Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses

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EVALUATING INSTRUCTOR COMPLIANCE WITH THE UTILIZATION OF TECHNOLOGY IN HIGHER EDUCATION ART AND DESIGN COURSES

A THESIS

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ABSTRACT

College students of today differ significantly from the students of decades past. To keep up with the students' shift in age, development level, and various learning styles, instructors must embrace the technological revolution through supporting active learning strategies and technology integration methods. As classrooms grow more individualized for students in all disciplines, art and design students must be able to benefit from this style of instruction. Technology integration creates a learning environment where instructors connect and engage students in the classroom while also preparing them to join the digital workforce.

This quantitative study surveyed instructors' attitudes toward technology and the degree of technology use in higher education art and design classes. The literature in the study examines the history of technology in art and design, the importance of technology integration, types of instructional tools, and the attitudes and obstacles of art and design instructors in higher education institutions. Exploring instructors' attitudes and theories are fundamental to effective professional growth and development (Avalos, 2011).

To establish a foundation for further research, the researcher identified current art and design instructors' attitudes. The results of the study found that both instructors' attitudes towards computer use and the instructor's instructional method positively impact the level of computer use. Keywords: Active learning, instructors' attitudes, technology integration, higher education art

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INTRODUCTION

Introduction

Technology innovation occurring in the field of art and design education has rapidly progressed throughout the decades, resulting in fundamentally different approaches to art and design instruction (Eisner & Day, 2004). The idea of integrating technology in the art and design classroom is not a new concept; the origin of these combined practices created a relationship between engineers and artists. These two fields embrace the connections between art, design, and technology, which provides a new medium with an extension of artistic tools to utilize.

In today's art and design classroom, instructors must refine teaching methods, moving toward the integration of innovative teaching methodologies. The push for the presence of technology in art and design has never been as relevant as it is today. Research published in the past two decades highlights the benefits of using technology to make classroom learning more relatable to "screenagers" (Livingstone, 2011) or "digital natives" (Prensky, 2001). All art and design courses use some level of technology, whether it is during the process of creating, planning, documenting, or exhibiting.

The surge in the popularity of STEM-related majors has steadily increased since the Great Recession. However, small art colleges are struggling to survive (Schorr, 2019). These colleges struggle due to the perception that students with art degrees face debt and unemployment (Pearce, 2019). To avoid this dilemma, Pearce suggests that students acquire skills that are relevant to today's arts. As technology becomes more enmeshed into the higher education curriculum and today's workforce, it is essential to examine how art and design instructors are responding to the digital age. Higher education art and design classes provide a

comprehensive environment for researchers and instructors, to examine the utilization of technology to its fullest capacity.

In the field of art and design, there is no universal teaching method for learning digital programs or literature. Teaching methods vary from traditional lecture where students learn primarily from tutorials while the instructor is present in case problems occur. Tutorial based web instruction is a way to use active learning; utilizing technology as an instructional tool. Students engage in instructor-prepared, problem-based learning interventions helping students examine and assess the information learned in class (Mousavi, Akbar, and Farzad, 2014).

Webb, Jones, Barker, and Schaik (2004) suggest the influence of computer technology on education is multifaceted, and that electronic delivery is highlighted in current higher education courses. In today's academia, the virtual tools of art and design studios include simulations, digitized images, and games pointing toward a new way of teaching and learning. Students are no longer limited to textbooks and lectures; instead, they are engaging in digital education providing dimensional and creative instruction. This method of learning readily benefits any student with internet access. Moreover, the platform of virtual environments empowers students and teachers while giving students the opportunity of active and interactive learning.

Raein (2004) stated,

> Traditionally, art and design education in many higher education institutions has been characterized by a split between the teaching of theory and practice…there exists common ground between theory and practice in the form of research and that this common ground provides opportunities to integrate the two (p. 163).

Theoretical models have been vague in making distinctions between "art" and "design" because of the constant computer technology innovations and adaptions and changes in education. The

distinction becomes lost in translation, especially when schools include art in their name, such as The Academy of Art, which also focuses on design education. In essence, schools promote and market art and design as one. This paper uses the term "art and design" to acknowledge both.

The extensive use of computers and technology in almost all facets of daily life illustrates its important role in art and design higher education. Aldridge (2004) advocates that computer technology is a major component of our modern society, and the demand for it will only expand. Therefore, instructors must study the effects of creating an academic culture that uses technology as an instructional tool. McCracken expanded the connection between design and technology by stating:

> As a human soul is to the body, design is to technology. It is important to understand the interdependence and complimentary nature of technology and design. Like the inseparable relationship between body and soul, technology is incomplete without design. Design cannot be fully appreciated without an understanding of technology. If technology is to be fully understood, then the concepts of design need to be understood (p. 87).

Darts (2004) and Garber investigated the study of visual culture through art and design education. Educator explorations of visual culture as an educational strategy offer the potential to empower students coping with the social, cultural, and political stresses found in everyday life. Garber claims encouraging students to develop their voice requires teachers to gain a greater understanding of the many contexts and outlets that students deem essential. For example, as instructors investigate the visual culture of academic youth, their ability to communicate with the young adult culture significantly increases (Garber, 2004).

Research demonstrates that an instructor with positive attitudes toward technology

integration is more likely to use technology as an instructional tool in their lessons (Albirini, 2006; Al-Zaidiyeen et al., 2010; Cavas et al.,2009). As future research examines variables affecting attitudes towards technology, it will provide explanations for limited technology use in higher education art and design classrooms (Mumtaz, 2000). Since the extensive use of technology in our daily life continues to expand, instructors should help students prepare for being digitally literate in the workforce (Kalanada, 2005). Researchers continue to study the influential variables that contribute to the lack of acceptance of technology innovation in classroom settings.

The Teaching, Learning and Computing Study, performed by Center for Research on Information Technology and Organizations (CRITO), pioneered the examination of instructors and students who use technology in the classroom. In regard to investigating the relationship between computers and learning behaviors, Becker (1999) stated,

> This relationship is perhaps due to the fact that technology provides students with almost unlimited access to information that they need in order to do research and test their ideas. It facilitates communication, allowing students to present their beliefs and products to broader audiences and also exposes them to the opinions of a more diverse group of people in the real world beyond the classroom, school and local community — all conditions optimal for constructivist learning.

The relationship between computers and learning behaviors serves as a model for student-centered learning. Students can direct their learning while taking advantage of computer access to online resources or the instructor for help. Computer use in the classroom to achieve lesson objectives is another topic of interest because research indicated that computers play a vital part in technology education (Sanders, 2001, p. 47).

Guston (2006) states that this new generation of students not only requires technology in the classroom, but also needs to engage in specific topics, as the internet has been part of their life since birth (Gu, Zhu, & Guo, 2013; Margaryan, Littlejohn, & Vojt, 2011). A study directed by The Educause Center for Applied Research (ECAR) (2012), reveals that students utilize mobile devices, such as smartphones and tablets, in higher education. However, despite students using technology often, they rarely use technology for educational purposes outside the classroom unless directed by the instructor. Instructors in all disciplines should help students learn and retain information more effectively using technology that students are already utilizing. Studies show that students' technology use in education seems to correlate to their teachers' technology use (Inan & Lowther; 2009). When students do not witness their instructors using technology as an educational resource, they are more likely to shy away from using technology for an educational purpose (Ritzhaupt et al., 2012). Proficiency in technology and using the internet as a resource can better prepare students for a digital workforce. Although computer technology in education is a common topic for research, studies on instructor's attitudes regarding technology and the level of computer technology use in art and design programs in higher education are lacking.

To gain a better understanding of technology as an instructional tool, one must understand traditional teaching methods most commonly used in a higher education setting. The following chart depicts the traditional pedagogical model used in both K-12 and Higher Education alongside the andragogical model, which focuses on adult learners.

Assumptions		
About:	Pedagogical	Andragogical
Relevance of learning	Do what the teacher asks	A reason that makes sense to the learner
Concept of the learner	Dependent personality	Increasingly self-directed
Role of the learner's experience	To be built on more than used as a resource	A rich resource for learning by self and others
Readiness to learn	Uniform by age-level and curriculum	Develops from life task and problems
Orientation to learning	Subject-centered	Life-centered
Motivation to learn	By external rewards and punishment	By internal incentives, curiosity

Risley, (2012)

Figure 1. Assumptions and Process Elements of the Pedagogical and Andragogical Models of Learning

Understanding the needs of an adult learner is critical for both instructor and their students. The instructor, an adult learner themselves, needs to understand the importance of technology integration and the role technology plays in their daily life before they can successfully use technology as an instructional tool.

An adult learner is defined as a person twenty-five years of age or older, enrolled in an accredited academic program to obtain additional education (Aslanian, 2006). There is no single philosophy of learning that can be applied to all adults. Research suggests that adult learners have different learning needs when compared with children and teenagers (Huang, 2002). There are numerous theories about adult learners with which instructors should familiarize themselves to meet the needs of adult learners. Malcolm Knowles (Galbraith & Fouch, 2007) pioneered the field of andragogy, the study of adult learners.

Knowles (1984) also outlines six assumptions of andragogy based on characteristics found in his study of adult learners:

1. Adults must understand why they need to learn something before attempting to learn it.
2. Life experiences play a large role in determining final outcomes.
3. Adult learners feel responsible for their own decisions.
4. Adults are ready to learn things that can be applied to real life situations.
5. Adults display more motivation to learn when instruction is relevant to their problems or life tasks.
6. Motivation to learn is a response to external situations (p. 57-63).

Risley (2012) elaborates on one of the Andragogical Assumptions, readiness to learn, and explains the importance of planning relevant learning for adult learners. Adults need to understand the purpose of learning the specific subject matter since they will exert time and energy, deciding the advantages and disadvantages of the new material. To achieve this, instructors must expand on relevance and help students make connections that apply to their daily life. As facilitators of learning, instructors should give personal examples to create a stepping-stone for students to make relevant connections. When relevant connections are not apparent, students will disregard the information. For instructors to integrate technology successfully, it's necessary to understand the principles of *andragogy*—the art and science of helping adults learn—and how it differs from *pedagogy*—the art and science of teaching youth. These principles give instructors the ability to understand the role of technology in their life and help them adjust their teaching to encourage the use of technology as an instructional tool in the classroom.

Adult learning readiness is apparent when adult learners acknowledge the information pertains to their life. Significant life changes can result in a willingness to learn by exposing adult learners to leaders in their industry, and by helping students bridge the gap from classroom to career. This strategy will kickstart their readiness to learn. In the same way, instructors may be reluctant to learn how to integrate technology into their curriculum effectively. By investigating skills their students need to excel in the workforce, may motivate and encourage an instructor's readiness to infuse technology into their lessons (Risley,2012).

The difference between adult and pre-adult learners focuses on the level of experience the individuals bring to their educational studies. Adult learners older in age bring more complex and diverse backgrounds, life experiences, and knowledge bases (Kasworm, 2003). Knowles (1984) states that adult learners show genuine interest in solving problems that occur in their lives. Research supports the need for adult learners to be self-directed in their academic achievements. The most effective methods for teaching adult learners revolve around the learner’s life experiences and interests (Brookfield, 1986; Cross, 1987; Merriam & Caffarella, 1999). Adults learn at a more accelerated level than pre-adults, as they relate previous experiences with their educational work (Dinmore, 1997).

Learning is a process where the learner constructs relationships between different parts of new information and between that new information and their prior experiences. According to a study on adult learners and technology, adult learners and the adult educator are interactive influences on the process of learning in relation to technology (Kizzie, 2004). The adult educator is affected by three items: professional credentials, teaching experience, and training; learning contexts, such as specific levels of student critical thinking skills, specific prior content knowledge on which to base their instruction upon; and whatever knowledge, skills, and abilities

students bring with them into the instructional setting (Kizzie, 2004). As higher education instructors, the role of an adult learner does not stop but becomes more critical as an adult educator. According to Palmer (2007), the obstacles instructors experience in the classroom are likely a mirror of the instructor's inner life, past experiences, and bias. An instructor can experience successful technology integration when they understand their preferred teaching and learning practices. An instructor can experience successful technology integration when they understand their preferred teaching and learning practices. Palmer, (2007) theorizes about the difficulties instructors experience in the classroom; they mirror the condition on the instructor's soul. If an instructor can analyze their moments of defeat and adversity instead of running from them, they have a chance of gaining self-knowledge. Self-knowledge helps instructors propel the learning process of technology integration. If an instructor is unwilling to focus on self-reflection and hesitant about using technology, they will be less likely to implement technology in the classroom. Self-reflection, like technology, requires a high degree of trial and error.

Equipping art and design students to use technology in their field of study adequately should begin with relevant utilization of technology in the classroom by the instructor, adult learners.

Instructors should understand the intricacies of the adult learning process to ensure success inside and outside the classroom as they and their students pursue life-long learning. As instructors investigate and remain alert to academic learning styles, they provide student motivation and prosperous adult learning (Pereira & Aherne, 2009).

Traditional Learning

Higher education institutions traditionally use a lecture-based delivery method. Students must listen intently while diligently taking notes and communicate directly with the instructor to succeed. Participation here is characterized by listening as the instructor has authority; there is rarely discussion or working together with classmates. The basis of this learning process is collecting information or obtaining the "what." Students learn and perform tasks set by the instructor, while the instructor also creates the structure of the class and how time is utilized (Allen and Tanner, 2005). Many instructors use more traditional based methods because they were taught this way. Traditional passive forms of learning do not excite students born into a culture of widespread technology, thereby creating a decreased level of achievement (Taylor, 2010). Many art and design undergraduate classes with large class sizes use traditional lecture, which is useful in spreading information to a large body of students, but overall this method creates passive surface-level learning without meaningful application. (Brandsford et al., 2000). Traditional style learning studies show lecture-based lessons fail to motivate and increase student confidence, (Weimer, 2002) while active learning styles can improve attitudes and increase learning outcomes (Freeman et al., 2007; Knight and Wood, 2005; Preszler et al., 2007; Prince, 2004; Udovic et al., 2002).

Blended Learning

In contrast to the traditional lecture, blended learning (BL) methods integrate technological innovations for the primary learning delivery system. Blended learning techniques can include online classes and tutorial-based learning with minimal instructor interaction. The BL method goes beyond the earlier technological advances of simply adding a computer to the

classroom, providing a fundamental shift in the student's learning experience. There is no universal way to teach blended learning; it is a mixture or hybrid of different learning styles. Typically, blended learning classroom activities are facilitated by the instructor, using technology as an instructional tool. Examples of blended learning include online learning resources like tutorials or recorded lectures and facilitated independent study time to master material learned from lecture. Online instruction and tutorials are watched outside of the classroom, leaving classroom time for structured problem-solving exercises and application of learned online material (Lopez-Perez, Perez-Lopez, & Rodriguez-Ariza, 2011). The beginning of the semester utilizes classroom time, and as the semester progresses, students are given more outside online work. Blended learning offers advantages over traditional learning by providing students the option of having a virtual social presence, self-study, increased discussion between students and instructors (Bourne, 2005), and creates possibilities for group projects (Eiil, Pilot, & Voogd, 2005).

Today's instructors have a much different role in the classroom, thanks to the increase in computer-based education during the past three decades. The rise of online learning continues to develop as a reliable and cost-effective form of instructional delivery for universities (Huang, 2002). Studies conclude that online classes boost critical thinking abilities and provide better performance outcomes compared to traditional based learning (Bourne, Harris, & Maydas, 2005; Guiller, Durndell, & Ross, 2008; and Robertson, Grant, & Jackson, 2005). Blended learning solves the disconnect between effectiveness in learning outcomes and engagement in learning. A combination of traditional learning mixed with technology helps connect both learning styles in the following ways:

- Today's instructor is more of a facilitator with their primary goal of inspiring and equipping students with skills to utilize their online experiences and independent study time in the most efficient way;
- Instructors create online and offline content for the classroom;
- Instructors create and facilitate communication on online platforms; and
- Instructors produce learning material that reinforce the students' learning experience.

Labbo and Place (2010) describe integrating technology as "the infusion of technology as a tool to enhance learning in a content area or a multidisciplinary setting." Instructors must be ready to use a variation of technology applications to aid student learning, but to do this effectively, instructors need to navigate different modes of technology efficiently.

Definitions

Technology as an Instructional Tool - defined by Malhotra (2002) as "Instructional technology includes hardware and software, tools and techniques that are used directly or indirectly in facilitating, enhancing, and improving the effectiveness and efficiency of teaching, learning, and practicing marketing knowledge."

Technology Integration - defined as "Technology is an instructional tool; using it in an integrative fashion is an instructional strategy. It is a tool for delivering content to learners" (Woodbridge, 2004, p. 1). For successful technology integration the technology being used is a tool or a means to creating the end results and not the focus of the lesson (Cauley et al., 2009; Project Tomorrow, 2011; Thompson, 2013). For example, using a graphing calculator in a math

class, the focus is the graph created by the student through the technology device and not the graphing calculator itself.

Technology – defined as "human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities" and "the innovation, change, or modification of the natural environment to satisfy perceived human needs and wants" (ITEA, 2000, p. 251).

Technology Education – defined as "the study of technology, which provides an opportunity for students to learn about the processes and knowledge related to technology that are needed to solve problems and extend human capabilities." (ITEA, 2000, p. 251)

Teacher/Instructor – teacher and instructor are used interchangeably. A teacher defined by Merriam-Webster dictionary (2003) as "one that teaches or one whose occupation is to instruct. In this study it is referring to teachers/instructors in a higher education art and design setting.

Level of Computer Utilization for Instructional Purposes - defined as "the use of computer or electronic devices and its software for lesson preparation, lesson delivery, evaluation, communication and administrative record keeping (i.e., grades, attendance) as measured by the instrument developed for this study." Level defined by the Merriam-Webster Dictionary (2003) as "a position in a scale or rank; computer was defined as a programmable electronic device that can store, retrieve, and process data."

Student-Centered Education - puts the learner at the center of the classroom, rather than the instructor. "Student-centered classroom practices engage students in activities that require reasoning, discovering, problem-solving, data gathering, application, and communication of ideas" (Golightly, 2010, p. 234)

Attitude - defined by Merriam-Webster Dictionary (2003) as "a feeling or emotion toward a fact or state." Instructor attitudes for the purpose of this study were defined as instructor's feelings toward the use and integration of computers as tools for instructional purposes as measured by the instrument developed for this study.

Active Learning - defined by Bonwell and Eison (1991) is instructional activities involving students doing things and thinking about the task they are doing. Instructors use approaches that require students to use higher-order thinking and have instruction more student-centered.

Characteristic - was operationally defined as demographic information about higher education art and design instructors as measured by the instrument developed for this study.

Andrology - a scientific discipline studying the theory, processes and art of and for learning, teaching, instructing, guiding, leading, and modeling/exemplifying a way of life, which helps adults fulfill their full degree of humaneness or simply – the art and science of helping adults learn Risley (2012).

Thesis Statement

The purpose of this study was to investigate the degree to which technology is used as an instructional tool in art and design classes. And to survey the attitudes of art and design instructors regarding their use of technology in the classroom.

In our technological age, it is becoming unacceptable for an instructor to spend the entire class lecturing in front of the classroom; they need to utilize different modes of teaching. Often, instructors fear giving students more control of their learning process because they like to maintain control and order in the classroom. Saulnier (2009) states, "Instructors find it threatening to give up some control and power—in the learner-centered approach, faculty are no

longer the sole content expert" (p.78). Despite instructor reservations, current studies assess the techniques, benefits and effectiveness of using technology as an instructional tool in the classroom (Jamieson-Procter et al., 2013; Jorge et al., 2003; Young, 2003).

In chapter two, the a review of the literature introduces the background of classroom learning, history of technology in the classroom, positive effects of technology used as an instructional tool, and instructors' attitudes toward technology. Additional studies provided outline the disadvantages and obstacles instructors face while using technology as an instructional tool.

Further research will help make instruction more personalized and provide opportunities for collaborations, preparing students for a digital workforce.

Significance of the Thesis

Research on instructor use of technology and technology-based teaching strategies in art and design settings are limited at best. Academic studies examine large lecture-based classes and technology but have not researched effective teaching methods for art and design students. By examining the different factors of technology use and the attitudes of instructors, research can differentiate between characteristics that improve instruction and others that hinder learning. This study may help inform higher education faculty on how art and design instructors collectively perceive technology and their current ability to incorporate technology in the classroom. With this information, instructors and administrators can enhance their faculty development programs to encourage technology and training (Hochberg & Desimone, 2010).

Technology integrations should not hinder teaching, but instead, create excitement in the classroom. Students should be included in both the learning process and the facilitation of

learning. Peterson, Albaum, Munuera, and Cunningham (2002) state, “any new instructional technology should allow a student to learn more, learn faster, and learn easier” (p. 14). Technology use as an instructional tool in the classroom helps students share their work and receive immediate feedback from other students and the instructor. Students gain access to experts who otherwise would not be available (Peppler, 2013). Instructors need adequate planning, training, and preparation to create this type of learning environment.

Yong, Gates, and Harrison (2016) explain that adults not born into the digital age might assume students spend too much time on social media, internet platforms, and gaming consoles. Their assumption implies more time on technology results in students spending less time studying. Prensky (2001) claims that teaching methods used 20 years ago will not work on the current generation of students. Therefore, instructors need to understand the needs of students born in a digital age, and consider how to adapt teaching methods to create an environment that resonates with students.

In 2016, the University of Minnesota research program examined the employment status of 15,000 degree holders 12 months after graduating. Fine arts placed last in the study with an unemployment rate of 9.1% —lower than a high school drop-out. Fine art graduates most commonly found employment as art teachers, craft artists, and illustrators (Garcia, 2018). In a continually changing and challenging workforce, students need not only to obtain information, but also implement knowledge in real work scenarios. Using technology as an instructional tool in an active learning setting builds skills and processes for future industry workers instead of focusing on learning objectives.

Billions of dollars are spent on educational technology worldwide to keep up with technological advances. (Norris et al., 2003). In the United States, the American Recovery and

Reinvestment Act, ARRA, established that $650 million was invested in educational technology from 2009-2019 (Pelosi, 2009); however, the investment is not being utilized adequately in the classroom for teaching purposes (e.g., Middleton & Flores, 1997; Thomas, 2006). As instructors shift towards technology integration delivery methods, students may experience increased content comprehension, better performance outcomes, and increased retention rates within the classroom (Edmunds, 2007; Solvie & Kloek, 2007; Lopez-Perez, Perez-Lopez, & Rodriguez-Ariza, 2011). The rise of innovative teaching provides students with more learning opportunities and results in a deeper and more meaningful learning experience (Winters & Acevedo, 2005). Students are more involved and motivated in education when they were actively part of the learning process; they see the direct correlation their classroom assignments have with their future career. (D'Aloisio, 2006). More information concerning technological innovation is needed for implementing successful technology integration in art and design classrooms.

Even with the overabundance of technology-based innovations, there are still questions about instructors' reluctance to use technology as an instructional tool in the classroom. Instructors, as a community, carry the responsibility for preparing students for a future that includes technology skills (Hohlfeld, Ritzhaupt, Barron, & Kemker, 2008; Jones, Fox, & Douglas, 2011; Larson & Miller, 2012; Voogt & Roblin, 2012). Extensive research is needed to understand the instructors' attitudes to learning new technology to encourage and understand the adoption of technology innovation in art and design classrooms.

To better educate instructors and influence training decisions, higher education stakeholders must evaluate the attitudes instructors hold towards the use of technology. Effective use of this data may encourage instructors to implement technology as an instructional tool. Analyzing instructors' attitudes and levels of technology use aids higher education institutions in

making informed decisions; they aim to motivate and encourage instructors to use technology that captivates students and emphasizes digital principles in the classroom.

Students and instructors benefit from adopting technology-based active learning strategies. Technology as an instructional tool helps teachers increase student motivation and increase the effectiveness of their lessons. If students are actively engaged, they are more likely to achieve higher learning outcomes (Zyngier, 2008). Despite our technology-infused society, many instructors do not incorporate technology in the classroom, even when training and technology are readily available (McLeod, 2007). Perceptions and personal experience with technology may influence instructors' use of technology with students. Palmer (2007), an education activist, writes about issues in education and community. The framework of his work is based on this belief, "We teach who we are."

> Teaching...emerges from one's inwardness, for better or worse. As I teach, I project the condition of my soul onto my students, my subject, and our way of being together. The entanglements I experience in the classroom are often no more or less than the convolutions of my inner life. Viewed from this angle, teaching holds a mirror to the soul. If I am willing to look in that mirror and not run from what I see, I have a chance to gain self-knowledge — and knowing myself is as crucial to good teaching as knowing my students and my subject (p. 2-3).

Palmer (2007) suggests that instructors "more familiar with their internal terrain" become more confident and successful in their classroom. Essentially, the effective measure of technology as an instructional tool relies on an instructor's self-awareness. Palmer (2007) strongly recommends that instructors focus on self-reflection, then engage in professional collaborations to guide them to improved teaching practices. Haertel and Means (2003) determined that gauging technology

use in the classroom and the impact it has on learning requires multiple studies. The researchers stated that no single study or methodology was sufficient when investigating the research (Haertel & Means, 2003, pp. 257–258).

The impact of attitudes and beliefs on technology use in the classroom is a growing topic of research. A case study using award-winning technology integrators found multiple external and internal barriers reduced technology integration in the classroom. Instructors revealed one the of strongest obstacles in technology usage was their attitude toward technology and their current ability and knowledge (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). To gain a better understanding of instructional technology, exploring the barrier preventing instructor technology use is essential.

Goals of the Thesis

Instructors are given the freedom to teach students based on their experience, background, research, or how they see fit. This method of teaching creates a disconnect between the instructor-created course and the students' learning art and design principles.

The National Center for Education Statistics (2010) found that computers were utilized by 69% of instructors for educational purposes. Within this, 97% of the instructors used computers for school email, 94% used computers to submit grades, and 93% of teachers used computers to keep attendance records. The percentage of instructors who did not use computers for administrative tasks did their work by hand. This data demonstrates that instructors are more likely to use technology for administrative purposes than classroom instruction. While Institutions are adapting to the technology era, some instructors are deciding not to adopt new strategies. The goal of this study is to endorse meaningful active learning strategies utilizing

technology as an instructional tool to better preparing students for a digital workplace. The goal of the research is to determine the characteristics of instructors who use technology as an instructional tool and investigate differences between them and instructors who use a more traditional approach.

Constraints: Assumptions

This study assumes that participants responded to the survey with honesty, based on their knowledge and background. Secondly, the researcher assumed that instructors with positive attitudes toward technology and active learning strategies would be inclined to employ those strategies during class. An online survey was created to conduct the study, and the researcher assumed that based on previous research, instructors would be familiar with basic website navigation to complete the survey. Once the participants completed the survey, the researcher assumed that it would find differences in instructors who incorporate active learning strategies.

Limitations

This study focuses on attitudes instructors hold toward technology-related active learning strategies and traditional teaching methods. Some factors were not explored during the investigation that may impact technology related active learning strategies, such as budget constraints, access to technologies, or the timing of the survey's distribution. Due to timing complications, the surveys were distributed during the summer. This extended response times and could have caused a significant reduction of total responses. Further research can examine whether instructors use technology integration more when the constraints are removed. Most art and design students have access to computers, and therefore instructors may have significantly

more opportunities to implement technology compared to other disciplines. This suggests that more research is needed in examining the attitudes of instructors in other disciplines.

Research Questions

1. What levels of technology is used for educational purposes by art and design university instructors?

2. What are the attitudes among art and design instructors toward the use of technology for educational purposes?

3. Is there a significant relationship between types of technology used and art and design instructors' attitudes toward technology in the classroom?

4. What is the proportion of the variance in the attitudes of art and design instructors toward technology in education that can be explained by the selected independent variables (as well as instructors personal characteristics) and the relative significance of each independent variable in explaining the dependent variable?

LITERATURE REVIEW

Theoretical Framework

Martin Fishbein (1967) began examining the relationship between beliefs and attitudes. In 1970, with the assistance of Icek Aizen, they formed the Theory of Reasoned Action. The Theory of Reasoned Action assumes that a person's theories about behavior and predicted outcomes represent the person's attitudes. Subjective norms are comprised of a person's observed social pressures to participate in activities. Therefore, when an individual's subjective

standards and attitudes are positive, they are more likely to engage in certain behaviors. This philosophy of thinking and accepting technological innovation also supports Everett M. Rogers' Diffusion of Innovations Theory (1995).

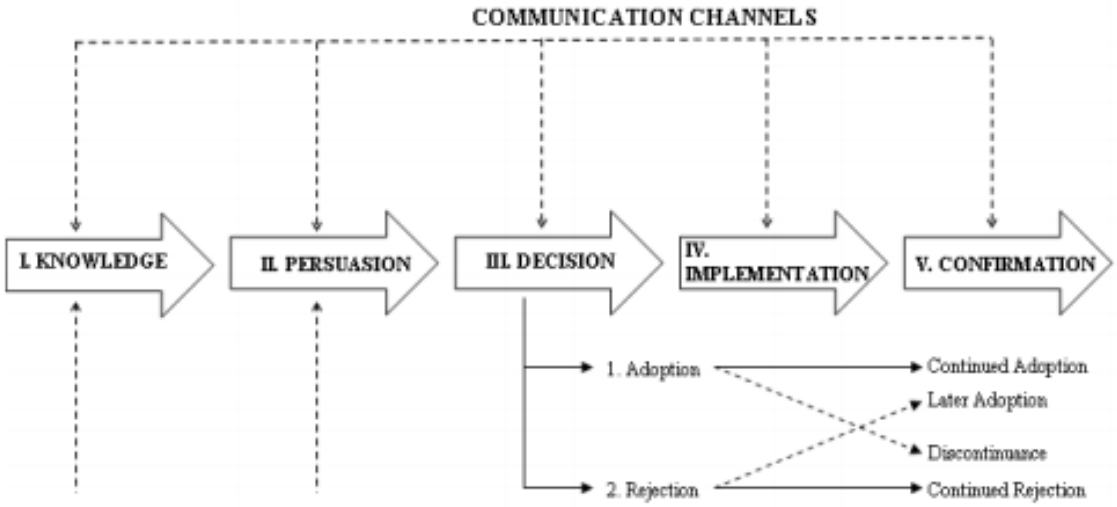
Rogers' Diffusion of Innovations Theory serves as the theoretical framework for this study. Innovation, defined by Rogers, is an idea, practice, or object perceived as new by an individual or another unit of adoption (Roger, 1995). A person may be indecisive or have positive or negative feelings that link to adopting or rejecting the idea. Typically, people must perceive a benefit involved to embrace technological innovation. Considering education as a field has been around for centuries, computer use as an instructional tool in classrooms is considered a recent development, despite having been available for decades (Roger, 1995).

Rogers describes adoption of an innovation as a domino effect in the population, and there is a "tipping point" to where an idea can catch on and spread. Rogers' concept of the "tipping point" derives from the Diffusion of Innovation Theory. This theory is a set of generalizations regarding technology that spread throughout society. Diffusion is the process by which an innovation is communicated through specific means over time among the population (Roger, 1995). Every member of the community has decisions to make when following the 5-step process.

Diffusion of Innovation: Five–Step Decision-Making Process of Diffusion

The diffusion process occurs during the five-steps of decision making. The process happens over time through a series of communication channels among members of the social system (Rogers, 2003).

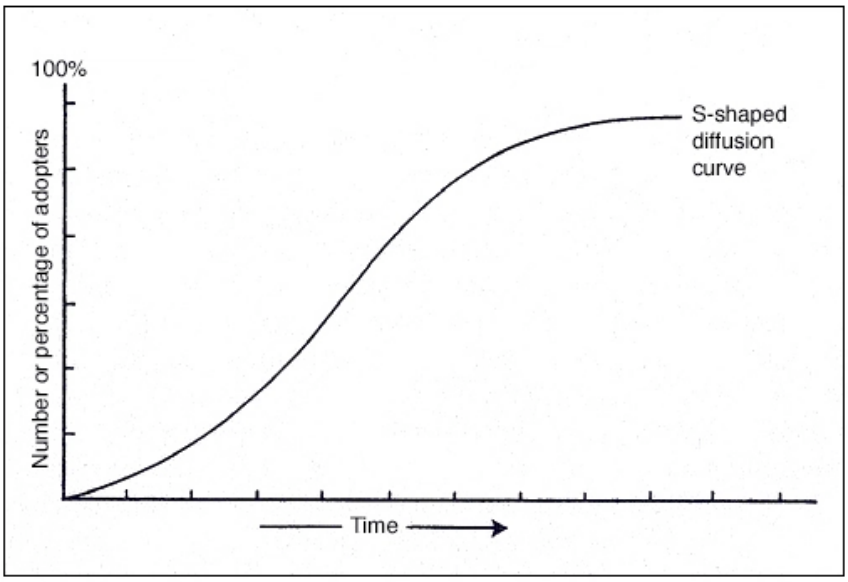
1. **Knowledge** – A person develops an awareness of the innovation and has assumptions on its purposes.
2. **Persuasion** – A person creates a positive or negative attitude toward the innovation.
3. **Decision** – A person participates in activities that lead to a choice to adopt or reject the innovation.
4. **Implementation** – A person actively participates in using the innovation.
5. **Confirmation** – A person assesses the results of the innovation which leads to a decision of acceptance.



Rogers, (1983)

Figure 2. Five Stages in the Innovation-Decision Process

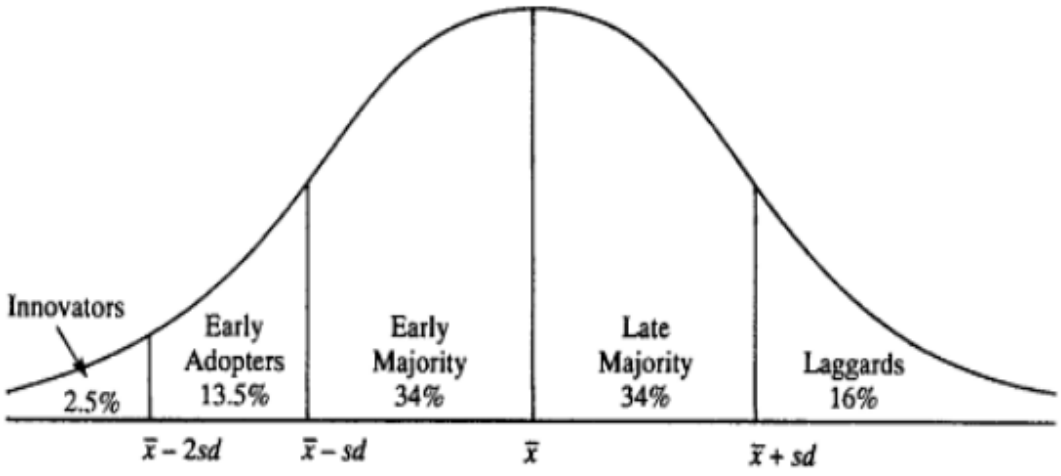
The decision to adopt innovation, according to the theory, relies heavily on other choices in the population. In Rogers'previous (1983) study, he shows the success of innovation following an S-shape curve. Statistically, after 10-25% of people in the system adopt an innovation, the innovation rapidly spreads until the rest of the people who make up the system adopt the innovation.



Rogers, (1983)

Figure 3. S-shape curve

At the beginning diffusion of the innovation process, there is only a small number of members who adopt the innovation (Rogers, 1983). The adopters of innovation are shown in the figure below.



Rogers, (1983)

Figure 4. Diffusion of Innovation curve

The innovators and early adopters represent a group that works within their creativity and do not need an outside incentive to integrate the innovation. The early majority and late majority groups require an introduction to the innovation that conveys directly to their needs, including persuasive evidence showing proof of results (Rogers, 1983). Laggards typically represent the population of non-adopters.

The common belief is that diffusion of innovation occurs naturally without the help of technology transfer activities or agents. The blame falls on the recipient when natural diffusion does not occur. In this study, the recipient is the instructor. The non-eager attitudes of recipients of innovation turn away change agents, causing increased likelihood of non-eager recipients to adopt. This situates more blame on individuals who are late adopters.

D. Jacobsen (1998) suggests that the challenge is not to blame or attempt to change instructor attitudes, but rather to design educational systems that reflect instructor social systems and patterns of diffusion. She explains the importance of having a foundation of support for all instructors if early adoption is to occur (p.7). Jacobsen (1998) also provides a perspective of constructive research to help explain the significance of the diffusion process in technology integration:

> If we are to understand how technology is diffused and what kind of adaptation is needed, we must understand the context of technology and education in the broader culture. The perceptions of the teachers, students, in the process, their real reasons for use and nonuse, require research that is reflective, grounded, and open. Studies that focus on the social context of technology for decision-makers, teachers, and students are the most productive new perspectives for diffusion and adoption research (p. 1130).

History of Technological Innovation Adoption for Learning

The digital revolution changed the method of working, learning and producing a product. Johnson (1997) explained, "The worlds of technology and culture are colliding" (p. 180) The computer and internet are the prominent representation of how our hemisphere assimilates and constructs information to create a global sharing environment. The world we live in today provides the ability to share and learn information at the click of a button, but elements of this began decades ago. According to Rogers (1995), during the knowledge stage of the innovation adoption process, the hypothetical adopter not only learned about the presence of the innovation, but also understood how it functioned. Educators have paved the way for technological advancements by mastering and adopting innovations over the past four centuries.

The 1600s

In the 1600s, education relied mostly on hornbooks and magic lanterns. Hornbooks contained and taught basic things like alphabets (vowels and consonants). Being a single sheet, they were laminated to prevent wear and tear from regular handling. The lamination for hornbook came from sheep or ox horn. Likewise, magic lanterns were invented in 1646. Apart from theaters and homes, they were used in classrooms to improve learning and student engagement. The device projected the subject matter from photographic slides onto a screen for the audience (Websters, 2009).

The 1800s

The 1800s witnessed invention of slates and blackboards along with the calculating engine and typewriter. Slates and chalk became the standard form of writing medium for people. However, the slate was only useful for keeping limited information because of its small size, but one had the luxury of erasing the chalk writings so it could be used again. Blackboards, which

were large slates bound by wood to prevent the board from breaking, allowing more writing space for teachers. However, because of the concern of toxic chalk waste, blackboards slowly went out of use. Charles Babbage came up with the calculating engine in 1822. It formed the base for modern day computing. This was followed by the invention of typewriters in the year 1873 by Christopher L. Sholes. It helped with faster writing, which previously solely depended on manual writing (Websters, 2009).

The 1900s

The 1900s brought the greatest number of changes concerning technology, ranging from stereoscopes to the Apple II. Stereoscopes enabled people to view images in 3D. It gave students three-dimensional images of concepts related to a lesson. This was followed by Film projectors, which were like the magic lanterns but used film strips for presenting information. Films were accompanied by audio recording from an audio recorder and stayed popular until the 1980s in libraries as an information source. The 1930s and 1940s added Radio in schools, which broadcasted lessons for other schools over the air with the help of radio stations. Another invention was the Overhead projector, which had transparent sheets that could be used as a surface for writing and later erased for reuse. The notes, which were prepared before the class, were reflected on the screen during the class presentation, and eliminated the need for a chalkboard at the front of the classroom.

Individual dissemination of materials followed with the invention of the Mimeograph, which could be used for printing classroom materials. The prints were made by manual cranking of an ink drum which forced ink through a stencil onto paper. Adding to the individualized learning process**,** Headphones entered the classrooms**,** allowing for each student to listen

separately to audio taped lessons. The listening stations were known as ‘language labs’ (Websters, 2009).

As the century went on, certain inventions were quickly made obsolete as quicker and more efficient technology took its place. For instance, the mimeograph machine was replaced by the Photocopier which enabled easier and faster copying of classroom materials. The audiotape and headphone method was, in some ways, replaced by Telecast. The University of Houston paved the way for computer-based learning in the 1950s when they offered the first college class via public television station. The telecasts were made available mainly at night so students who had day jobs could watch them. By 1960, the television station, KUHT, devoted one-third of the programming to education, resulting in over 100,000 semester hours that had been taught via telecast. Telecast was, however, replaced later by computer-based programs. Innovators created computer-based programs (CBI) to test, tutor, and aid students in learning along with assisting instructional programs. By the 1980s computers had made their way into classrooms but were used sparely and never as the primary teaching method (Websters, 2009).

The Havering Computed Managed learning system was created in London and, only a decade later, it had grown to service 10,000 students and teachers in academic subjects; such as science technology, math, career assistance, and industrial training. Computer-based learning continued to blossom but also had its limitation, the average memory in the 1980s was 16,000 bytes (as compared to 128,000,000 or more today) (Websters, 2009).

The 1980s also saw the arrival of the Apple II, a desktop computer that allowed students to learn geography and math via games. Many classrooms had a computer that sat in the corner, but was rarely utilized. Classroom computers went unused often because teachers lacked technical knowledge and found it impossible to integrate single student computer use while the

others sat at their desks learning in traditional techniques. While the in-classroom computer went unused, teachers started to send students to the computer lab. The computer lab had a trained monitor that was more technologically savvy, and the monitor could teach software to the class or to groups of students instead of isolating just one student (AL-Bataineh, Brooks, 2003).

Following the success of the Apple II**,** IBM came up with the first personal computer. Initially, it was used for various learning purposes, and it eventually replaced typewriters. As these developed further, drives were added for CD-ROMs that helped store audio and video information on separate disks and that could provide numerous pieces of software that did not need to be stored on the hard drive.

An innovation that would change technology-based learning forever was made accessible to the public in the early to mid-1990s; the internet enabled the distribution of information and resources on various topics over a larger domain via a wired network. What followed were many other technologies that further built on the internet and personal computers. The Interactive whiteboard came into the education scene in the late 1990s. It combined white screen, computer, and projector, making it more sophisticated than the overhead projectors of the 1960s. Pearson, a company best known for its publishing of textbooks, joined the digital revolution with "Pearson Digital Learning." Pearson is still popular today for its learning management system for grades K-12. Other companies also took advantage of the wide dissemination offered by the internet. Lynda.com**,** a revolutionary online tutorial program, was founded in California by Lynda Wieman. Wieman was a special effects animator and professor who used the online support for her books and classes. Now anyone can access tutorials online to learn a broad spectrum of subjects, including digital media.

Research supports the success of computer-based learning and shows it is the most effective structure for disciplines like math (Valdez et al., 1999). However, limitations with computers continued to exist from the lack of time and resources. In spite of this concern, education shifted toward its second phase of technological utilization. This phase was characterized by learner-centered control. For successful integration, technology practices must contain learning theories and specific content methods to develop a meaningful curriculum. To address this need, multimedia applications were developed, allowing students to access a large amount of data needed for problem-solving. These applications increased enthusiasm and motivation in students, as they were able to investigate topics of interest more efficiently (Huang & Law, 2005). Tutorials were the next step in digital learning and were a supplemental method of learning that could be utilized outside the classroom. This technique left more time in class for mastering foundational concepts as well as one-on-one instruction.

The Role of Active Learning in Higher Education

Active learning is a type of blended learning strategy implementing technology as an instructional tool, not simply as a medium (Mosenson & Johnson, 2010). Active learning embodies the fundamental concepts higher education institutions strive to provide students. Briefly stated, “active participation strengthens learning,” regardless of the environment (Niemi, 2002). This makes active learning essential, as universities provide a broader spectrum of education. Active learning promotes higher-order thinking, accommodates for all learning types, encourages student achievement, and increases student motivation and attitudes. (Faust & Paulson, 1985). Students are empowered by taking responsibility for their learning and future.

Lucas, Testman, Hoyland, Kimble, and Euler (2013) investigated the effectiveness of active learning in higher education. Their study examined second, and third-year students earning their doctorate in pharmacology and compared their retention to fourth-year students, who had only experienced traditional teaching methods. The researchers believed that participants who received active learning strategies would show increased performances in retention and application aptitudes. The results showed significantly higher scores for participants engaged in active learning compared with those who experienced only traditional teaching methods.

Utilizing Active Learning in Higher Education

Active learning is increasing in popularity as instructors and researchers continue to explore different ways for students to retain and process information. During active learning, students engage in instructor-prepared, problem-based learning interventions that will help them examine and assess the information taught in class (Faust & Paulson, 1985).

Previous research on active learning sought to prove that active learning techniques were superior to traditional-based learning (Lanier, 1966). Active learning proved superior when the instructor provides specific learning objectives. H. Niemi (2002) demonstrated active learning techniques to be more effective at teaching problem-solving skills, which makes tutorial-based learning an active learning strategy.

In a trial study, W. Ada (2009) used collaborative learning tools to determine the effectiveness of active learning in a group setting as compared to individual learning. The researcher looked specifically at the effect of incorporating small, medium, and large amounts of group work on achievement. The researcher believed an increase in retained, learned, and

recalled information would be seen throughout every group. Although the results depend on a relatively small number of studies, they did show an increase in performance for all group sizes. Their findings supported the hypothesis that active learning would increase information retention.

Other studies have shown performance enhancements when problem-based learning is introduced. A.B. Mosenson and J.M. Johnson (2010) used Fink's integrated instructional design principles to teach students financial analysis through active learning. The investigators hypothesized that whoever incorporated Fink's design would do better on a standardized comprehensive assessment exam. The model of instructional design had three interrelated components: (a) learning goals, (b) teaching and learning activities, and (c) feedback and assessment. The participants of this study were 114 nonrandomized undergraduate students in a School of Business and Economics. Results in performance showed that participants had significantly better performance pertaining to their GPA. These results indicate that student performance can also be observed across educational disciplines. This particular study demonstrates that active learning strategies can be effective in all parts of academia, not only in the digital art field as Mosenson and Johnson (2010) researched performance in science, engineering, and mathematics. The researchers posited that active learning showed an increase in performance over lecturing in these disciplines.

The environment instructors create with problem-based learning as the active learning strategy helps develop enhanced problem-solving skills. Each study has provided valid and reliable results comparing academic performance. These reviewed studies indicate that integrating an active learning strategy can be academically beneficial throughout many scholarly disciplines.

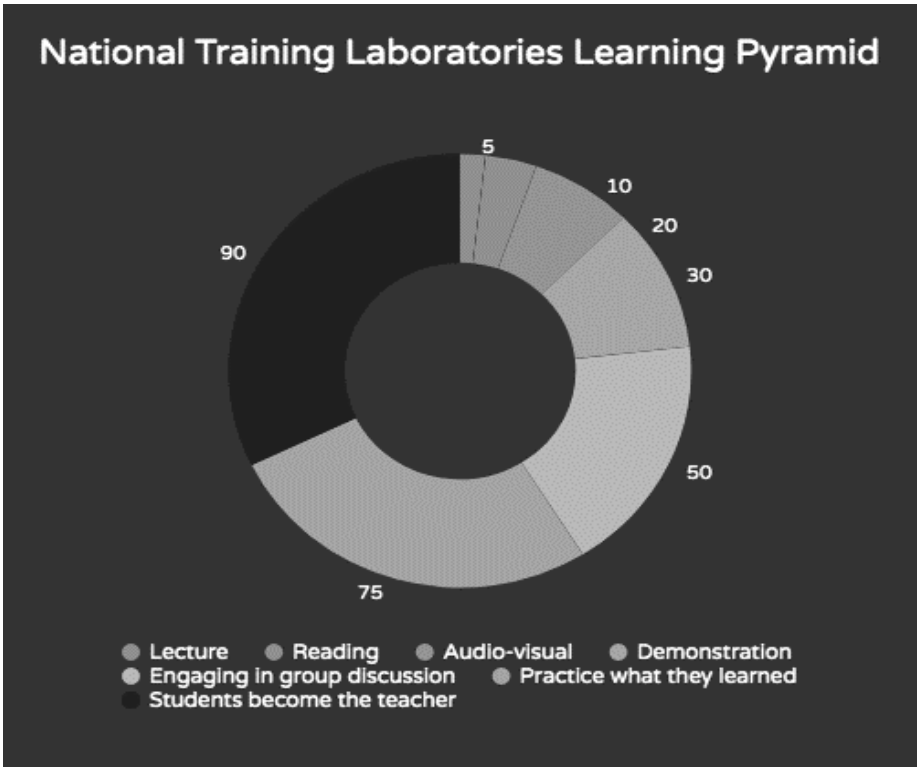
Technology as an Instructional Tool in Active Learning

Technology-based education can be successful when used with active learning strategies. Computers altered the style of teaching for many instructors; they can show students the concepts they are learning in real-time. For example, instead of reading how gases react at different temperatures in a science class, students could view a simulation of the phenomenon. (Courville, 2011). While advancement in technology changes the style of teaching, the role of the instructor should stay unchanged (Avalos, 2011). This section will examine specific strategies for employing technology in digital art and design classrooms, helping students learn fundamental concepts and principles. This section will also explore strategies and the benefits of instructors using technology during the class period instead of relying solely on traditional-based learning techniques, such as lectures.

Some instructors may still consider note-taking as active learning, but according to D. Gregory (1995), students must discuss and be engaged in problem-solving for learning to be considered active and for retention to take place. As Elliot (2016) states, “lectures alone are too often a useless expenditure of force. The lecturer pumps laboriously into sieves. The water may be wholesome, but it runs through. A mind must work to grow.” This beautifully illustrates the phenomenon that occurs during traditional-based learning. Students’ brains are often tired and full of information. When providing information in only one way, the bucket retains some of the water, but by the time it reaches its destination or the day of the test, the bucket is almost empty, making the brain unable to recall the information.

Instructors utilizing technology encourage students to explore new solutions to real-world problems. In the past, students were asked to solve the problems given at the end of each chapter. Instructors focused on covering a large amount of material in a short period, but by introducing

technology, instructors can focus on delivering content effectively. Students learn to solve problems the instructor creates while using higher-order thinking to find the solution to the given problem (Freeman et al., 2007). This practice better prepares the students for success in their discipline after graduation. When creating projects for students, it is vital to not only incorporate new material for students to learn but also to consider the knowledge they already have and build upon their experiences. A traditional style of learning can fail students when instructors use examples or word problems that students cannot relate to in their lives. Solving real-world problems helps students not only learn course material but also teaches them how the lesson can aid in achieving their goals (Walker et al., 2008). Technology, with the guidance of the instructor, helps connect students to their community and the world of tomorrow.



Zyngier, D. (2008)

Figure 5. Student Engagement Categories

Figure 5 demonstrates how learning occurs to the highest degree when students participate in activities or act to facilitate learning. Engagement increases when instructors deliver course material with a technology-driven mode compared to traditional lectures. Students are more active participants during the class period and take an interest in the overall learning process. Student behavior changes when students become active in the classroom compared to the attitudes seen in a passive learning environment.

However, using technology by itself does not automatically increase learning and provide a positive learning experience. Giving students access to a tablet or screen is still a passive form of learning. Technology-based active learning is about giving the lesson a larger design. Researchers Steinkuehler (2004, 2006) and Gee (2003) argue that learning is a social practice, and immersive learning environments are effective teaching and learning tools. S. Kluge and L. Riley (2008) recommended a variety of technology integration activities and applications in art and design education, including producing and manipulating digitized images, supporting graphic design, 3-D modeling and desktop publishing, virtual field trips to art museums, and sharing projects digitally.

Digital technology and higher art and design education can quickly form a partnership; image-making, consumption, and reception are each transformed in the digital environment (Delacruz, 2009). Databases on artists, including full portfolios of their work, critical responses, and background information, are immediately accessible on the internet. Virtual representations of the world's finest museums can become a part of the classroom space when technology becomes an instructional tool in the classroom.

Tutorial-Based Learning

In the technological age, quality tutors are available to everyone through computer-based learning (Bork, 2001). Tutorials were designed to be a supplemental method of learning utilized outside or inside the classroom, leaving more class time for mastering foundational concepts. Art and design programs are adopting a mixed method of teaching using the software training program Lynda.com for supplemental classroom instruction. Undergraduate design students complete required core material primarily through lecture-based learning. Students then navigate through self-regulatory tutorial-based education on Lynda.com for additional insights. Students are likely to succeed in tutorial-based learning when they have self-confidence and an understanding of their field of study. According to Bork (2001), there is no set number of students who may be working on tutorials at one time. Students may work by themselves, in pairs, or as a group of up to four. However, it is stated that smaller group sizes are ideal for staying on task, supporting discussions, and expressing ideas.

A tutorial is most effective when it includes active learning—where the students are more involved in the learning process, as opposed to merely being bystanders. Digital art tutorials can be used outside of the classroom, improving and bettering skills while creating motivation and excitement in the classroom. Students focus on learning the "how," and their assignments involve researching and collecting digital information to inspire them to complete their assignments.

Digital tutorials use multiple mediums of active learning, like images, video, text, and audio, that provide students with a unique experience. This approach benefits all types of learners (Kranz, 2008). If a student misses information during the tutorial, they can 'rewind" and listen to digest the new content fully. Tutorials tend to be less effective in large classes, much

like traditional classrooms. There is less personal attention to students, and one-on-one communication between a student and instructor is nearly impossible during class time. Critiquing students' works is an important part of the art and design program and would be too time-consuming during a full class session. Large classes also offer more distractions for students, especially when they are in front of a computer for the entire class period (McLeod, 2007).

Internet as an Instructional Tool

A. Ebert (2015) conducted a case study to determine how instructors utilize technology to explore real-world topics. The instructor gathered information on diamond rings to create data for his students to use in a statistics assignment. In the same way, it might be useful for digital art and design students to use internet resources during the creative process. Art and design students can use the internet and active learning principles, researching references for a current project or collecting and analyzing previous research for classroom assignments. Allowing classroom internet use places the student in control of their environment, creating higher-order thinking while accommodating all types of learners (Askar & Umay, 2001).

The ability to be successful in small group collaboration is vital in the classroom and workplace. Scientific studies support the benefits of students collaborating in groups (Steinkuehler, 2004). When working interactively with others, students learn to investigate, share ideas, clarify differences, problem-solve, and hypothesize new understandings (Smith, 2001). This study explored the question of why some students are thriving in a group atmosphere while others are not. A common frustration with group work is the lack of equal participation; some students within the group do little, leaving more work for the other student (Smith, 2001).

One way to improve the group work experience is by having students and instructors work with online programs like Google Docs. Google Docs allows students and instructors to communicate and collaborate in real-time. Chinnery (2008) suggests that Google Docs are a productive tool that creatively promotes collaboration through learning activities. Another advantage to Google Docs is its use of initialed notifications, allowing instructors to see how efficiently students are working, and who has contributed which comments. Developing a student's ability to scrutinize their work and constructively critique others is a key skill for instructors to build into assignments. Collaborations are another essential skill for student success in the workforce and for instructors to create student-centered learning. Smith (2001) states, "Collaborative methods of practice are increasingly the norm in contemporary art and design. Such works prioritize process over object production and technical proficiency, as well as social engagement and community over artistic autonomy." There are numerous online platforms for students to utilize for brainstorming and collaboration. The sketchbookpractice.com is a website where students can view or upload work and search for collaborators. Artstation.com is another website for showcasing their digital artwork, research, show progressions, and have their work critiqued by others.

Social media platforms have become increasingly popular for students and instructors. Social media allows students to connect and collaborate outside the classroom. Delacruz (2009) explained the usefulness of social media websites for educational purposes.

> Social media enhanced learning systems allow students to participate in educational online communities by creating, manipulating and sharing content online, communication and exchanging opinions, connecting with each other, establishing opinions, establishing social networks and creating communities for different needs (p.16)

Social media sites like Facebook, Twitter, and Instagram are also useful for instructors to gain and share new teaching strategies. Instructors can have students research and gain inspiration by using social media platforms to follow and view contemporary artists and their work. Students can connect, share, communicate, and work on projects together while also documenting the interactive involvements for the instructor.

Virtual Reality

Virtual reality (VR) is prevalent in the digital art and design field, but also valuable if successfully implemented in all areas of higher education (Kluge & Riley, 2008; NMC, 2008). VR combines audio and graphics with the capacity to interact and communicate with other users (Bell, Peters & Pope, 2007; Kushner, 2004: Haertel & Means, 2003). The success of implementing VR depends on effective course design, delivery, and assessment, like all active learning strategies. Active learning within virtual reality involves students learning from their experiences and from the technology itself. Instructors can use past situations to design relatable learning environments (Kluge & Riley, 2008).

VR has taken visual learning to new heights because instructors can provide students with invaluable experiences through virtual field trips. Students can virtually see geological sites, navigate through the different cells that run through the human body, and visit art museums on-site that play videos and audio to describe art and design. For example, at Rush University in Chicago, ophthalmology students use VR to practice performing cataract surgery on virtual patients. Students use active learning strategies paired with state-of-the-art technology in learning new material “hands-on.” Students work in small groups, discuss, and problem-solve with their peers as they tackle new environments (Kluge & Riley, 2008).

Art and design history is the most investigated area of research in higher education art. Instructors find helping students analyze artwork to be difficult and complicated by the fact that most history courses are lecture-based, with a focus on memorizing facts over developing analytical skills. Research suggests field trips to art museums help students develop analytical skills where they can view artwork in a real context (Steinkuehler, 2006). A more practical hands-on approach for students is viewing art museums with the help of Virtual Reality. The Metropolitan Museum of Art and The British Museum give a virtual reality experience of Ancient Egyptian Collections (Metmuseum.org). The two museums are among the worlds most admired, but also the most densely populated. Using a VR headset, students can view museums containing over 26,000 historical and cultural pieces of art. Virtual reality is just one instructional tool for art and design instructors to use to bring a better understanding of historical art and practices to life.

Technology in Art and Design Education

Technology integration in the classroom continues to gain momentum as research supports the positive effects of using technology as an instructional tool. Art and design instructors have explored and written about the significance of using computer technology for over 20 years (Delacruz, 2009; Gregory, 2009).

In the 1960s, art and design instructors examined digital media as an applicable and sustainable area of study for art and design education (Lanier, 1966). As access to personal technology grew, instructors' adopting of computers in schools rose in the 1980s. This created more excitement and more possibilities of utilizing technology in the art and design

classroom. However, with the adoption of innovations rising, also came resistance to the concept of creating art with the assistance of computers (Delacruz, 2004; Lu, 2005).

Writings about art classrooms have been mostly descriptive and promotional to explain the possibilities related to using electronic techniques in the art and design classroom. Researchers often described how the electronic surge and the profession of art and design education connect, and they propose persuasive arguments in support (Madeja, 1983; Ettinger, 1988; Hubbard & Greh, 1991; Hicks, 1993; Krug, 1996; Freedman, 1997; Tomaszkiewicz, 1997; Halsey-Dutton, 2002, Garber, 2004).

However, art and design classrooms are slow to adopt new ways of teaching. Gregory (2009) believed the line between traditional methods and future technologies was an important balance to keep, arguing for keeping the aesthetic and physical methods in the art and design classroom while cautiously integrating technology to preserve the integrity of the arts. The knowledge art and design students hold when stepping into the classroom is likely derived from technology that delivered (Gregory, 2009). This benefits the art and design classroom because students have been exposed to it and utilized forms of technology for creative purposes. Therefore, instructors using technology integration during a lesson was well-received by students, hopefully encouraging the instructor to continue with this method of instruction. Gregory (1995) also encourages art instructors to use more interactive, digital technology. He saw technology being significant to the coming years in education. C. Roland (1990) wrote:

> The future holds the promise of rich interchanges between the worlds of art and technology. Art teachers can take advantage of this link by developing innovative approaches to the computer that help their students gain insights into its versatile role as an art medium. (p. 60)

Gregory (2009) stated that teaching is not about giving the most inspirational lectures or using the most innovative technology, but it is solely about the learner, and how the student learns most effectively. Instructors should allow students to take charge of their learning while they are creating student-centered learning approaches that integrate technology. Gregory wrote about the importance of using the goals of active learning, which included creating real-world problem solving, student collaborating, and creative and critical thinking. This style of teaching is still slow to penetrate art and design classrooms in higher education. Gregory (2009) stressed the importance of integrating technology and active learning strategies soon, to help students solve the economic, social and cultural problems of their generation.

Technology has changed the way we view the world around us, including the way we teach. As a result, instructors should prepare students to thrive in a body of society that centers around technology (Ghavifekr, Afshari & Amla Salleh, 2012). Roland (2006) found that only 26% of art instructors place high importance on integrating computer technology in art classrooms. Roland's interviews also found that 44% of teachers made computer technology a moderate priority, and 26% considered it a low priority. The teachers that were in the high percentage of technology integration priority used it mainly in an instructor-centered approach while they focused on the actual art-making in a student-centered approach. According to his results, instructors did not see the importance of having technology integration be student-centered. However, they understood the importance of having students use art-making tools in class. They failed to see the necessity of having technology tools in the hands of art and design students.

Elizabeth Delacruz (2009) encouraged the use of classroom technology integrations for enriching the teaching of art and design. Instructors created interactive approaches to using

technology as an instructional tool in art and design decades ago. Researchers suggested art teachers could write their own software programs (Gregory, 1989), or design educational web pages (Marschalek, 2002) to help facilitate student-centered learning. Another idea for art and design instructors' technology integration is to have computers to examine postmodern concepts of art (Efland, Freedman, & Stuhr, 1996). The National Art Education Association (NEAE) published teacher preparation standards for university art faculty. One of the seven rules addressed the use of technology in the classroom (NAEA, 2014). According to the standards, art and design instructors should use computer technology as a tool and also use a wide range of technology as art and design media (p. 2). Research continued to support the benefits of technology integration in the art and design curriculum to help reach constructivist goals in the classroom (Prater, 2001; Carpenter & Taylor, 2003).

As Bill Buxton, principal researcher at Microsoft, stated in 2000, "Tomorrow everything will be a computer." Harvard provided a method of student-centered learning in their New Pathway case-method learning approach to teaching law. This method of student problem-solving involved students critically viewing information on the internet that required them to solve specific problems the instructor provided. Students research and gather information to find a solution to the created problem (Garvin, 2003). This method of technology integration helped students develop critical thinking skills that they will use in the workforce.

In 2005 as the digital workforce grew, a new media arts center in Canada hosted the first New Media Art History Summit. The conference marked the sanctification of a new field of study. Art and design departments added digital technology to their function classes and looked for instructors who were already incorporating technology with traditional teaching materials. This continued to grow in higher education platforms. Sherry Mayo (2007) stated, "There exists

value for having an artist with technology skills to contribute to problem-solving HCI design, emergent technology development, and digital aesthetics." While there is value in digital technology skills, there is also value in artist-driven self-expression. A conference on New Media Art Education in 2005 committed itself to investigate problems that arise from a pedagogical position in the new media. Instructors at the conference noted the struggle to earn respect for a new field in art and design involving technology in higher education (p.48).

An aspect of media art, not referenced, is how to instruct in a new field. Instructors and students have used digital tools to create art and design, but instructors need to realize the importance of using active learning strategies with technology as an instructional tool while teaching students computer-based programs. Another significant characteristic of art and design education is helping students investigate and critique philosophical issues in their world. Technology as an instructional tool uses digital learning in a way that students of all ages can navigate the issues they encounter in society while equipping them to handle struggles in the workforce. Eber (2000) argued that an innovative curriculum must be born to confirm effective teaching and learning since "Young digital art students have a different reality, one that includes an upbringing with digital technology" (p. 4). 21st-century art design education necessitates self-expression of students using digital mediums. However, some instructors may have less respect for digital creativity since computer tools are not traditional mediums. The lack of appreciation for the most current digital applications could dismiss the artist's growth and creativity.

Studies over the past decade continue to support the use of technology as an instructional tool along with the right pedagogical design. This form of instruction benefitted higher education teaching (Kali, Levin-Peld, & Dori, 2009). For example, in 2009 students used cell phones

during a student trip to gather information in a museum. Upon arrival, students reflected and wrote an analysis of the experience.

In the discipline of art and design, brushes, clay, and pencils help artists create innovative solutions for open-ended problems. Having an art and design education or pursuing a life as an artist or art and design educator adds value to society. The artist brings creativity and understanding of the issues that provoke emotion that human interaction sometimes cannot. They can paint a picture of an emotional event that time has since erased and bring cultures together through eyes of any age. Technology is only another medium and tool that art and design instructors can put in their toolbox. Brushes and pencils do not have to be traded in for computer-generated pixels to integrate technology into the classroom. Instead, art and design instructors use technology to teach art and design literacy and principles to students who retain information better through a digital platform. Students can use computers to research and collect information for brainstorming and storyboarding. This is a fundamental skill that undergraduate students need to master to be successful in their academic career and professional work. How do art and design instructors become literate in technologies that they have not used in the classroom before? It takes practice.

Training Art and Design Instructors to Integrate Technology into the Classroom

To create an atmosphere that fosters creative and productive learning using technology-based instruction, instructors must be familiar with current studies investigating teaching and technology. An instructor must also be aware of their personal views on technology use in the classroom because their bias can influence the way they present technology to students.
One crucial finding in a study performed by South East Initiatives Regional Technology (2001)

found “effective use of technology requires changes in teaching; in turn, the adoption of a new teaching strategy can be a catalyst for technology integration” (p. 58). Instructors who have mastered the ability to teach students with technology-based instruction effectively shift their mindset and view technology as a valuable learning tool.

Apple Classrooms of Tomorrow Project (1995) investigated how students and instructors used technology for over ten years. The project concluded that for technology to be successful in the classroom, teachers had to learn to use technology in stages properly. After teachers mastered the use of technology, they were equipped with the tools to integrate their knowledge into the classroom successfully. The steps identified in this research are shown in table 1.

Stage	**Behaviors**
Entry	Instructor is acquiring the fundamental basics of technology, example, computer operation, function, and set up
Adoption	Instructor operates technology in administration areas, example, computer-based quizzes or worksheets, grade books.
Adaption	Instructor utilizes software as an instructional tool, example, a commercially produced content area program like word processor.
Appropriation	Teacher begins to focus on project-based technology use, and technology becomes a

	part of an active learning lesson and used as an instructional tool.
Invention	Teacher uses learned skills to develop different uses for technology, example, creates projects that combine two or more technologies.

Table 1. Steps of Behavior in the Classroom

During 1993-1994, 257 teachers participated in ACOT (Apple Classrooms of Tomorrow) Teacher Development Center activities. The activities teachers participated in had a positive effect on their teaching ability, which led teachers to question traditional teaching methods and implementing new techniques they learned. The excitement of mastering a new skill led many instructors to further their technical knowledge and learn more sophisticated software than they had been taught at the ACOT Development Center. Instructors reported that students were more engaged, student motivation and work improvement increased, and students collaborated more effectively. Participants in the study also used their new skills to train fellow instructors, administrators, and students, which increased technology use throughout the whole school. However, not all participants applied what they had learned during the project to classroom teaching methods.

Research has shown that a significant variable in the success of faculty development involving technology integration is the intrinsic and extrinsic motivation of instructors (Surry & Land, 2000). Professional development at the higher education level consisted mainly of

sabbatical leaves so that the faculty member could provide his or her own experiences (Mehlinger & Powers, 2002).

Sabbatical leaves motivated instructors to pursue professional development, but Lim (2000) states, "training and development should not be an afterthought. It should be a vital part of any successful implementation plan for technology in education" (p.243). According to the CEO Forum on Education and Technology (1999), the report indicated that instructor development programs should be ongoing with a commitment that begins with the decision to pursue a career in education.

Despite training, a mindset change must occur with many instructors over the age of 30 to effectively use technology in the classroom. Palmer (2007) states, "Good teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the teacher." For instructors as adult learners to achieve this mindset, Palmer suggests instructors must first reflect on the inner life. The term *digital immigrants*, coined by Prensky (2001), for adults who learned how to use technology as adults compared to their students who learned to use technology at a young age. Prensky said adults who learn a new language still have an accent; the same is to be said about adults who learn technology at a later stage in life. Digital immigrants can learn how to incorporate technology but are subconsciously limited to it being used automatically to complete a familiar task.

Jacobsen (1998) investigated the adoption patterns and characteristics of faculty who used computer technology in higher education and used Rogers' (1995) Theory of Diffusion of Innovations as the framework for the study. The study investigated the various factors including, distinctions between early adopters compared to other faculty concerning their computer and technology use patterns. The elements included were computer experience, self-efficacy,

changes in teaching, participant data, incentives to use technology, barriers preventing technology use, and evaluating the consequences of using technology. Her results found a difference in computer proficiency and computer adoption. Her hypothesis that computer proficiency was a determining factor in adoption was confirmed. Jacobsen also determined that colleague-supported training was vital for encouraging the diffusion of technology in a university.

Former U.S. Secretary of Education Rod Paige said, "Education is the only business still debating the usefulness of technology." Unsuccessful attempts to apply technology to lessons could discourage instructors from seeing the benefits of utilizing technology in the classroom (Susan Brooks-Young, 2007).

Obstacles for Implementing Technology in the Classroom

Nearly all public schools in America have access to the internet and implement some form of technology in the curriculum (Tripp & Herr-Stephenson, 2009, p. 1190). Previous research supported the concept of enhanced learning experience due to computer technology utilization in the classroom, and an increased level of learning occurred if all classrooms had computer technology to implement (Sinclair, 2006, p. 46).

However, obstacles for implementing technology in the classroom have been caused by not understanding how to use technology in a lesson efficiently. Instructors struggled with choosing specific types of technology, effectively integrating technology seamlessly in a class period, and an overall lack of understanding of the factors that successfully utilized technology in the classroom (Bordbar, 2010). Instead of implementing active learning strategies to

complement technology, instructors commonly used technology alone to teach students (Dror, 2008).

Palmer (2007) offers another obstacle for instructors to overcome; he explores the connection between a teacher's inner life and their life in a professional community. Palmer states that academic atmospheres can lack both depth and context because of the isolation that occurs in teaching. Generally, instructors construct lesson plans independently, teach within a closed classroom, and reflect on their daily instruction, by themselves. Other modes of assistance and support are absent. Palmer explains that the sole reliance upon one's insight while teaching students, is not promoted as a "positive experience" in today's professional world. This practice stands in dramatic opposition to other professionals, such as lawyers or surgeons, who consistently collaborate with colleagues, all proficient in their area of skill. For instructors, their daily scenario includes independent instruction of curriculum with a rare experience of sharing and comparing learning outcomes with other colleagues. While some professionals refer to this practice as "academic freedom," Palmer views this practice as isolation. Instead of trying to overcome this issue, instructors view their ability to brainstorm, plan, construct, and teach lessons in "isolation" as a virtue (Palmer, 2007).

Technology should be a tool to enrich learning and not be credited for increasing academic performance without instruction (Klein, 2010). Teachers may teach things faster and efficiently with digital media. However, instructors may also use new technologies in outdated ways, teaching much the same as they did before (Roland, 2007). This makes providing professional development opportunities even more essential. Palmer (2007) suggests that when instructors focus on self-development, it opens the door for instructors to work together to integrate new forms of teaching strategies effectively. Honan (2010) found poorly trained

instructors led to a lack of effectively addressing classroom objectives, which can lead to an overuse or misuse of technology (Postman, 1998). School supervisors should be aware of the school's philosophy and demographics to avoid the misuse of technology. Instructors also require adequate training before trying to implement technology in the classroom (Hayes, 2006).

Successfully Implementing Technology in the Classroom

In the past decade, researchers explored the benefits and downfalls of using technology; and investigated ways to successfully implement technology as a learning and teaching tool in the classroom. As previously demonstrated, technology has a positive impact on students when used as an instructional tool; this has been accomplished by using technology in lessons and unit objectives and giving students information on the technology to help them achieve their learning goals. For technology to be beneficial, however, students need to have a basic understanding of how to use it to apply it to their studies (Chinnery, 2008). Technology should support or reinforce the core curriculum. Students successfully learn when the implementation of technology is supported by school administrators and their parents. Success with technology occurs when the difficulty level is adjusted to the students' needs, and when instructors give students opportunities to collaborate (Chinnery, 2008). Students are discouraged from relying solely on technology, but to incorporate it as a tool for efficiency. For example, instead of handwriting a final draft of a paper, they are encouraged to type it in a Word document.

Even though instructors recognize the effectiveness of traditional teaching methods, more students are reached and motivated by using additional resources. Students use technology in their daily life to help familiarize themselves with their surroundings. Therefore, to reach a

student's full learning potential, instructors must use these performance indicators to help implement technology as an instructional tool in the classroom (McLeod, 2007).

Figure 4. Performance Indicator Chart

Performance Indicators

In order to best meet the technology needs of students, there are five performance indicators that must be applied, according to (McLeod, 2007). They are, in order:

1. Create developmentally relevant learning opportunities using technology-based instructional approaches to encourage and serve all styles of learners.
2. Apply current research studies that use technology as an instructional tool when preparing learning atmospheres and activities.
3. Isolate and label technology resources and evaluate them for accuracy and appropriateness.

4. Organize supervision of technology within the context of learning activities.

5. Plan methods to accomplish student learning in a technology-based atmosphere.

By following the steps below, instructors could reap the benefits of using technology as an instructional tool correctly.

Based on Rother (2004), there are six steps to successfully plan technology use in the classroom. Instructors must:

1. After completing the course plan and objectives, determine if technology would be appropriate for the lesson plan.
2. Choose a familiar technology tool for your class that effectively teaches lesson plan objectives.
3. Create a teaching activity.
4. Reflect: Does this activity exhibit effective use of technology as an instructional teaching tool?
5. Can this form of technology reinforce lesson objectives beyond the class exercise to build upon knowledge that was learned?
6. Track student learning and technology skills.

Technology is effective when used as an instructional tool and can be implemented effectively when these steps are followed. Student and instructor proficiency is required while using technology and is most effective when skills are learned outside the classroom. Using technology to increase and reinforce semester curriculum, while detailing how technology is supported and utilized in the curriculum, not only helps students and instructors, but it also helps the administration understand the effectiveness of using technology as an instructional tool (Rother, 2004).

Instructors Attitudes toward Technology as an Instructional Tool

Rogers (1995) explained that for innovation diffusion to occur, participants must perceive the innovation as possessing a definite advantage. Concerning this study, instructors must see the practice of instructional tools in the classroom not only positively, but view technology as an advantage. Additionally, Jacobsen, (1998) expanded on this idea, showing innovation can have little effect on the individual if it does not apply to the person's needs or the person's beliefs. Therefore, the introduction of technology as an instructional tool is irrelevant to adaptation if the instructor does not perceive technology positively.

Research in the past decade has examined the perceptions and methodologies of university instructors. Exploring this variable in juxtaposition with student attitudes allowed researchers to understand the implications of technology integration encountered by instructors. Before recommending improvements to technology use in the classroom, or improvements to the professional development of instructors, instructors' attitudes towards technology require assessment. In previous studies, the emphasis was on the transmission of information to students and stressing the importance of student learning and development (Gerlese & Akerlind, 2004; Kember, 1997; Samuelowicz & Bain, 2001).

Despite the growing body of research touting the benefits of active learning, some instructors still apply traditional teacher-centered strategies. Again, research indicated that instructors who have an instructor-centered focus have a less refined view of teaching and produce lower-quality learning outcomes compared to instructors who use learner-centered focus (Pratt and Associates, 1998). To further explain active versus passive learning, Freire (1970) coined the notion of "banking" to explain this educational process. He began with the assertion that students were merely empty bank accounts, and they should allow instructors to make

deposits; however, they deem appropriate. However, when knowledge became a pattern of depositing, student assignment shifted to strictly accommodating information, and there was no opportunity for active communication. Freire (1970) rejected this method of education and claimed that this approach resulted in the dehumanization of students and instructors. Freire defended the notion that knowledge arose only by invention and re-invention in combination with humans who communicated and interacted with the surrounding world (p.54). Current research continues to support active learning by teaching students to analyze and evaluate information in a classroom setting (Simpson & Courtney, 2002).

Implementing active learning strategies relies heavily on the instructor's attitude. Blankenship (1998) discovered instructor attitudes were a leading factor in computer usage in the classroom. Studies suggest that if instructors perceived computers were not fulfilling their students' needs, then they would be unlikely to utilize computers as a teaching approach or resource (Askar & Umay, 2001). Sheingold (1990) suggested that incorporating technology in the classroom was not about teaching students how to work a computer but using technology as a learning tool. Williams (2001) reinforced the idea and encouraged instructors to replace traditional lectures with student facilitated learning in the classroom, as they sought out the how and why of the problems.

Albejadi (2000) supported the importance of investigating instructors' beliefs, examining instructor attitudes towards the value of using the internet as an instructional tool. His data supported the idea that negative attitudes towards the internet correlated with low internet usage during classroom activities (p.19).

Using technology in all aspects of classroom learning is a practical learning tool for art and design students. Replacing textbooks with useful tutorials students can view serves as one

example, allowing the instructor to display examples and instructional steps on a screen visible to the entire classroom. Bauer and Kenton (2005) believed technology was an effective way to broaden opportunities, but some instructors opted out of using technology as a delivery system in the classroom. Their research also discovered that despite instructors being skilled in computer knowledge, they were not incorporating technology consistently during the learning process. Ertmer, Conklin, Lewandowski, Osika, Selo, and Wignall (2003) provided one possible answer for the lack of technology during instruction. In many cases, instructors at the beginning of their careers had intentions of using technology, but they did not know how to combine technology during a lesson effectively (p.100) .

Wepner, Tao, & Ziomek (2006) stated the use of technology is not a one-size-fits-all, meaning that instructors cannot do the same thing for all students or classes. Instructors needed to understand meaningful ways to incorporate technology into the learning process. Their work further implied that using technology-based instruction, such as tutorials in art and design classrooms, was a useful learning tool when utilized well by instructors.

Encouraging higher-order thinking in the classroom is most successful during active learning. Wang (2002) investigated the significance of instructors' perceptions between instructor and student-centered classrooms. Instructors felt no bias towards computer usage during a lesson; they were likely to incorporate instructor-centered and student-centered activities equally when using computers. Despite these instructors' perceptions, they still thought implementing technology would not change their teaching style or roles as instructors or teaching style (p.150). The study concluded that when given the option, instructors chose to use technology, but computer usage was for instructor-centered activities rather than active learning.

Research on instructors' perceptions of technology continues to vary. Sharpe (2004) believed that instructor views on technology were an essential component to furthering student education; despite the research, instructors remained slow adopters of technology. Redmond, Albion, and Maroulis (2005) discovered instructor confidence, interests in using technology, and willingness to use technology as an instructional tool, were significant factors in promoting technology in the classroom.

Several studies have evaluated variables that might affect an instructor's perceptions of technology, like age and teaching experience. Kay (1993) demonstrated a correlation between positive attitude and technology when looking at instructor educational levels. An instructor's educational level was also correlated to positive attitudes toward technology (Kay, 1993; Loyd, 1984; Pelgrum, 1991), while new instructors or instructors with only a few years of experience, were less likely to use technology with students (Russell, 2007).

Blankenship (1998) explored several characteristics that may factor in instructor attitudes. His study examined age, gender, years before retirement, and grade level. The most significant factor affecting technology use was age (p.16). Hoerups (2001) observed a different variable that he found significantly affecting computer usage was an individual's innovativeness. Consequently, an individual's or instructor's ability to adopt an innovation is relative to their level of innovativeness. Further information is needed to explore the level and characteristics of the innovativeness of effective adoption.

METHODOLOGY

Research Method

The purpose of this quantitative study was to discover instructor attitudes and levels of technology used in art and design classrooms. The goal of the study was to both identify the

degree of technology use among instructors and to endorse the implementation of technology as a strong instructional tool in art and design classrooms. A correlation study was chosen to determine the relationship between the independent and dependent variables, where data was collected via survey. The surveys gave broad assessment of what art and design instructors are doing with new technologies (Burton, 2001; Obiokor, 2002; Roland, 2007). This type of research helps predict when events will happen in the future and helps researchers understand to what degree a changing variable impacts another (Merriam, 2009).

Another feature of a quantitative study is that findings can be generalized and applied to a larger population. However, exploratory studies are most effective when there is not as much research on the specific population being studied (Creswell, 2003). The target population in this study was limited to art and design instructors in Oklahoma and the University of Central Oklahoma peer institutions. There has been little to no research conducted exploring teaching strategies of art and design instructors of adult learners. Therefore, a descriptive exploratory study was used. A self-reporting survey was administered and analyzed quantitatively to aid the researcher in answering the research questions. The study referred to computer use for instructional purposes, which included using computers and technology for lesson delivery and preparation, communication, and record-keeping. Technology manifests itself in countless ways, but this study focused on computer use for instructional purposes.

Research Design and Rationale

The design for this study was constructed by reviewing research designs, theoretical and conceptual frameworks, and various relevant research. The research design had to explore the correlation between instructors' attitudes and factors that could influence their perceptions of

technology, such as perceived computer characteristics and attitudes. Instructors' characteristics (teaching experience, gender, and academic background) are included in the study to control as many extraneous variables that might affect instructors' perceptions by incorporating them into the study's design (Gay & Airasian, 2000). A quantitative correlation survey research design was used to provide the information needed to answer the following research questions:

1. What levels of technology are used for educational purposes by university instructors?

2. What are the attitudes among instructors towards the use of technology for educational purposes?

3. Is there a significant relationship between types of technology used and their attitudes towards technology in the classroom?

4. What is the proportion of the variance in the attitudes of instructors toward technology in education that can be explained by the selected independent variables, (as well as instructors' personal characteristics) and the relative significance of each independent variable in explaining the dependent variable?

The research design covered the objectives of the study and calculated the level of computer use for instructional purposes. In this design, the researcher began by first collecting and analyzing quantitative data. Descriptive statistics were used; overall, the data included frequency percentages, means, and standard deviations. Pearson's correlation coefficients were used to identify the relationships between the level of technology use and the selected factors.

Sample

The population consisted of higher education art and design instructors who taught art and design classes in Oklahoma and at UCO peer institutions schools during the 2018-2019 school year. Instructor emails were obtained for the following Universities: University of Central of Oklahoma, Oklahoma Christian University, Oklahoma City College, Oklahoma State University, University of Central Oklahoma, University of Tulsa, Boise State University, California State University-Fresno, Kennesaw State University, Missouri State University, Sam Houston State University, San Jose State University, Texas State University-San Marcos, Towson University, Wichita State University, Youngstown State University. All art and design instructors were invited to complete the survey emailed to them. The list of emails contained 427 higher education art and design instructors, and 56 from the potential sample participated in the survey.

Description of Instruments

The instrument used for the quantitative study was a Likert scale survey asking instructors to rate how strongly they agree or disagree with using technology in the classroom. Survey questions were developed based on previous studies (Isleem, 2003; Albrini, 2006) and literature discussing instructor perceptions of technology in the classroom. The survey also included demographics for age, years of experience, and level of educational degree. The survey was designed and administered using the Survey Monkey website, which automatically collates data as respondents submit their answers.

By using an online service, the researcher sent the survey directly to instructors. The first questionnaire included 17 questions used to measure instructor attitudes toward technology. A

five-point Likert scale format was used to assess instructors' level of technology used for educational purposes (1=never use, 2=rarely use, 3=sometimes use, 4=often use, 5=very often use). The survey constructed by Albirini (2006) was created by an extensive review of literature about instructor's perceptions. The second part of the questionnaire contained 15 items to examine the levels of technology currently being used in the classroom. The questionnaire is adapted to a 5-point Likert's scale (See Appendix A).

Dependent Variable

The dependent variable in the study was the level of computer use in instructional practices by art and design instructors in Oklahoma and peer institutions of the University of Central Oklahoma. The level of computer use is defined by self-reported use of computers and types of software for communication, record keeping, lesson preparation, and delivery. The dependent variable was quantified by scoring the 15-item questionnaire using a five-point Likert scale (See Appendix A). The replies to the items were examined by using frequency percentages to calculate the extent that art and design instructors use technology as an instructional tool.

Independent Variable: Instructor Attitudes

The definition of attitude defined by Merriam-Webster Dictionary (2003) is a feeling or emotion toward a fact or state. For the study, attitude is described as the instructor's views toward technology use and integration of technology in the classroom while teaching. Questions to help art and design instructors evaluate their attitudes toward technology were listed in the questionnaire. The independent variable was scored by using a 5 Point-Likert scale on the 17-item survey.

Characteristics were defined by demographic data about higher education art and design instructors in Oklahoma and official UCO peer Institutions. Demographic details relating to art and design instructors examined age, gender, educational background, teaching experience, and computer training. Individual scores of the 5 questions quantified the data. The scores were individually viewed as descriptive information to be correlated with the level of technology use. These characteristics were defined and examined as follows. Gender was self-reported and measured by asking participants, "What is your gender?" They were given a choice between male or female. Instructor experience was self-reported and measured by the question, "How many years have you been teaching?" with a choice of five-year intervals as guided responses. Educational background was self-reported and measured by responding to the question, "What is your highest completed academic degree?" Their choices were a instructor's certificate, a Bachelors or a Masters of Fine Arts degree**.** Instructional Training was self-reported via yes/no question*, "*Have you ever attended any training course, workshop, or seminar on using computers?" If yes was given as an answer, participants were asked for the number of instructional hours attained. Teaching method was self-reported and measured by multiple choice responses to, "What instructional method do you use?" Options included choice of teaching methods, active discussion, collaborative activates, demonstration, lecturing, computer-assisted instruction or other. The characteristic variables were examined individually using frequency percentages to determine characteristics of higher education art and design instructors. Multiple regression analysis was used to observe relationships of the characteristics to the level of computer use.

Validity

The validity of a study, as used in research, indicates the appropriateness, importance, and usefulness of any implications a researcher concludes based on data obtained through the use of an instrument (Websters, 2009). A panel of higher education computer instructors examined Albirini's (2006) survey for content and validity. The Cronbach's reliability coefficients were also used to ensure the validity of the questionnaire. External validity discusses the ability of the results of this study to be generalized to the target population. Given that this research did not vary at any time, people, place or dimension, using the entire population reduced threats to external validity.

Reliability

The reliability of a study refers to the stability of the answers given by the instrument used in the survey. The internal-consistency method of valuing reliability includes comparing responses to a different series of items that are part of an instrument (Fraenkel & Wallen, 2000). To test the instrument for internal consistency, the survey instrument was assessed using Cronbach's analysis. The test determined reliability by estimating internal consistency.
The last chapter contains a belief summary of the study, examines the study's findings, conclusions of the research, and recommendations for further investigation.

Summary

Technology will continue to develop; it has already absorbed the lives of the average student, giving them direct access to abundant amounts of data (Egbert, 2009). Technology in the classroom, when used correctly with proper instructor training and active learning strategies, benefits students in reaching academic success while increasing instructor levels of skill

(Courville, 2011). Despite having access to technology in the classroom, many schools and instructors are still not integrating these principles (Bolkan, 2012). The most significant problem with instructors ignoring the usefulness of technology is the expanding divide between instructor and student.

The purpose of this study was to investigate the degree to which technology is used as an instructional tool in art and design classes and to survey the attitudes of art and design instructors regarding their use of technology in the classroom.

Rogers (1995) explains diffusion of innovation is how the population adopts innovation. Innovation is as an idea, behavior, or object that is observed as new by the community of people. Diffusion of innovation helps guide society in knowing how technological advancements in the classroom can be adopted. According to Rogers' theory, the characteristics that encourage adoption of innovation are communication channels, nature of the social system, and the extent of the change agent's promotional efforts.

Investigating the factors related to the early adoption of using technology in the classroom would benefit administrators when it comes to acknowledging the challenges of technology-based instruction (U.S. Department of Education, 2002).

DATA ANALYSIS AND DISCUSSION

Data Analysis

Two tools best used for studying the relationship between two or more items in relationship include the correlation coefficient and the regression analysis. While the regression analysis may establish whether a relationship exists between the variables, the correlation can

estimate the strength of relationship between set of variables. It is, however, important to note that correlation does not imply causation.

This study employed a joint test of correlation and regression analysis to understand the factors and determinant of level of computer usage. A total 57 questionnaires were gathered with one non-response case, leaving 56 sample respondents. Prior to testing the model, research work explored the dataset using frequency and percentage, and tested data reliability and validity using Cronbach Alpha. Validity tests of this nature measured the agreement and reliability of the response provided by the respondent on questions relating to level of computer usage and instructors attitude towards computer as a tool.

Note on Regression

The researcher attempted to fit a regression model to establish the relationship between two or more variables, which was done here using both a simple linear regression and a multiple linear regression (a moderator introduced to study the relationship). Data was fitted using a dependent variable and some other listed independent variable while mediating variable green brand knowledge. The regression model tried to establish whether there was any relationship between the research (dependent) variable and the predictor variables and, if they existed, how the strength of this relationship, negative or positive. The measure of model validity was measured using the R-square and the adjusted R-square measured the extent of variation in the response variable being accounted for by the predictor variables. The study used the Analysis of Variance table to check whether the regression model proposed would fit; the idea of including the ANOVA table was to test the adequacy of the proposed regression model. Statistical significance for each factor was be carried out using the p-value of the t-test of individual parameter.

Note on Correlation:

This is used to test the strength of relationship between two bivariate data, the correlation co-efficient ranges from -1< r < +1, The closer it is to one the stronger the relationship that exist between the bivariate data.

SOME USEFUL INTERPRETATION

1. When r = +1 and -1, there exist a perfect negative and perfect positive relationship between the bivariate data
2. When r = 0. There exists no relationship between the bivariate data
3. The correlation between a variable and itself is 1 (one).

Cronbach's Alpha

Cronbach's alpha measures the strength of reliability among groups of items or questions of a data. It is important to note that while the values may range between 0 and 1, the closer the value is to 1, the more reliable it is while the closer it is to 0, the less reliable it is. The significance of such estimates cannot be over-emphasized; beside giving confidence to results and estimates obtained in research work, it additionally gives confidence as to how good or bad items of the questionnaires are constructed.

The formulae for Cronbach's Alpha are given by

Research Question

Is there a significant relationship between the level of computer use and instructors' attitude toward computers as tools?

Is there a significant relationship between the level of computer use and gender?

Is there a significant relationship between the level of computer use and art and design instructors' instructional experience?

Is there a significant relationship between the level of computer use and educational achievement?

Is there a significant relationship between the level of computer use and training attended by instructors?

Is there a significant relationship between the level of computer use and art and design education instructors' instructional methods?

Research Hypothesis

There is no significant relationship between the level of computer use and instructors' attitude toward computers as tools

There is no significant relationship between the level of computer use and gender

There is no significant relationship between the level of computer use and art and design instructors' instructional experience

There is no significant relationship between the level of computer use and educational achievement

There is no significant relationship between the level of computer use and training attended by instructors

There is no significant relationship between the level of computer use and art and design education instructors' instructional methods

For this research work 5% level of significance (which corresponds to 95% confidence interval) were used throughout. All research and data analysis were conducted in SPSS environment.

Introduction to Results and Hypothesis Testing

The dataset illustrates descriptive techniques of frequency and percentages. All 56 respondents gave consent to participate in the survey. Below is the exploration of the data prior to the testing of hypothesis.

Variable	Factor/Levels	Frequency	Percentage
I use computers to help me organize my work	Strongly Disagree	2	3.6
	Disagree	1	1.8
	Neutral	5	8.9
	Agree	11	19.6
	Strongly Agree	36	64.3
Using computers makes the subject matter more interesting	Strongly Disagree	1	1.8
	Disagree	6	10.7
	Neutral	22	39.3
	Agree	11	19.6
	Strongly Agree	16	28.6
Computers save time and effort	Disagree	2	3.6
	Neutral	12	21.4
	Agree	27	48.2
	Strongly Agree	15	26.8
Computers increase my productivity	Disagree	5	8.9
	Neutral	11	19.6
	Agree	24	42.9
	Strongly Agree	15	26.8
I have noticed an elevation in student learning outcomes through my classroom computer utilization	Strongly Disagree	4	7.1
	Disagree	2	3.6
	Neutral	20	35.7

	Agree	15	26.8
	Strongly Agree	14	25.0
I use computers as effective learning tools in the classroom	Strongly Disagree	1	1.8
	Neutral	14	25.0
	Agree	24	42.9
	Strongly Agree	16	28.6
My computer use within the classroom enhances student learning	Disagree	1	1.8
	Neutral	8	14.3
	Agree	34	60.7
	Strongly Agree	13	23.2
Computer use in the classroom can improve education	Strongly Disagree	1	1.8
	Disagree	1	1.8
	Neutral	15	26.8
	Agree	27	48.2
	Strongly Agree	11	19.6
I use computers to collect classroom evaluation and assessment data	Strongly Disagree	1	1.8
	Disagree	4	7.1
	Neutral	9	16.1
	Agree	21	37.5
	Strongly Agree	21	37.5
I use e-textbooks and related material in the classroom	Strongly Disagree	4	7.1
	Disagree	22	39.3
	Neutral	10	17.9
	Agree	13	23.2
	Strongly Agree	7	12.5
My utilization of free open educational resources increases student learning outcomes in my classroom	Strongly Disagree	1	1.8
	Disagree	8	14.3
	Neutral	16	28.6
	Agree	20	35.7
	Strongly Agree	11	19.6

Table 2. Level of Computer Use

Variable	Factor/Levels	Frequency	Percentage
Spreadsheet programs	Never	10	17.9
	Rarely	7	12.5
	Sometimes	22	39.3
	Often	14	25.0
	Always	3	5.4
Computer Graphic Software for photo editing, animation, or layouts	Never	4	7.1
	Rarely	7	12.5
	Sometimes	7	12.5
	Often	21	37.5
	Always	17	30.4
Free and Open Educational Resources	Never	3	5.4
	Rarely	10	17.9
	Sometimes	23	41.1
	Often	13	23.2
	Always	7	12.5
E-mail to communicate with students and faculty	Often	9	16.1
	Always	47	83.9
Simulation and Games	Never	19	33.9
	Rarely	21	37.5
	Sometimes	10	17.9
	Often	2	3.6
	Always	4	7.1
Computer Presentation Software	Rarely	2	3.6
	Sometimes	14	25.0
	Often	20	35.7
	Always	20	35.7
Internet: Research/Assessment/Evaluation	Rarely	7	12.5
	Sometimes	8	14.3
	Often	22	39.3
	Always	19	33.9
Tablet Device	Never	25	44.6
	Rarely	10	17.9
	Sometimes	11	19.6
	Often	8	14.3
	Always	2	3.6
Google Doc	Never	7	12.5

	Rarely	9	16.1
	Sometimes	15	26.8
	Often	18	32.1
	Always	6	10.7
Tutorials	Never	5	8.9
	Rarely	9	16.1
	Sometimes	31	55.4
	Often	6	10.7
	Always	4	7.1
Projectors or Multi-Screen Displays	Rarely	3	5.4
	Sometimes	12	21.4
	Often	21	37.5
	Always	20	35.7
Video Streaming Websites	Never	5	8.9
	Rarely	5	8.9
	Sometimes	23	41.1
	Often	16	28.6
	Always	7	12.5
Social Media Networks	Never	10	17.9
	Rarely	16	28.6
	Sometimes	13	23.2
	Often	11	19.6
	Always	5	8.9
Video Editing Software	Never	25	44.6
	Rarely	11	19.6
	Sometimes	12	21.4
	Often	3	5.4
	Always	5	8.9
Smart Phone Apps	Never	15	26.8
	Rarely	10	17.9
	Sometimes	16	28.6
	Often	12	21.4
	Always	3	5.4

Table 3. Attitude towards technology utilization in the classroom

Variable	Factor/Levels	Frequency	Percentage
Gender	Missing	2	3.6
	Male	20	35.7
	Female	34	60.7
how many years have you been teaching	1-5 years	5	8.9
	6-10 years	7	12.5
	11-15 years	21	37.5
	16-20 years	9	16.1
	Over 20 years	14	25.0
highest completed academic degree	Bachelors	5	8.9
	Masters	31	55.4
	PhD/Ed.D/MFA/Other Terminal Degree	20	35.7
Have you ever attended any training course	Yes	32	57.1
	No	24	42.9
What is the teaching method you use most often	Active Discussion	21	18.6
	Collaborative Activities	17	15.0
	Demonstration	29	25.7
	Lecture	33	29.2
	Computer Assisted Instruction	13	11.5

Table 4. Demographics of the respondents

The result showed 20 respondents , or 36%, were male, 34 respondents, or 61%, were female and 2 respondents chose not to identify , meaning the majority of the respondents were female. In terms of the distribution years of teaching, the result showed that 5 respondents , or 9%, had 1-5 years' experience, 7 respondents, or 13%, had 6-10 years' experience, 21 (38%) respondents had 11-15 years' experience. On the more experienced end of the spectrum, 9 , or 16% , had 16-20 years experiences and 14, or 25% had 25 years of experience.

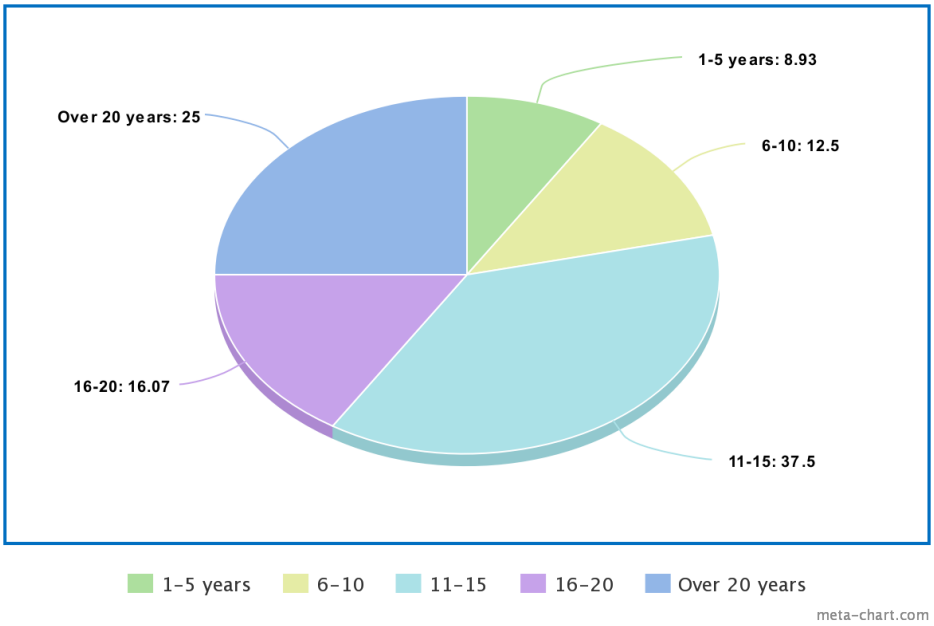


Figure 5. Years of Experience Teaching in Higher Education

The descriptive statistics related to the educational achievement of the study participants are represented in Figure 6.

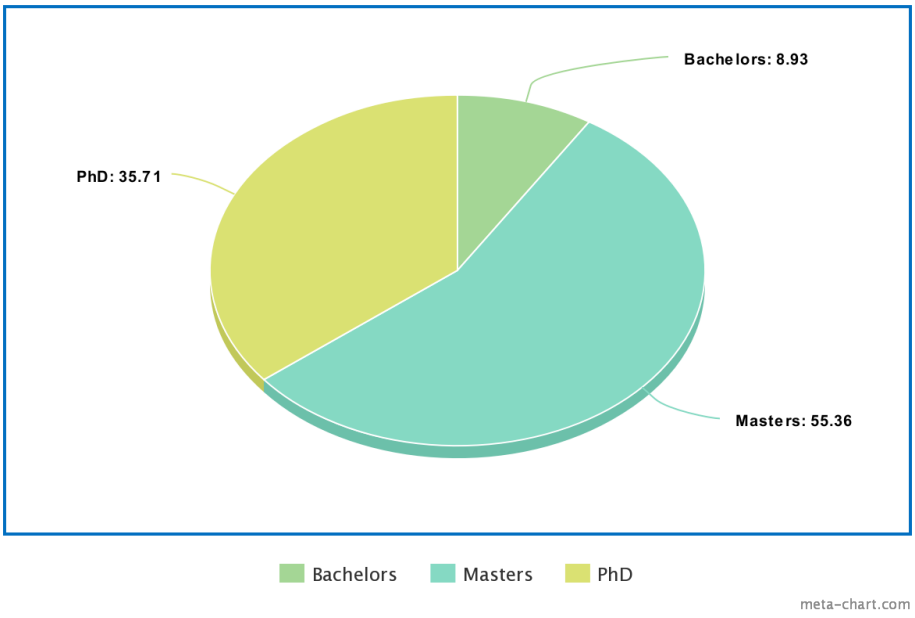


Figure 6. Highest Education Level Completed

The sample of the 56 higher education art and design instructors breaks down into 35.71% instructors with doctorate degrees (n = 20), 55.36% instructors with master's degrees (n = 31), and 8.93% instructors with bachelor's degrees (n = 5). This analysis determined that the majority of higher education art and design instructors in the sample have master's degrees. Positive attitudes toward technology for instructional purposes were found most commonly with e-mail (100% "often" or "very often"), organization work (83.9% "often" or "very often"), and computer use within the classroom enhancing student learning (83.9 % "often" or "very often"). Questions with the most negative percentages included computers increasing productivity (28.5% "rarely" or "never"), and computers as effective learning tools in the classroom (26.8% "rarely" or "never). Instructional tools used most were projectors or multi-screen displays (73.2%) and computer Graphic Software for photo editing, animation, or layouts (67.9%).

Variables	**Cronbach Alpha**	**Number of items**
Instructors Attitude Towards Computers as Tools	0.844	11
Level of Computer use	0.863	15

Table 4. Cronbach's alpha of questionnaire variables (Important variables)

According to Cronbach LJ (1951) alpha categorization, an alpha value between 0.7 - 0.8, is acceptable, 0.8 - 0.9 is good and alpha value greater than 0.9 is excellent.

From the result of the Cronbach's alpha presented above, the reliability test reveals that the questions contained in our variables are good. Hence, the questions were carefully designed understand the factors and determinant of level of computer usage.

	Level of	Instructors	Gender	Years of	Highest	Attended	Instructors

	Computer Use	Attitude Towards Computer as Tools		Teaching	Academic Degree	Training	Instruction Method
Computer Use	1	.627**	-.176	-.310*	-.149	-.045	.235
Instructors Attitude Towards Computer As Tools		1	-.026	-.105	-.203	-.043	.203
Gender			1	.015	.074	.147	-.091
Years Of Teaching				1	.063	-.515**	-.120
Highest Academic Degree					1	-.143	-.045
Attended Training						1	-.118
Instructors Instruction Method							1

*, ** correspondence to significance at 5% and 1%

Table 5. Correlation matrix of important variables

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Intercept	9.197 (6.56)	52.16** (3.75)	55.52** (3.54)	55.02** (6.89)	48.77** (3.914)	43.96** (2.37)	29.84* (11.76)
Instructors Attitude Towards Computer as Tools	0.922** (0.156)						0.834** (0.156)
Gender		-2.944 (2.25)					-2.09 (1.728)
Years of Teaching			-2.377* (0.99)				-2.522 (0.933)
Highest Academic Degree				-2.289 (2.072)			-0.401 (1.614)
Attended Training					-0.865 (2.589)		-3.241 (2.37)
Instructors Instruction Method						0.591 (0.333)	0.120 (0.266)
F-Stat	34.99**	1.719	5.761*	1.22	0.112	3.614	8.247

R-Square	39.3%	3.1%	9.6%	2.2%	0.2%	5.5%	50.2%
Adj-Square	38.2%	1.3%	8.0%	0.4%	-1.6%	3.8%	44.2%

*, ** correspondence to significance at 5% and 1%

Co-efficient and (standard error) presentation, dependent variable is Level of Computer Use

Table 6. Parameter estimates of regression models

RESULTS

Discussion and Summary

This study investigated the factors and determinants of instructor level of computer use. It examined six predictors; instructors' attitude towards computer as tools, gender, educational achievement, instructional experience, instructors' instructional methods and training attended by instructors to predict the instructors' level of computer usage. The researcher deployed a combination of correlation and regression analysis. A simple linear regression analyzed all individual variables and then a regression model was run on predictor variables.

Finding indicate there exists a strong positive relationship between the level of computer use and instructors' attitude towards computer use. This means that an increase in the level of computer use will result in more positive attitudes among instructors towards computer use. Similarly, there is a positive but weak relationship between the level of computer use and the instructor's instructional method. This simply means that the instructor's level of computer usage drives the manner and methods the instructors instruct their students. The more instructors use technology outside of the classroom, the more likely they are to use advance technologies in their instruction. This finding supports Palmer's (2007) framework that "teaching, like any truly human activity, emerges from one's inwardness." If technology is not used in daily activities, it is unlikely that instructors will effectively integrate technology into classroom.

In contrast, a negative relationship was shown between the level of computer use and gender, highest educational achievement, instructors instructional experience and amount of training attended. The implication of this finding is that the respondent's gender and training attended does not impact their level of computer usage positively. This implied that, first, computer usage did not correlate with a particular gender. Males and females used or avoided using technology equally. Likewise, further training on technology did not change instructor attitudes towards computer usage. Other factors created greater concern; the higher the academic attainment of instructors, the lower the level of computer usage, and the greater the years of experience, the lower the computer usage of instructors.

The simple regression models showed that instructors attitude towards computer use as a predictor of usage at best accounts for about 39.3% of variation in the level of computer use. Years of teaching explained 9.6% of variation and instructor's instruction methods accounted for 5.5% variation in level of computer use. Jointly, the 6 predictors account for about 50.2% of variation in level of computer use using the R-square (called the coefficient of determination) and 44.2% using the adjusted R-square. This means that the model has left about 49.8%, or nearly half, of variations unexplained.

The result of the simple and multiple linear regression corroborates the correlation test above as only instructors' attitude towards computer use and instructor's instructional method positively impact the level of computer use. Likewise, gender, highest educational achievement, instructors instructional experience and training attended impact the level of computer use negatively, in fitting with the model.

Finally, in terms of hypothesis reception or acceptance, the decision rule of the t-test of individual parameter for the regression model rejects the null hypothesis whenever the p-value is

less than 5%, otherwise, we fail to reject the null hypothesis. From the results obtained in table 6, we must reject null hypothesis 1, meaning that there exists a significant relationship between the level of computer use and instructors' attitude toward computers as tools. Additionally, we must reject null hypothesis 3, meaning there exists a significant relationship between the level of computer use and art and design instructors' instructional experience. The remaining hypotheses are not significant, and we do not reject their null hypothesis, because the p-value is greater than 5% for their parameters.

Recommendation & Further Research Work

One recommendation for further research is to identify other predictors that significantly contribute to the factors and determinants of the level of computer use. The predictors selected here accounted for 50% of the variation, leaving half of the factors unaccounted. More work must be done to determine why technology is not being used in art and design classrooms when the literature clearly shows its benefits.

This study contributed to the research on higher education art and design instructors. It provided a data interpretation of 56 art and design faculty and their use of technology at the university level. In addition, it explored computer use's role in creating instructional change.

There are many directions future research could take to expand on the findings of this study. Future research might investigate additional factors such as self-efficacy, training, and incentives that may increase the likelihood of art and design instructors using technology as an instructional tool. Additional studies could employ different or a mixed research methods by viewing technology use through a qualitative research approach. While this study indicates the benefits of teaching with technology, future research may investigate the correlations between

technology use for instructional purposes and art and design student achievement. Furthermore, this study revealed a variety of teaching methods currently used by higher education art and design instructors. Future research should explore which teaching methods correlate with higher levels of technology use for instructional purposes. Whether instructors teaching in higher education art and design programs have higher levels of technology use for instructional purposes than other instructors in liberal art programs should also be explored. It is also recommended that future research examine whether art and design instructors utilize technology with higher frequency when those perceived obstacles are removed.

Findings in this study imply that future research should also include studying expectations of university students concerning technology usage in the classroom environment and assignments. Additional noteworthy studies would emphasize how faculty use or requirements for technology affect the way college students feel that they learn best.

CONCLUSIONS

The study provided quantitative data illuminating the descriptive characteristics of higher education art and design faculty. The data suggest that higher education art and design instructors are involved with technology at varying levels, meeting various relevant needs. The primary purpose of this study was to determine the levels of technology used in classrooms and the significant factors affecting the technology integration process engaged in by higher education art and design instructors.

This study found that higher education art and design instructors have high levels of technology use for mainstream devices such as e-mail, presentation software, and classroom management. According to the findings, higher education art and design instructors have a

generally positive attitude regarding computers as tools for instructional purposes. Consistent with Rogers' (1995), Almusalam (2001), Albejadi (2000), the findings suggest that a positive attitude toward an innovation does lead to its adoption. In spite of instructor's positive attitudes towards computers as a teaching aid, the majority of instructors do not like talking about computers with others and would prefer working by hand rather than using a computer.

There is a need for additional research concerning professional development at the collegiate level and how universities offer professional development in relation to technology. This is particularly relevant to institutions who focus primarily on research with similar goals and emphases that often do not focus on teaching or technology integration strategies.

The findings indicate that the majority of art and design instructors are women, with master's degrees who have been teaching for over ten years. The most common method of instruction is a lecture or demonstration. Most of the instructors had taken a training course, workshop or seminar on using computers. While the level of education and years taught were determined to be significant variables in computer usage, female participants displayed a significant relationship in their attitude towards technology utilization as well.

Adoption, according to Rogers (1995), can be influenced by several factors. The term diffusion of innovations is best used to explain this adoption process. In this theory, the factors responsible for the highest adoption are characteristics of innovations, type of innovation decision, communication channels, nature of the social system, and the extent of the change agent's promotional efforts (p.62). This study examined instructor attitudes and personal characteristics. A significant relationship was revealed between the level of computer use and instructor attitude toward computers as tools, as well as the parallel between the level of computer use and the art and design instructor's instructional experience.

The investigation of variables that affect art and design instructors' technology use, not only benefit instructors but also benefit decision-makers in addressing the challenges of technology integration. This study is foundational to the field of art and design as it evolves in a technical world. This study exposes the connection between the faculty-adult learners, and their early adaption and thus modeling that early adaptation of innovative technology to promote students as lifelong learners in the ever-evolving world of technology. The era of teaching, as we were taught, is no longer acceptable when the technology we utilized is outdated. Faculty must adapt and model this behavior to ensure student success in a competitive job market.

I am using this study as a foundation for my current research. Following Palmers (2007) recommendation of focusing on self-reflection, I have implemented projects for students that help and engage the community instead of project-based learning directed toward the entertainment field. Palmer (2007) encourages educators to work in communion with each other to improve teaching practices.

In my field of study, game development and digital production are constantly updating and improving, and more opportunities arise for game developers to collaborate across disciplines. This opens possibilities for game developers to utilize their skills outside of the entertainment industry. We have implemented these theories and collaborated with our Health Science department and a local medical institute to research Gait analysis. Our students are studying human movement to better understand and apply the knowledge to character development and animation. While simultaneously assisting collaborators with our motion capture equipment to measure body mechanics and analyze the rehabilitation of patients.

There have been several new instructors in my Gaming and Animation department working to improve technology integration into the classroom. By using Knowles (1984)

framework, a better, more efficient curriculum will benefit instructors and students; thus, have a positive and direct impact on the community.

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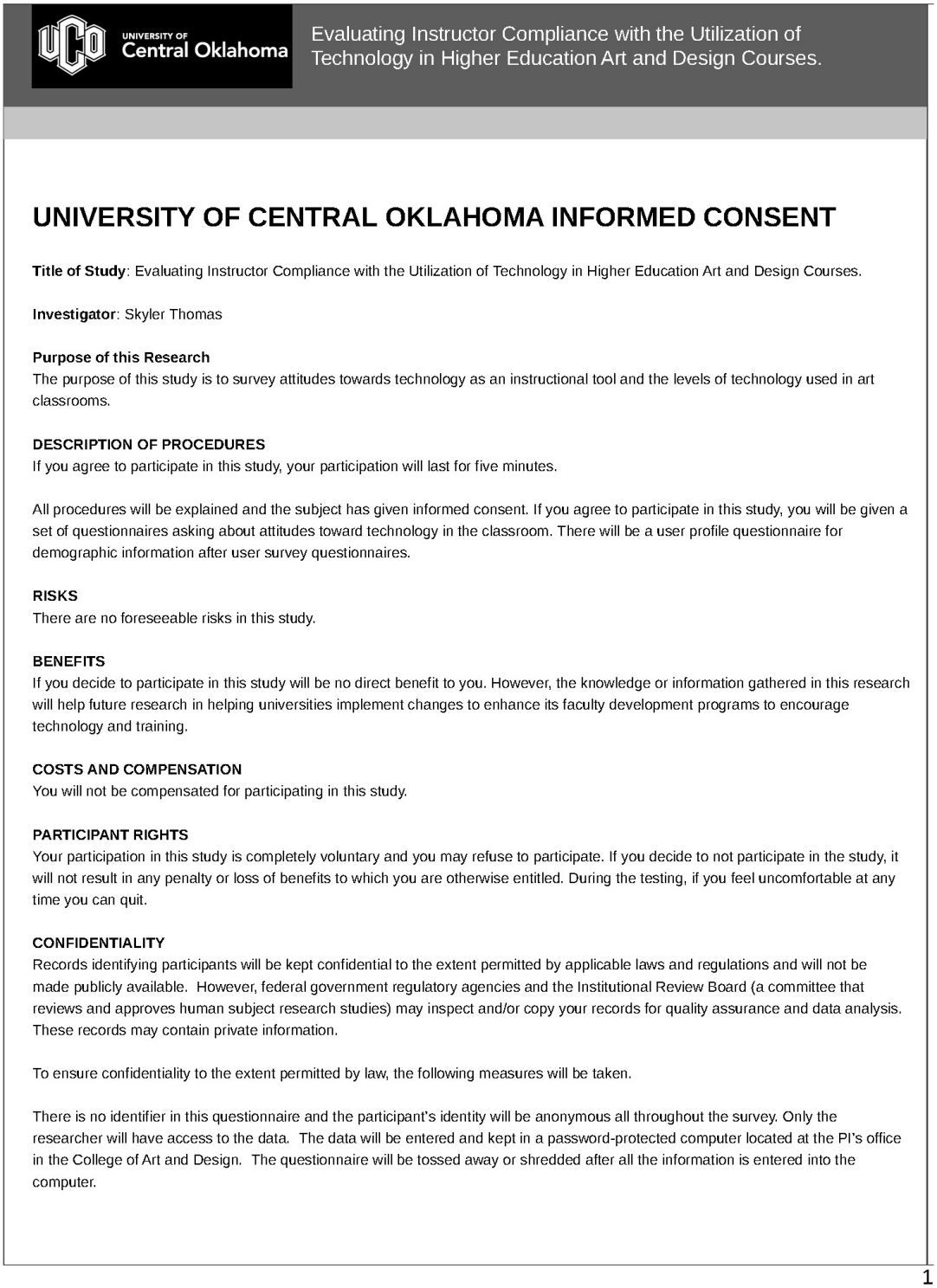
APPENDIX A: QUESTIONNAIRE FOR PARTICIPANTS OF THE SURVEY



UNIVERSITY OF Central Oklahoma

Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses.

UNIVERSITY OF CENTRAL OKLAHOMA INFORMED CONSENT

Title of Study: Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses.

Investigator: Skyler Thomas

Purpose of this Research
The purpose of this study is to survey attitudes towards technology as an instructional tool and the levels of technology used in art classrooms.

DESCRIPTION OF PROCEDURES
If you agree to participate in this study, your participation will last for five minutes.

All procedures will be explained and the subject has given informed consent. If you agree to participate in this study, you will be given a set of questionnaires asking about attitudes toward technology in the classroom. There will be a user profile questionnaire for demographic information after user survey questionnaires.

RISKS
There are no foreseeable risks in this study.

BENEFITS
If you decide to participate in this study will be no direct benefit to you. However, the knowledge or information gathered in this research will help future research in helping universities implement changes to enhance its faculty development programs to encourage technology and training.

COSTS AND COMPENSATION
You will not be compensated for participating in this study.

PARTICIPANT RIGHTS
Your participation in this study is completely voluntary and you may refuse to participate. If you decide to not participate in the study, it will not result in any penalty or loss of benefits to which you are otherwise entitled. During the testing, if you feel uncomfortable at any time you can quit.

CONFIDENTIALITY
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken.

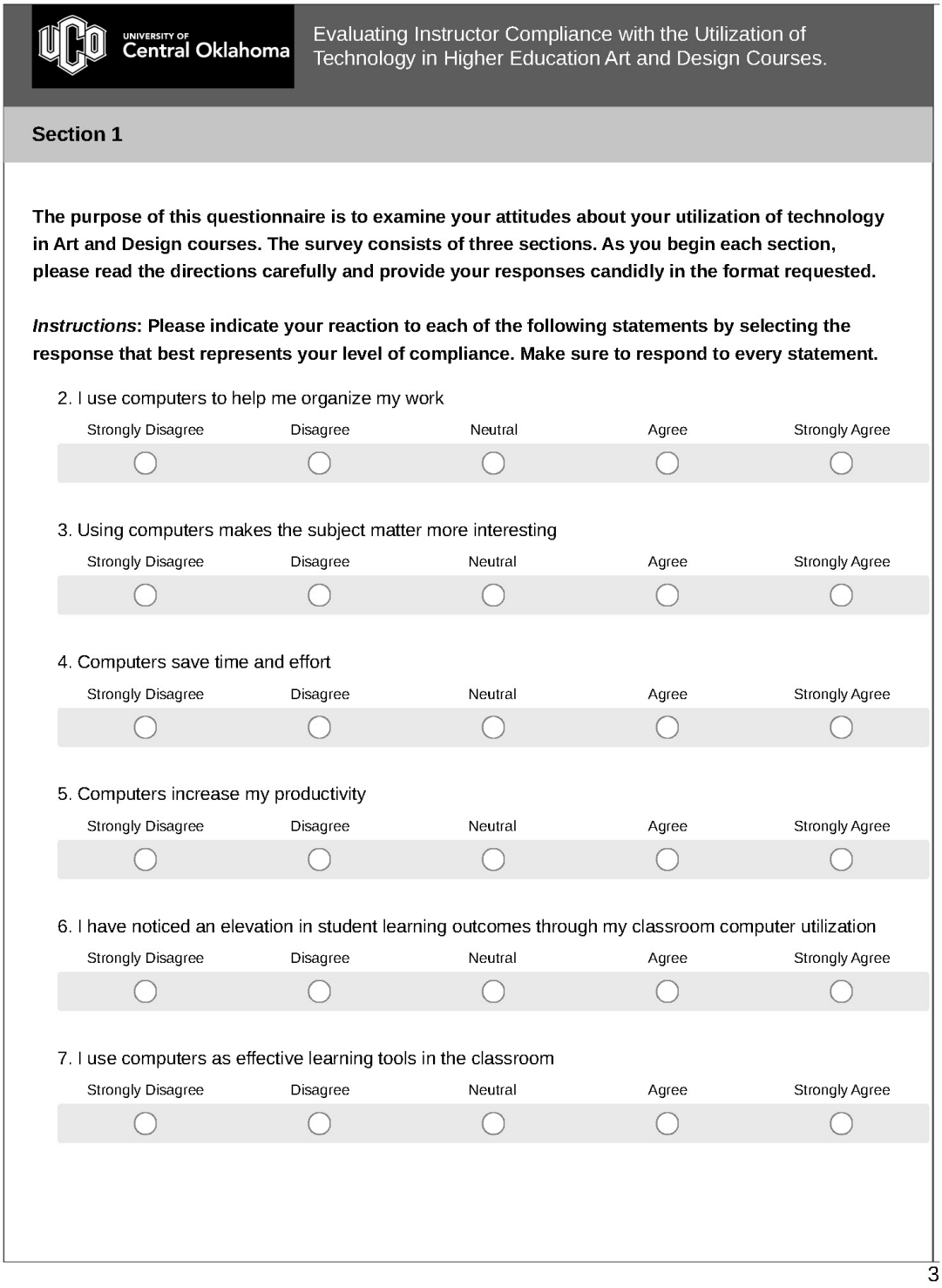
There is no identifier in this questionnaire and the participant's identity will be anonymous all throughout the survey. Only the researcher will have access to the data. The data will be entered and kept in a password-protected computer located at the PI's office in the College of Art and Design. The questionnaire will be tossed away or shredded after all the information is entered into the computer.

1

1. By advancing beyond this Informed Consent Form screen, I consent to participate in this study.

- ◯ Yes
- ◯ No

2



UNIVERSITY OF Central Oklahoma

Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses.

Section 1

The purpose of this questionnaire is to examine your attitudes about your utilization of technology in Art and Design courses. The survey consists of three sections. As you begin each section, please read the directions carefully and provide your responses candidly in the format requested.

***Instructions*: Please indicate your reaction to each of the following statements by selecting the response that best represents your level of compliance. Make sure to respond to every statement.**

2. I use computers to help me organize my work

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

3. Using computers makes the subject matter more interesting

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

4. Computers save time and effort

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

5. Computers increase my productivity

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

6. I have noticed an elevation in student learning outcomes through my classroom computer utilization

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

7. I use computers as effective learning tools in the classroom

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

3

8. My computer use within the classroom enhances student learning

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

9. Computer use in the classroom can improve education

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

10. I use computers to collect classroom evaluation and assessment data.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

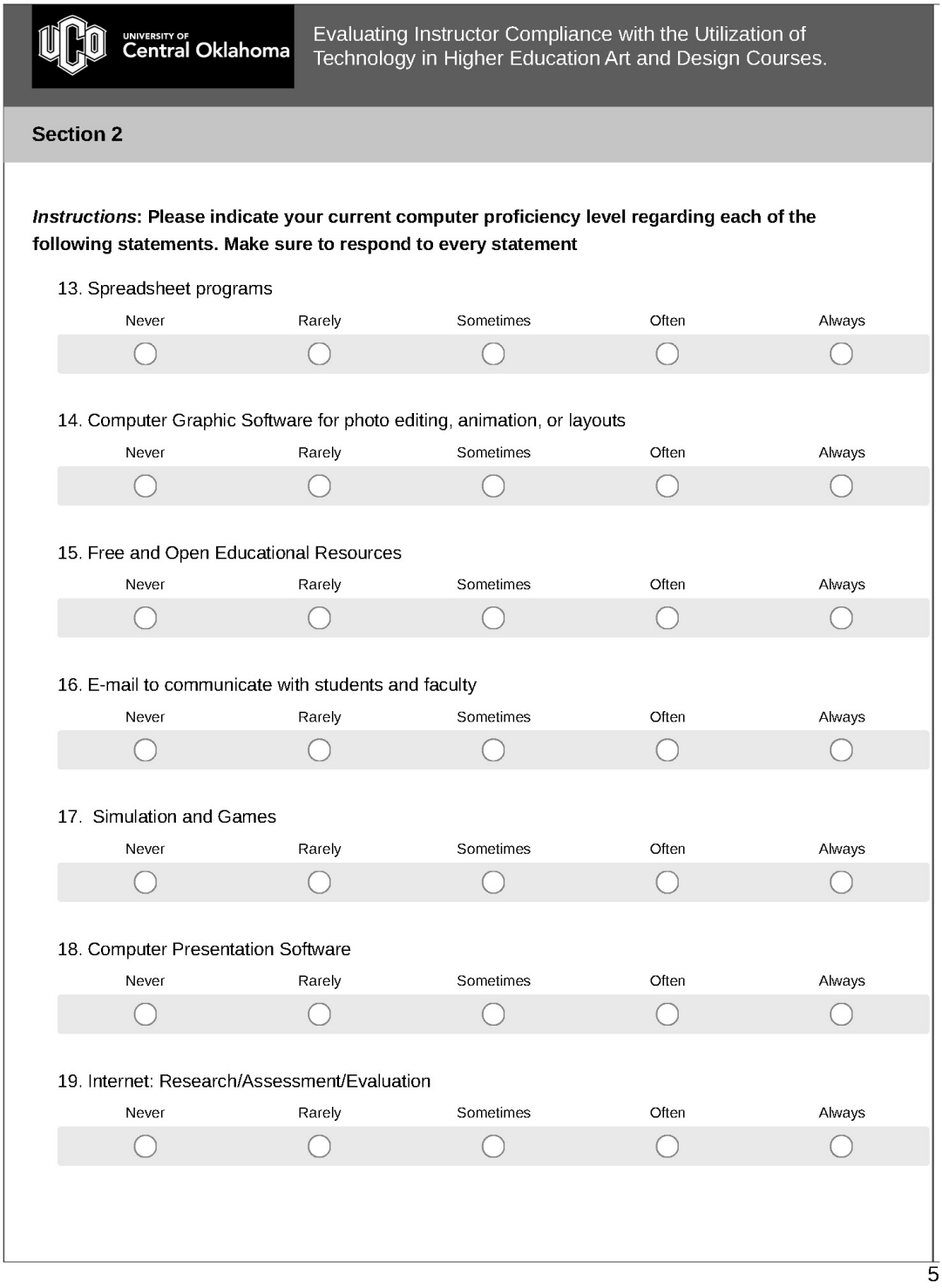
11. I use e-textbooks and related material in the classroom

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

12. My utilization of free open educational resources increases student learning outcomes in my classroom.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

4



UNIVERSITY OF Central Oklahoma

Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses.

Section 2

***Instructions*: Please indicate your current computer proficiency level regarding each of the following statements. Make sure to respond to every statement**

13. Spreadsheet programs

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

14. Computer Graphic Software for photo editing, animation, or layouts

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

15. Free and Open Educational Resources

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

16. E-mail to communicate with students and faculty

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

17. Simulation and Games

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

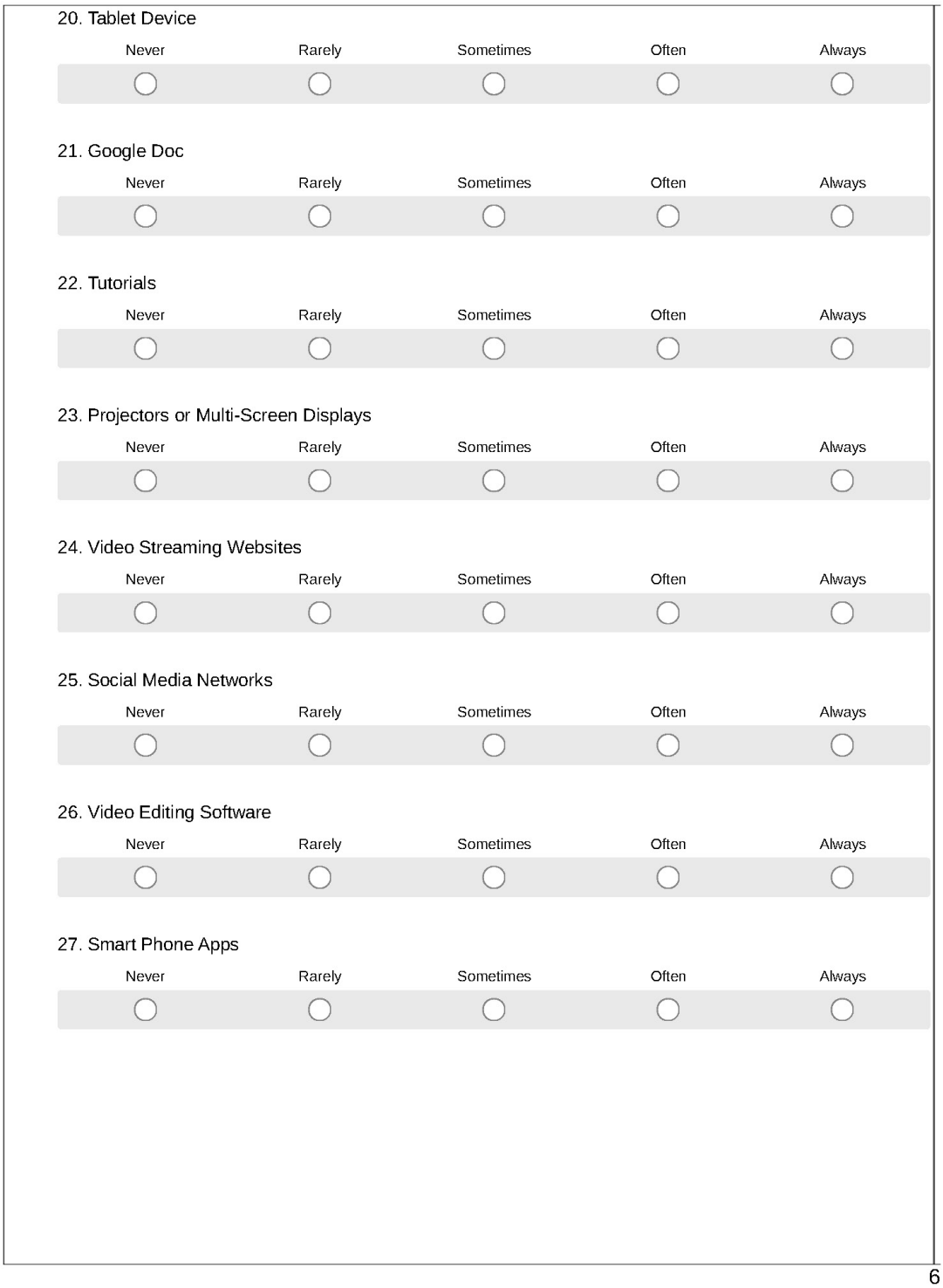
18. Computer Presentation Software

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

19. Internet: Research/Assessment/Evaluation

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

5



20. Tablet Device

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

21. Google Doc

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

22. Tutorials

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

23. Projectors or Multi-Screen Displays

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

24. Video Streaming Websites

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

25. Social Media Networks

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

26. Video Editing Software

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

27. Smart Phone Apps

Never	Rarely	Sometimes	Often	Always
○	○	○	○	○

6

UNIVERSITY OF Central Oklahoma

Evaluating Instructor Compliance with the Utilization of Technology in Higher Education Art and Design Courses.

Section 3

***Instructions*: Please indicate your response to the following questions by checking the appropriate boxes:**

28. What is your gender?

- ☐ Male
- ☐ Female

29. Including the current year, how many years have you been teaching?

- ☐ 1-5 Years
- ☐ 6-10 Years
- ☐ 11-15 Years
- ☐ 16-20 Years
- ☐ Over 20 Years
- ☐ Less than once a month
- ☐ 65+

30. What is your highest completed academic degree?

- ☐ Teacher Certificate
- ☐ Bachelors
- ☐ Masters
- ☐ Ph. D / Ed.D. / MFA / or other Terminal Degree

31. Have you ever attended any training course, workshop, or seminar on using computers?

- ☐ Yes
- ☐ No

If "Yes", please specify the number of hours and/or days

32. What is the teaching method you use most often?

- [ ] Active Discussion
- [ ] Lecture
- [ ] Collaborative Activities
- [ ] Computer-Assisted Instruction
- [ ] Demonstration
- [ ] Other (please specify)

33. I would choose to work by hand than with a computer

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

34. I am confident in my computer skills in the classroom

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

35. I do not like talking with others about computers

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

36. I like to use computers as a teaching aid

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
○	○	○	○	○

8