT) has built and continues to develop an understanding of multimedia learning (Mayer & Moreno, 2007, 2000, 1999 1998; Reed, 2006; Kalyuga, Chandler, & Sweller, 2004, 1999; Kirschner, 2002). Mayer (2009) suggests, “meaningful learning depends on the learner’s cognitive activity and that well-designed multimedia instructional messages can promote active cognitive processing” (p. 22). CLT discusses usability of technology as an important factor when using multimedia as a learning tool. However, interactive media and mobile devices introduce additional user experience challenges that go beyond usability. Much of the scholarship evaluates and measures learning based on one piece of software, animation, website, or technology. These studies focus on a top-down digital and multimedia perspective rather than thinking about it as a two-way interactive process of communication. Kalyuga (2007) proposes new technology provides educators tools to monitor, manage, measure, and engage that are all unique to interactive learning environments’ responsiveness to learners’ actions. The two major factors represented in efficient learning in interactive environments—structural characteristics and processing limitations of human cognition—are required when designing and evaluating these spaces (Kalyuga, 2007). The numerous types of media used in higher education have only become more complex with digital and interactive media. Beginning with books and



images, leading to audio, then to include video, and now opening up to encompass all aspects of interactive media including structure of technology, communication context, and user perception (Kioussis, 2002).

Mass communications and the media industry are also tackling similar challenges with interactive media platforms. A survey of marketers found the industry will continue spending millions of dollars using interactive media as part of their communications strategy. However, only 9% feel confident with their efforts and 80% responded that digital training is happening informally on the job (Adobe, 2013). Even though the modern Internet has been around for decades, the rapid technological innovations in mobile, social media, and digital measurement require integration strategies to happen on the fly. New types of media have introduced an endless number of ways users consume content disrupting traditional communication strategies (Anderson, 2008). Furthermore, social networks have given audiences a voice and opportunities to directly participate with and influence brand experiences (Shirky, 2009).

User experience (UX) is defined by Marchitto and Canas (2011) as “an extension of the traditional usability approach to human-technology interaction research that includes the user’s psychological, sociological and cultural experiences with technology” (p. 270). Zhou, Xu, and Jiao (2011) suggest UX is split into two areas, cognitive (information processing and decision making) and affective (responses and inspirations). This line of research provides a common thread where education and the media industry can learn from each other when integrating interactive media with engagement tactics. However, Hassenzahl and Tractinsky (2006) point out industry and conferences have been discussing UX for a while, but the academic research is lacking in journals both

quantitative and qualitative. The result is a lack of theoretic frameworks and models. A UX perspective begins to bridge cognitive research as a foundation for learning with technology and mass communications' rapid adoption and experimentation with cutting edge technology.

It is important for educators to begin to seriously evaluate these new environments and methods of interacting with materials from a user's point-of-view. This study outlines a UX perspective on learning with interactive instructional technology that is grounded in cognitive and communications theories. The information-processing model provides the foundation for cognitive load and affective theories with UX research. Mass communications theory is then offered as a framework to integrating media types and strategies to effectively reach and engage audiences with interactive media. The combination of these perspectives provides a framework for instructors, professors, and administrators in higher education who are interested in the content students are receiving and generating during education and how students perceive their education through interactive instructional technology. The purpose of this qualitative case study is to describe the experiences with interactive instructional technology from the perspective of college students at a large Midwestern university.

### **Rationale for the Study**

This study examines the role UX plays in selecting, adapting, and integrating interactive instructional technologies into the learning process in higher education. Much of the literature on usability and instructional technology looks at usability and evaluation of a specific application. UX introduces more holistic concepts to look at the experience with interactive media compared to usability. Hassenzahl and Tractinsky (2006) point out

the communications industry has been discussing UX for a while, but the academic research has been minimal. The result is a lack of theoretic frameworks and models to expand the UX perspective. Research on technology and usability primarily are evaluating individual technologies or courses from an instructional standpoint.

Many college students take five courses a semester resulting in numerous digital interfaces, locations, and procedures they have to bounce between throughout the entire term. This is compounded by multiple semesters where this demand may restart each semester. Furthermore, youth media usage is rising, “kids are media multitasking, packing an average of 8.5 hours' worth of media into 6.5 hours a day. Twenty-six percent of young people are using one medium while they are doing something else media-related at the same time” (Erickson, 2012). This results in challenges for instructors to compete for time and attention as students interact with instructional technology. The problem being studied is the rapid technological advancements that now require active involvement by the user as part of the process. How should instructors consider UX as part of their selection process? Specifically, a macro level view of this issue sees students taking multiple courses at a time, over many semesters, and using different instructional technologies that mix with other forms of online media consumption. UX challenges begin to emerge from the integration of interactive instructional technology into college courses. Schools have an opportunity to create positive experiences with technology to build trust with students and brand equity for future classes. This project takes a UX perspective to add a student perspective to the research that is missing from the literature.

## **Rationale for Qualitative Methods**

Qualitative research is used in this study to develop an understanding of the challenges produced by interactive instructional technology through the lived experiences of participants. Philosophical assumptions provide a foundation for researchers when they are conceptualizing research designs, choosing qualitative methods, and selecting a specific approach (Babchuk & Badiie, 2010). A constructivist worldview is taken in this project to seek an understanding of the world we live in through multiple perspectives that are inductively understood by gathering and analyzing data from multiple sources to build a holistic view of the central phenomenon (Creswell, 2007). In qualitative research, the researcher acts as a human instrument to study a central phenomenon that seeks to explore areas of that topic (Saldana, 2011). UX, at its core, is defined by describing an individual's entire interaction with media "as well as the thoughts, feelings, and perceptions that result from those interactions" (Tullis & Albert, 2008, p. 4). Hence, a case study, qualitative approach is ideal to explore how students experience interactive instructional technology.

## **Statement of Problem**

Over the last decade mobile, social media and other new media types have emerged to create new challenges in higher education. These new interactive media types are increasingly used in higher education, but little research has focused on how college students experience these changes. Pass and Sweller (2012) suggest there are many opportunities to use interactive media with further research required to inform the design of these interactive learning environments. For teachers, this may come in the form of monitoring, managing, measuring, and engaging students to enhance learning. For

students, these interactive media provide access, convenience, self-regulation, and motivation. New media require new ways of teaching, but many instructors developed their skills in an all-text world and other forms of one-way communication. Ohler (2009) proposed instructors must find ways to take advantage of young students' comfort with digital media while guiding students. Currently, a proliferation of digital media, applications, websites, and other instructional technologies give instructional designers an endless number of solutions to integrate into their approaches. For these reasons, a UX perspective is important to form a communications structure to inform instructional strategies with interactive media.

### **Research Questions**

The central research question of this study is: how do college students experience interactive instructional technology at a large Midwestern university? A UX approach keeps the individual student in mind instead of just an anonymous identification number. This personal approach has the opportunity to connect with students using technology. Trust is built over time and must be done at multiple levels of the university structure, from the departmental to the institutional level. Faculty can build relationships with students while administration can build brand equity. The study also introduces sub-questions including:

1. How do students use interactive instructional technology?
2. How are student perceptions formed about interactive instructional technology?
3. Why is using interactive instructional technology easy / difficult?

4. How do students view the advantages / disadvantages of interactive instructional technology?
5. How does interactive instructional technology interface with student study habits outside of class?

## CHAPTER 2

### Literature Review

This chapter is divided into five sections to highlight the different threads of research that provide a foundation to explore interactive instructional technology in higher education. Appendix A provides a literature map outlining the scholarship used to frame this study. The first section begins to address the UX perspective by providing operational definitions to create a common understanding of key concepts. The second section outlines cognitive load theory and multimedia learning theory to provide a foundational layer for making connections with UX instructional technology. The third section introduces affective theories regarding user perceptions and emotions to build a framework for a cognitive UX perspective. The fourth section explores current aspects of interactive instructional technology as it pertains to UX including media and technology aspects. The fifth section highlights theories in mass communications with interactive media while connecting these strategies with what is currently being done to address these new challenges in higher education. Finally, limitations of the available research on this topic and the need for continued scholarship in this area are offered. To begin, operational definitions are provided to develop a common understanding of terminology, starting with user experience.

#### **What is User Experience?**

User experience (UX) was a term invented by Donald Norman in 1998 to describe the interaction with digital media. He suggested that, "...human interface and usability were too narrow. I wanted to cover all aspects of the person's experience with the system including industrial design graphics, the interface, the physical interaction, and the

manual” (Merholz, 2007, para. 2). Much of the research on UX identifies the purpose as creating a positive experience for users when using technology to achieve specific goals, usually referring to the use of interactive media (Krug, 2014; Garrett, 2011; Marchitto & Canas, 2011; Manresa-Yee, Ponsa, Varona, & Perales, 2010; Hassenzahl & Tractinsky, 2006). Zhou, Xu, & Jiao (2011) further these concepts by suggesting interactive media environments are dynamic spaces that are contextually dependent. This introduces cognitive and decision-making processing as well as affective responses of the user. As UX research has emerged by expanding usability to include more user response and perception, a user-centered design (UCD) is often suggested as a strategy for interactive media.

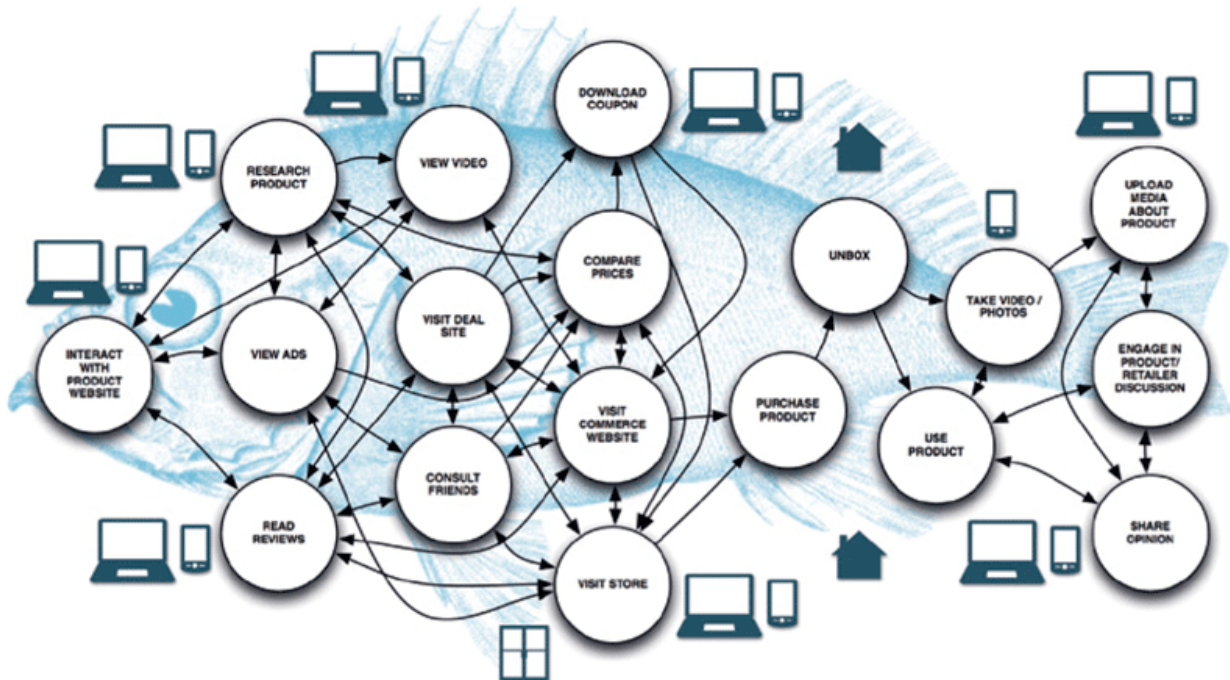
A UCD focus around interactive media goes beyond multimedia and enters in the emotions and perceptions of the person using the technology. “The goal of UX design is to create a seamless, simple, and useful interaction between a user and a product, whether it be hardware or software. User experience design focuses on creating interactions intended to meet or assist a user's goals and needs” (Riley, 2012). UX focuses on interpretations and ideas of the user as reality. Interfaces have evolved from simply clicking on things with which the users want to interact with, to now including multi-touch screens and gestures. Mobile technologies include natural, first person user interfaces that often integrate social aspects, which have the ability to connect learners who share similar prior knowledge regardless of their school, class, and grade level. This continued development of new ways of interacting with content on state-of-the-art devices used in daily lives has renewed the interest in the affective system and its interplay with cognition (Hassenzahl & Tractinsky, 2006).



It is important to differentiate between terms that are commonly used interchangeably when discussing new forms of media such as multimedia, digital media, and interactive media. *Multimedia* is viewed by Mayer (2009) in three ways: “the devices used to deliver an instructional message (i.e., the delivery media), the representational formats used to present the instructional message (i.e., the presentation modes), or the sense modalities the learner uses to receive the instructional message (i.e., sensory modalities)” (p. 7). *Digital media* is a term used to describe the new channels used to deliver multimedia over the Internet or another computer network (pcmag.com, n.d.). *Interactive media* “is the integration of *digital media* in a computerized environment that allows people to interact with the data” (England & Finney, 2011, p. 2). Additionally, Griffin, Morrison, and Sheehan (2009) propose that interactive media are no longer a “top-down,” mass media. These definitions highlight the subtle differences between terms in regard to moving forward with a UX perspective of interactive instructional technology.

Professional communicators are looking at how to connect with audiences using interactive media. UX with technology becomes important to communicate a message, engage with audiences, and have positive perceptions of the brand. Anderson (2008) suggested the increased technology and online applications create niche markets where users control the information they receive. He goes on to describe his idea of media fragmentation as “the long tail” of media. This concept highlights the number of choices people have for consuming media. For example, the Daily Show with John Stewart can be watched when it airs on broadcast television, online streaming, a clip on Facebook, or a podcast download. This reality puts into question traditional conceptions of mass

communications. Instead of a one-size-fits-all, one-way form of communication, mass media is adapting to a two-way communication environment that includes and integrates interactive, social, and mobile channels. Designers are taking a user-centered design (UCD) approach to developing interactive media. “UCD is about designing the total user experience consisting of all aspects of a product or services as perceived by users; and incorporating the most effective and efficient way of maximizing usage” (Sandler, 2010, p. 37). Mooney and Rollins’ (2008) purchasing fish model outlines the entire experience consumers have pre and post purchase. Audiences use the internet to research products looking at videos, reviews, ratings, and recommendations that are all generated by people other than the brand. Once the product has been purchased, audiences demand content and communication to support, share, and engage with other consumers as well as the



*Figure 2.1: Mooney and Rollins’ (2008) purchasing fish model*

brand. A dynamic purchasing path creates multiple media types where brand messages are received, interpreted, and shared. This requires the brand, company, or organization to actively participate with users and respond to their cognitive and affective needs. A digital environment creates a complex informational gathering process. A key point is that much of the information is not generated and passed on from the top-down, but rather a combination of multiple people and sources. As interactive media and mobile devices become commonplace on higher education campuses, a UX perspective is more important than ever to keep the focus on relevant content as students access instructional materials in a variety of different ways.

A UX perspective is made up of usability, visual design, interactivity, delivery modes, devices, and overall attitudes towards their own personal interaction with educational material. The challenge for educators is college students now come to school with multiple devices and mix together instructional technologies with all their media consumption habits. As students demand control over content in interactive environments, challenges emerge for instructional designers, professors, and administrators to provide positive experiences with instructional technology during their college education. Hassenzahl and Tractinsky (2006) call attention to the communications industry, which has been discussing UX for a while, but the academic research has been minimal. The result is a lack of theoretic frameworks and models to expand a UX perspective in education. The following uses cognitive and affective theories to begin building a framework for a UX perspective with interactive instructional technology in higher education.

## **Cognitive Processes and UX**

Cooper (1998) describes memory using the information-processing model that includes sensory, short-term, and long-term memories as modes used in the cognitive process. In 1974, Baddeley introduced a multicomponent framework identifying additional components focusing on the dynamic and integrated pieces making up human cognition (Baddeley, 2007). This dynamic process begins with perception of information depending on where a person's attention and focus is directed. Information is then processed in working memory. Formerly referred to as short-term memory, it was changed to working memory as research identified this area as actively handling information. Before working memory was conceptualized, it was simply referred to as a temporary storage space before information was stored in long-term memory. The model describes subsystems that make up working memory to include: "an attention control system – central executive – together with two subsidiary storage systems, the phonological loop and the visuospatial sketchpad" (Baddeley, 2007, p. 7). Generally speaking, the phonological loop handles verbal information, while the visuospatial sketchpad handles visual information. Later, the episodic buffer was added to the model, linking working memory with long-term memory. It attaches meaning to information from the phonological loop and visuospatial sketchpad. The governing component of this process is the central executive that makes decisions and functions as traffic cop, controlling the flow of information from the three slave systems previously mentioned. From working memory, information is learned, organized, and stored in long-term memory into schemata. Once information is in long-term memory, it then can go the other way and be retrieved from the schema by the episodic buffer. The buffer attaches

meaning and prior knowledge to the mix of information being processed in working memory as the cycle continues. While the human mind is conscious, this dynamic process is continuously processing, encoding, and retrieving various forms of information to and from working memory and long-term memory.

**Attention.** Attention is, arguably, one of the most important aspects of the cognitive process and, more specifically, to learning. Wettingham (2009) captured this idea by simply stating “if you don’t pay attention to something, you can’t learn it” (p. 43). He proposes that eliciting some type of emotional response with content helps memory, but is necessary for learning. An emotional response generally creates time for thinking and reflecting on material, which supports his idea that the residue of thought is memory.

Baddeley (2007) calls for more research around the study of emotions and motivation, specifically why we allocate working memory. One framework furthering this discussion is proposed by Shell et al. (2010), who integrate multiple theories as part of what they refer to as the Unified Learning Model (ULM). The ULM specifically links motivation directly to working memory and the task of learning. It is based on three principles involving working memory: 1) learning is a product of working memory allocation, 2) working memory’s capacity for allocation is affected by prior knowledge, and 3) working memory allocation is directed by motivation.

These concepts of memory directly inform how interactive media should be integrated in learning settings. When students are given time to think about the topic and spend time developing their own goals this will begin to instill self-regulated learning. Students gain confidence when they are invested in their goals and have the ability to

tackle challenges on their own. “Numerous researchers have shown that student learning can be enhanced if students are encouraged to employ self-regulated learning processes as they go about acquiring new skills” (Kitsanta et al., 2004, p. 270). If instructors are tasked with managing working memory, the extrinsic load factors must be kept to a minimum to keep the focus on the materials. Learning requires effort, but educators can take advantage of ULM techniques to motivate students, make materials more approachable, and ultimately facilitate a self-regulation in the student so they can challenge themselves to learn new things. Furthermore, the proper management of cognitive loads when using interactive instructional technology allows working memory to focus on the learning materials.

**Cognitive Load.** Cognitive load refers to the total amount of mental activity imposed on working memory at an instance in time. “Cognitive load theory has become one of the most influential theories in the area of instructional design and is widely accepted by instructional designers” (Rey & Buchwald, 2011, p. 33-34). This notion is evident in the number of elements an individual can attend to at one time. The background knowledge and familiarity of content will determine how much information that person can handle. The more schemas that develop, the more information a person can process effectively. Scheiter and Gerjets (2007) suggest cognitive overload results from too much information being sent to the learner without emphasis on important information. Furthermore, too much information in a multimedia presentation results in inefficient learning and a breakdown of information processing. Paivio’s dual coding theory purposes that information is encoded within the two different areas, verbal and visual (Bruning, Schraw, Norby, & Ronning, 2004). An excess amount of elements

bombarding either or both of these channels creates an overload of information that impairs learner's working memory, restricting the encoding of information into long-term memory (Mayer & Moreno, 2003).

Three types of cognitive load include intrinsic, extraneous, and germane cognitive loads (CL). Intrinsic load is considered unalterable because of its inherent level of difficulty regarding the instructional materials (Chandler & Sweller, 1991). Instructional designers are then tasked with attempting to reduce extraneous CL and increase germane CL. "Although both can be altered by instructional interventions, extraneous CL is the effort required to process poorly designed instruction, whereas germane CL is the effort that contributes to the construction of schemas. Appropriate instructional designs decrease extraneous CL, but increases germane CL; provided the total stays within the limits" (Kirschner, 2002, p. 4-5).

Mayer and Moreno (2003) propose nine techniques based on years of research providing common scenarios and solutions to challenges involving cognitive overload in multimedia. This is captured when they point out, "multimedia instruction should be designed in ways that minimize any unnecessary cognitive load" (Mayer & Moreno, 2003, p. 50). Learning requires active processing on the part of the learner where the two channels, verbal and visual, need to work efficiently to encode information. This leads to the idea that there is limited capacity in these channels to handle a certain amount of information until it overloads (Bruning, Schraw, Norby, & Ronning, 2004; Mayer & Moreno, 2003). The reduction of cognitive load using techniques such as weeding, signaling, pre-training, segmenting, off-loading, aligning, eliminating redundancy,

synchronizing, and individualizing all can improve learner acquisition of knowledge (Mayer & Moreno, 2003).

These concepts have created a basis for instructional designers to effectively integrate multimedia learning, but continued work is needed when introducing dynamic interactive media environments. Moreno and Mayer (2007) describe five types of "interactivity": dialoguing, controlling, manipulating, searching, and navigating. The first is *dialoguing* where the learner receives questions and answers or feedback based on their input. The second is *controlling* where the learner has control of the presentation. Third, *manipulating* is when learners can adjust parameters' elements and run simulations to see what happens. Fourth, *searching* allows learners to use keywords, queries, and terms to find new content based on these inputs. Last, is *navigating*, which is similar to controlling, but gives more power to the learner. These types of interaction have the potential for learners to access content in a non-linear way so the order in which content is processed may differ depending on the learner's navigation path. Additionally, Moreno and Mayer (2007) offer five design principles for interactive and multimodal instruction: guided activity, reflection, feedback, pacing, and pre-training. It is important to note all these principles do not cause learning, but are research-based principles to promote learning through the use of interactive, multimodal learning environments.

Van Gog, Paas, Marcus, Ares, and Sweller (2009) studied dynamic visualizations that include animations and videos. They found dynamic visualizations have mixed effects (e.g. both good and bad) when compared to static visualizations. Educators with students immersed in a dynamic and interactive world of media are a reality of a multi-device, multi-tasking demands, which result in a competition for attention. Van Gog et al.



(2009) call for further research to arrive at clear design guidelines for dynamic visualizations (p. 28). Furthermore, Sweller (2006) calls for additional research surrounding the reduction of extraneous and germane cognitive loads. He is concerned with inefficiencies when reducing germane load while intrinsic load is still high and will not get reduced until expertise is increased to open up sufficient working memory resources. All this provides a framework for UX with instructional technology to build on and include affective theories regarding user perceptions and emotions.

### **Cognitive UX Interplay with Affective Theories**

Affective theories of UX introduce unique, individual aspects of a person into the cognitive mix. Jenkins (1974) presented the idea of contextualism, which is important when discussing UX and working memory. Contextualism brings the personal into the cognitive process and begins the call to include prior knowledge, experiences, and events surrounding the individual. The events, context, prior knowledge, and experiences all contribute to how information is stored and retrieved. Bower (1981) explores the associative network theory of memory and emotion, specifically where the human mind organizes information in long-term memory in schemata. This network uses state-dependent memory and mood congruency where emotion plays a part in the processing, encoding, and retrieval of information. Emotions and prior knowledge help make connections with memories that influence perception and future associations.

In terms of UX, Marchitto and Canas (2011) take these ideas further by reducing the human experience with interactive media to include behavioral and emotional usability. Behavioral usability deals with efficiency, effectiveness, and satisfaction of the interaction where as emotional usability encompasses enjoyment, entertainment,

involvement, and personal stimulation. These make up UX to extend traditional usability with interactive media by including a user's psychological, sociological, and cultural experience.

Krug (2014) has proposed the idea of a reservoir of goodwill when looking at the usability of a website. Users start out with various levels of patience (goodwill) when interacting with a website and each problem they encounter lowers the level of that reservoir. Conversely, levels can increase when things work well. Depending on the user's reservoir of goodwill, bad experiences can drive them away from a website. Student perception and experience using the technology can affect what is learned regardless of the content. Additionally, outside of class mood and context does play a role when students are interacting with instructional technology. "When people have trouble using complicated pieces of technology: They blame themselves. They feel like they must have done something wrong" (Garrett, 2011, p. 10). This makes it important for interactive instructional technology to provide good UX and keep focus on content. All these aspects are complicated when instructors assign students to specific technologies as part of a course requirement. There is a saying that the best UX is when it goes unnoticed, which in an educational setting would keep attention on the learning materials, reducing extrinsic load.

Moreno and Mayer (2007) suggest the idea of goodwill extends into teaching and learning with interactive multimodal learning environments. The cognitive-affective theory of learning with media (CATLM) extends multimedia learning theory to include the ability to present the learner with instructional materials other than text and images. In other words, the user experience plays a role in the processing of information. The

CATLM introduces self-regulation and motivational aspects where student perceptions can influence the amount of time and effort on tasks (Artino, 2008). A positive UX with technology leading to a positive perception with both the materials and metacognition is an opportunity for instructional designers to increase germane cognitive load using interactive instructional technology.

### **Interactive Instructional Technology in Higher Education**

Noel-Levitz (2014) found that 90% of high school seniors have regular access to a mobile device. If college campuses are not already saturated with technology, then the demographics of future freshman classes will solidify any doubt about the adoption of technology. In turn, the title “digital native” has been given to contemporary students who grew up with digital technologies (Prensky, 2001). The idea of a “digital native” is a challenge for educators because of the variety of student backgrounds, comfort levels, preferences, and socio-economic situations in higher education. This label should not be used as a blanket term for all college students; however, many have been immersed with computers, video games, mobile phones, the Internet, and social media their entire lives. “Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach” (Prensky, 2001, p. 1). College students grow up learning outside of the classroom in an interactive, media rich environment. “The intersections of traditional media and newly emerging digital media, is where young people’s real and virtual communities intersect, making them both consumers and producers of media. This issue reaches beyond the media as text, to explore the world of Facebook, YouTube, and other lived spaces that our students – Millennials that they are – call home” (Luschen & Bogad, 2010, p. 451). Furthermore, a Nielsen Norman Group

study (2010) suggests kids as young as six are highly proficient, and kids as young as nine are as proficient as adults at using the Internet. Self-efficacy and media literacy are important aspect of learning and being able to have students grow their knowledge independently is a goal for educators. Educators have opportunities to leverage interactive instructional technology to reach more students and give them various ways to engage in learning materials that was simply not possible with traditional media.

The fact that younger generations are heavy users of a medium that gives access to an endless amount of information is remarkable, but also creates challenges. Instructional design in blended and distance learning environments is demanding because of the various environments in which students consume educational materials. Some students may interact with the materials at home on their desktop computer, while others may use their laptop at a coffee shop or a smartphone on a bench on campus. The question arises: What are optimal ways of producing lessons and content that facilitates effective learning in an interactive environment? “These may include decisions related to structure of course delivery, teacher-student communication, appropriate assignments, and activates that are conducive to online learning, and effective use of online resources” (Richmond & Cummings, 2005, p. 51).

As media developed – print, radio, and TV – education has sought ways to take advantage of them to *deliver* educational materials. “Deliver” is the significant word here. Similar to the communications industry, instructors must communicate *with* students when using interactive media as part of a course. Katz (2014) refers to the Internet as a “lean forward” medium where participants play an active role compared to traditional media (radio and television) that are considered “lean back” media with passive viewers.

These two broad categories of media highlight an important factor with educational media: student participation. Interactive media require new ways of teaching, but many instructors developed their skills in an all-text world (Ohler, 2009). Scardamalia and Bereiter (2006) describe the Internet as more than a simple information-gathering tool and email *delivery* system. They have suggested that it creates the first realistic way for students to connect with broader groups of learners and experts to build knowledge as part of the classroom experience. Taking this idea further, Scheiter and Gerjets (2007) propose, “interactive learning environments allow learners to manipulate the presentation of information that they contain” (p. 285). New interactive media including the Internet, mobile, and social media have all become two-way communication platforms where students are actively part of the process moving far beyond digital *delivery* of information. “Technology is not an end in itself” (Zawacki-Richter, 2009, p. 15), but as more institutions develop online courses and programs it is vital to explore the most effective, modern communication channels used to share content and how to properly engage students who use them. For example, it may be easy to create a course website now, but not being familiar with usability and information architecture issues on the web may result in a hard to use website making it more difficult to access content compared to a simple download through Blackboard. Taking a UX perspective will keep a user-centered focus during the course and the instructional design process.

Educators in higher education are exploring meaningful uses of interactive technology as part of the learning process. In an era with rapid change and development of new communications technologies it will continue to be important to integrate types of media with which college students spend much of their time. Much of interactive media

is now a two-way communication channel with students being an important part of the process. Terms like *blended learning* and *flipped classrooms* propose interesting ways to take advantage of digital technology. However, there is little research from the user (student) perspective, which is a vital piece of interactive media that, at the core, relies on the perception and participation of the users. Next is an exploration of components both cognitively and commutatively on aspects of UX with interactive media used in learning environments. These ideas impact traditional instruction, distance education, hybrid/blended classes, informal/self regulated learning, and motivation, which is why it is necessary to begin with how humans process information.

### **Moving Forward with a UX Perspective**

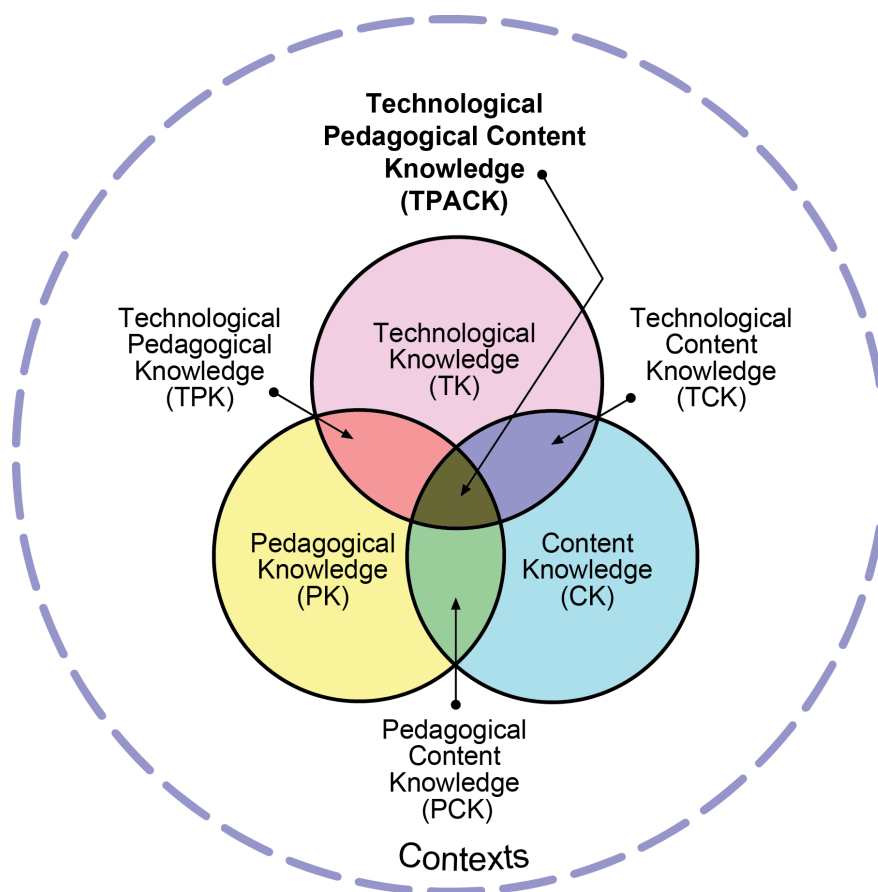
As online media consumption rises and student access to more devices to interact with content increases, the connection between education and mass communications becomes more interesting and necessary. Both industries are facing similar challenges that compete for attention and time. As a result of these realities, the combination of cognitive load theory and how the medium influences perception of content will provide a framework for using interactive instructional technology.

Kanuka and Anderson's (1998) application of a mass communications model to distance education discusses how students construct knowledge through five-stages: 1) sharing, 2) discussing inconsistency, 3) negotiating co-constructed knowledge 4) testing/modifying new knowledge, and 5) applying this co-constructed knowledge. Mass communications techniques can facilitate the creation of new knowledge. This provides interesting connection points to frame a discussion about the integration of mass

communications and pedagogy. Discussions about UX must be had as the media fragments and new technologies provide an endless number of information sources.

Traditional mass media are attempting to find ways to connect at a personal level using interactive and social media. The industry itself is questioning the term “mass communications.” Advertising agencies are embracing change and creatively thinking about the message and the medium. This reflects McLuhan’s (1964; 1995) idea of “the medium is the message” where the delivery method heavily influences how the message is perceived by the audience. Applying this to the cognitive perspectives outlined above requires an exploration of how the delivery mechanism affects learning and perceptions. Media fragmentation generates new delivery channels where users have multiple options, no matter how niche, that result in new challenges for instructional designers. Multiple devices, user preferences, and new platforms created by advancements in technology create a dynamic environment both in and out of class. Educators should look further into the parallels of how the communications industry is tackling challenges with interactive media to meet its objectives. Simple steps should begin with questions about how students would like to access content, which might help guide decisions about other media those materials are interactive with and how they are being delivered. A basic example is a course that requires video lectures online for students to review prior to class instructors. Can the videos be played on a mobile device? This does not mean every student will access the videos on their smartphone, but it is important to know if they play and how well. In this case, if the UX is bad, it runs the risk of turning students off to the subject simply by the perceptions based on the delivery regardless of the content in the video.

As media evolve and learning environments change, educators need to think of ways to effectively integrate these media types. They must be thinking of it from a user (student) perspective with interfaces and interactions in mind. This goes beyond simple usability issues to include UX concepts such as perception, context, environment, location, motivation, and prior knowledge. These issues affect learning and specifically impact working memory. Meaningful applications of these concepts are required to the rapidly changing media environment. This is not to say using the new technology for technology sake, but identifying ways it could measure, track, engage, expand, include, motivate and reward learners to interact with materials. Mishra and Koehler (2006) proposed the Technological Pedagogical Content Knowledge (TPACK)



*Figure 2.2: Mishra and Koehler TPACK Model*

*Reproduced by permission of the publisher, © 2012 by tpack.org*



model that discusses three main areas of integrating technology into the classroom. These areas include knowledge in content, pedagogy, and technology. There is little discussed about how users experience technology. This study looks closer at the circle surrounding the different types of knowledge. The contexts in which this model exists is a dynamic and fluid area. Adding a UX perspective to cognitive load theory provides a new and important point of view educators can use to integrate interactive instructional technology into their course, curriculum, and institution.

This study identifies the need for cognitive load theory to expand with the inclusion of UX ideas as interactive technology becomes more embedded into higher education courses and campus life. If current media used by students in their everyday life are considered interactive, then what does it mean to add digital, mobile, and social technologies to a college course? With the developments in media and technology usage, what are advantages and disadvantages for students using these devices in the learning process? If educators truly embrace a UX perspective, then a user's point-of-view of interactive instructional technology is needed. What are the student perceptions of interactive instructional technology in higher education? Furthermore, how can these perspectives inform the development, selection, and implementation of interactive instructional technology in higher education?

## CHAPTER 3

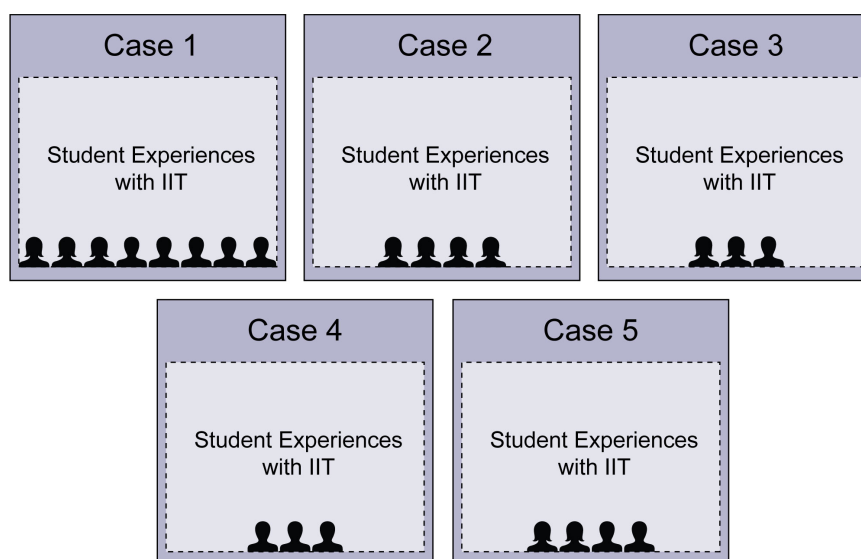
### Methodology

A case study approach to qualitative research is used in this study to describe lived experiences of participants. Philosophical assumptions provide a foundation for researchers when they are conceptualizing research designs, choosing qualitative methods, and selecting a specific approach (Babchuk & Badiee, 2010). These belief systems guide researchers during their projects and require a self-understanding of what it means to be an inquirer (Greene & Hall, 2010). Qualitative research is used in this study to develop an understanding of the challenges produced by interactive instructional technology through the lived experiences of participants.

A constructivist worldview is taken in this project to seek an understanding of the world we live in through multiple perspectives that are inductively understood by gathering and analyzing data from multiple sources to build a holistic view of the central phenomenon (Creswell, 2007). This form of inquiry is shaped from the bottom up from the perspectives of the participants that create themes and develop understandings (Creswell & Plano Clark, 2011). In qualitative research, the researcher acts as a human instrument to study a central phenomenon that seeks to explore areas of that topic (Saldana, 2011). UX at its core is defined to look at an individual's entire interaction with interactive media "as well as the thoughts, feelings, and perceptions that result from those interactions" (Tullis & Albert, 2008, p. 4). These multiple realities are used to explore emerging themes to gain a better understanding of the experience college students have with interactive instructional technology during their college career.

The case study approach in this project will use a multiple-case design. Multiple-case study design investigates numerous cases to develop an understanding into a central phenomenon (Yin, 2014; Creswell, 2007; Stake, 1995). This type of design is frequently used with new educational technology and innovation because of the lessons it provides to the theory of a social process (Yin, 2014). The result will be an in-depth exploration of the cases through rich descriptions of the groups' activities (Creswell, 2008). The cases being studied are students experiencing interactive instructional technology at a large Midwestern university. These experiences include face-to-face, blended, and online courses as well as institution websites that indirectly shape perceptions of their education. The cases represent multiple types of students to compare and contrast experiences to develop either literal replication or theoretical replication. The case is bound by the use of interactive instructional technology at the university under investigation. The lived experiences from the cases directly relate to the central phenomenon for this study.

Figure 3.1 illustrates the structure of the multiple-case design used in this study.



*Figure 3.1: Multiple-case design used in this study. Icons represent number and gender of participants in each case.*

### **Case Selection and Participant Sampling**

The research design was approved by the researcher's Institutional Review Board (IRB). Purposeful sampling was used in the study to identify potential participants (Creswell, 2007). Maximum variation was used to represent diverse experiences between participants to identify common patterns. Gender, race, and age provided diverse perspectives to study. Participating students had multiple experiences using interactive instructional technology as part of their undergraduate coursework depending on their major, year, and backgrounds. Access to the participants began with the researcher's personal and professional relationships at the university. Initial participant recruitment included open calls through university student organization email listservs and websites with a link to a simple online screening survey. Additionally, the researcher made in-person appearances in courses to recruit participants. Paper screening surveys were handed out to interested students [Appendix B]. Students who volunteered by completing the screening survey and who were at least 19 years old were contacted by email with a formal recruitment letter [Appendix C]. The email also included date, time, and location of their assigned focus group session. The screening survey was completed by 49 students. Four students were removed from the pool due to being younger than 19 years. From the 45 students who met the age criteria for the study, 22 chose to participate in the focus groups.

### **Data Collection**

As Creswell (2007) suggests, multiple types of data must be collected to converge on the central phenomenon and creativity is encouraged to include new forms of data types. Yin (2014) offers six types of information to collect for case study evidence:

1. Documents
2. Archival records
3. Interviews
4. Direct observations
5. Participant-observations
6. Physical artifacts

This study gathered multiple data types that include unconventional types to strengthen the narrative and add new perspectives. All data came from three major areas 1) focus group interviews, 2) learning environment observations, and 3) institutional resources. Figure 3.2 outlines the multiple types of information collected and sources used in this study based on Yin's (2014) list on data types.

	Documents	Archival Records	Interviews	Direct Observations	Participant Observations	Physical Artifacts
Focus Groups	X		X	X	X	X
Learning Environments				X		X
Institutional Resources	X					

*Figure 3.2: Data types and sources collected*

**Focus groups.** The primary source of data was collected through focus group sessions with college students. Creswell (2007) suggests focus groups are advantageous when interaction between interviewees will yield the best information and similar to each other. In this study, focus groups initiated conversation and ideas about student experiences with interactive instructional technology. All protocols were piloted with one

group of students that identified minor flaws in the survey and a few complications with the focus group protocol. The pilot data were not included. However, the notes gathered from the pilot session informed changes and additions to the protocols prior to data collection.

Multiple one-hour focus group sessions were scheduled with 22 students. Five focus groups were held with 3-8 participants in each session. Reminder emails were sent two days prior to their scheduled session. These sessions were held in a quiet focus group room or classroom located on the institution's campus. The rooms had a conference room setup, desktop computer, projector, and a whiteboard. Pizza, soda, and water were provided during the sessions. As the participants arrived, a consent form [Appendix D] and demographic, technology, and media usage survey [Appendix E] was distributed. The 22 participants were made up of 11 females and 11 males, the majority of which were seniors in college and an average age just over 21. The ethnicity of participants was comparable to the makeup of the University.

Most of the participants majored in some form of communications field such as advertising and public relations, journalism, broadcasting, and film. All of the students were active users of technology with various comfort levels. The mix of communications majors and technology experience allowed for the students to think critically about their experiences with interactive media as part of their college education during the focus groups. Appendix F provides an overview of the demographics of the student participants. The media and technology usage data is included in Appendix G, which provided a snapshot of habits and behaviors of the students. Once the survey was completed, the focus group session began with a group brainstorming session to list on a

whiteboard the technology students used in college. This helped students to start thinking about examples of technology used in higher education. A follow-up to this was an icebreaker activity where students were asked to draw a good and bad example of an interactive instructional technology using provided drawing supplies. Following 5-10 minutes of sketching, semi-structured sessions included a set of open-ended questions. Students shared with the group what they drew to generate and frame the conversation. The researcher facilitated the discussion by asking probing questions and guiding the interactions. They were asked questions to describe their experiences using technology during their college career. Do they have any say in using particular technologies? Is it mandatory? What advantages and disadvantages do they see with using interactive instructional technology? Appendix H provides the full focus group protocol used to facilitate discussion. Students were encouraged to show examples, describe experiences, and share thoughts during the session. At the end of the session, participants were thanked for their time and informed that they will be contacted at a later date for member checking.

**Learning environment observation.** Observational data was collected from informal learning environments that included public areas in the main university library and the student union. Using the observational protocol in Appendix I notes were taken during dead week and finals week. These weeks were selected because of the activity at this time of the semester where students are working on final projects and studying for final exams. The researcher also visited classrooms and other formal learning environments where instructional technology is heavily integrated on campus.

**Institutional resources.** As a result of the focus groups, participants were asked to share relevant materials and links to publically available resources. Additionally, UNL faculty and staff were informally asked to share similar resources the institution provides regarding interactive instructional technology and instructional design initiatives with technology at the university. The researcher received the following list of data types:

1. University websites
2. Instructional technology websites
3. Internal white papers and reports
4. Screenshots
5. Mobile Apps
6. Device / equipment lists

All these types and resources were reviewed in the context of the focus group discussions to get a clearer picture of the materials students use on a day-to-day basis.

### **Data Analysis**

Focus groups were video- and audio-recorded and transcribed by the author. [Appendix J] Data were then imported and coded using a qualitative software data analysis program, MAXQDA. The transcripts were in vivo-coded from individual cases and clustered into themes that emerged from the participant responses. A cross-case synthesis was then performed to aggregate data and themes across all the cases (Yin, 2014). The cross-case synthesis also merged in relevant artifacts gathered during the study, observations of learning environments, and analysis of institutional resources to provide richer descriptions. These findings were written into theme passages and organized to create a flowing narrative that describes student experiences with interactive



instructional technology in higher education. Pseudonyms were given in the report to protect the identity of the participants.

A narrative of emergent themes resulting from this study creates a better understanding of how students experience the integration of interactive instructional technology in higher education. The findings can inform instructional designers, professors, and administrators as they adopt more technology layers as part of the learning process. Exploration of viewpoints from a variety of perspectives help generate a discussion and better understanding that benefits the academic community by providing a model for educating college students using interactive media.

### **Validity**

Stake (1995) suggests data source triangulation as a validation strategy where observations and reporting carry the same meaning from multiple circumstances. Triangulation is used in this study between focus groups interviews, learning environment observations and analysis of institutional resources to provide evidence from multiple sources that present the same meaning. In addition to triangulation, member checking was used for validation of findings. Participants in the project should play an important role in case study findings (Creswell, 2007; Stake, 1995). A member check is used for validation by emailing participants a summary of findings soliciting their feedback and comments. Participant responses were then integrated into the findings for the final report. At the completion of the study, a letter and a copy of the final report was sent to those who participated in the study thanking them for their time.

**Reflexivity.** As the researcher of this study, I am also an assistant professor at the university in this paper. I am interested in developing strategies for effectively integrating

interactive instructional technology into higher education, starting with the academic environment in which I work. My professional background includes developing instructional technology and designing interactive products for clients. I am passionate about technology, but believe that poor strategies, applications, and design can negatively impact learning. Interactive media are altering dissemination, engagement, and ways we approach information. As a designer and interactive strategist, usability and UX are important concepts when developing technology. In turn, as technology continues to be adopted in college courses, part of the evaluation and measurement of success should include the user perspective. My background in communications, education, and technology grounds my thinking about media perspectives and strategies. Combined with concepts used in educational psychology this study informs the strategic integration of interactive media to effectively achieve learning objectives.

## CHAPTER 4

### Findings

The data collected suggest students have complex and robust views of their experiences with interactive instructional technology. Many accounts were shared ranging from happy, painful, surprising, and unusual experiences. Although there was no consensus on implementation of interactive instructional technology, students understand it is a changing environment and that they play an active role in shaping its use in higher education. Six emergent themes were developed from the focus groups:

1. Communication as Number One Priority with Interactive Instructional Technology
2. Line between Personal and Professional Lives using Interactive Instructional Technology
3. Interactive Instructional Technology Creates Layers of Separation
4. Familiarity with the Interactive Instructional Technology Used
5. Building Trust with Interactive Instructional Technology
6. Interactive Instructional Technology Always has Problems

Students point out *communication as the number one priority* when using interactive instructional technology for instruction and setting expectations. However, as more social media is adopted, the *line between personal and professional lives* is being blurred for better or worse. Technological advances introduce *layers of separation* between student and faculty, as well as student and course content, which all impact motivation. Students want faculty to have a *familiarity with the technology* that provides appropriate and natural interactivity with tools to aid their learning. In turn, this *builds trust* with their

interactions using interactive instructional technology that impacts education. There will *always be technology problems*, but students now need to actively solve problems when technology isn't working. The students in this study offer a number of suggestions and UX tools are provided to improve student experiences with interactive instructional technology. This chapter begins with what students described as the number one priority with interactive instructional technology: communication.

### **Communication as the Number One Priority with Interactive Instructional Technology**

*“Communication should be the number one priority. If technology is helping or hurting it that is what faculty need to look at first.” – Laura*

**Prioritizing communication.** Communication plays an important role in technology, social lives, and academic work for students. Social media, email, and various forms of chat are all collectively used, depending on the situation. Students use what they consider normal. Blackboard is usually easy to follow for announcements and course materials. Sara expressed that it is “helpful because you go to the course and the last thing the professor wanted you to know is in the announcements and easy to follow along.” A baseline of communication was expected for instruction and clarification on course activities. Laura pointed out that, “Communication is the one thing that needs to be there, whether it is through Blackboard or email.” Communication needs to be open between faculty and students.

However, there were preferences between ways to communicate among students. The communication tools considered “normal” were described with annoyance because

of the lack of immediacy and integration with their personal communication practices. Mary described, “the problem with Blackboard and even email is I don’t use it. I am sure you posted that 2 ½ weeks ago and I am sure you emailed me. ‘Oh there it is’.” If students aren’t using it, then it results in lack of awareness of where important materials are located and adds confusion to what is required of them. Email is debatable among students. Mixed feelings and usage make it daunting for many students. Dana describes, “Email is this really scary thing to me. It is something I hate, but everyone uses it. I hate when I have 15 emails in an hour.” She continues, “Email is really touchy-feely for me. Those with OCD don’t want a huge inbox. Things just get lost.” It is overwhelming having an inbox full of messages from different students and professors.

New technology creates questions simply because it is out of the norm for students. Alexandria describes the first couple of days of school where a professor was telling the class they didn’t have to buy the book; the textbook is online on a course website. “You just have to pay for the website. Some people were like ‘What?’ because they had already bought the textbook. It seems like the website has a lot of features that are unnecessary. I am still learning about it. It seems helpful because there are online videos and examples to help you, but our homework is online. It seems overwhelming when you look it and try and figure out where to click to do your homework.”

These examples highlight the variety of approaches and experiences students encounter while working with numerous professors who may use technology differently. Pam describes how she feels about this, “communication-wise on every level it is important that people are all on the same page of different communications systems.” However, this is muddled when taking into consideration all forms of communication

online. Mary points out, “If you are going to have multiple platforms, you have to follow through with all the platforms. If I see my professor create something on Facebook I expect that the documents I need will be on Facebook. I am not going to think ‘Oh I should go check the other two platforms.’ It is kind of a pain in the butt for them I realize, but then just tell me.” The runaround becomes nerve racking as things don’t work as expected. Alexandria quickly points out when things don’t work she “panics and then emails the teacher.” After panic sets in Dana jokingly replies, “You think about dropping out of school and changing my major. Then you let the teacher know.”

Many students described most professors provide multiple ways to contact them. Pam notes, “It is nice to have a teacher accessible on email or Facebook or Twitter or whatever. It is nice to have different options of getting a hold of them. Rather than emailing them and waiting for them to reply. Cause that is really annoying.” Pam mentions, “A lot of times they will give you their email, but they suck at emailing you back.” Mary immediately responds, “Or just emailing 50 more times and never hearing from them. [Group laughing]” Regardless of the technology used in a course it is important to communicate the expectations clearly and then follow through.

**Follow through.** Introducing additional technology and locations for learning materials produces more questions requiring professors to clearly communicate where and how students need to use these materials for class. As things move online, a more blended learning environment, timing becomes a point of concern for students. Online materials have the luxury for teachers to be posted easily and at anytime. However, clearly communicating where materials are available is vital. A few students outline this with the following interaction.

Dana: In one class we read from a specific website for all of our assignments. He posts all them, we read them and we have quizzes on them. Last week he posted a video Tuesday night we talked about Wednesday, but I had already done the readings Monday night so I didn't see the Tuesday night post. It gets to the point where if you are going to use technology you need to set a time limit on it. I ran into that a couple times and it is crucifying students who get their work done faster or earlier. "Oh well now I can't have this discussion because it seems like I didn't do it."

Emily: It helps if they send reminders when they do that.

Dana: It gets irritating when they email you "I posted this on Blackboard" and then you go to Blackboard or they attach it to the email or just like put it on Blackboard and we just know to look at Blackboard. Also, if they put an announcement on Blackboard you expect an email. Definitely establishing whether you are going to use email or Blackboard.

Mia: I think that is definitely helpful. Each professor is different in the way they use Blackboard and email. Some professors are super easy to contact by email and they respond right away. Others don't and just post things on Blackboard and don't email you. In a perfect world everyone would use Blackboard and email in a similar way, but that is not realistic. I think definitely agree with establishing how they plan to use it and following through.

Students are looking to professors for clearly communicated expectations and consistent use of technology when using Blackboard and email. Amber sums this up by saying, "They expect us to follow through on assignments so we expect them to follow through when we have questions."

**Professors don't use tech the same way students do.** Students have varying opinions about professors and the skills they had with technology. Some want professors to be more comfortable with certain technology and not just the basics. Matt mentions, "Professors think they are tech savvy so when they get their hands on something they are

like, “Oh yeah! I know how to use Blackboard.” Okay, get on our level and use Facebook. [Students laughing] You are already way behind.” Simply using technology is not enough, but rather thinking about how students use technology and adapting to their workflow is important.

A common stereotype about college is the library is where students live and study. However, the following interaction paints a more realistic picture:

Carl: How many times have you guys been to the library since you have been in school?

Solomon: One time, it was because I had to go there for a class.

Victor: I took a class.

Carl: This is my 6th year and I have never been there.

Solomon: I haven't checked out a book once.

Carl: That is just a time saver. Even if it takes 15 minutes to walk there, check a book out, and 15 minutes back you just save 30-40 minutes just Googling something. Technology in that way just is time efficient.

There is an expectation that things are available online. Guy mentions, “No one actually opens books. Professors don't realize that. You are using the Internet like you would otherwise but just so happens this was in a book once.” All these have an interface that mediates interaction with the majority of learning materials used in higher education. Not long ago the situation was very different. Popular belief still holds on to traditional notions of hours spent in the library pouring over books.

Students wanted professors to understand technology changes little things like page numbers. Solomon talks about an eBook he had for one course, “In class, we had to



find a page in the book. Our professor's book was different than the book we have. He was like, 'Okay, go to page 96.'" Instead of page numbers he thinks professors should start having students search for the content rather than relying on a page number in a particular printed book. Solomon was not upset, but rather provides this observation of some professors living in the past while not recognizing new ways of accessing information.

Dan describes, "Professors don't necessarily know how to use the technology in a way their students know how to use it or would in that situation." Understanding the technology is one thing, but knowing when and the correct way to use it is another. Alexandria talks about the nuances of each media type, "Each outlet is a little different. I think in general all of them are kind of awkward when you have classmates or teachers posting things that don't necessarily make sense...." The added complexity of a group coming together with different styles and approaches to using technology makes it a challenge.

### **Line between Personal and Professional Lives using Interactive Instructional Technology**

*"When it comes to the boundary of social networking and academics coming together is something a lot of students are uncomfortable with. Then for faculty to actually use it in a classroom setting is kind of weird to us." – Mia*

**Line between personal and professional.** The concept of good and bad experiences was something students struggle to articulate. The student sketches were meant as an icebreaker, but many describe the task as hard because it wasn't as straight forward as good and bad. Devin describes, "It was harder for me to distinguish between

good and bad because some things have both good and bad aspects. Like, this is good sometimes, but when it's over-used or not used then it turns bad." There are lots of variables students weighed and discussed as they drew examples. They realize there are pros and cons of using technology. Dana explains her thought process, "I picked Facebook groups, which I started them out as bad, but I realized that half of the time they are annoying, but they are good because you can connect with people easier to discuss class and a time when you can get together and work on a project of something. Then again all the notifications drive me crazy so I wrote.... 'Good god, make it stop.' Because it seems like I constantly get on Facebook. I get excited because I have notifications and it is about stuff for class." [Appendix L]

Many students are comfortable with social media and actively participate in at least one network. From the survey, participants all had Facebook and Twitter accounts, as well as a variety of other networks. Increasingly, these accounts are used as part of their academic work, which raises questions of boundaries between personal and academic lives of students.

**Setting boundaries.** Students enter into a larger discussion about the pros and cons of using social media for academic work. As the waters of communication with social media get muddier, Dana suggests, "Setting boundaries with technology. I have a teacher that follows me on Twitter right now and I really hate it. Not that I post obscene things on Twitter. It is just like, Twitter is a very: 'This is what is happening in my life right now' and it is like I don't want you to know I am watching the Olympics at 8pm at night."

Mia expands on this more, "when it comes to the boundary of social networking

and academics coming together is something a lot of students are uncomfortable with. Then for faculty to actually use it in a classroom setting is kind of weird to us.” As more technology is used, social media is continuously integrated into higher education. A professor’s comfort level with social media is important as this begins to tread on students’ territory. Dana expands on this, “You shouldn’t have your Twitter on private. It defeats the purpose.” She continues, “I think that social media should be the boundary. Just don’t do it. It is true we have much more of a substantiated presence online, but there is still a fine line between personal and professional. I don’t want my boss following me on Twitter. I think with professional workplaces we set boundaries we don’t set in school and we would probably benefit by setting those boundaries.”

**Part of our everyday lives.** Pam states she thinks technology is important “because technology is advancing quickly. It is something we all need to learn how to do because it is a part of our everyday lives. No matter what you do there is technology involved.” Students want to use technology, but question professors who cannot use it themselves. Additionally, students’ social media activity differs in usage and comfort. Social media is not a new thing, it is normal and a “more familiar environment” for many students. Devin went so far to say, “I can’t imagine group projects without Facebook. [Students agreeing] Because, I can’t imagine sending an email every time... I mean... no.” Social media is a defacto collaboration tool for schoolwork. Students highlight the benefits of social media as not having to try to track someone down because you can see if they have seen a message. Rory summarizes, “They don’t have to respond. They saw the information. You are good to go.” These types of interactions are seen as helpful to

know who is participating in the group online, thus holding individuals accountable for contributing to the project.

Students point to social media as being much more personal. Requests and messages felt like a person was directing the message to them. The following exchange outlines this thinking around the scenario of getting caught up from missing class:

Guy: If you sound really miserable. Like “This is pretty awkward, but I didn’t come to the class for four weeks...someone help me.” [Students laughing] I think that kind of thing would work in a Facebook group though. If you said, “I missed class today” then someone could comment. [Students agreeing]

Rory: Then you get an instant response.

Guy: Yeah, because, you are seeing someone’s face and you don’t have to go out of your way to send an email potentially to your entire class. It is just a more familiar environment.

Professors who assign social media must be comfortable using it because of the comfort level many students already have with the environment.

**You need to *Twitter*.** Professors must understand the technology patterns and tools available. Guy describes when professors say you need to be on Twitter or something patronizing like, “‘You need to Twitter.’ Why would you listen to that person? [Students laughing] I just don’t like being told we need to tweet when that is our turf.” Professors should be aware of ways students use technology and be comfortable enough talking about it in the correct context.

The pros of using social media is it is easier for students to communicate with each other, gives notifications where they spend a lot of their time, and is simple to use because it is part of their everyday life. The cons of using social media are the blending

of academic and social lives. There is concern around sharing their personal accounts with classmates and faculty. Laura expands on the downside of using one's own account when tweeting an event is that "it blows up everyone's timeline when you are tweeting about and frankly you don't care about either. It is 25 tweets within an hour and it is so annoying." Bill points out that he doesn't care for mandatory class Facebook groups, but thinks they are good for group projects. Mixed opinions create a challenging new dynamic where students spend a lot of time with a medium, but hesitant to use it for something that feels "weird." The following outlines the upsides and downsides of using social media as part of their academic work in college.

### *Upside of Social Media.*

**1. Checked regularly.** Students are active on Facebook along with other social media sites. Devin states, "I think everyone uses Facebook and you are on it all the time. So it is like, okay, I got a notification. I am in school and on Facebook at the same time. I am not on Blackboard all the time. I don't have my Blackboard app popped up..." The comparison to the learning management app from the university is telling about what is the best point of contact. Furthermore, professors have an opportunity to use what marketers call "pull tactics" to create content that entices users to follow them on social media. Mary provided an example of a "classes where the T.A., not the professor, started a private Facebook group I actually checked. When the documents were there I knew how to use it and how to get to it that made it so much easier. I know that is a really simple thing, but I think it makes a big difference."

**2. Alternative way to participate in class.** Many students point to examples of using social media as a good resource or supplemental course material. Sara points out, “you are already on Twitter and have to go find an article that goes along with what you are talking about in class. It forces you to read, be interested, and be interactive with the entire class.”

Students understand it helps their learning, but the participation is noticed by the teacher. Pam says, “if you see something you like or you think it is a good idea you can just use the hashtag and tweet it and the teacher will see it. I think that kind of stuff is good because it is interactive and a good way for students to be involved with their classes.” Furthermore, students point out it is best when the professor ties in the social media activity back into class. Victor explains: “It boosts people to want to actually go on Facebook and do stuff, because you are getting recognized for the work you put into class.”

**3. Ease of use.** Social media is simply easier to use than academic websites. Sara explains, “Facebook is good for group projects as opposed to Blackboard groups. In one class we always had to upload all of our work to blackboard and it just seemed like a hassle.” Students have spent hours using the tools and are familiar with features, functions, and capabilities. If they don’t know how to do something, they have an endless number of peers who can help them. Social media at its core is built around interaction between people. Solomon highlights this aspect when comparing Facebook and Blackboard discussions. “I think Facebook is

better than the discussion board on Blackboard. Pretty much Blackboard is just not good.”

***Downside of Social Media.***

**1. Lose Control of Social Identity Online.** Many students note the effects of having to post something on their social media accounts that is academically related. Dana captures this saying, “Yeah, I am going to lose a ton of followers if we are doing this for class.” Beyond the effects of their followers, students also describe the constant connectedness to class they feel from continuous notifications about a class. Matt sums it up in regards to being forced to join a large Facebook group for class, “ You get notifications all the time...”

**2. Lack of Faculty Understanding.** Faculty must be comfortable with technology they use as part of class, but also be comfortable understanding students’ use of technology as part of their learning. Mary describes a professor who “would wig out.” The class had a Facebook group going where we would talk about ideas and the things we were working on. “She got really mad about it. She said ‘Figure something else out.’ And we would say ‘Okay, what do you want us to do?’ And she would get mad because we didn’t know what she wanted us to do.”

**3. Concerns for privacy on the Internet.** Privacy is an issue with social media between students and faculty as well as their students and students. Emily points out concerns with sharing personal information with peers you may not know, “I had to use Vine and Instagram videos for class

assignments. I had to put the links on Blackboard and made me feel really weird like they were going to go through my stuff. I am sure they wouldn't, but it was still like 'Oh god there is my Instagram name. I hope they don't get drunk and creep me.' It is just putting it out there when you put personal information that could possibly affect their opinion of you. If they see that then that makes me nervous. Not that I have anything that would, but still."

### **Interactive Instructional Technology Creates Layers of Separation**

*"A lot of my friends have fallen behind in online classes. I think the extra layer of separation lets people put class on the backburner. Whenever you are showing up for tests, quizzes, or regular classes it is easier to hold yourself accountable." – Chad*

**Layers of separation.** Many students discuss online materials as more difficult because of the separation it has from the actual class. Chad describes, "A lot my friends have fallen behind in online classes. The extra layer of separation lets people put class on the backburner. Whenever you are showing up for tests, quizzes, or regular classes it is easier to hold yourself accountable." The content is not different, but where they sit to watch the lecture, when they block out time to review the course materials, or how to keep from getting distracted from other online things. The procrastination is outlined in this exchange,

Pam: I tried to make time during the week where I would only do that sort of thing, but if I had other stuff come up I would do that and it is like "Oh I will just do that later."

Mary: Yeah, not even important stuff.



Pam: Yeah, it was more like “I know it is going to be there so I will just do it later.” There is no deadline to read that stuff.

Mary: If blocking out time you mean three days before the test, to watch nine hours of lectures, then yeah I blocked out time.

The way content is delivered online becomes a point of discussion for students managing face-to-face, online, and blended courses, which all take advantage of digital materials as part of their instruction. By reducing the layers and using technology appropriately, faculty can make connections with students. This connection impacts how a course is managed from both a student and professor perspective.

**Zero interactivity.** Students understand at the end of the day it is their fault, but all of them look to professors to provide activities and assignments to keep them on task and interacting with course materials. Pam discusses, “With the online stuff, I don’t really like it because I procrastinate more. I know it is there for me to look at, whenever I want to look at it. I put it off which never really helps me out. I definitely prefer the actual classes.” Mary adds, “I realize it is completely my own fault, but as far as class is concerned I need something due every week to make me do the work.” When asking what types of things would be best, Matt offers a solution. “If there is more interaction I feel like that is the excitement within the class. If students are not intimidated by the professor and teaching methods, I feel like you are grasping more and it is more interesting to you and more valuable to you because it is making it somewhat your own.” As a result many students feel comfort with technology and packaging it in a way that is entertaining makes the course engaging and interactive.

Normally, professors would consider students to be lazy by putting off homework and work for class, but it is more complex. Devin expands on this, “I know it is hard for

online classes. You kind of have to do something like that, but when they are like four hours long [other students laughing] and the audio doesn't work on half of them." Rory adds, "And there is zero interactivity. You are literally just sitting there staring at your screen doing nothing."

Students look for ways to make connections with professors, specifically with online and digital materials. Many discuss videos they need to watch for class as long narrated PowerPoints. Pam illustrates this idea, "Those are really hard to watch because it kind of like a PowerPoint of just text and there is a really monotone voice. Just sit and stare at the computer and listen to that." Students are looking for something to grab them to want to pay attention and get interested. If a video starts off with a monotone, narrated PowerPoint presentation that says it is an hour long then they don't have much to look forward to, in terms of engagement.

If the content online isn't engaging the environment where they are watching, it will effect things as well. Matt talks about watching things online before class on his laptop. "Something happens in the environment and you get side tracked and looking all over the place except the PowerPoint itself because it is just so boring to watch. You can only stare at a white screen for so long before you're like 'Alright, I am going to do something else.'" As a result students begin to create strategies to make long drawn out things that aren't engaging shorter. Emily sums it up, "Yeah, I try to get out of watching the lectures." Engagement includes appropriate use of technology: delivery, length, and medium. Additionally, professors must demonstrate a genuine interest in what they are teaching to keep students' attention. It is very clear to students if the professor doesn't

want to be there. If that is the case then it is perceived as a waste of everyone's time and information.

**Three hours long, that is absurd.** Many of the students discuss recorded sessions straight to the web don't work because of length, but also as good because it is archived to return to before tests. Bill mentions he doesn't like videos because, "part of taking online courses is so you don't have to go to lecture, but it is basically like a lecture if it is a 60-minute YouTube video or PowerPoint." This resulted in skewed expectations. The question becomes: how much out of class time can be expected for students to listen to lectures and still complete the necessary homework? Mia mentions videos are "helpful when it is used in the right way, but when it is full lectures you are expected to use your extra time to watch them." Lengthy outside of class materials requires students to set up some type of routine.

Carl describes his routine for one online course. "I watched the online lectures every Tuesday and Thursday at 11:30 because it fit my schedule. I got a Husker hoagie and watched the video. It was convenient because then I could do it at my own pace, but still blocked out time." However, other students mentioned they want the online materials to be more to the point. Solomon describes how he asks himself, "Okay this is the material he is going to cover on the test and I would find myself fast forwarding through the lecture. Because he would make jokes. His jokes were funny I guess, but I don't want to hear that I just want to get the meat of the lecture."

The benefit of video lectures is students have the ability to set their own pace when things are online. Victor highlights that after an intense Computer Science course, "I can pause the videos and do the step then go to the next step. In class, while the

professor is doing it I don't necessarily feel comfortable stopping him and saying how do you do this, but with the video I can go back and catch it back.” This control allows students to find necessary information when completing homework on their own.

Students offer ideas to make the online videos better because most of them were raw lecture video simply posted online. The majority of the students say videos hover around an hour long. Solomon mentions, “Small chunks would be better, because if you are studying for the test. And you are like ‘I don't want to watch this entire lecture. I just want to get to this one piece.’ It would be nice to have smaller pieces or a shortcut to that area.”

Student perception of how the content is produced can affect motivation and let them decide whether to spend time on a subject. Being required to attend class makes students more accountable. One group describes this:

Amber: I am in one right now where everything is online. I find myself just listening to the last 10 seconds to see if I need to respond to anything. If I don't, I don't even listen to the slide. It is a three-hour presentation every week and I am not willing to sit through and listen to it. It is really difficult to focus when it is not someone standing in front of you.

Laura: You get shamed into paying attention in a classroom, otherwise at home you can be watching Netflix or doing something else. When you are in a lecture you have to pay attention because everyone else is judging you. Not just the teacher.

Amber: Yeah, they are normally three hours long.

Dan: Wow.

Laura: That is absurd.

Delivery methods do matter and are noticed by students. If attention is lacking, then the motivation may be negatively impacted by the format available to students. Students understand all courses offer materials online. Students shared experiences with four-hour long videos, audio that doesn't work, repetition of materials, and poor quality of visuals that are not readable. Guy adds, "It is always funny when it is someone else's slides, too. Like when it is another professor narrating your class. [Students agreeing] You feel like they didn't put any time into you." Students spend hours interacting, reading, and watching materials online. They see the production quality as a connection to professor motivation to teaching the course and the subject as a whole. Many students are looking for a connection with the professor to feel like they are learning from someone who genuinely cares about their learning.

**Couldn't have done it at my house.** Students consume learning materials in a variety of settings. George describes one course that had hour and a half long lectures to watch for class. "It was really hard for me to stay awake for them because I would do them at my desk or in bed right before bed. Not in a place where I can really focus. If I go to a lecture hall I am ready to take notes. But if I am at home already shutdown it is hard for me to get myself back in the school vibe."

Students describe multiple situations and environments where they watch videos or do homework online. Obvious places included home, dorms, or computer rooms. Rory described she would "banish anyone from the room." On the other end of the spectrum one exchange with students sums up the challenges and settings that are in play with online learning materials.

Matt: The library, so you don't get side tracked, quiet places. You're just fidgety because it is too long.

Guy: Today, I sat on a bench in Burnett Hall and watched a two-hour and 10-minute long computer science tutorial. [Students giggling and gasping “Oh my gosh”] There is just no way to do it. I couldn’t have done it at my house.

Sara: [Laughing] That is so long.

Matt: Was it comfortable?

Guy: No, but you can’t be comfortable...

Rory: That is probably what kept him awake. [Students laughing]

Bill: I get distracted by people walking back and forth.

Jokingly, the uncomfortable-ness of the actual chair and the length of the video are used as props to complete the assignments. Students actually select places based on comfort and distractions to set themselves up to complete the assignments. The mobile aspect caters to these types of choices by doing the assignments whenever they can. However, the length of the materials directly affects the mobile learning experience. Many of the students talk about watching videos and reviewing materials in public places such as hallways, hotel rooms, and computer labs. The reality is there is a ton of content online for students to work through outside of class. In turn, students expect materials to be digital and online to access information on the go.

**Educating each other.** Students noted that often they watch lectures as part of a group, which allowed them to talk among themselves during the video to ask questions and discuss concepts. Carl thought, “It is interesting, even though online courses are the most individualized version of taking the class, I was like; ‘I would rather do this with somebody.’ I watched it with my roommate every time so we could bounce ideas off of

each other. It was almost like having a class where you were allowed to talk the whole time.” Victor describes collaborative, team watching of online lectures as more comfortable. “What I like, let's say in a large class you don't typically feel comfortable asking questions versus me and a friend watching the videos. I could be like, ‘I really don't get this, can you explain.’ Whereas with a professor you don't want to be like ‘I really don't get what you are trying to teach me.’ So I really like that you can watch it with a friend and it isn't cheating, you are just educating each other.” The peer-to-peer learning makes things more relaxed and focused on trying to figure things out about the concepts, instead of what the professor thinks about them as a student.

Additionally, students discuss working together to figure out issues of collaboration using technology. Cloud technology has also become a central place for documents to be created and edited. Students express benefits in annotations and live-editing to make things move faster. Sara describes, “Google docs are so helpful. They are like magic. Especially for group projects you can just post anything and anyone can edit it. It just saves so much time.” This was echoed multiple times for the ease of use and time saved. However, all this requires students in the cohort to be comfortable or get comfortable with technology. Laura says, “It still surprises me at this level how many people don't have access to Google Drive or access to Dropbox or Facebook. I worked on a project with a senior that didn't have a Facebook account. I was like, ‘I don't know how to talk to you.’” This gap in experience with technology proves to be a point many students noticed on collaborative projects. As a result of the mobile learning environment advancing online students find ways to manage their courses using technology. George talks about being flexible, “It depends on what my group-mates use. So if we do

Facebook or Dropbox or Google Drive. I am never one of the guys that says, ‘We have to do this, that, or the other.’ I just kind of follow what everyone else thinks is the easiest. Then figure it out from there.”

### **Familiarity with the Interactive Instructional Technology Used**

*“Simple tech stuff, they (professors) are calling the technician to come in. That takes away 10 minutes of the class then they are trying to rush through the lecture because in their mind they have this amount of material to cover and they are going to cover it whether or not you get it.”*

– Victor

**Be familiar with tech you are using.** Technology issues not only waste time, but professors need to understand that the wasted time impacts the entire lesson. Professors need to understand the technology to efficiently run the class, but also be flexible enough to adjust as needed to allow students to grasp concepts during class. If technology does fail, having a backup plan is required as to give students the opportunity to learn. Students describe they often wait for technology to be fixed. Laura describes the wait as taking a hit to credibility. “It kind of shaves away the legitimacy of the lecture. If you can't even figure out how to make us learn that is beneficial and not a waste of everyone's time it kind of... I really think people do checkout, but I think it goes deeper. You kind of lose respect for the subject or how they are teaching it. That seems kind of harsh but...”

Students expect professors to be comfortable with technology and model the presentation of information using tech correctly. Rory says: “If they don't themselves want to become experts at whatever technology that they use, just have someone help them then. Don't waste our time fumbling around trying to figure it out. Either teach yourself or say to someone ‘Hey can you come click this button for me, I don't know



how to do it.” When things aren’t working Mia sums it up saying, “I feel like I am not learning anything and we are not being productive so that is a little frustrating.”

In class this becomes a display or test to see how comfortable the professor is with technology. Many students talk about the “update box” that pops up from time-to-time that throws professors off. Devin sarcastically points out, “Oh, an update box will pop up and that just throws them.... with the rest of the students responding, Ohhhhhhh [Laughing]. You’d think the world is ending when the update box comes up.” This small item is something all students had experienced. Bill elaborates how he doesn’t understand why professor struggle, “It is the end of the semester and it’s the 10<sup>th</sup> time it has popped up and they are just like ‘Oh what is this?’” Chad sums it up with, “It is the worst when you watch a teacher struggle at the front of the room with a projector or a computer.” He went on saying it is always the projector and seems so simple. Many students suggest a mandatory training on equipment in the classrooms they teach in to be comfortable with the technology.

Comfort with technology not only aids in the selection and use of technology, but also the ability to make a decision when not to use technology. Carl explains it is frustrating to waste 15-20 minutes because the technology doesn't work. “Especially, when it seems like if you simplify it all we could start class right on time.” George seconds this thought, “I would say less is more. Use what you know, but don’t try to complicate things.” Technology shouldn’t be used only because it is cool or hip, but rather because it is appropriate to a situation. Having professors comfortable when using the technology was important to the students. Laura mentions, “I definitely think sometimes they force more technology into a class than is necessary. It makes everything

more complicated.” This creates a lot of wasted time, but also highlights the differences between student and professor experiences with technology.

This requires professors to do research and experiment on their own to gain benefits from technology. Laura describes one professor who introduces different kinds of technologies as tools. “I have never heard of most of the things, but she has become the expert on them and she has done the research on it and she does it herself with every project. That shows respect for the technology and respect for our learning process because she is learning with us.” Modeling usage of technology in a professional manner for students sets those up, to not only be comfortable with technology for class, but also a professional world that is increasingly more digital.

Students want to feel confident with the professor’s ability to use appropriate technology because they don’t want to worry about it not working and affecting their grade. Chad talks about a high school teacher providing such guidance in how to take advantage of technology. “The teacher actually gave us a French story and encouraged us to use an online translator. It was weird because up to that point language teachers didn’t like Google Translate. However, when we actually went in and translated the whole thing it is tedious, but it helped us fill in the gaps a lot more. It helped to have a teacher have a game plan with how to pick and chose what technology was appropriate and when.” This guidance not only helps the students focus on the learning outcomes, but gave them strategies to use technology appropriately.

**More motivation if tech works.** Students discuss that when technology works well, there is potential to be more motivated. Victor describes a class that always had relevant information online. “It was always stuff that people were just generally

interested to see. We would actually want to go out and do stuff for this class.” On the flip side, technology also negatively impacts motivation for a course. As Emily simply puts it, “I will have more motivation for class if technology works well.”

Professors using new technology well can be motivating, but it also models professional uses of technology. Carl describes one professor who is really tech savvy. “Our entire class could have been super boring, but all of our assignments constituted a course blog that actually generated traffic. There was a tangible result.” Motivation to produce a project reaching beyond the course created the opportunity for students to excel.

Students want to keep up with technology and look to professors for guidance. Pam describes the motivation to continue to learn technology is not to fall behind. “When I look at older people like my parents, they see me using something and wonder how I can do it so well or so quickly. I never want to be like that, because I hate not knowing how to do something.” This competitive spirit is evident in the discussion around clickers in class. Rory sums it up by calling the results, “instant gratification.” She explains, “Seeing how many people got it right and wrong – you don’t want to be in the wrong category. [Students laughing]. It is nice to know if you got it right or wrong, right away. You don’t have to wait a week or two to find out the answers back.” Matt elaborates, “With the clickers, the first quiz was just hard, but encouraged me to read more material and grasp the concepts because I wanted to be prepared for those quizzes. It pushed me to apply some of those things outside of class.”

**Don’t fake it.** Students look at technology as being so ubiquitous there is an expectation of professors being comfortable with technology. This is measured and

evaluated by simple things as operating a computer in class, making videos full-screen, and posting grades online. They mention it isn't always the case. Rory points out, "It is refreshing to have a teacher that is technologically savvy." Sara agrees, "It should be something we expect, but it doesn't happen."

This notion of comfort is something that students evaluate right from the start of class. Devin explains, "I feel like I can walk into a class and be like 'Oh, I am going to know my grades.' Or 'Nope, I am not going to know my grades.'" These actions signal to the students a professor's level of comfort or interest in technology. Guy talks about how he feels some professors view technology, "A lot of them are forced into doing it and use it really reluctantly. I have professors who hate the fact that they have to use email."

Students explain content knowledge is equal to the comfort with technology. Matt says, "If they are going to be entitled as Doctor or Professor, you know, higher than us and they don't know how to use technology and you are just like, 'this is questionable.' [Students laughing]" Rory then adds, "They lose creditability at that point." Students recognize when professors don't have technology skills. Carl suggests, "Don't fake it, because we are going to know right away if the teacher is faking."

Students understand things change. Solomon points out, "I remember my freshman year, we didn't really use Blackboard the way they use it now. Now the primary source is Blackboard." Even in the course of one student's college education technology evolved so rapidly that it fundamentally changed the way courses were run and managed. Students have different levels of skills and experience the technologies in a much different way than the professors.

**One experience is all it takes.** The perception of value is something students express for technology to be used as part of their learning. Laura explains, “The value you get from something doesn't correlate with how much time was spent trying to get it to work. Sometimes it just feels like a big show for nothing.” Students see professors using technology because they think it is something they have to do rather than selecting appropriate applications for learning. Some disciplines require the most up-to-date technologies, which impacts student perception of instruction. Matt describes a web design course: “The professor was talking about the old stuff and how we are not going to focus on the mobile device and things like that. I am thinking why we are moving backwards when we could go forward.”

Mobile devices and interactive media are professionally thought as “lean-in media,” making it a space that is personal to the individual using the technology. This contrasts with older “lean-back media” where content is simply presented to the user (Katz, 2014). “I think it is helpful when used in the right way, but when it is full lectures online you are expected to use your extra time.” Mia explains her interest is based on, “how they present the information to me.” This gets at the idea that once it is online, the experience becomes very personal, compared to a lecture hall with hundreds of students.

Students understand the importance of technology, but are reluctant to be first adopters when it involves their grade. Emily mentions, “One experience is all it takes to ruin it.” Students recognize the importance of technology and being able to implement it into a course, but expect the professor to properly integrate it into the curriculum.

**Ask for help.** All the talk about technology leads to a discussion about helping professors out, if they are having issues in class. Laura clearly states, “It is awkward.” If

they do offer help, Amber says it is not something you immediately jump up and do. “I have suggested things to professors, but very hesitantly. You wait until the last option.” It might scare off some professors from using any type of technology by asking students for help. Chad describes, “Professors haven’t really tried to adapt to technology. They stay with what level their comfort level is at even if a higher level of technology might benefit the class.” Since students have years of experience learning and interacting using technology, they do have a particular expertise professors can use and learn from. Laura explains, “It is kind of awkward.” Students feel if they tell the teacher what to do then somehow that would impact their grade or insult the professor’s authority.

Rory is blunt when using technology as part of a class, “Just figure it out, man, or ask for help.” This explains a mentality unique to generations of students who have grown up with technology. It seems very logical for them to use these tools and get them to work to their advantage. Rory continues, “Professors have to assume every single student in that room knows more about whatever piece of technology used than you do.” Dana shares an example of how one professor took advantage of student expertise with technology.

“She taught us what she knew and the way that she knew it. We did individual projects where we brought forth new technology. We became the experts then taught the whole class. The professor got to teach what they are best at and we got to learn from our peers. I think that was really smart.”

Integration of technology is always a learning experience for everyone. Even though the professor wasn’t the technology expert, they get credit for allowing students to experiment and share techniques. Everyone is benefiting from the sharing of information.

## **Building Trust with Interactive Instructional Technology**

*“I can’t imagine having to research things before Google, because you get more up-to-date information instead of having to wait for a book to come out you can look it up online immediately.” – Mary*

**How can I trust you?** Students describe intense scenarios when technical issues put further pressure on them while turning in homework online. Alexandria spells it out, “You don’t want to be scared when you have online homework and you are like ‘Oh will it work this time?’” Alexandria elaborates, “Normally there is a deadline and it isn’t working all of a sudden. Frustrating.” Professors can build up credibility by creating good user experiences with technology. The confidence built with positive experiences will keep the students focused on the assignment rather than the technology.

Amber explains that when a professor doesn’t know how to answer a question about the technology they are using she asks herself, "Okay, now can I trust you to actually teach me this?" When asking if they notice the good technology when they are using it, the following was offered by one group:

Dana: I think so.

Mia: I do, but in a subtle way. Like I don’t get on and like “Yes this is a good website!” [Students laughing]. I don’t throw a party, but I think I realize when something is helpful when it comes to technology. I always assume that technology isn’t necessarily going to help what I am doing partly because I feel like I am not very good with technology. And because I know you can’t rely on it all the time. I think when it does help I notice it and I think to myself, “Well, that is nice.” But that is pretty much it.

Dana: That is a good question. I think it is definitely more noticeable when they are using technology horribly in class. It should supplement and it is easier to recognize in class if they are depending on it.

Confidence with technology is built over time, which starts with usability and organization of Blackboard. For some, there were positive experiences, and for others, it was still frustrating. Juan talks about how teachers and students see two different things when viewing a Blackboard course. He says, “I think it causes a lot of problems. I have had several classes where the teacher will say it should be somewhere and doesn’t appear that way to us.” Students are looking for things, and when they can’t find them, they spend too much time tracking it down. Some may email the professor, while others will continue to hunt until they give up. All scenarios end up wasting time because of software issues, which lowers trust in technology and the credibility of the professor.

**It is 2014.** Technology is viewed as making things more efficient to keep up with all of the demands on students. Victor says, “It makes you more efficient as a student. You can get a lot more done.” As a result of access anywhere and content available at anytime, this puts more burden on students to be responsible for accessing the content online and not get distracted by other forms of media. Technology is evaluated in many ways, but rooted in benefits and expectations. Sara describes one professor who uses an overhead projector and doesn’t post anything online. “It made you pay attention because I can’t get the notes from someone. I have to go to class. It was good in that aspect, but frustrating because nothing was online and you couldn’t go back and remember what he said unless you took really good notes.” Students describe that technology was not always required. Guy explains, “I don’t think people find classes any less interesting when technology is not being used. Technology is only interesting when it is being used in an innovative way.”



However, there are various expectations when using technology as part of a course. Chad talks about simply posting grades to Blackboard, “If a teacher doesn't post the grades in Blackboard, it really annoys me. I am like ‘It is 2014, the other 75% of my teachers are doing it and you are still using a piece of paper in your office.’ That is not hard.” Mary adds, “It makes it hard for everyone when the professors are on a different page from the students.”

Guy explains how some tools are viewed as a misuse of technology. He shares a story of an example for a music history course,

“We were required to buy a Rhapsody subscription. Which like who uses Rhapsody? [Students laughing]. What it is used for is to listen to the jazz songs, but they are all on YouTube and elsewhere on the Internet. The professor knows this. I suggested to the professor there are ways. There were people on the first day, like Real Player, what is this [Students laughing]. The professor’s response was a cop-out answer that some of the versions might not be the same.”

This illustrates the extra amount of technology is required of students to purchase as part of a course. Students want to make sure these additional expenses are tools that are used appropriately and are the most cost effective ways to aid their learning of a topic.

Furthermore, using obscure or outdated technology influences perception on the quality of instruction. Real Player and Rhapsody both made the students laugh simplify for being viewed as old and outdated.

**Structured organization.** Students manage courses and learning materials using various technologies. Figuring out the structure for each class gets easier the longer they are in college. Rory describes her ability to bounce from class to class during the semester, “Once you get into the class and figure out what the teacher is doing it is pretty easy to stay on track.” However, materials are expected to be accessible online or in a

digital format. This is seen as a time management issue, which is described in the follow interaction:

Rory: Yeah, actually having to go to the library to look things up.  
[Students laughing]

Devin: “I have to do what?” “This doesn’t come in an online article, gosh.”

Matt: “I have to find a book and it isn’t on Google? No thanks”

Rory: It takes way too much time. Everything is so much easier, accessible, just faster.

Matt: There so much to do in the day so a student isn’t going to sit all day in a library. They have jobs and things to do. Making things more accessible and quicker for a student to finish their work is that much easier.

In general, students describe Blackboard as relatively easy. Carl says, “A lot of the front end of Blackboard, the basics, are really user friendly.” However, more complex modules begin to see issues crop up. He continues, “When you start moving into discussion boards, taking tests, submitting assignments, that stuff is never taught so there is always tech problems. The teacher is assigning it and no one knows how to do it. Then everyone is late and they are mad.”

The issue with Blackboard isn’t black and white. Bill states by expressing, “It is tough to navigate when things are posted to Blackboard and figure out where the professor posted things.” Sara adds, “Yeah, is it in the course documents or assignments?” This issue of individual professors simply organizing materials differently requires students to “figure out” how the class is structured online and how the professor will or will not use Blackboard. Guy explains, “No one knows what the individual tabs

are for. Your syllabus will be somewhere in the course documents or maybe under syllabus. Your grades might exist or might never exist. Every professor has a different idea.” Rory adds, “There isn’t one standard operating procedure for how to use Blackboard. You have to get a feel for how this professor is going to use it. It doesn’t usually take very long. [Students agreeing] I think it is usually simple. ‘Okay, I got it.’ They are probably going to screw things up and put things here, but that is cool. I will figure it out.”

Although some students didn’t think it was a big deal switching from class to class on Blackboard they mention it takes a couple of weeks to get a feel for what the professor is going to do with Blackboard as part of the course. However, Devin points out for her, “It takes as long as the first assignment or test. ‘Okay where is the first assignment, where do I upload it, done?’”

As students progress during their college career they get better at navigating online learning tools and figuring out quickly how they will approach a course. Nevertheless, Solomon points out that as an incoming freshman it “would be kind of overwhelming to get 4-5 different syllabi and have to decipher all the information they have in them. I think it is a skill that you get better at over time.” Multiple setups, structures, and approaches to using Blackboard have the opportunity to create confusion. In terms of usability, students expect the interface and functionality to be intuitive. When asked if they need training or if the professor should spend more time with how-tos, the response was to make it simpler and easier to figure out. Devin provides an in-depth example of too much instruction and too much change.

“I have a class where literally she uploaded a document with step-by-step instructions for every chapter for every week. ‘First do this, click here,

then click there, then click here.’ It was different every time. ‘First do this. When you are done with that, complete this, which is located here. Then this, which is located here.’ That was just a drag. Thank goodness I had a huge desktop computer so I could put the instructions up here and work on it over here. It wasn’t the same material, but the way we were learning changed every week so instead of new and exciting to me it was just ‘Oh my god, I have to learn how to do this again.’”

**You have to sacrifice a lamb.** Dependency on technology is noticeable at the course level, but also at the institutional level. An internal site at the university helps students manage their student account, register for classes, pay their student bill, and other non-course related degree management items. However, this influences their perception of the institution from the interaction with a website. Amber mentions, “I have to force myself to not click the back button in MyRed. Everything comes up as a separate popup thing and if you hit back you sign out of MyRed. It is like you have to consciously tell yourself, ‘Do not hit that button and things like that.’ The most used feature in a browser you can’t touch.” Students end up developing special behaviors just to get websites to work. Dan explains, “There are things in MyRed I have done a hundred times and I never remember how to do it when I go back in to it. Every time I have to re-learn it. You have to turn off your pop-up blocker to pay your bill. [Students groaning and agreeing].” Laura adds, “You have to sacrifice a lamb to get your unofficial transcripts. It should not be that hard. [Students laughing]” Students expect things to be simple if they are available online. This website illustrates how a required website multiples the frustration because there are no other options where students can find their own way.

Students point out usability issues that make it difficult to focus on the tasks and learning required of them at the course level. Pam describes a Spanish class website, “It

had so much stuff inside of other stuff. It was a matter of looking around the website. It could have been just a website issue where it wasn't designed for students." Additionally, some courses use other learning management software or add-ons as part of their course. Victor describes a computer science course, "They used Blackboard, but when you went to Blackboard it is a link to something else. It was really confusing. I felt like that wasn't properly explained in class and I had to seek outside help to figure out how to hand in assignments because the normal way of handing in assignments for regular classes was not the way I handed in assignments in that class."

Many students describe frustrations with institution websites. They acknowledge it is better to have things online than not at all, but share many examples of times they struggled to complete simple tasks. They highlight confusing, impossible, and frustrating examples with one student describing interactions with one site as "a kamikaze mission." Students agree it is noticeable when jumping from websites like Facebook and Twitter to academic websites. George, points out, "I don't mind going on Facebook, but if I have to go on MyRed or Blackboard it is like a chore." Which Laura follows up, "Yeah, you have to pump yourself up to do it. [Students laughing]."

Usability issues caused by the technology are especially critical to online assessment. Emily describes, "For my really bad one I drew an online test that you can take in the testing center or you can take them on your laptop depending on the class. One of my classes I could take them on my laptop and it was constantly kicking me off the server and it was saying the server timed-out and I would be in the middle of the test."

[Appendix L]

However, having students spend time with a website and creating friction for them to experience creates opportunities for learning. George talks about a website where he became a food detective as part of a course. “It wasn’t designed the best, but it was still interesting to go through. It probably taught me the most in the class, even though it was a little frustrating. I think overall it was the time commitment, because you had to do it for a certain amount of time because it tracks you.” Students understand there is a difference between educational materials and their normal media consumption, but still look for good experience regardless of the purpose. This boils down to not what the technology was, but how it is used as part of the class. The students summed up the strategy professors should use when using technology into one word: consistency.

**Be consistent.** Devin explains, “Teachers don’t have to use every possible technology out there. Stick with what they know and the class will go smoothly. Be consistent.” Overcomplicating things gets frustrating and creates additional pitfalls for students. Professors can make it easier by keeping things consistent and providing structure for materials. Devin describes how-to videos for assignments as part of a course, each assignment was different for no apparent reason. She says, “If it was the same every time I could have gotten it done faster and still learn the same information.” Consistency with technology provides guidance for students to focus on the learning objectives.

When things are different students look for an outline or guidelines of how tech will be used. Emily likes when professors direct her to where she should be paying attention so she doesn’t have to worry about technology or miscommunication affecting her grade. Statements like “Always look for assignments on Blackboard.” or “I will give

you assignments in class.” make things clear for her. Simply being consistent with communication and organization goes a long way when using technology as part of a course.

Professors need to understand technology requires troubleshooting skills and a mentality to figure things out to be able to use and make decisions around their value. Students have expertise in this, but not in the content. Finding ways to learn from their experience is important to understand how they approach technology, which inevitably requires troubleshooting skills to function effectively in a digital world.

### **Interactive Instructional Technology Always has Problems**

*“If I am expected to troubleshoot something because, that is kind of where we are now-a-days, if something doesn't work you are expected to figure it out. If they (professors) can't troubleshoot it and they only know the bare minimum then when something messes up, inevitably time will be wasted.” – Carl*

**Always tech problems.** Students are now asked and required to identify, react, and fix things as technology has been incorporated as an integral part of their education. These troubleshooting skills are now a core skill for students to be comfortable using technology in college. The risk of not being able to make things work with technology, either on your own, finding a friend who can help, or contacting a professor, could directly impact their grade in a course. Alexandria explains how her class struggled with one site they had to use for a course, “It wouldn't work on Chrome so some just didn't do the first homework assignment which was a really big grade. Then when they got to class is when they figured out it only worked on Internet Explorer.”

Students admit to procrastinating as well as pointing out they are learning how to manage everything. They mention that professors get mad if things are late no matter what the cause. Carl says, “There are always tech problems.” When professors aren’t familiar with the technology it is frustrating because things still are due. Victor puts this, “It is like the blind leading the blind then. It feels like a lot of the time a lot of the professors expect you to figure it out and if you can't figure it out then it is your bad luck.”

**Must figure things out.** Students feel if the professor is going to use technology they should be comfortable with it. Carl takes this concept further by venting, “Professors almost need to be more than comfortable. If I am expected to troubleshoot something because, that is kind of where we are now-a-days, if something doesn't work you are expected to figure it out. If they (professors) can't troubleshoot it and they only know the bare minimum then when something messes up, inevitably time will be wasted. I didn't know I was so upset about this, but I guess I am upset about it.” Students develop ways to cope with technology challenges beginning by checking with classmates and friends. This peer-to-peer approach to tackle issues with technology becomes invaluable as students become busier and technology more complex.

Dana explains her experience working on campus helping others with technology has given her tools to approach problems. She describes a strategy she uses, “I try different browsers. I always assume it is ‘me’ and not the technology. I check with other people first before I go to the professor. I always double-check everything.” This illustrates a usability concept where users blame themselves if something doesn’t work. Unfortunately, students generally have no options other than to figure it out and make it



work. In this case, Dana has figured out it could be as simple as the browser or her computer. Checking with others in the class also helps her cross off potential issues before contacting the professor.

However, students point out some professors put the onus on them to figure things out if technology doesn't work. Mary talks about a course where technology wasn't working so the students began a Facebook page. The professor was uncomfortable with that and told them to "figure something else out." Mary explained when they asked the professor for guidance the response was, "you guys are all seniors, how do you not know this?" This requires the professor to be involved with the technology used as part of the course because students need to feel comfortable completing the work.

Communication makes it clear how technology is going to be used as part of a course. Chad mentions, "One of my teachers this semester informed us after four weeks when someone finally asked 'We have been taking quizzes and we just took a test and nothing is on Blackboard.' She said, 'Oh, I don't really use Blackboard.' It is frustrating because she put it on us when she said, "Well you are intelligent college students you guys can guess at your grades." Putting the responsibility on the student is not uncommon in college, but professors must be comfortable with technology to perform basic functions so the student focus is on learning and not guessing at their grades. Pam responds to the standard answers of "you are intelligent college students" with, "They say that about everything. All professor do."

**That isn't the simplest way, I am figuring out something else.** Students find ways to use the technology they are comfortable with so much so that they will convert materials to formats that make it easier for them. Bill explains, "If professor posts a PDF

or Word.doc. I always go and export a PDF. It is just easier to open.” It was hard to determine if students thought this was a better process for them to work with the file or simply superstition, thinking this is how it works. Some students go out of their way to find ways to get around things that don’t work technically or are considered a waste of time. Emily says, “I try to find ways to get around it and some of my friends have past tests so I study those rather than watching lectures. Because they were like an hour-ish.” They are looking for efficient ways to consume the material rather than putting in the time.

Online materials give students the ability to focus on only what is perceived as important materials. Solomon goes on to describe that he is looking for the simplest way to do things. A recent course he took had an eBook. “For me as soon as technology is presented I am going to figure out a different way to do this. That is where my mind goes to.” Carl agrees, “My first thought is, ‘Is this the simplest way to do it?’ Like, ‘That is not simple, I am figuring out something else.’” Much of the discussion is how to make content and materials work for the students on their own terms. They figure ways to make things function the way they think it should work. However, this is not always possible because of timing or certain technologies required by a course.

Although many of these applications are for group work they are also used individually. Devin mentions she relies on, “Google docs a lot, especially for note taking. I will have one big doc for notes for each class so I can go back and look.” Rory on the other had uses, “the notepad feature on Mac all the time. For each class I have a different note.” Carl put it simply when evaluating technology to use as part of a course to manage information. “It comes down to simplicity and quickness for everything.”

**It is going to be okay.** Email is used for interesting things that are not efficient. Alexandria says she emails all her assignments to herself to make sure she has them. When asked why she does this, her response was unclear. She says, “I don’t know. I think my friends hate email and when teachers email me, it is so permanent. But I use email so I know I have it from anywhere; I don’t have to bring a flash drive. It is just on email.” This notion of wanting to make sure work is backed up and accessibly is important to students, but using email may cause confusion when combined with course communications. As previously outlined, many students are taking advantage of cloud storage options to keep their file storage and communications separated. It is up to the student to stay organized and develop a workflow that is efficient for them.

With all the pressure to complete assignments and tests online students are looking for guidance and expertise from the professors. Alexandria points out, “It makes you feel more comfortable in the first couple days if the teacher says they have used this website or whatever program and they know what it is like and won’t be like you ask them a question and they say ‘I don’t know, you figure it out.’” Some professors have found ways to make this work. George says, “I had a class where we had Blackboard discussions and there was one person in the class who didn’t know how to do it and they took the time to explain it.”

Students who feel they are inadequately prepared for using technology will find other places online for information. Many of the students talk about going to YouTube and Googling for tutorials or answers to technology questions. Victor explains this concept further, “I always give the teacher the benefit of the doubt. When I can't figure it out then I will go and YouTube and Google that is how I typically come across new ways

of doing stuff.” Pam thinks there is always room for learning more about technology. Having a time or place where students can get help beyond classmates and their professor is a good idea. “I think it is good for students to go learn things that they might need in the future or for any classes they are currently taking.” This type of space is an opportunity to bridge the gap on any misunderstands between students and professors in terms of technology.

In summary, students point out *communication as the number one priority* when using interactive instructional technology. However, as more social media is adopted, the *line between personal and professional lives* is being blurred for better or worse. Technological advances introduce *layers of separation* between student and faculty, as well as student and course content, which all impact motivation. Students want faculty to have a *familiarity with the technology* that provides appropriate and natural interactivity with tools to aid their learning. In turn, this *builds trust* with their interactions using interactive instructional technology that impacts education. There will *always be technology problems*, but students now need to actively solve problems when technology isn't working.

## CHAPTER 5

### Discussion

The purpose of this qualitative case study was to describe the experiences with interactive instructional technology from the perspective of college students. It is obvious from the focus groups that technology is integrated into every part of higher education, for personal, academic, and administrative purposes. The media usage survey pointed out that all the students use and rely on technology as part of their college education. This was backed up by the conversations with the students when they say, “I can’t imagine going to school without the internet and technology.” It is important to understand the way media, information, and technologies are used by students to interact with the world around them and each other.

The fundamental ways students access information and consume media are drastically different from a decade ago. This is well documented and continues to evolve, but college is no longer isolated with overnights in the library, carrying around heavy books, and listening to lectures. It is now in the same space as all media – online, interactive, mobile, social, and real-time. This requires universities, departments, and professors to find ways to make learning environments authentic to the world in which our students live.

From the focus groups, students made it clear that all classes, no matter distance or face-to-face, are blended in nature. In-person classes all have required tutorials, lectures, or materials to access online outside of class. Online courses now have the capabilities to incorporate in-person interactions using tools like Google Hangouts, Adobe Connect, Facetime, and Skype.

All these options are used by professors in various forms as part of their teaching in every format. Students shared many of these experiences, good and bad. In very candid and honest discussions, it boiled down to their expectation that technology used as part of college should work. The sweet spot for teaching with technology is the intersection of all three types of knowledge from Mishra and Koehler's (2006) TPACK model that includes: content, pedagogy, and technical knowledge. However, this model is not static. As the context of the TPACK model continues to grow, it requires teachers to have their core technology skills increase. Students understand things change and professors have various levels of comfort with technology. Nevertheless, it is up to the professor to find ways to make it work on an individual level for students.

Digital media creates competition for attention, but also creates extraneous loads through the access, organization, and interaction of learning materials. As cognitive load theory (Moreno & Mayer, 2007; Sweller, 2006) outlines, professors need to keep this in mind as an added challenge for lowering extraneous load. We need to find ways to grab the attention of students and have them intrinsically motivated to focus on learning materials. The more seamless we make the learning experience with digital media, the more opportunities students will have to focus on learning.

Extraneous load increases with the amount of technology and troubleshooting to get things to work, following lectures online, working with multiple file types, using various interfaces, and turning assignments in correctly. These extra layers result in the focus taken away from learning materials for courses. Whitenon (2013) calls for us to minimize cognitive load to maximize usability. Imagine a student's workspace when they are working on a paper. Laptop going with multiple browser tabs opened with readings

and Google Docs. Continuous Googling occurs for information to include in their project. Then their phone within arm's reach to stay connected to others via text, social media, email, and other notifications throughout the study session. All of these are demands on cognitive load, instructional designers must keep extraneous loads as low as possible by making the interfaces and experiences as simple as possible.

Audience engagement with interactive media is important so capturing student's attention is equally as important in class, but even more important outside of class with online materials. The time competes with all their other media habits and devices so engagement plays a greater role in learning.

Adopting a UX perspective to teaching becomes more important to realize and fully appreciate how mobile, social, technology and communicating online is part of many students' DNA. It is part of communication, thus making teaching a communication challenge. Communication involves media and properly using these channels to engage students. Educators have the opportunity to use practices from communication professionals. This starts with understanding the audience and finding ways to creatively connect with them so messages are communicated in a meaningful and memorable way.

The goal for faculty is to have a comfort level with interactive instructional technology to clearly and effectively communicate with students about instructions and setting expectations. Using a professional communicator's approach, professors can focus on how to reach an audience, communicate with them, and create relationships that build trust. Faculty must have confidence with multiple types of knowledge: content, teaching, and technology, to truly be effective in the minds of students.

**Evolving environments.** McLuhan's concept of the medium being the message begins to frame the challenge for educators. He explains the idea further, "It is the environment that changes people, not the technology" (McLuhan, 1974). This is a crucial concept to approaching the rapid changes in technology and how students use it in every aspect of their lives. McLuhan outlined how the environment changed people by talking about the invention of the automobile. The automobile itself was an innovative piece of technology, but the environment created around it is what had the biggest impact on people. Automobiles brought and connected highways, rest stops, hotels, gas stations, and expanded the American persona of living free with the ability to go anywhere. This harkens back to the very definition of interactive media which "is the integration of digital media in a computerized environment that allows people to interact with the data" (England & Finney, 2011, p. 2). This change in environment is expanded with the advent of the Internet. It has created the web, social media, smartphones, and many other digital innovations. Amazon, Facebook, online banking, the iPhone, and Google all have had huge effects on day-to-day lives, and most students can't imagine and haven't lived in a world without these giants. Even in the current rich media, technology heavy environment we live in now, it is far from solidified. New technology such as wearables, virtual reality, 3D printing, and holograms all are positioned to disrupt higher education in the near future.

These innovations have rapidly been adopted and are still relatively young, making it a necessary challenge for higher education to continue to tackle. A UX perspective allows for educators to focus on the environment created by technology. Students have hours of using their own, as well as academic technology, so professors



can learn from them just as web designers learn for their users. The goal is to make things easier to complete and learn from people who have these experiences.

This is evident by the discussion students had around social media. The mixed feelings about using social media for anything other than socializing was something students struggled to articulate whether it was good or bad. When the personal and the professional are mixed, students described as having to always be “on” without anytime to relax. Too many notifications make it hard to just ignore. Educators generally see using social media as an opportunity to connect with students in an environment where they spend time. Higher education must find a balance between convenient ways of connecting with students while not being intrusive. This is something professional communicators are struggling with as well. How much communication is too much, to where it becomes annoying? This gets into the idea of push vs. pull marketing tactics. Social media and mobile apps are such a personal space it is up to the communicator to provide relevant and beneficial content so the audience is motivated to receive the message. Too much of it is perceived as intrusive, whereas too little of it might get the message lost.

The personal and professional lives of everyone have blended over the past few years. However, college students are documenting and sharing their lives with their peers. Now in college there is an expectation to incorporate school into their personal life. From the focus groups the students who didn't mind being open weren't affected by the incorporation of social media into college classes. However, the transition from a youth to an adult is being captured and archived online. All college experiences have students

learn a subject area, but they also learn how to grow up. Their social lives online are also going through this transition.

**New technology, new skills.** Furthermore, the environment now requires students to not only be comfortable using technology to learn, but to have the ability to troubleshoot things if things go wrong. Troubleshooting is the norm. Troubleshooting technology is part of education now. For example, students talked about taking tests and turning assignments in online. As always there are stresses to meet deadlines and complete an exam. However, imagine relying on technology to hand in assignments or take an exam. Things are fine if things work, but confidence is broken when things are ambiguous or don't work as the user expects. In terms of usability, when things don't work users blame themselves, which makes them feel stupid (Krug, 2014; Garrett, 2011). After bad experiences, confidence is shaky, adding more stress for students, which has nothing to do with knowledge of course content.

Students are skeptical and pessimistic using interactive instructional technology from a history of poor uses, non-functioning features, and no training. They discussed that it would be good to have a little training on new technology to keep frustration down. This would help them get started, but also demonstrate the professor is aware of how to make the technology work. Moreno and Mayer (2007) highlighted pre-training as important to learning for similar reasons. This builds confidence in not only the professor's comfort level, but also trust that the technology works as intended.

As the Dahlstrom, Walker, and Dziuban (2013) EDUCAUSE survey found, students looking for guidance from faculty in using technology as part of their learning. Furthermore, the findings from the focus groups from the current study supports the

EDUCAUSE results that students are comfortable with technology, but lack the knowledge how to take advantage of it during their coursework. The dilemma is students have experience using and developing ways to embed technology into their lives where faculty have not lived through these developments in the same ways. Mentorship and connections between student and teacher are generally latent effects of a college education. The use of technology is an individual expression of a professor's pedagogical approach. Living in a digital age requires it and is part of the experience in higher education. Many professors inherit courses or courses are scaled up to be mass offered, leaving it up to the professor to become comfortable with what is given, or modify as needed. Additionally, students mentioned how this can impact their motivation and learning. At the end of the day, students look to professors for guidance and expertise. Poor uses of technology hinder that persona, for better or worse.

**Next steps.** We are in a period of trial, experimentation, and transition to integrate approaches with interactive media to education, which raises more questions than answers. How many extra resources should professors provide? Students discussed a lot of professors would post lectures as well as have class time. Should instruction lean so heavily on the ability to just post the lecture and have students watch it later or before class? Does this double their time spent on class? Does it hold students more accountable for knowing the material? Or are professors being unrealistic by not respecting the students' time and expecting them to figure out how to self-regulate? Students expressed pain, surprise, frustration, joy, and relief by having the lectures provided online as part of a face-to-face course. As professors are we doing a bait and switch? One student talked about specifically signing up for F2F courses because she didn't want to watch online

lectures. We have the tools to access an unlimited number of resources, knowledge, and expertise on subjects for courses. It is up to the professor to distill it down to relevant materials that effectively and efficiently communicate those concepts. Extra material muddies the water, but could help high functioning students dig deeper.

Technology is ubiquitous in all aspects of life, but the findings of this study indicate it is still something students notice in educational settings. Furthermore, many have thought about this and notice it as it is happening: watching professors struggle making a video full screen, seeing professors confused by software update notifications, and sitting through long narrated PowerPoints. These are what students consider the very basics of using technology in an appropriate manner. Much like the user interface of any type of design, bad experiences are easier to notice and recall, which highlights the importance of being comfortable with technology. Higher education still has much work to do to make technology invisible as part of the learning experience in order for students to focus on course content in an interactive environment.

### **Suggestions from Students**

Continued education is important. Students genuinely want professors to use technology seamlessly. It is expected to be able to use what students feel is “normal.” Technology is not special, but part of their culture and daily lives. The respondents, students offered the following suggestions for professors to integrate interactive instructional technology into their course appropriately.

1. **Be Consistent.** Students said establishing how professors are going to use technology and following through was the best way to use technology as part of a course. Good communication is key. They said ideally professors all use

Blackboard and email in similar ways. Standardization may not be realistic so make it clear how you use technology so students are clear. Being clear allows students to not have to worry about their grades being affected by poor communication or guessing if the technology will work.

2. **Limit the amount of technology.** Limiting the amount of technology used as part of a course simply makes it more manageable for student to concentrate on learning objectives. They compared this to phone features, in that they usually see all the features, but only rely on a few. Students said it would be good to have the features progressively appear or turn on when they need it. For example, a website could have content appear at certain times of the semester so it aligns with when concepts are discussed in class.
3. **Production value matters.** Much of the content on the web is low-fi, but students discussed low production value as distracting. They talked about video lectures being way too long and should be broken into smaller chunks so it is easier to find things. They compared this experience to other videos they watched. Rarely do they ever watch anything for an hour on their computer. Additionally, they described one online lecture where the professor was having a coughing fit. They felt it was unprofessional and distracting because it was loud and jarring. Paying attention to the quality of online materials is important to model professional presentation practices and communications.
4. **Communicate course format clearly.** One student described a face-to-face course during registration. When she took the course it turned out the professor moved most of the materials online. This upset the student because she outlined

why she didn't like online courses and specifically signs up for face-to-face courses. In terms of customer service this bait and switch is frustrating when technology is used as a replacement. Many students said technology should be used to supplement a course, but the format needs to be clearly communicated up front. This allows students to prepare and know what they are getting into prior to starting the course. The hope is they will choose a format in which they can be successful.

5. **Use social media correctly.** Students struggle to mix academic and social lives, especially online. The mixed reactions highlight how faculty are trying to figure out how to use social media in an academic setting. The students generally felt it was being misused. Additionally, their online presence was viewed as affecting the professor's opinion or grade in class. Live chats during larger classes were discussed as a value-added outlet for students to voice opinions and ask questions. Students proposed a teaching assistant moderator for live chats during the class. Students didn't feel professors would be open to this idea for fear of losing control of the course. However, social media used well could be good for students who aren't comfortable asking the professor directly to express concern or leave comments.
6. **Get comfortable.** Professors need to have the basics of technology down. Using it well and being comfortable with what is part of the course builds trust with the students. Teachers should continue to learn in various professional development settings. Continued education is important and being comfortable with technology used in class shows respect for student learning and respect for the technology.

This takes time, but is the environment in which many students feel comfortable in and confident using.

7. **Minimize frustration.** Being comfortable with technology leads to the ability to plan ahead and prepare students, which minimizes frustration. Mayer and Moreno (2003) suggest pre-training reduces cognitive load. Students look to faculty as leaders and mentors for many things, which include technological knowledge. If things don't go well or technology doesn't work, professors need to have a backup plan. Krug's (2014) reservoir of goodwill played out in class with the following example. Professors can model behavior and usage so students know what to expect when they approach challenges outside of class on their own.
8. **Digitize material appropriately.** Digital media, when produced correctly, makes material searchable. The ability to search notes and textbooks for information is something students are used to being able to do. It is seen as a time saver and more efficient. Students look to save time by using technology. The library isn't visited because it takes time to walk over to the physical building rather than searching a textbook online. Many students have never been to the library for anything and those who have been were there because of a required course. Furthermore, digital media should function on multiple devices: desktop, laptop, tablet, and mobile. Video formats, lengths, organization of content, and interfaces all need to take into account the environment in which they will be used.
9. **Go old school.** Students are not opposed to old school methods of teaching that involve pencil and paper if it is easier and work better. They said professors shouldn't use technology if it is not related to learning. One student described the

use of technology sometimes feels like a big show for nothing. Technology sometimes gets used in class to be able to present, brag, or show off in other settings, rather than relating to student learning.

10. **Take advantage of student expertise.** Peer review and social learning came up often in the focus groups, especially when discussing technology. One student provided examples where teachers taught the ways to approach new technology, the ethics behind it, and concepting, but students have experience with new technology they think is cool and can bring to class to share with others. Everyone benefits—professors and other students. The challenge is to create a space where students feel comfortable sharing their experiences.

### **UX Tools for Faculty**

Professionals who build and maintain interactive media, such as websites, mobile apps, and software, use many tools to make sure their products function well. Specifically, care is taken to make sure the user can complete tasks, but also have a good experience using the product. Faculty have the opportunity to take advantage of UX tools and techniques to evaluate student experience with instructional technology.

1. **Journey maps.** This process is good for evaluating new tools by thinking of ways students would use the technology. Specifically, writing out the path(s) they might take to complete tasks. This could be a list of each step, sketches of each screen, or a flow chart. The user flow provides an understanding of how easy it is to use, but more importantly, potentially pinpoints what may impact learning. The exercise anticipates what may happen when students use the software allowing professors to be proactive when implementing technology.



2. **Talk with students.** Traditional evaluation tools such as conversations, surveys, and periodic check-ins as students use updated versions, new tools, or instructional technology is always a good idea. It provides valuable feedback to the professor that can be used to improve experience with technology. Additionally, this exercise is a visible activity that shows students the professor is taking care to make sure things are working and asking them for feedback.
3. **Usability tests.** An informative exercise is to watch students use the technology that is part of a course. Use one or more of the tasks they use and observe them try to complete the tasks. Ideally, watching over their shoulder and having them talk aloud provides insights into the path they take when using the software. This can be compared with journey maps to see if there are common patterns. The process always highlights all the unique ways people use technology, but gives the professor an understanding of how students approach tasks. This also gives the professor a space to offer training for students and mentorship with technology. Furthermore, it creates a space for professors to learn about new options or features of the technology the students have figured out.

The results from these exercises may be obvious, but often reveal unique settings and behaviors students use while learning outside of class. Through these findings, professors will gain technical knowledge, but also insights to optimize student experiences with online materials.

## UX Teaching Model

Finally, the findings from this research provide a basis on which a UX model for using technology in higher education is proposed. Combining a UX development process from the professional industry with the TPACK model creates a unique approach to selecting, evaluating, and using technology in higher education. Figure 5.1 illustrates the

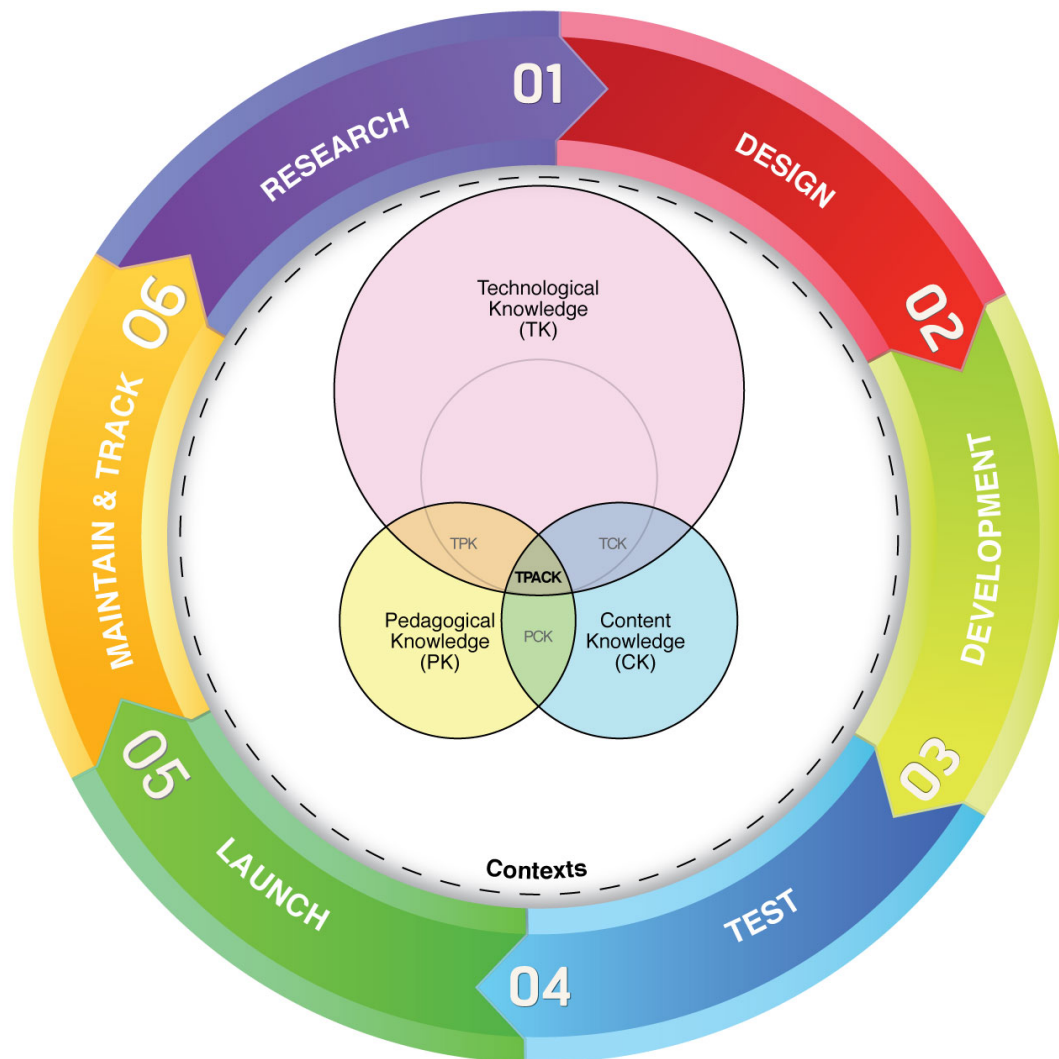


Figure 5.1: UX Teaching Model

UX Teaching Model extending the TPACK concepts by highlighting the technology rich environments faculty and students operating in higher education. As technology continues to play larger roles in all facets of higher education the contexts in which students learn becomes more dynamic. The UX Teaching Model embeds a technology development process in the contexts surrounding the three TPACK knowledge areas. Thus, educators should teach like industry professionals create technology. UX, a term normally associated with interactive design, provides a framework for all instructors to effectively integrate interactive media into their teaching.

When a new piece of technology is developed, it follows an iterative process of research, design, development, testing, launch, and maintenance/tracking. In the UX Teaching Model, teaching like they build it follows the same, circular path to emphasize the importance of continuous exploration of environments and experiences with interactive instructional technology. For example, imagine an instructor who is interested in introducing a virtual reality (VR) experience into a history course. Since this is a new, emerging technology *research* is required to explore possibilities, limitations, and opportunities. Next, the instructor *designs* an activity based on a learning objective for a unit in their course. The *development* process in this case may require coding, but more likely starts with identifying existing VR apps. Some type of *testing* is then needed to evaluate and make sure the app works appropriately. This process can be formal or informal, but necessary for the instructor to be aware and comfortable with the quirks introduced by the technology. Next, *launching* the VR app history activity must be planned during earlier steps, but preparing for a good first experience is important so students are confident that they can learn using this new technology. *Maintenance and*

*tracking* is then important to not only measure student learning, but also make sure the technology is performing as expected. The first time using the VR history app activity the instructor may use it as an option to learn a particular concept, then after this test run might find ways to build on the activity the next time around. Eventually, this leads to potential ideas for custom app development, funding opportunities, and interdisciplinary collaborations. Each of these steps is not mutually exclusive or always linear, but is iterative to be flexible and adjust to technological, pedagogical, or content needs in the context in which students learn.

The provided example uses a piece of emerging technology, but can be used when approaching any piece of technology. “New technology” is relative to the individual instructor, but actively thinking about how technology is embedded into the learning process and understanding the technology will inevitably change is key. The UX Teaching Model begins to conceptualize how educators can approach interactive instructional technology in a sustainable way without feeling overwhelmed and keep the users in mind. This begins to solidify challenges and opportunities by creating a framework for faculty to understand how students use tech for learning and adapt over time. The UX Teaching Model provides a viewpoint focusing on the environment from the user’s perspective rather than focusing on the inevitable change in interactive instructional technology.

### **Future Research**

The amount of distractions created by technology competes for attention. Future research needs to measure how technology influences learning. How do personal and academic media interact with each other to influence learning? How many pieces of

media do students regularly have open at one time? Students are now faced with multiple layers of interface surrounding learning materials on screen. How do these layers affect learning? Further research is needed to identify and implement sustainable practices for using interactive instructional technology in higher education. Simply looking at the best ways to organize Blackboard would immediately benefit students and professors. These will further help understand the environment created by digital media where students spend much of their time.

Additionally, training programs should be updated for professors teaching them not to push buttons, but find ways to truly understand the digital environment. In what ways can faculty use digital communications strategies to engage students in an interactive environment? This type of training helps faculty to incorporate more digital media into their everyday lives as many students already do in their life.

Finally, the development of a UX model of instruction in higher education is needed. The findings from this research provide a basis on which a UX model for using technology in higher education. This model would aid faculty during the interim in a transitional period and age of rapid development in technology. This begins to solidify challenges and opportunities by creating a framework for faculty to understand how students use tech for learning and adapt over time. A UX approach provides a viewpoint that focuses on the environment from the user's perspective rather than focusing on the inevitable change in interactive instructional technology.

### **Limitations**

Limitations revolve around the challenges with a qualitative approach used. In its very nature, qualitative research cannot be generalized to a larger population so

additional research is needed. This study explained some of the results from the Dahlstrom, Walker, and Dziuban (2013) EDUCAUSE survey by providing descriptive findings of how students use technology in college. Additionally, this research project explored the topic in depth, which found other areas to measure using quantitative research methods. Specifically, the qualitative finds have created an opportunity for a mixed methods study, which begins to develop a model surrounding a UX approach in higher education. Returning to Mooney & Rollins' (2008) purchasing fish model, a similar approach could be taken for students completing assignments or during their entire college career. This starts with variables, such as media usage, personal organization tools, institutional technology, learning management systems, and information gathering techniques. All contribute to the student experience during their college career.

Additionally, there are limitations to using focus groups. Recruitment of upperclassmen was a challenge. Students lead busy lives. Many who signed up did not show up, limiting the groups to those motivated to participate. Incentives were used, but a particular type of student will take the time to participate in a research study. Focus groups do introduce group think issues, but the research attempted to include everyone during the discussion by using the sketches everyone created at the beginning of the session. The study may have benefited from individual interviews to follow up on particular findings or explore different groups of students. Furthermore, the analysis includes researcher bias, but member checks and other source materials were collected to address validity.

Lastly, the sample in this project is homogeneous. All were from one university and many had the same major. Efforts were taken to obtain diversity in race and gender comparable to the demographics of the university. As the project developed, communications students emerged as having the ability to articulate their technology and media usage. Advertising and Public Relations majors were able to critically think about how they view this usage. Furthermore, technology used by the students represents one university's system and setup. There are opportunities to expand and replicate incorporating other majors, institutions, and ages. It would also be beneficial to hear from students who are not technology savvy or non-traditional students who have additional challenges catching up with technological usage in higher education. Furthermore, different institutions may have other teaching requirements, support systems, and technology networks. A comparison between institutions would identify successful applications and lessons learned from poor implications of technology.

Moving forward, a sequential, exploratory mixed methods approach will aid in the development of future studies. Creswell and Plano Clark (2011) suggest, "the exploratory design is a mixed methods design in which the researcher begins by qualitatively exploring a topic before building to a second quantitative phase. In many applications of this iterative design, the researcher develops an instrument as an intermediate step between the phases that builds on the qualitative results and is used in the subsequent quantitative data collection" (p. 86). This method is particularly useful when the researcher wants to assess or test qualitative results (Creswell & Plano Clark, 2011). Themes from this qualitative study have the opportunity to form the foundation for a survey to select the sample used during a future quantitative study.

## **Final Thoughts**

The purpose of this study was to better understanding student perspective in higher education. Over the last decade there has been the introduction to Facebook, YouTube, the iPhone, Mobile Apps, Tablets and an endless number of software tools. All have been adopted and integrated into higher education by instructors and students alike. I feel both have adopted these tools in different ways and for different motivations, which creates misunderstandings between faculty and students. My professional experience as a designer and developer for web and mobile apps influences my approaches to teaching. I continue experimenting with new technology in the hopes to identify better ways to make technology seamless so it benefits learning. Technology is only expanding with the introduction of 3D printing, virtual reality, drones, and wearables. All of this requires constant attention to the ways it affects learning and incorporation into higher educational environments. Specifically from a UX perspective, the overall goal is to continue to find ways to make interactive instructional technology better as well as its implementation.

Professional significance for this study is to inform educators of issues they could expect when teaching with technology and offer ideas to integrate it in appropriate ways. The communications industry has actively adopted and driven how many of these new technologies are used in our day-to-day lives. There are opportunities to take advantage of professional communications strategies and tactics to improve using technology in higher education. Furthermore, a UX approach keeps the individual student in mind instead of just a number. This has the opportunity to connect with students using technology as well as improve the relationship and build trust during the course. This must be done at multiple levels of the university structure, from the departmental to the



institutional level, to include everyone from faculty to administration. In terms of a communications point of view, this builds and maintains brand equity of the institution to reinforce the confidence in students that their education will prepare them for their future careers. All these careers will be heavily influenced and evolve with the technological developments coming and have yet to emerge. Students anticipate and understand their use of technology is only going to increase as they graduate and start their careers.

At the end of the day, students all made it clear to “use technology carefully” when using it as part of their education. Technology is very powerful and the use of it can result in both positive and negative experiences that impact learning. Many students are comfortable in a digital world, but few have thought about its usage in a professional context. This study identifies successful applications and pain-points students experience during college, which has the opportunity to guide faculty to improve implementations as technology advances. College is about growth. Students study particular subjects and gain content knowledge, but also they build connections and learn about themselves. Continued exploration using a UX perspective keeps the focus on the environment students experience created by technology, rather than on the technology itself. The one thing that will continue is technology will change and environments will evolve. Consistent evaluation is needed to maintain appropriate and sustainable approaches to enhance student learning. A UX perspective provides these tools.

## References

- Adobe (2013, September). Digital distress: What keeps marketers up at night? *Adobe Systems Report*.  
<http://www.images.adobe.com/www.adobe.com/content/dam/Adobe/en/solutions/digital-marketing/pdfs/adobe-digital-distress-survey.pdf>.
- Anderson, C. (2008). *The long tail: Why the future of business is selling less of more*. New York: Hyperion.
- Artino, A.R., Jr. (2008). Cognitive load theory and the role of learner experience: An abbreviated review for educational practitioners. *AACE Journal*, 16(4), 425-439.
- Babchuk, W.A., & Badiee, M. (2010). Realizing the potential of qualitative designs: A conceptual guide for research and practice. In J. Dirkx (Ed.), *Proceedings of the 28<sup>th</sup> Annual Midwest Research Research-to-Practice Conference in Adult, Continuing, and Community Education* (pp. 25-31). Michigan State University, East Lansing, Michigan. September 26-28, 2010.
- Baddeley, A. (2007). *Working memory, thought and action*. New York: Oxford University Press.
- Bart, M. (2011, September). Social media usage trends among higher education faculty. *Faculty Focus*. Retrieved from <http://www.facultyfocus.com/free-reports/social-media-usage-trends-among-higher-education-faculty/>.
- Bower, G. (1981). Mood and memory. *American Psychologist*, 36, 129-148.
- Bruning, R., Schraw, G., Norby, M., & Ronning, R. (2004). *Cognitive psychology and instruction* (4<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.

- Chandler, P. & Sweller, J. (1991). Cognitive Load Theory and the Format of Instruction. *Cognition and Instruction*, 8(4): 293–332.
- Clark, R. E. & Feldon, D. F. (2005). Five common but questionable principles of multimedia learning. In Mayer, R. (Ed.) *Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press.
- Cooper, P. (1998). *Research into cognitive load theory and instructional design at UNSW*.
- Creswell, J. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3<sup>rd</sup> ed.). Upper Saddle River, NJ: Pearson.
- Creswell, J. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Dahlstrom, E., Walker, J.D., & Dziuban, C. (2013, September 16). ECAR study of undergraduate students and information technology, 2013. *EDUCAUSE*. Retrieved from <http://www.educause.edu/library/resources/ecar-study-undergraduate-students-and-information-technology-2013>.
- England, E. & Finney, A. (2011). *Interactive media: What's that? Who's involved?* ATSF White Paper. Retrieved from [http://www.atsf.co.uk/atsf/interactive\\_media.pdf](http://www.atsf.co.uk/atsf/interactive_media.pdf).
- Erickson, T. (2012). How mobile technologies are shaping a new generation. *Harvard Business Review*. Retrieved from [http://blogs.hbr.org/erickson/2012/04/the\\_mobile\\_re-generation.html](http://blogs.hbr.org/erickson/2012/04/the_mobile_re-generation.html).

- Fredericks, H. & Besnoy, C. (2012, November 8). Building more informed mobile strategies for today's multi-device world. *comScore*. Retrieved from [http://www.comscore.com/Insights/Presentations\\_and\\_Whitepapers/2012/Building\\_More\\_Informed\\_Mobile\\_Strategies](http://www.comscore.com/Insights/Presentations_and_Whitepapers/2012/Building_More_Informed_Mobile_Strategies).
- Garret, J. (2011). *The elements of user experience: User-centered design for the web and beyond*. (2<sup>nd</sup> ed.). Berkeley, CA: New Riders.
- Greene, J.C., & Hall, J.N. (2010). Dialectics and pragmatism: Being of consequence. In A. Tashakkori and C. Teddlie (eds.), *Sage handbook of mixed methods in social and behavioral research, second edition* (pp. 119-143). Thousand Oaks CA: Sage.
- Griffin, G., Morrison, D. K., & Sheehan, K. B. (2009). Perspectives of digital creativity. *Journal of Interactive Advertising*, 9(2), 63-65.
- Hassenzahl, M. & Tractinsky, N. (2006). User experience – a research agenda. *Behaviour and Information Technology*, 25(2), 91-97.
- Jenkins, J. J. (1974). Remember that old theory of memory? Well forget it! *American Psychologist*, 29, 785-795.
- Kanuka, H., & Anderson, T. (1998). Online social interchange, discord, and knowledge construction. *Journal of Distance Education*, 13(1), 57-74.
- Kalyuga, S. (2007). Enhancing instructional efficiency of interactive e-learning environments: A cognitive load perspective. *Educational Psychology Review* 19, 387-399.
- Kalyuga, S., Chandler, P., & Sweller, J. (1999). Managing split-attention and redundancy in multimedia instruction. *Applied Cognitive Psychology*, 13, 351-371.

- Kalyuga, S., Chandler, P., & Sweller, J. (2004). When redundant on-screen text in multimedia instruction can interfere with learning. *Human Factors* 46(3), 567-581.
- Katz, H. (2014). *The media handbook: A complete guide to advertising media selection, planning, research, and buying*. (5<sup>th</sup> ed.). New York, NY: Routledge.
- Kiousis, S. (2002). Interactivity: A concept explication. *New Media & Society*, 4(3), 355-383.
- Kirschner, P. (2002). Cognitive load theory: Implications of cognitive load theory on the design of learning. *Learning and Instruction*, 12, 1-10.
- Kitsanta, K., Reiser, R., & Doster, J. (2004) Developing self-regulated learners: Goal setting, self-evaluation, and organizational signals during acquisition of procedural skills. *The Journal of Experimental Education*. 72(4), 269-287.
- Kozma, R. (1994). Will media influence learning? Reframing the debate. *Educational Technology Research and Development*, 42(2), 7-19.
- Krug, S. (2014). *Don't make me think: A common sense approach to web usability*. (3<sup>rd</sup> ed.). Berkeley, CA: New Riders.
- Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010). *Teens and mobile phones text messaging explodes as teens embrace it as the centerpiece of their communication strategies with friends*. Washington, D.C.: Pew Research Center.
- Lipsman, A. (2014, June 25). Major Mobile Milestones in May: Apps Now Drive Half of All Time Spent on Digital. *comScore*. Retrieved from <http://www.comscore.com/Insights/Blog/Major-Mobile-Milestones-in-May-Apps-Now-Drive-Half-of-All-Time-Spent-on-Digital>.

- Luschen, K., & Bogad, L. (2010). Youth, New media and education: An introduction. *Educational Studies*, 46(5), 450-456.
- Manresa-Yee, C., Ponsa, P., Varona, J., & Perales, F. (2010). User experience to improve the usability of a vision-based interface. *Interacting with Computers*, 22, 594-605.
- Marchitto, M & Canas, J. (2011). User experience as a challenge for cognitive psychology and ergonomics. *Human Technology: An Interdisciplinary Journal of Humans in ICT Environments*, 7(3), 268-280.
- Mayer, R. (2009). *Multimedia learning* (2<sup>nd</sup> ed.). New York, NY: Cambridge University Press.
- Mayer, R. & Moreno, R. (1998). A split-attention effect in multimedia learning: Evidence for dual processing systems in working memory. *Journal of Educational Psychology*, 90(2), 312-320.
- Mayer, R. & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, 38(1), 43-52.
- McLuhan, M. (1995). The medium is the message. In Eric McLuhan & Frank Zingrone (Eds.), *Essential McLuhan* (pp. 151-161). New York, NY: Basic Books. (Reprinted from *Understanding Media: The Extensions of Man*, 1964).
- McLuhan, M. (1974). The medium is the message. *Marshall McLuhan Speaks*. Retrieved from <http://marshallmcluhanspeaks.com/sayings/1974-the-medium-is-the-message.php>.
- Merholz, P. (2007, December 13). Peter in conversation with Don Norman about UX and innovation. *Adaptive Path*. Retrieved from <http://www.adaptivepath.com/ideas/e000862>.

- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Mooney, K. & Rollins, N. (2008). *The open brand: When push comes to pull in a web-made world*. Berkeley, CA: New Riders.
- Moreno, R. & Mayer, R. (1999). Cognitive principles of multimedia learning: The role of modality and contiguity. *Journal of Educational Psychology*, 91(2), 358-368.
- Moreno, R. & Mayer, R. (2000). Engaging students in active learning: The case for personalized multimedia messages. *Journal of Educational Psychology*, 92(4), 724-733.
- Moreno, R. & Mayer, R. (2007) Interactive multimodal learning environments. *Educational Psychology Review*, 19, 309-326.
- Nielsen Norman Group (2010). *Children (Ages 3-12) on the Web*. (3<sup>rd</sup> Ed.) Fremont, CA: NN/g.
- Noel-Levitz (2014). 2014 E-Expectations Report: The Online Preferences of College-Bound High School Seniors and Their Parents. *Noel-Levitz*. Retrieved from <https://www.noellevitz.com/papers-research-higher-education/2014/2014-e-expectations-report>.
- Ohler, J. (2009). New-media literacies. *Academe*, 95(3), 30-33.
- Pass, F. & Sweller, J. (2012). An evolutionary upgrade of cognitive load theory: Using the human motor system and collaboration to support the learning of complex cognitive tasks. *Educational Psychology Review*, 24, 27-45.

PC Magazine. (2012). Digital media definition from PC Magazine encyclopedia.

Retrieved from

[http://www.pcmag.com/encyclopedia\\_term/0,1237,t=digital+media&i=41342,00.asp](http://www.pcmag.com/encyclopedia_term/0,1237,t=digital+media&i=41342,00.asp).

Prensky, M. (2001). Digital natives, digital immigrants. *On The Horizon*, 9(5), 1-6.

Reed, S. (2006). Cognitive architectures for multimedia learning. *Educational Psychologist*, 41(2), 87-98.

Rey, G. & Buchwald, F. (2011). The expertise reversal effect: Cognitive load and motivational explanations. *Journal of Experimental Psychology*, 12(1), 33-48.

Richmond, A. & Cummings, R. (2005). Implementing Kolb's learning styles into online distance education. *International Journal of Technology in Teaching and Learning*. 1(1), 45-54.

Riley, W. (2012). *Startups, this is how design works*. Retrieved from <http://startupsthisishowdesignworks.com>.

Rogers, E. (2003). *Diffusion of innovations*. (5<sup>th</sup> ed.). New York, NY: Free Press.

Saldana, J. (2011). *Fundamentals of qualitative research*. Oxford: Oxford University Press.

Sandler, J. (2010). eProject user experience: The reality. *International Journal of Advanced Corporate Learning*, 3(4), 35-40.

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge University Press.



- Scheiter, K., & Gerjets, P. (2007). Learner control in hypermedia environments. *Educational Psychology Review, 19*, 285-307.
- Shell, D., Brooks, D., Guy, T., Wilson, K. Kauffman, D., & Herr, L. (2010) *The Unified learning model: How motivational, cognitive, and neurobiological sciences inform best teaching practices*. New York, NY: Springer.
- Shirky, C. (2009). *Here comes everybody: The power of organizing without organizations*. New York, NY: Penguin.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Sweller, J. (2006). Discussion of emerging topics in cognitive load research: Using learner and information characteristics in the design of powerful learning environment. *Applied Cognitive Psychology, 20*, 353-357.
- Tullis, T. & Albert, B. (2008). *Measuring the user experience: Collecting, analyzing, and presenting usability metrics*. Burlington: Morgan Kaufmann.
- Van Gog, T., Pass, F., Marcus, N., Ayres, P., & Sweller, J. (2009). The mirror neuron system and observational learning: Implications for the effectiveness of dynamic visualizations. *Educational Psychology Review, 21*, 21-30.
- Wettingham, D. T. (2009). *Why don't students like school? A cognitive scientist answers questions about how the mind works and what it means for the classroom*. San Francisco: Jossey Bass (Wiley).
- Whitenton, K. (2013, December 22). Minimize cognitive load to maximize usability. *Nielsen Norman Group*. Retrieved from <http://www.nngroup.com/articles/minimize-cognitive-load/>.

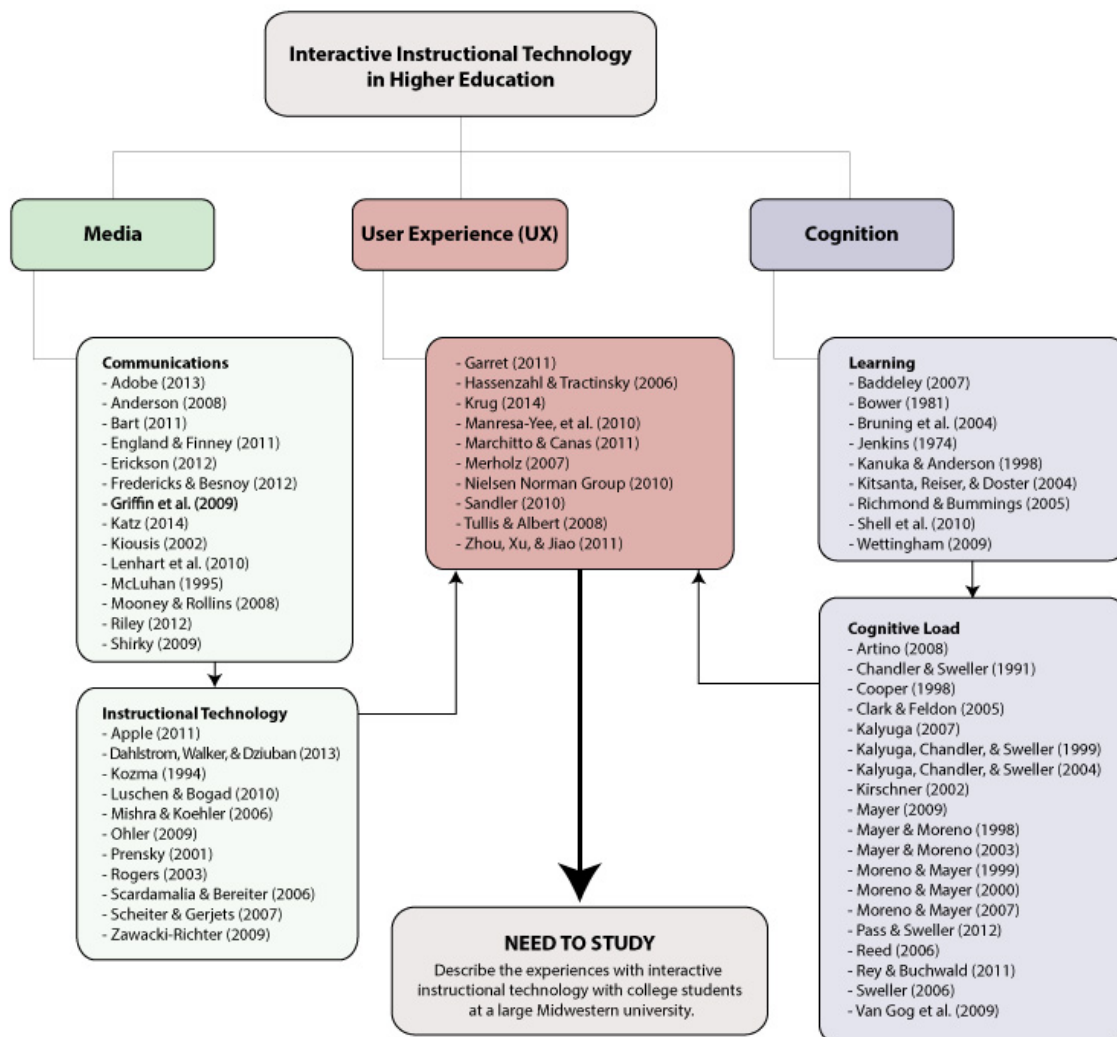
Yin, R. (2014). *Case study research: Design and methods*. (5<sup>th</sup> Ed.). Thousand Oaks, CA: Sage.

Zawacki-Richter. (2009). Research areas in distance education: A delphi study. *The International Review of Research in Open and Distance Learning*, 10(3), 1-17.

Zhou, F., Xu, Q., & Jiao, R. (2011). Fundamentals of product ecosystems design for user experience. *Research in Engineering Design*, 22, 43-61.

## Appendices

## Appendix A: Literature Map



## Appendix B: Participant Screening Questions

1. Name \_\_\_\_\_
2. Year in College \_\_\_\_\_
3. Are you 19 years old or above?  
 Yes  
 No
4. Have all the years been at UNL?  
 Yes  
 No
5. How many classes at UNL have you taken that used Internet based technology?  
 0  
 1-2  
 3-5  
 5-7  
 8+
6. Have you enrolled in a distance / online course at UNL?  
 Yes  
 No

## Appendix C: Recruitment Letter

### **Developing an understanding of how college students experience interactive instructional technology: A UX perspective**

Dear Potential Participant,

You are invited to take part in a research study at UNL that is interested in your experience with interactive instructional technology in higher education. I am working on a project that is exploring college students' experience with interactive instructional technology. The project is particularly interested in ways these experiences affect teaching and learning. The goal is to develop an understanding of what college students experience with new technology in a fragmented media environment, which will benefit instructional designers, professors, and administrators.

By participating in this focus group, your ideas will help make our understanding better. You will be asked to complete a demographic and media usage survey. The session is also a chance for you to talk with me about your current experiences with interactive instructional technology and how the higher education integrates new types of media.

The session will be 60 minutes. It will be audio and video recorded with your permission. Photos and screenshots of examples (i.e. websites, drawings, etc.) you provide will also be collected. This will take place during a time that is convenient and will not interfere with any work or school activities. All sessions will take place at the University of Nebraska-Lincoln's College of Journalism and Mass Communications located in Andersen Hall or a quiet area at your workplace. The exact day has not yet been scheduled, but will take place from January 2014 to March 2014. The information obtained in this study may be published in academic journals or presented at conferences, but the data will be reported as aggregated data. You will receive a copy of the written report for participating in this project.

Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researcher or the University of Nebraska-Lincoln. If you have any questions or concerns about your rights as a participant in this research, please contact the UNL IRB Office at 402-472-6965.

**If you do not want to participate in this study for any reason,** please contact me directly. Each session will be scheduled at your convenience on a volunteer basis. I would love to include your perspective in the study. Please feel free to contact Adam directly if you have any questions about the study.

Sincerely,

Adam Wagler, Investigator

[awagler2@unl.edu](mailto:awagler2@unl.edu)

office: 402-472-2984

## Appendix D: Consent Form

### **Developing an understanding of how college students experience interactive instructional technology: A UX perspective**

This research project is exploring college students' experience with interactive instructional technology. The project is particularly interested in ways these experiences affect teaching and learning. Developing an understanding of what college students experience with new technology in a fragmented media environment will benefit instructional designers, professors, and administrators. You must be 19 years of age or older to participate. You are being asked to participate in this study because of your experience with interactive instructional technology in higher education.

By participating in this focus group, your ideas will help make our understanding better. You will be asked to complete a demographic and media usage survey. The session is also a chance for you to talk about your current experiences with interactive instructional technology and how the higher education integrates new types of media.

The session will be 60 minutes. It will be audio and video recorded with your permission. Photos and screenshots of examples (i.e. websites, drawings, etc.) you provide will also be collected. This will take place during a time that is convenient and will not interfere with any work or school activities. All sessions will take place at the University of Nebraska-Lincoln's College of Journalism and Mass Communications located in Andersen Hall or a quiet area at your workplace. The exact day has not yet been scheduled, but will take place from January 2014 to March 2014.

If you participate the raw data will only be accessible by the researcher. The raw data will be stored in a locked cabinet in the investigator's office and will only be seen by the investigator during the study. There are no known risks to participate in this research. The small sample size makes autonomy difficult so all participants should be aware of this issue prior to their involvement with the project. Due to the nature of a focus group, we cannot guarantee complete confidentiality, but we ask that you respect other members of the group and not repeat what is said during the session.

The information obtained in this study may be published in academic journals or presented at conferences, but the data will be reported as aggregated data. You will receive a copy of the written report for participating in this project. Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researcher or the University of Nebraska-Lincoln. If you have any questions or concerns about your rights as a participant in this research, please contact the UNL IRB Office at 402-472-6965. At anytime if you have specific questions about the project please contact one of the investigators listed below.

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

#### **Signature of Participant:**

\_\_\_\_\_ Signature of Research Participant

\_\_\_\_\_ Date

\_\_\_\_\_ I agree to be audio and video recorded during this session

#### **Name and Phone number of investigator**

Adam Wagler, Investigator

[awagler2@unl.edu](mailto:awagler2@unl.edu)

Office: 402-472-4784



7. If you have class in a computer lab, do you prefer to using?

- Your Personal Laptop  
 Desktop Computer  
 I don't have a laptop so I use the desktop computer.

8. How many hours do you spend on a typical day using the following?

	0-1	1-2	2-3	3-4	5-6	6+
Laptop Computer						
Desktop Computer						
Social media sites						
Smartphone (talk, text, Internet)						
Tablet or iPad/iPad Mini						

9. What cloud storage services do you use for academic work? (Check all that apply)

- Dropbox  
 Evernote  
 Google Drive / Docs  
 SkyDrive  
 iCloud  
 Box  
 Other  
 I don't use cloud storage

10. Which social media networks do you use and for what purpose?

	Not Used	Personal Only	Academic Only	Personal & Academic
<b>Facebook</b>				
<b>LinkedIn</b>				
<b>Twitter</b>				
<b>Pinterest</b>				
<b>Instagram</b>				
<b>Google+</b>				
<b>YouTube</b>				
<b>Tumblr</b>				
<b>Blog (other than Tumblr)</b>				
<b>Other</b>				

11. Thinking about your college experience within the last year, how many instructors:

...effectively use technology to support your academic success?

- None       Some       Most       All

...provide you with adequate training for the technology used in courses?

- None       Some       Most       All

...have adequate technical skills for carrying out course instruction?

- None       Some       Most       All

...use "the right kind(s)" of technology?

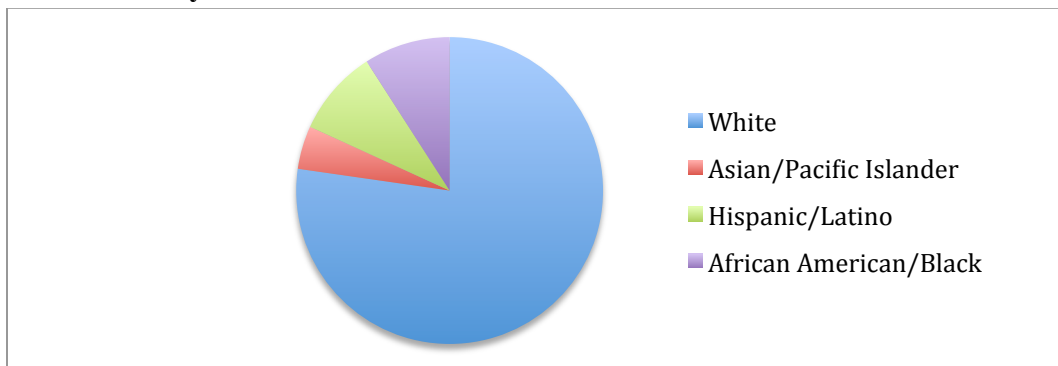
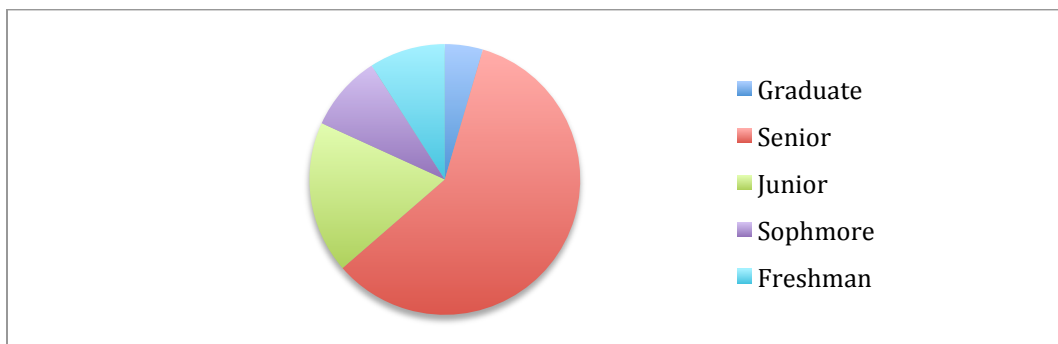
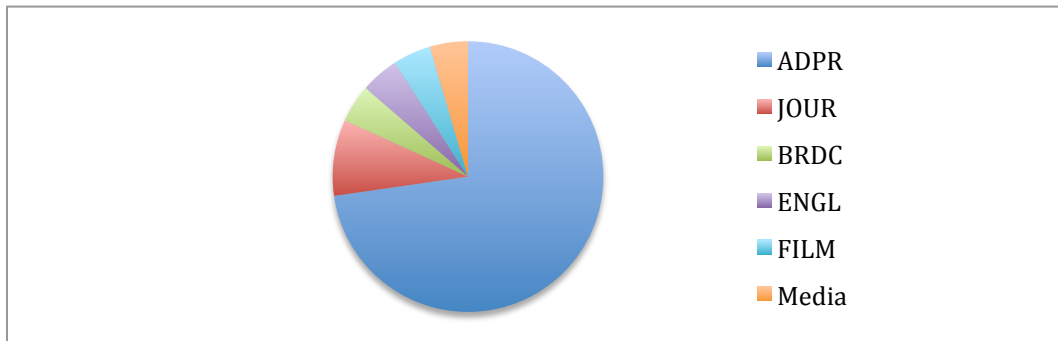
- None       Some       Most       All



**To what extent do you agree with the following statements?**

12. In terms of social networking, I like to keep my academic life and my social life separate.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
13. I get more actively involved in courses that use technology.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
14. When I entered college, I was adequately prepared to use technology needed in my course.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
15. Technology makes me feel more connected to what's going on at the college/university.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
16. Technology makes me feel connected to other students.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
17. Technology makes me feel connected to professors  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
18. Technology helps me achieve my academic outcomes.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
19. The use of mobile devices in class can enhance learning.  
 Strongly disagree      Disagree      Neither agree nor disagree      Agree      Strongly Agree
20. How important is it that YOU are better trained or skilled at using available technologies to learn, study, and complete coursework?  
 Extremely important  
 Very important  
 Moderately important  
 Not very important  
 Not at all important
21. How will your use of technology change in the next 3 years?  
 I expect my use of technology will **increase** in the next 3 years  
 I expect my use of technology will **stay the same** in the next 3 years  
 I expect my use of technology will **decline** in the next 3 years
22. On a scale of 1-10, how comfortable are you with technology?  
 1      2      3      4      5      6      7      8      9      10  
 Uncomfortable ----- Comfortable

## Appendix F: Participant Demographics Summary

**Total:** 22**Gender:** Female: 11 | Male: 11**Average age:** 21.4**Race/Ethnicity****Year****Major**

## Appendix G: Media Usage Survey Responses

8. How many hours do you spend on a typical day using the following?

	0 - 1	1 -- 2	2 -- 3	3 -- 4	5 -- 6	6+
8a. Laptop Computer	1	2	3	4	6	6
8b. Desktop Computer	16	1	1	1	1	2
8c. Social media sites	1	9	3	2	3	4
8d. Smartphone (talk, text, Internet)	2	2	5	3	2	8
8e. Tablet or iPad/iPad Mini	17	3	1	1	0	0

9. What cloud storage services do you use for academic work? (Check all that apply)

	Yes
iCloud	6
Dropbox	10
Google Docs/Drive	21
Skydrive	3
Evernote	2

10. Which social media networks do you use and for what purpose?

	Not Used	Personal Only	Academic Only	Personal & Academic
10a. Facebook	0	6	0	16
10b. LinkedIn	4	3	6	9
10c. Twitter	0	9	1	12
10d. Pinterest	13	5	0	4
10e. Instagram	8	13	0	1
10f. Google+	10	7	3	2
10g. YouTube	2	12	0	8
10h. Tumblr	13	6	1	2
10i. Blog (other than Tumblr)	9	4	5	4
10j. Other	5	4	0	0

11. Thinking about your college experience within the last year, how many instructors:

	None	Some	Most	All
11a. ...effectively use technology to support your academic success?	0	9	13	0
11b. ...provide you with adequate training for the technology used in courses?	3	9	10	0
11c. ...have adequate technical skills for carrying out course instruction?	1	14	7	0
11d. ...use "the right kind(s)" of technology?	0	10	10	2

## Questions 12-19

	S. Disagree	Disagree	Neither	Agree	S. Agree
12. In terms of social networking, I like to keep my academic life and my social life separate.	0	3	8	9	2
13. I get more actively involved in courses that use technology.	0	0	6	15	1
14. When I entered college, I was adequately prepared to use technology needed in my course.	1	1	4	11	5
15. Technology makes me feel more connected to what's going on at the college/university.	0	0	2	12	8
16. Technology makes me feel connected to other students.	0	0	2	10	10
17. Technology makes me feel connected to professors.	0	0	6	14	2
18. Technology helps me achieve my academic outcomes.	0	0	2	13	7
19. The use of mobile devices in class can enhance learning.	0	4	8	8	2

20. How important is it that YOU are better trained or skilled at using available technologies to learn, study, and complete coursework?

	Not at All Important	Not Very Important	Moderately Important	Very Important	Extremely Important
20. How important is it that YOU are better trained or skilled at using available technologies to learn, study, and complete coursework?	0	0	0	7	15

21. How will your use of technology change in the next 3 years?

	Decrease	Stay the Same	Increase
21. How will your use of technology change in the next 3 years?	1	1	20

22. On a scale of 1-10, how comfortable are you with technology?

	1	2	3	4	5	6	7	8	9	10
22. On a scale of 1-10, how comfortable are you with technology?	0	0	0	0	0	0	3	10	5	4

## Appendix H: Focus Group Protocol

### **Focus Group Protocol Project: Interactive Instructional Technology in Higher Education**

Time of focus group:

Date:

Place:

Interviewer: Adam Wagler

Focus group participants:

Position of participants:

(Briefly describe the project)

Ask participants to sign consent form and complete demographic survey.

Turn on audio and video recorders.

#### **Activity**

Using the materials supplied (paper, markers, pencils, pens, crayons, etc.) Please draw an example of a technology you have used as part of a course you have taken in college. Take some time to think of a good example as well as a bad example. Draw two drawings one good example and one bad example.

#### **Questions:**

1. Why did you draw what you did?
2. Describe your experience(s) using interactive instructional technology for past courses.
3. How can interactive instructional technology be effectively used for a course?
4. Describe your thoughts when instructors use web/interactive technology?
5. How do you think instructors select some of the technology they use in class?
6. From the perspective of technology, describe how do you manage all of your courses in a semester?
7. How do you think technology shapes your learning?
8. In terms of motivation, describe your thoughts at the beginning of the semester when an instructor describes what technology will be used as part of the course?
9. Who should I talk to find out more about this?

(Thank the individual for participating in this interview. Reminder there will be follow up to verify accuracy of final report.)



## Appendix J: Sample Transcription

Devin: Professors should know how to use the technology.

Matt: I think that if they are going to be entitled as Dr. or Professor, you know, higher than us and they don't know how to do it and you are just like "this is questionable."

[Students laughing]

Rory: They lose creditability at that point.

Devin: I can't tell you how many times the entire class is sitting there like "huuuuuuuuhhh"

Guy: It is kind of awesome though.

[Students laughing]

Devin: When the mouse is just like... slowly moving... and you are just like "aahhhhhhh, just let me do it."

Sara: Like the instructors that don't know how to make the video full screen, something as easy as that.

Bill: Or even open a link from PowerPoint.

Devin: Yeah.

Rory: If they don't themselves want to become experts at whatever technology that they use, just have someone help them then. Don't waste our time fumbling around trying to figure it out. Either YouTube a video the night before and teach yourself or have say to someone "Hey can you come click this button for me, I don't know how to do it."

Bill: Well, they call up the T.A. sometimes. And they actually know which is kind of nice. You know. Oh and update box will pop up and that just throws them....

Students: Ohhhhhhh [Laughing]

Devin: The update box!

Bill: "What is this?" "What do I click?"

Devin: You'd think the world is ending when the update box comes up.

Bill: It is the end of the semester and it's the 10<sup>th</sup> time it has popped up and they are just like "Oh, what is this?"

Sara: And you just have students that laughing like "I am not going to help the teacher."

Devin: Yeah, the update box will popup and they will click the "X" on the tab that they wanted open and you are just like "ohhhh here's another 10 minutes."

[Students laughing]

Guy: I was in a classroom, 3 weeks ago. My iPhone was charging in a computer and it got done charging so it made that noise and vibrated. None of the students batted an eye. There were 3 professors that all looked at the computer, like at the box, thinking that it was making noise.

[Students laughing]

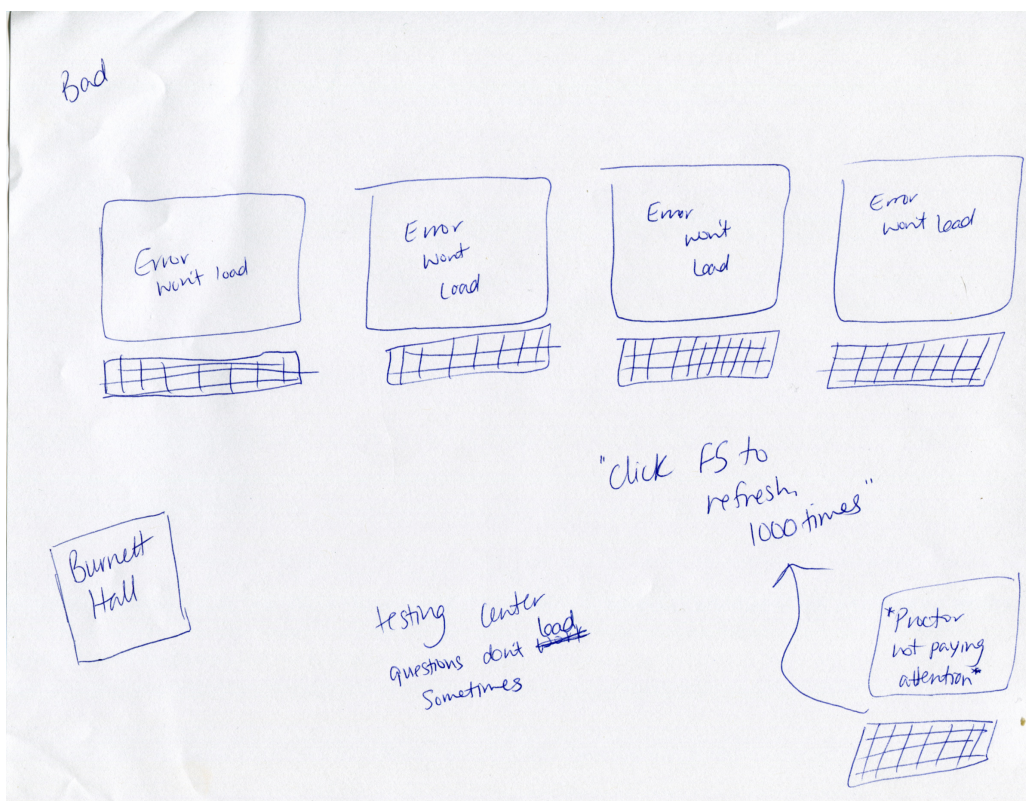
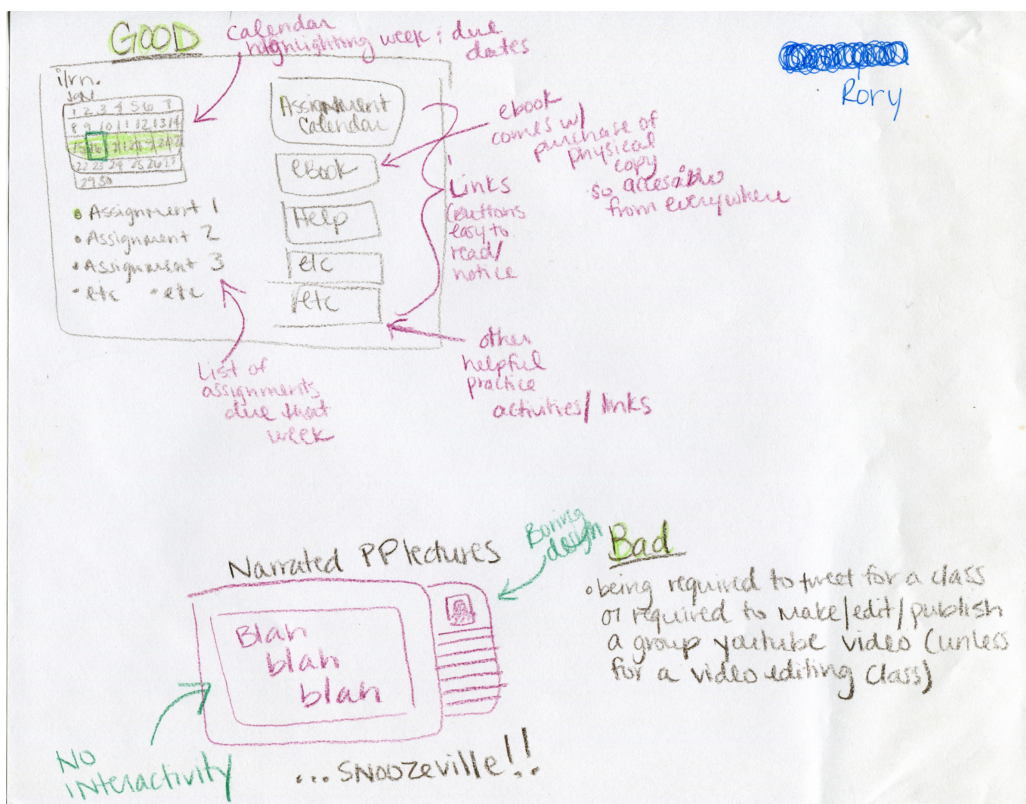
Guy: And it was like "What the F was that?"

## Appendix K: Participant Good and Bad Sketches Overview

Good	Bad
Blackboard (see grades and know where you stand)	YouTube Lecture (distractions by TV & Food)
Engaging lecture	Blackboard – online classes that pile up work
Photoshop & InDesign	Twitter – for class assignments
Blog	Testing Center
Organizational technology	Narrated PPT
Online Textbook	Narrated PPT – audio doesn't work
Facebook for Group Projects	Blackboard groups
Twitter for Class	Testing Center not loading
Engaging Presentation	Boring PPT Lecture
Websites mixed with Social Media	YouTube video - teachers depend
Blackboard – good clean organized	Facebook – social vs. academic
Facebook Groups – Good and Bad -	Maple TA Test - hard to use and frustrating
Blackboard – nicely organized, easy to use/navigate	Course Compass – cluttered, hard to navigate
Learning Catalytics – engaging Q&A session	Prezi – lame presentation
Instructor comfortable with tech and working with students to teach them	Facebook group – not secure and bad professors who don't teach
Blackboard App – easy to navigate, notifications, link to Dropbox	PowerPoint – not creative, boring, hard to follow, most teachers that use it aren't creative
Photoshop – interface is usable and simple	Alice – everything is hidden from the user – hard to navigate
Tut's Videos – interactive video broken into sections – easy to follow	eBook Presentation – very busy
Editing audio in studio – hands on learning environment	Asynchronous class with technology not working and students not engaged
Social Media – for quick responses	Blackboard Discussions that have no value
Skype interviews/guest speakers	PowerPoints – sitting through boring lectures
Group Me with Facebook	Online lectures - boring
Skype calls with industry professionals	Twitter – live tweeting



Appendix L: Participant Good and Bad Sketching Examples





Facebook — BAD !!

SOCIAL	ACADEMIC
<input type="checkbox"/> SALLY SAID... <input type="checkbox"/> SUZY SAID... <input type="checkbox"/> COMMENT <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;">PHOTO</div> <input type="checkbox"/> COMMENT	GROUP FOR CLASS - BILLY - BOBBY - PAM ? <input type="checkbox"/>


Blackboard — GOOD!

CLEAN ✓  
ORGANIZED!  
HELPPFUL!

	ACADEMIC	SOCIAL
WEEK 1	LINK TO VIDEO	<input type="checkbox"/> SALLY SAID... <input type="checkbox"/> SUZY SAID... <input type="checkbox"/> COMMENT
WEEK 2	READING PDF	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;">PHOTO</div> <input type="checkbox"/> COMMENT
WEEK 3		



facebook Groups



MAPLE T.A. TEST

Server  
Time  
XOOT

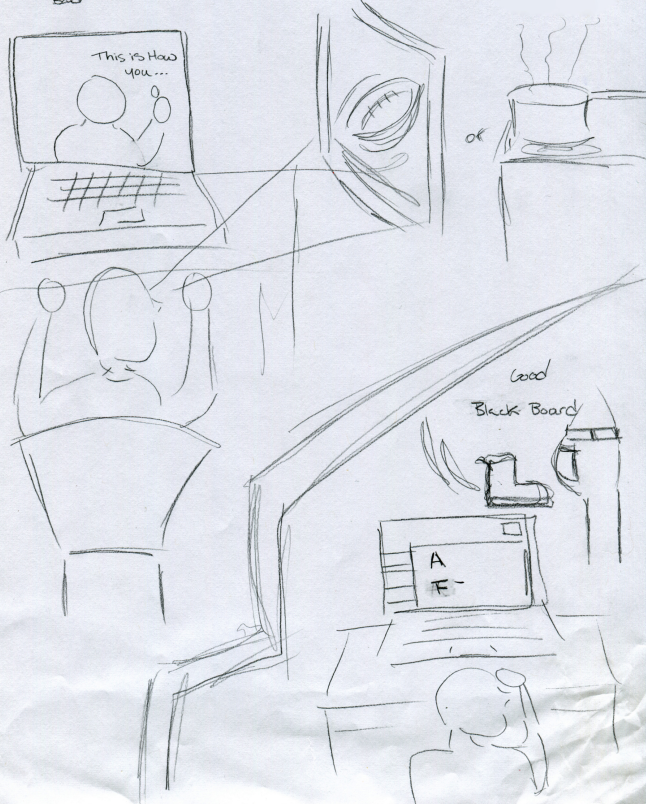
Frustration  
Confusion  
Very few tutorials  
online class - hard to email question to instructor

Good  
Good  
Make it  
Stop

Informative  
+  
Easy to  
discuss  
class

Emily

Youtube Lecture  
Bad



Good  
Black Board

A  
F

## Appendix M: Summary of Findings

Emergent Themes	Participant Responses
<b>Communication as the Number One Priority with Interactive Instructional Technology</b>	“Communication should be the number one priority. If technology is helping or hurting it that is what faculty need to look at first.” – Laura
<b>Line between Personal and Professional Lives using Interactive Instructional Technology</b>	“When it comes to the boundary of social networking and academics coming together is something a lot of students are uncomfortable with. Then for faculty to actually use it in a classroom setting is kind of weird to us.” - Mia
<b>Interactive Instructional Technology Creates Layers of Separation</b>	“A lot my friends have fallen behind in online classes. I think the extra layer of separation lets people put class on the backburner. Whenever you are showing up for tests, quizzes, or regular classes it is easier to hold yourself accountable.” - Chad
<b>Familiarity with the Interactive Instructional Technology Used</b>	“Simple tech stuff, they (professors) are calling the technician to come in. That takes away 10 minutes of the class then they are trying to rush through the lecture because in their mind they have this amount of material to cover and they are going to cover it whether or not you get it.” - Victor
<b>Building Trust with Interactive Instructional Technology</b>	“I can’t imagine having to research things before Google, because you get more up-to-date information instead of having to wait for a book to come out you can look it up online immediately.” - Mary
<b>Interactive Instructional Technology Always has Problems</b>	“If I am expected to troubleshoot something because, that is kind of where we are now-a-days, if something doesn't work you are expected to figure it out. If they (professors) can't troubleshoot it and they only know the bare minimum then when something messes up, inevitably time will be wasted.” - Carl