

Technology Predispositions of Art Teacher Candidates:
Influences on Technology Integration Practices

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Dedication

For my daughter, Corinne, who is by far the most beautiful thing I've ever seen and the most beautiful thing I've ever done.

Abstract

As computer and mobile technologies have become more prevalent in recent decades, the need for thoughtful consideration and implementation of these tools into classroom curriculum has increased significantly. Within the field of art education, technology implementation presents a unique set of challenges as these tools can be used for both presentation and art creation purposes. K-12 art teachers are tasked with the responsibility of providing their students the necessary technology experience through their curriculum to foster creativity and the development of technical skills. But how are art teachers being trained to use technology in their classrooms?

Within the framework of arts based research, with elements of narrative inquiry, autoethnography, and case study, this study examines the baseline inclination and orientation towards technology, or “technology predispositions,” art teacher candidates possess at the beginning of their licensure program. These predispositions, the Technology Averse, the Technology Willing, and the Technology Savvy, are presented as narrative constructions created from compiled course data and interview transcripts, that illustrate the numerous factors that influence art teacher candidates’ ability and willingness to integrate technology into their teaching practice.

Based on the stories of former art education licensure students, barriers to technology integration are identified such as computer anxiety, a rejection of the idea of computer technologies as a medium for art-creation, and a lack of technology-specific student teacher mentoring. Findings of this research indicate the benefits of increased knowledge sharing and effective integration modeling practices, as well as the need for

greater technology mentorship within the pre-service year and student teacher placements.

Table of Contents

Acknowledgements.....	i
Dedication.....	ii
Abstract.....	iii
Chapter I: Overview.....	1
Methods.....	3
Arts Based Research.....	4
Narrative Inquiry.....	5
Autoethnography.....	6
Case study.....	7
Data Collection.....	9
Participants.....	9
Validity and Biases.....	10
Data Analysis.....	11
Definition of Terms.....	12
Outline of the study.....	14
Chapter II: Learning to Teach.....	15
Chapter III: The Technology Averse.....	28
Roger.....	28
Emily.....	32
Ginny.....	35
Analysis.....	41

	vi
Chapter IV: The Technology Willing	46
Laura	46
Amy.....	57
Analysis.....	60
Chapter V: The Technology Savvy.....	68
Michael	68
Jenna	76
Chapter VI: Discussion and Recommendations	86
Addendum: Literature Review.....	98
References.....	123

Chapter I: Overview

As computer and mobile technologies have become more prevalent in recent decades, the need for thoughtful consideration and implementation of these tools into classroom curriculum has increased significantly. Within the field of art education, technology implementation presents a unique set of challenges as these tools can be used for both presentation and art creation purposes. As a method of presenting information in art, technology offers the ability to create dynamic, interactive presentations. As a medium for creating art, technology presents nearly endless possibilities for creative expression, skills acquisition, and information gathering. K-12 art teachers are tasked with the responsibility of providing their students the necessary technology experience through their curriculum to foster creativity and the development of technical skills. But how are art teachers being trained to use technology in their classrooms? How are they applying this technology knowledge for the purpose of using digital media to create art in their future classrooms? Do they receive the appropriate training within their licensure programs? “More extensive research would be useful in ascertaining how pre-service teacher education programs engage with technology” (Delacruz, 2004, p. 9).

My interest in investigating the technology experience of pre-service art teachers formed as I started teaching EDHD 5007 Technology for Teaching and Learning. Through the process of teaching the course, I questioned what it is to adequately prepare art teachers to teach with technology as well as my own effectiveness as an instructor. Despite my observations and general feelings that my approaches were mostly successful, does this course adequately introduce these students to practical and useful educational technology tools? I had to rely on student course evaluation feedback to gauge the

effectiveness of my instruction as well as the usefulness of the class as a whole.

Ultimately however, given the short amount of time we were together as well as the lack of opportunity for a continued collegial relationship at the conclusion of the course, I was left with the overarching questions about what it is to prepare our future art teachers to teach with technology. How are the technologies and skills presented in EDHD 5007 integrated into their teaching? Are there other technologies that have been overlooked? Are programs and tools being modeled effectively?

Understanding the ways in which universities are currently preparing art teacher candidates to use technology is a topic in great need of attention. It is logical to assume that art teachers will use technology in their classrooms similar to the ways in which they were taught, and therefore “it is incumbent upon teacher education programs to consider how, or even whether, they are preparing teacher candidates to educate today’s youth in light of the possibilities that new and emerging technologies have to offer” (Roland, 2010, p. 18). I would additionally argue however, given my experience instructing art education students for four years, that there are innumerable factors that affect an art teacher candidate’s ability and willingness to integrate technology into their teaching.

This study proposes to fill the critical gap in research knowledge (Delacruz, 2004; Roland, 2010) regarding how art teachers are prepared to teach with technology during their initial licensure programs. Specifically, what factors influence an art teacher’s readiness and ability to incorporate technology in the art classroom? This research seeks to reveal the strengths and weaknesses of technology preparation by examining those who experience it first hand, both students and instructor. The feedback of students, combined with a detailed analysis of my own experience as an instructor of technology,

will begin to paint a fuller picture of how university art teacher preparation programs engage with technology to prepare their students to use it both as a method of presentation, and as a means of creating art in their future classrooms. A close examination of these student and instructor perspectives in reference to teaching and learning approaches with technology, and the lived experience of the current technology curriculum will offer the opportunity to redefine the ways in which we think about technology education and reshape our approaches to technology integration.

Methods

This study employs qualitative data collection and analysis methods. I am interested in more than a reporting and analysis of what classes our art education cohort is required to complete or what types of technology they are exposed to. I am interested in understanding what the technology experience is, through these classes, the uses of technologies, and student teacher placements, but more specifically in how these experiences could be used to shape future technology curriculum for pre-service art teachers. What factors influence an art teacher candidate's willingness and ability to integrate technology into their teaching? Gaining insights into this research question requires a qualitative approach. Merriam (2009) explains, "qualitative researchers are interested in understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world" (2009, p. 13). How are future art teachers experiencing technology training in their pre-service year? How are they interpreting this experience?

Arts Based Research

More specifically, I have completed this work within the overarching framework of arts based research and inquiry. I am an artist by nature and by training. My process when creating visual art is to gather multiple examples, tools and supplies, and begin to experiment with combining and rearranging elements as I construct a piece. For me, the manner of joining and remixing components of my work is invaluable to the process of creating. This work is an extension of that creative process, an experimentation with method, form, and meaning. First and foremost, an arts based approach is research that is guided by aesthetic elements in both data collection and representation phases (Barone & Eisner, 2011). My first goal in this research is to understand what the pre-service art teacher technology experience is from the student perspective. As students of an initial licensure program in art education, future art teachers are the individuals best equipped to articulate both the positive and negative aspects of their technology preparation. In addition to the student voice within this work, I weave my own experiences as an instructor and researcher throughout as an alternative viewpoint, sometimes confirmatory, sometimes conflicting. Working within this framework, I do not claim to have answered the overarching research question with any degree of definitiveness. Arts based research is “not aimed toward a quest for certainty. Its purpose may instead be described as the enhancement of perspectives” (Barone & Eisner, 1997, p. 96).

Secondly, arts based research “represents [that] diversity in methodology is possible” (Barone & Eisner, 2011, p. 4). Arts based research affords the opportunity to experiment throughout each stage of the research process, combining multiple inquiry and representational approaches. Within the context of arts based research, this study also

incorporates the use of: story in the form on narrative constructions; elements of autoethnography in describing and analyzing my role in art teacher preparation; and case study as a way to investigate art teacher candidates within the real-life context of their licensure program.

Narrative Inquiry

Within the primary context of arts based research, this study employs narrative methods in both inquiry and reporting. The use of story is seen in research fields including psychology (Britton & Pellegrini, 1990; Bruner, 1985; Sarbin, 1986), education, (Barone, 2001; Connelly & Clandinin, 1990; Elbaz, 1991; Gudmundsdottir, 1991; Hollingsworth, 1989; Polkinghorne, 1995; Richert, 1992), and even teacher education specifically, (Carter, 1993; Clandinin & Connelly, 2004; Doyle & Carter, 2003). “If we understand the world narratively, as we do, then it makes sense to study the world narratively” (Clandinin & Connelly, 2004, p. 17). Seeking insight into the questions about art teacher candidates’ experiences with technology learning and teaching required a narrative approach. Each participant had an individual story, the cohort as a whole had a story, and I had a story. All of these stories overlap, intertwine and intersect, creating a larger, fuller narrative. “Life is filled with narrative fragments, enacted in storied moments of time and space, and reflected upon and understood in terms of narrative unities and discontinuities” (Clandinin & Connelly, 2004, p. 17). All data sources serve as field texts that are constructed into narratives that more fully illustrate experience. The process of combining and constructing these narrative fragments is inherently interpretive. How do these stories fit together, and how can they be used in art teacher education? “The special attractiveness of story in contemporary

research on teaching and teacher education is grounded in the notion that story represents a way of knowing and thinking that is particularly suited to explicating the issues with which we deal” (Carter, 1993, p. 6).

Through the use of narrative inquiry, this work investigates the influences and meaning of art teacher technology preparation within then context of the narratives of those who lived the process and an analysis of the significance of these experiences (Barone, 2001). It is a work of creative non-fiction, which is reflected in the various writing styles and formats.

Autoethnography

Analyzing my own role in preparing art teachers to teach with technology is an important component in gaining an understanding of the pre-service technology experience. As both participant and researcher, I have a unique insider perspective into the process and limitations of teaching technology. Autoethnography is “an approach to research and writing that seeks to describe and analyze personal experience in order to understand cultural experience” (Ellis, Adams, & Bochner, 2010, p. 1). Separating my teaching experience from this research is an impossible task. In actuality, I believe this experience enhances the depth and authenticity of the research findings. As a method, autoethnography specifically utilizes data about the self and its context to gain an understanding of the connectivity between self and others within the same context” (Ngunjiri, Hernandez, & Chang, 2010, p. 2).

Autoethnography borrows from the main purpose of Ethnography by studying a culture’s relational practices, shared experiences and common beliefs and values. The purpose of investigations of this nature are to help “insiders,” or those involved within

the culture, and “outsiders,” those who are considered cultural strangers, better understand the culture under investigation (Geertz, 1973). This can be accomplished as the Ethnographer, or researcher, becomes a participant observer within the culture (Ellis et al., 2010). While many authors of autoethnography describe “culture” in research in a traditional sense (Chang, 2008; Ellis, 2003; Ellis et al., 2010; Ngunjiri et al., 2010; Reed-Danahay, 1997), my inquiry focuses rather on the culture of teaching and learning, specifically within the context of the art education cohort’s academic experience. This academic “culture” of educating art teacher candidates is one that I was a participant and observer in by nature of my status as both student of art education and instructor of technology for art education. This approach allows me to analyze both my own experience and the experience of my students from multiple perspectives while piecing together the broader issues surrounding technology teaching and learning.

Case study

Given my interest in understanding the technology experience of pre-service art teachers in their initial licensure year, it was logical to conduct research within the art education cohort at the University of Minnesota as my case. As Yin (2008) defines, “A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (2008, p. 18). This definition focuses on case study as a methodology and process by which a more general topic can be researched using an appropriate case. Merriam (2009) offers a simpler explanation in that case study is “an in-depth description and analysis of a bounded system” (2009, p. 40). This definition, while more direct, focuses on the critical component of a case study, the bounded system. The

bounded system is the unit to be studied or analyzed and has clear boundaries. For my research purposes, the “case” is the art education cohort. This cohort is a unit with clear, definable boundaries. Those within the cohort are considered to be the case, whereas other members of the Initial Licensure Program in other disciplines, such as math, science or social studies, fall outside this specified bounded system.

My interest is in technology education for pre-service art teachers as a whole, not strictly the educational experience of the students at the University of Minnesota. A case study approach, and more specifically an instrumental case study approach (Stake in Denzin & Lincoln, 2005) provides the necessary framework to investigate this larger issue by conducting research within the smaller context of the art education initial licensure program (ILP) cohort at the University of Minnesota. Of the instrumental case study design, Stake explains that a specific case “is examined mainly to provide insight into an issue or to redraw a generalization. The case is of secondary interest, it plays a supportive role, and it facilitates our understanding of something else” (2005, p. 437).

This study is presented from three distinct perspectives, that of academic researcher, that of an instructor, and that of the initial licensure art education students. These perspectives are intertwined throughout this work and are represented in different writing styles. The perspective of academic researcher is presented in traditional academic language and format. The perspective of instructor is narrative construction, combining elements of personal and professional history and data and is presented in a reflective, first person voice. The perspectives of my former students are also presented

as narrative constructions, created from interview data, conversational exchanges, teaching videos, and correspondence.

Data Collection

Data for this study comes from three main sources: 1) class data from EDHD 5007 (2009 - 2012), which includes syllabi, project files, student reflection assignments, and email correspondence, 2) an all-cohort discussion of technology needs conducted in 2013, and 3) individual interviews with four members of the 2012-2013 art education initial licensure cohort. Interview subjects self-selected to participate after a request to all twelve members of the cohort. Interview questions were open-ended and unstructured allowing participants to guide the discussion on issues, opinions and experiences of merit to them. Initial general questions were used to facilitate the discussion such as; what types of technology do you use as a student to facilitate your own learning? Are there specific computer programs or skills that you have been exposed to as a student that have been beneficial to your learning? Are there programs or skills that you have not been exposed to that you believe would be beneficial to your learning? In what ways do you feel you have been prepared through your ILP program to teach with technology? Describe your student teaching experiences. Additional data as provided from interview subjects such as lesson handouts, class websites, and teaching videos were also reviewed. These data are supplemented by my own experiences, including journal reflections, teaching notes and correspondence with students while teaching EDHD 5007.

Participants

The participants for this study were members of the 2012 - 2013 art education Initial Licensure Program (ILP) cohort at the University of Minnesota. This art education

cohort consisted of twelve members, four of whom consented to be individually interviewed for this study. These four participants completed the course EDHD 5007 in the summer of 2012 with me as their instructor. In order to protect the rights of my participants and ensure that they fully understood the research process I proposed, each participant was asked to read and sign an informed consent document outlining the specific research procedures, what would be asked of them, the type of data that would be collected, and how that data would be stored and used. Participants were also informed that their participation was voluntary and they were permitted to withdraw from the study at any time.

Validity and Biases

The rationale for using these multiple sources of data is to ensure data triangulation. By collecting information from multiple sources the potential problem of constructing validity are addressed by providing multiple measures of the same phenomenon (Yin, 2008). Using multiple sources of data does, of course, complicate the data collection process, as each source of data must have its own well-defined procedures. Data collected from interviews is not analyzed in the same way as a physical artifact. Each data type “must be developed and mastered independently to ensure that each source is properly used” (Yin, 2008, p. 114). Issues of reliability will also be addressed through the use of multiple data sources. By maintaining a *chain of evidence* (Yin, 2008) an external observer will be able to “follow the derivation of any evidence from initial research questions to the ultimate case study conclusions” (2008, p. 122).

Issues of validity will be addressed in multiple ways. As a former instructor of these students, I acknowledge the inherent complexity of the relationship we developed

as researcher and participants. This relationship is unavoidably affected by our previous instructor-student relationship. My previous experience as the instructor of EDHD 5007, and specifically my involvement with the 2013 art education cohort, adds a level of authenticity and perspective to this study by building on our established rapport to form a collegial relationship as arts educators with a shared interest in bettering art teacher education practices. My role, when interviewing and interacting with the ILP students, was that of objective researcher, interested in their authentic thoughts and experiences with technology. Throughout the data collection and analysis phase, I remained committed to reflective practice and remaining aware of my unique positioning within this research process, and how that positioning could influence my interpretations and analysis.

In addition, the trustworthiness of this study is increased by the triangulation of data sources— interview transcripts and audio, observation notes, email correspondence and class data—and through analysis methods—case description, interpretation and autoethnographic analysis. Establishing an initial group discussion with cohort participants followed by select individual follow-up interviews also increase the credibility of this study by providing opportunities for member checking.

Data Analysis

A key strategy in analyzing these data was to rely upon the *theoretical proposition* (Yin, 2008) that underlies this study. The basic proposition of this research is that technology education at the pre-service level can be improved and it is likely that pre-service teachers are the individuals most knowledgeable about what improvements

can be made based on their experience. This theoretical proposition guided my data analysis process and assisted in categorizing and analyzing data appropriately.

An initial analysis of class enrollment data from EDHD 5007, section 006, art education (2009 – 2012), examined the following variables; gender, approximate age range at time of enrollment, and a ranking of technology experience based on self-reported answers from students on the first day of class. Total enrollment for EDHD 5007 section 006, art education, from 2009 – 2012 is 54 students: 15 male, 39 female. On the first day of class each year, I asked the students to indicate their level of experience with technology as minimal, moderate or extensive. *Minimal* meaning they use technology sparingly both personally and professionally, and/or have little to no interest in technology. *Moderate* meaning they have experience with technologies and use them personally, but do not have a specific technology background — they consider themselves moderate users. *Extensive* meaning they likely have a digital media or graphic design undergraduate background and/or have worked in a digital media field, or have strong personal interest and experience. Out of 54 students over the course of four years, 17 self-reported as extensive, 29 as moderate, and 8 as minimal users. Of the 15 males, over half, 9 total, rated themselves as extensive users. Only 8 out of 39 females rated themselves as extensive users. Of the 8 self-reported minimal users, 7 were female and 1 male.

Definition of Terms

Examining the self-reported technology experience levels of EDHD 5007 students, minimal, moderate and extensive, revealed what I have termed “technology predispositions”; a baseline inclination or orientation towards technology based on their

personal and professional history at the starting point of both EDHD 5007 and their initial licensure program. The predispositions are: the Technology Averse, the Technology Willing, and the Technology Savvy. These predispositions often correspond to the students' self-reported rankings, but are not necessarily specifically associated. For instance, a student ranking himself or herself as a minimal user does not mean they are automatically placed in the Technology Averse predisposition, nor are moderate or extensive users automatically placed in their comparable categories. Analyzing students' self-reported technology experience level was the first step in defining these predispositions. A further analysis of class data, correspondence and personal interactions with me as their instructor was necessary in order to more accurately make these categorizations.

For the purposes of this study, the definitions of the technology predispositions are as follows: 1) Technology Averse – individuals placed in this category typically self-report as minimal technology users and often demonstrate a dislike or resistance to using technology both personally and professionally. 2) Technology Willing – individuals placed in this category often self-report as moderate or minimal technology users and possess low to intermediate technology skills but demonstrate a willingness to learn and use new technologies. 3) Technology Savvy – individuals placed in this category usually self-report as extensive technology users, possess a high level of technology skills, and demonstrate an ease of use with technology tools.

How do these technology predispositions affect art teachers' ability or willingness to incorporate technology into their classrooms?

Outline of the study

This study is presented in six sections: *Chapter I: Overview*, provides a general description of the research question and methods as well as an overview of organization and formatting. *Chapter II: Learning to Teach*, is an autoethnographic narrative construction of my history and experiences specific to technology, teaching, and learning. *Chapters III, IV, and V*, introduce the technology predispositions and the student stories that represent them: *Chapter III: The Technology Averse*, *Chapter IV: The Technology Willing*, and *Chapter V: The Technology Savvy*. *Chapter VI: Discussion and Future Directions* includes a summary of the study, a general review and interpretation of findings, and provides recommendations, and suggestions for further research.

Chapter II: Learning to Teach

In May of 2015 my Facebook feed erupted with posts containing an iconic and sweetly nostalgic image for nearly anyone my age. It was the black and green pixelated image of an ox and covered wagon declaring, “You have died of dysentery” from the video game, Oregon Trail. The image linked to an article that affectionately dubbed those of us born in the late 70s and early 80s, as “The Oregon Trail Generation” (Garvey, 2015), too old to be a digital native, (Prensky, 2001) but young enough to have grown up in the midst of the shift of mainstream technology.

Technology had not been a big part of life, and certainly not education, when I started high school twenty years ago. The extent of technology use in my K-12 years was mostly limited to slide carousels and AV carts with a VCR. We learned keyboarding on clunky IBM desktop computers and had to load the program onto the machine with a floppy disk. The Internet was just coming into K-12 education when I was in high school. For the first time, in my junior year, we were required to locate and use just *one* resource from the Internet for our research papers. We used landline phones to call our friends, and sometimes there was a busy signal. I knew only one girl my senior year of high school who had a cell phone, and it was huge. There was no Facebook, Twitter, Instagram or SnapChat. Other than occasional use of slideshows, displayed by actual slides in a carousel, technology was not used in my art classes as a child. Examples of famous art works were laminated posters tacked to the board.

As I began college, I immediately gravitated towards photography and electronic media. It was all new to me, but I felt comfortable with computers and using them in various ways to create art. It became normal, second nature even. I moved away from

“hand created” art and began working exclusively in digital media and photography. In retrospect, the technology of the time was still rather crude in comparison to today. I purchased untold quantities of 100MB Zip disks to save my work. In Advanced Interactive Art, I spent nearly an entire ten-week quarter creating two spheres and getting them to bounce across the screen in 3D Studio Max. We weren’t even required to have email addresses until my final year of college, and at that I never had a university issued address. Perhaps my creativity occasionally had to take a backseat to the steep learning curve of programs used in my degree program, as well as the cumbersome storage and file transfer options. I think about the things these applications can do today and the ease with which you can store, share and edit files and I am admittedly a bit jealous of those currently going through similar fine arts programs. Experiencing this technology transition firsthand certainly prepared me to be technologically flexible, a skill that has been vital in my various career paths.

It is certainly no secret that an undergraduate fine arts degree does not exactly lead to immediate, steady, high-paying employment. Like many in my graduating class I found that I was painfully unprepared to make a living. Staggering student loan debt has a magical effect on how appealing certain job prospects look. I began working in the file room at a medical management company with a small staff of about fifteen people. It was a close-knit group where it was common to just yell across the common space if you had a question rather than get up and walk ten feet. It sounds improbable, but everyone

actually liked each other and got along. My supervisor would occasionally slip me notes behind the cubicle or shoot rubber bands at the ceiling strategically so that they would land on my head. It was a relaxed atmosphere where every holiday was an excuse for yet another party.

About two months into my tenure there however, the operations manager suddenly quit. To this day, no one really knows what happened other than her departure had an enormous ripple effect. As the days passed after her sudden exit, we all began to realize just how tightly controlled our daily activities had actually been. No one knew the username or password to the main email address. No one knew how to access the server, restart the network, or even attach multiple documents as an email attachment. Why? Because we were never allowed to do those things. Shelley did those things. At the time, I'm sure she thought she was running a very tight ship. The problem being, of course, is that all of that vital operations information walked out the door with her. On the third day after Shelley's abrupt departure, near disaster struck. No one could access the Internet. Shouts began crisscrossing the cubicle area.

“Barbara, is the bureau website down? I can't get on!”

“I can't get on either, Judy. I think the network might be down.”

“What? Oh God. What are we going to do? Shelley always restarted it. Does anyone else even know how?!”

I poked my head out from my cubicle and saw everyone begin to gather in the central office area. Looks of panic and horror as far as the eye could see. As the youngest

employee there, I found myself suddenly the subject of much finger pointing. “Ellyn! You know computers, right?”

I didn’t *really* know computers. I understood the basic operations, but that was all. If they had needed me to manipulate a bunch of photos in Photoshop, then I was their girl, but I had no experience with networks, or even advanced computer operations. I could, however, see that no one else was willing to go flip a switch. The common repeated refrain was, “Oh no, I can’t do it. I’m afraid I’d break something.” It was the first time I had encountered such anxiety about computers, a nearly paralyzing fear of messing something up, simply by touching it.

I’ll be honest; my decision in that moment to go back to the server room and poke around until I found the magical “Internet switch” was far less from a place of altruism or willingness to be a team player, but rather it was simply that I didn’t have an inherent fear of blowing up the entire computer system by flipping one switch. I probably *should* have had that fear. But I didn’t. I made my way into the small server room, deep in the middle of the office suite. The room was full of computer and tech equipment, all with blinking lights of various colors and speeds. I scanned the room to find where the modem might be, and along the wall with all the cable wiring seemed a likely bet. The cable box was sitting right there, on the front of a wire rack, with an indicator light blaring red. I slid the switch on the back to the other side and watched the red light slowly fade out. When I flipped it back, a series of green and yellow lights flickered across the front, and then remained lit. Before I had even made it all the way back out of the server room, I could hear cheers from across the office. “You did it!” and “Yes! It’s working again!”

From that day forward, anything computer-related was my job. I set up everyone's individual email accounts, swapped out monitors, thin-clients, and did basic troubleshooting. In my arrogant youth, I would sometimes roll my eyes and sigh, "Ugh. No, you can't open an Excel spreadsheet in Word. Word is not the magical gateway to opening all documents." It didn't take long to realize that my co-workers simply didn't have the experience with computers that I did, and they seemed to have a certain level of anxiety about them in general, but they were all very eager to learn. And I was more than happy to teach them.

Those who can, do; those who can't teach

The origin of this rather insidious phrase, often reviled within the field of education is generally attributed to George Bernard Shaw's "Maxims for Revolutionists" in *Man and Superman*. The implication, of course, is that those who teach lack a refined skill set for "real" work, and therefore resort to the "ease" of teaching. Inexplicably, this phrase has persisted in modern society and has become a casual refrain in discussions about both the real and perceived inadequacies of the American educational system. As galling as the statement is, I must admit it has always played a role in my educational decisions, but for a somewhat unexpected reason. My interpretation of the saying has always been that it is in fact false, and that teaching requires a tremendous skill set that can easily trump those who "do." For reasons I cannot fully articulate, throughout my undergraduate and early graduate career, I labored under the impression that I did not and

could not possess the necessary skills to teach. My thought at the time was — if I cannot teach, what am I supposed to do?

As I began my graduate studies at the University of Minnesota, my perception of not being able to teach was initially reinforced as I began to experience what I considered a shocking lack of understanding of art and education. Shocking to me because I had spent four years in a relatively well respected fine arts program at my undergraduate university fully immersed in art and toiling away in the studio. I foolishly thought that having been through this program as a student, that somehow this adequately prepared me for study and research in art education. As an undergraduate student however, at least in my experience, you are conditioned to consume information. Points of discussion are presented to you, and *correct* analysis, interpretation or answers are expected. At the conclusion of those four years I was comfortable in my development as a student. I was capable of “playing the game” insofar as I could produce the answers and artwork that was expected of me. How is it though, that I spent those four years so seemingly engaged in the field and yet remained so unfamiliar with the subject matter as a whole?

After leaving the medical management company to begin my graduate studies, I had very little direction as far as what I wanted to accomplish other than somehow I wanted to find a researchable intersection of art and technology. I had already developed the necessary technical skills to produce and edit media content but struggled with the various ways technology could be useful in the teaching and learning of art. Throughout my coursework I pursued my interests in art and technology by seeking out classes that would assist in structuring and furthering my understanding of the issues inherent in both. I found inspiration in the social and historical foundations of art education, instructional

design and constructivism. Through these influences I formed a deeper understanding of the role technology could play in art education and began to formulate my own answers to questions such as: Is technology an important addition to the art curriculum and if so, why? What are the technology needs of today's arts educators? How can technology be incorporated into the art classroom effectively?

In the summer of 2009 I was offered the position of Graduate Instructor, teaching EDHD 5007 Technology for Teaching and Learning, the technology foundation class for initial licensure students in the College of Education and Human Development. The University of Minnesota course catalog description of EDHD 5007 is, "Diverse educational technology in K-12 classrooms. Effective use of technology. Computer technologies used to stimulate personal productivity/communication and to enhance teaching/learning processes" ("Twin Cities Course Details : University Catalogs : U of M," n.d.). Each section of the course is divided by cohort so that the class material is tailored to the discipline. Specifically, I would be teaching the art education cohort how to incorporate technology into their future art curriculum. Despite my long-held misgivings about my ability to teach, instructing this class provided the opportunity to move from theory to practice. Instead of theorizing about the potential benefits and best approaches to incorporating art and technology, I was now charged with the task of providing the technology skills and pedagogical knowledge to pre-service art teachers.

Nervous would have been an understatement, *terrified* feels more accurate. I never wanted to teach. The mere thought of myself in front of a classroom was complete anathema to me. I was no sage, and a stage was the absolute last place I wanted to be. When I was asked to teach the course, I believe my exact words were, “Um...sure...” with the raised intonation of a question rather than a definitive answer. Professionally, it was a step I knew I had to take. The experience would be valuable to my research interests, and I was comfortable with the technologies used in the course. But the irony that I was now a teacher of teachers, but I had never taught, was not lost on me. I did my best to get ready to teach this course, but I only felt half prepared. Sure, I could show my students how to use technology — how the programs operated, offer troubleshooting tips when issues came up, I could even help them think about technology in academic terms. But I was never able to share my experience with integrating technology into my art teaching because that is not my experience. I am not now, nor will I ever be, a K-12 art teacher. Without that experience, I could never be as prepared to teach this course as I wanted to be. In the weeks before the course started, I emailed a friend to tell her about my new job; “I have no idea what I’m doing. Don’t tell anyone!”

As I prepared to teach for the first time, I began to dig into what it was that I thought the class should, and could, accomplish. The course is worth one and a half credits, which translates to seven, three-hour class periods over three and a half weeks of summer session. This extremely tight schedule adds a certain level of difficulty when

attempting to balance pedagogical goals with a limited time frame with which to master new technology skills. Throughout the course, each assignment is presented to students with a rubric of specific guidelines and grading scale, as well as the questions to be addressed for their project reflection response. Reflection-paper responses are included as a component of the assignments in order to encourage critical thinking about each of the technologies we practiced, and what issues, both positive and negative, arise when integrating technology into the art classroom.

Throughout the process of teaching this class for four years, I questioned what it is to teach technology to pre-service teachers as well as my own effectiveness as an instructor. Ideally, what does technology integration training look like? What are the necessary skills and tools that we should be teaching to these future art teachers? My teaching style was heavily influenced by the Multimedia Design and Development certificate program offered through the department of Curriculum and Instruction. The instructional style modeled in these classes, CI 5362, CI 5363, CI 5336, and CI 5367 (circa 2009 – 2010) relied on constructivist methods for student learning. In each course, when new projects were introduced, the specific media application was briefly demonstrated for us, and then the project parameters explained in detail. As students, it was then our responsibility to begin planning our projects and experimenting with the software in order to discover the functions and techniques that would bring our project concept to fruition. Personally, I found this approach to teaching and learning tremendously effective. As I began these classes I had clear recollections of media classes in my undergraduate program, and how similar software systems were taught. In this case, it was commonplace for instructors to prepare a PowerPoint presentation that

walked us through each and every tool available in programs such as Adobe Photoshop or Flash. An entire four-hour studio class could be devoted to simply watching the presentation and listening as the instructor explained what each of the tools could do. At no point were these tools demonstrated to us. The classroom lights were dimmed, the projector was humming and there was a soothing cadence of descriptions that soon lulled us all to sleep. The next studio class would finally be our opportunity to experiment with the technology and where, in my experience, I began to actually learn how programs worked. There was a sharp contrast between this instructional style and the style presented in the Multimedia Design and Development classes. Here, the basics of a program were demonstrated then the challenge to students was presented immediately. There is a tension, almost an anxiety that comes with this form of instruction. Learning the program hands-on in a way that would accomplish my project goals was incumbent upon me, and it is that tension that propelled me forward. The dynamic of the classroom was cultivated as a supportive community. With peer and instructor support, each student pushed himself or herself to create the project that they had conceptualized, and the finished pieces were consistently impressive.

As a result of this experience as a student, I modeled my instructional style for EDHD 5007 similarly, rooted in the framework of Constructivism. A vast body of literature on technology integration for art education focuses on constructivist approaches, and for good reason. Constructivism differs from the more traditional teaching and learning point of view that “a discipline of knowledge is composed of “facts” that are true and considered constants, existing in a hierarchy that represents the structure of the discipline. Curriculum involves creating a sequence of objectives that

expose students to the “facts” of a discipline in a manner that reflects their hierarchy” (Prater, 2001, p. 44). Constructivism instead focuses on the social aspects of learning as a community, and relies on the students themselves to construct meaning and direct their own learning process. This approach lends itself well not only to the teaching and learning of art, but also to the usage of technology within the classroom.

I generally found this approach to be successful in my teaching when introducing new technologies in EDHD 5007. For any project we completed in the EDHD 5007 course, I demonstrated the software to be used by showing key features and functions. The demonstration typically lasts no longer than ten minutes and I would then move to an explanation of the specific project guidelines and timeline for completion. I presented projects to my students with a choice of two to three broad topic parameters allowing for them to choose a specific subject matter of interest to them. The class then transitioned to open work time for them to research their chosen subject matter, collect media assets, and to experiment with more advanced features of the software if they so chose. It is in these times of the class that I personally felt that most learning occurred. With a spark of interest in their chosen theme, be it a favorite artist, a media technique with which they are proficient and knowledgeable, or a topic they personally wish to explore further, they quickly begin to envision how they wanted their final piece to look and function. I always encouraged my students to ask both their colleagues and myself for guidance should they feel stuck or frustrated while attempting to bring their conceptualized projects to completion. Often these open work times lead to the development of community-style learning with students who may be more technically skilled offering assistance and guidance to students who may be struggling. Conversely it seems, those students who are

less familiar with technology often planned and executed more complex and engaging project ideas and encouraged others push themselves beyond their current skill set.

In the spring of 2013, I was able to sit in on a discussion with the art education cohort regarding their thoughts on how the technology preparation piece of their initial licensure program could be improved. They had completed my course in the summer of 2012 and this was their opportunity to help inform changes to the curriculum for the new incoming instructor of EDHD 5007. The students listed several areas where they thought technology integration preparation could be improved, which I compiled from their feedback.

- SmartBoard and Promethean boards. Students would like a more thorough understanding of how these technologies work (specifically the Notebook program, and calibration issues) as well as how best to incorporate them into teaching art.
- An introduction to the TPA (Teacher Performance Assessment) video assignment with an introduction to basic video shooting and editing.
- More alignment of EDHD 5007 (and all classes) with eventual TPA completion. Students expressed an interest in beginning work in EDHD 5007 that could be built upon throughout their ILP year.
- Basic introduction to PowerPoint and presentation software should still be included.
- Basic website building project done with weebly.com was said to have been very useful with several students indicating that they have used the site to build websites for both professional and personal reasons.

- An introduction to how to build class websites in Moodle, Blackboard, or similar learning management systems would be helpful.
- Introduction to iPad apps for both class management and art-creation purposes.
- A more clear connection between projects, programs, and apps discussed in class and their specific uses in the classroom. Direct modeling of effective uses.

Each year that I taught EDHD 5007, I would re-evaluate the content and make a few changes. The concept-mapping project was updated to use a free online application when the original software I used was no longer available. I updated a few of the course readings with materials I had come across in my graduate work. I moved the course over to the University's new learning management system, Moodle, and used the platform for reflection forum posts rather than submitted papers. All in all, my changes to the course were minor and incremental. I wanted to do more. Aside from these small changes the course remained mostly the same in structure and content as when I took over from the previous instructor. I wanted to make the class more relevant to their future teaching, but wasn't sure how. The feedback from the technology discussion supported my thought that the content and structure of the course needed to be drastically updated, and it was my hope that the new instructor would have the knowledge and experience to better prepare our art education students for teaching with technology.

Chapter III: The Technology Averse

This section illustrates the first observed predisposition of art teacher candidates, within the framework of technology integration, the Technology Averse. Technology Averse individuals typically self-reported as minimal technology users and often demonstrated a dislike or resistance to using technology both personally and professionally. Here I present four vignettes constructed from my experiences teaching EDHD 5007, as well class data and personal correspondence. The first three vignettes are narratives created from experiences with select students, Roger, Emily, and Ginny (pseudonyms). The fourth vignette is a narrative combining data and experiences from a specific cohort of students.

Roger

“Ok. I should have done this entire project from the lab, where I would have had my hand held and Kleenex pathetically passed to my weeping eyes, with kind words of understanding and encouragement. Instead, I spent hours trying to do things at home, and fear that I have done things wrong regarding the submission process. I did some crazy things, only to find myself stuck in the tarry goo of my own incompetence.”

Roger was embarking on a second career. He had a deep love for sculpting and woodworking and wanted to be an art teacher so that he could teach children how to create art with their hands, how to get dirty, and how to appreciate the oft-forgotten beauty in the world. He is without a doubt the most passionate student I have ever had the pleasure of having in class. He was jovial, engaged, funny and generally a joy to be around. Roger also had a flair for the dramatic. Not too far under the gregarious surface

was a thick layer of self-deprecation. Roger came up to me at the end of our first class meeting to issue a warning, “I’m just so excited to be here, but I’ve got to tell you, I know nothing about computers. I mean, nothing. You’ve got a rough road ahead of you here.” This was the first day that I had ever officially taught in my life. In retrospect, I just thought he was making conversation, letting me know he may need a little extra encouragement. I told him what I would end up repeating many times over the years, “Don’t worry. We’ll work through this together. It’s just daunting in the beginning.”

Roger’s resistance to technology was immediate and unbridled. His project reflection post for the first assignment was a collection of reasons pen on paper or chalk on blackboard were better and more efficient than the program we had used, and his points were certainly valid. I had made it clear to the class that it was not a requirement to “like” any of the applications we used. It was only a requirement to think about how they *could* be used in the classroom. As the course wore on, Roger’s reflection papers were peppered with references to “cold sweats,” “my weeping eyes,” “fear,” and invariably punctuated with, “And that’s why I would *never* use this program.”

As a first-time instructor, I found it hard to reconcile his overall pleasant demeanor with what I viewed at the time as his complete unwillingness to *try*. I didn’t understand what I was doing wrong. Each new project seemed to be a new affront to his core principles and identity that caused him deep anxiety. It eventually came to a head with the professional online portfolio project. The assignment is meant to familiarize students with the Minnesota State Standards for Art Education. They review the standards, choose projects we had already completed to demonstrate competency in those standards, and showcase them in an online portfolio. Roger had stopped asking questions

of me and of his colleagues in class. He was still present in class, happy, talkative, engaged in discussions, but seemingly withdrawn when actively working on his projects. All of his anxiety was compartmentalized, internalized, it seemed. I received the following message from him the day the assignment was due:

My efolio is far from complete, I have not really begun to address all of the required points in this assignment. The reasons for such a lack-luster completion are many, and emotionally complicated. First, the design of the efolio site is not intuitive, for me. I stumble inside its working just terrible. The points that I have completed were painful, and compared to assembling info for our weebly website, this efolio thing is a mess. As [redacted] had so kindly reminded us in our [redacted] class, the University of Minnesota is not interested in effort, only product completion and results. Within this rubric, I have done poorly regarding the efolio assignment. Setting aside the multitude of technological barriers I have experienced, the truly more challenging aspect of this assignment is that I have had an impossible time feeling that any utility will arise from utilizing this resource. I need to believe in the use of this site, and I don't. I am really uncomfortable thinking that this is the way that I would represent myself to others. My level of discomfort with the idea of its use makes me want to run away, and while working on the site, I really did sweat bullets and fear. I am not looking forward to a career or job search process that depends on electronic storage and retrieval of information that I see to be very intimate and personal. I cannot imagine that I would ever broadcast this much personal info in such a public

manner. I apologize, I am simply too uncomfortable with the notion, to go through the steps. I sincerely thank you for the exposure to this resource. I foresee that it may take months of pondering the possibilities, to find a way for me to acclimate to the idea of using this resume tool in earnest. I have looked on the map, and I cannot find earnest anywhere. If I were to put together an attempt reflecting a genuine personal and professional representation, I feel that I would have to work directly with a career development specialist with a high degree of proficiency and comfort with efolio. I am a cultural critic. And in relation to the ever-widening and all-encompassing necessity to play in web-based arenas, I am both skeptical and critical. I do not foresee this to be sustainable. Apple's announcements of record sales are never joyous news, to me they are always frightening. And with good cause. If this method of representation becomes professionally unavoidable, perhaps I am playing in the wrong arena.

Ouch. I admit that after initially reading his message, I was angry. Why didn't he just ask me for help? I would have sat with him and showed him how to do it! Why did he wait until the last minute to say anything? Why is he *so* emotional about this? This isn't something to get emotional about! After some time, I sat down at my computer to read his message again while trying to figure out how to respond. I attempted to put aside my anger and judgment about what he "should" have done. This second time I read his words, I saw them more as a nearly tangible anxiety, an intense and complicated emotional response to not only the technology itself, but as he saw it, the social shift to a more technology-centered way of life — something I couldn't fix. More than anything, I

wanted my students to feel comfortable with technology. If they couldn't feel comfortable with the technology in general, I at least wanted them to feel comfortable experimenting with it within the safety of our classroom. It was a painful lesson for me in that, as an idealistic and naïve new instructor, there were more barriers to technology than I had realized or that I could possibly personally address. Roger had certainly not been suffering in silence as far as his hesitation with computers was concerned up until that point, but his message laid bare an intense emotional reaction, and I was not at all prepared for it.

* * *

Emily

Emily was always brutally honest and never minced her words. She freely offered her thoughts and opinions on topics ranging widely from who her favorite artists were, what foods she didn't like, why she didn't drive a car, and of course, why she saw no utility in using computers in an art classroom. "Maybe I'm just old fashioned, but I don't see the point. We're supposed to be teaching kids how to create art, not how to use a computer." This was not surprising to me. Every year on the first day of class, my computer-hesitant students almost always immediately self-identified. I could never be certain what motivated the abrupt confessions, but I could always feel their uneasiness. In this regard, Emily was no different. She needed for me to know that she had minimal experience with technology, and quite frankly, she had a distinct disdain for it in general.

Emily reminded me of several former students who had had similar resistance to technology. For some, the experience is deeply emotional and the reactions visceral. For Emily, the frustration was at times so intense that she needed to leave the room. When she would return, she would come to me and ask for help. “Can you show me this again? I feel stupid. I can’t deal.” I was always more than happy to go over things again. Afterwards she would always return to her table and sit alone. She was immediately negative and defensive at nearly every step in the course. “No, this doesn’t make sense. No, I’m never going to use this. No, you went through that too fast. No, it’s too complicated.” Everything was no, no, no.

For whatever reason, it seemed that Emily felt embarrassed by not immediately understanding how to work with the programs. It didn’t help matters that Emily was the only student in the class that was experiencing difficulties. At only 10 years or so older than her colleagues, she fell just on the other side of a massive technological divide. She hadn’t grown up using computers in school, and as a painting major, she had little exposure to them in college. It was a stark contrast to her early to mid-twenties classmates, some of who breezed through projects in mere minutes.

In the beginning, Emily maintained her dislike of technology and the required projects in class, but she did them. Her initial project reflection papers echoed her verbal misgivings and discomfort.

As the teacher, my knee-jerk reaction is that I will not use this technology in my classroom...I am in the process of becoming more open to technology in

general...If I was proficient at using the software it could also function like a chalkboard during class presentations, I guess.

I plan to work with the younger grades (K-4), so I don't think my students will be using PowerPoint. Perhaps third and fourth graders will be ready, but I kind of doubt it.

I don't see myself using this technology in my classroom. The elementary-aged population seems too young to use iMovie. Maybe this opinion is a prejudice of mine, or a reflection of my ignorance about the program. Perhaps if I was more familiar with iMovie, the more I could see it as a tool for others regardless of their age.

As we neared the end of the course, Emily began to soften towards her peers. Perhaps she finally felt comfortable with them; perhaps she was tired of struggling with the programs alone. Whatever the reason, she began to ask them questions. "If I want to add a new page up here, where do I go again?" She would even ask them about how they saw themselves using the technologies in their classrooms. She engaged. The shift was evident in her projects and her reflections.

For my website, I chose to focus on showing my artwork as an introduction to me as an art teacher. I selected a simple, colorful template, which is easy to navigate. I can see myself using this tool in my classroom, especially as something to

facilitate communication with parents and to showcase student artwork. It would be great to have the website projected during an open house, for example. The students would probably be excited to see their artwork on the website as well.

Wherever Emily is now, I would bet good money that she isn't teaching media arts, and that's fine. She is a gifted painter and photographer and has a tremendous passion for the arts. My hope is that she's found some level of comfort, even if tiny, in interacting with technology.

* * *

Ginny

Ginny was a mystery to me from the beginning. It seemed immediately obvious that she had no desire to associate with the cohort on a personal level. As everyone sat at the tables towards the front of the room on the first day of class, Ginny chose a seat at an empty table at the back. On that first day, as I always did, I had the class gather at the center of the room and each student introduced themselves, told us a little bit about their art background and why they wanted to be an art teacher. As we went around the room I heard the typical answers I was used to — a passion for art mixed with a love of working with children. Each answer had its variations, but the sentiment was always nearly identical. I always like hearing students talk about why they are there, especially on the

first day of their program. They are full of optimism, and I always hope that it sticks with them.

Ginny had moved up one table, but remained outside the circle of her peers. She didn't appear to have been paying attention to any of her classmates' introductions, which I admit is a real pet peeve of mine. As it came to Ginny's turn, she said simply, "I'm Ginny. I've been in the program before. I just have to finish some requirements. Some of it I have to redo, which I'm not very happy about." An awkward silence hung in the air until I realized she was finished. That was all she intended to say. There were a few faces around the room that looked confused, maybe even uncomfortable. I was uncomfortable. I stammered something clumsily about being glad she was there and this course being a fun way to get to know the cohort and experiment with technology. Ginny had already disengaged. I quickly moved to the next person hoping to purge the awkward sting from the air.

During our three and a half weeks together, Ginny made it clear to me that she had no interest in the class or technology as a whole. I gave my canned, "Don't worry. We can get through this together. It just feels daunting in the beginning," speech. Even though it often became a stock answer to students when I could palpably feel their anxiety, I did genuinely mean it. I will sit with you. I will show you step-by-step. "I only want to teach painting. I don't need any of this," she said. I found myself having to dig deeper for reasons or motivation for her, but I was coming up empty.

The third project of the course is to create a video poem in iMovie. First time iMovie users can face a pretty steep learning curve. Despite what Apple may claim, their programs are often not as user-friendly or intuitive as their glitzy marketing would have

you believe. For this reason, the requirements of the project are simple and few.

Combine text, images and audio of some kind in an artistic way using iMovie. Keeping the requirements simple, I felt, allowed students to focus more on becoming comfortable with the software after the demonstration, and having the freedom to experiment. For the most part, this approach seemed to work. Students often had an immediate vision of what they wanted their final project to look and sound like, but weren't necessarily sure if the program could do what they wanted. One student had a particular video clip that she had recorded and wanted to use, but didn't want the audio in the video. "There's all this background noise and you can hear a siren. Can I get the volume on it down really low, or somehow take the audio off? That would be ideal. Is that possible?" It was possible. Another student who had used iMovie a few times before jumped in, "Wait, I've done that before. Hold on, I think it's under this menu." In these instances my students would often work together to solve a problem, or ask if they weren't sure about something.

Ginny appeared uninterested in working with her classmates and actually seemed determined to make the project as difficult and complicated as possible. It was a seemingly unending string of misfortunes and missteps; the library's computer had a different version of iMovie, a flash drive that didn't have enough storage space, and the asset files that were lost. In her reflection paper, Ginny let us all know just how frustrated she was.

To be completely honest, I will not be using iMovie in my classroom. Until I am confident in my use of iMovie myself I will not present it to my students. I feel we have enough other subjects and chances to use technology in the art classroom that are much easier. If I were to use this software, regardless of what I have

previously said, I would create a step by step document on how to use iMovie and provide it to my students. I am the kind of learner that benefits from step by step instructions on how to do certain things, especially computer programs.

Now I don't think it's too far fetched to read those last two sentences as a dig at me. Ginny did ask me for an iMovie instruction sheet. I hadn't prepared one. I felt like there was no way I could possibly capture all the information about iMovie features that anyone could possibly want in a document. I offered my help, iMovie help guides, YouTube video tutorials, and Apple help forums. I eventually realized it didn't actually matter what I offered. Ginny had decided that the only thing that would help her learn how to use iMovie was a step-by-step instructional document. A classmate even chimed in that, realistically, a step-by-step document wasn't practical because they were each using the program in a different way, with different purpose.

Ginny had a number of barriers working against her as far as learning the different technologies for the course. Some were self-imposed, others perhaps situational, some maybe even generational. I could never quite pinpoint what it was specifically that made her seem apathetic, perhaps even hostile at times, about the projects we were completing in class.

* * *

Subject: Panic!

"I'm freaking out!"

I looked at the class list and immediately felt intimidated. The cohort itself was larger than usual, and there were a few students from last year's group who had been unable to take the class the previous year. As students began filing in on the first day, the

room quickly filled to capacity. As I looked around the room at the new faces I would be teaching for the next three and a half weeks, I breathed a quick, naïve sigh of relief. The faces staring back at me were all my age or younger. I immediately assumed that this term would be a piece of cake. Anyone my age and younger would have grown up with computers and technology. This term we would sail through without any resistance, hesitation or anxiety. I just knew it.

The questions started trickling in the first week. At first they were simple requests for approval. “Can you look at this? Did I do this right?” There were a few emails after our class sessions that week just double-checking that they understood project submission requirements. “I just want to make sure I do this right! I’ll submit my assignment to Moodle, and post my reflection to the forum. How should I submit the rubric?” I responded to the emails quickly, even when they were sent late at night. I was awake, the answer was simple, and I didn’t think there was any reason to not reply right away. By the second week however, I felt like I was drowning in my students’ anxiety. The trickle had morphed into an endless tsunami. In class, everywhere I looked there was a pained, panic-stricken face. I spent our in-class lab time rotating from student to student, reassuring them that everything was indeed fine. I spent my evenings fielding emails.

11:16pm

Subject: Panic!

I was just in the process of uploading my iMovie to MediaMill and have somehow lost my movie! When I reopen iMovie, the only files there are drafts that appear to have saved at some random point in my process. [My movie] opens with only about 5 images files and has none of my sound, editing, title, credits, etc. I'm freaking out! Please let me know if you have any ideas about how I might locate the file. I'm working on my (new) MacBook at home. I'm now afraid I didn't save properly and have lost all of my work. Please advise.

Sometimes I would just wait. In this case was no way for me to know what the issue might have been without looking at the file and the computer this student was working on. It was 11:16pm and I decided to do nothing until the next day. I felt guilty at first. Clearly this student was distressed, but here was legitimately nothing I could do in that moment to fix the problem. So I waited.

11:39pm

Subject: Crisis Averted!!!

I am happy to report that my iMovie crisis has been resolved. Please disregard the previous message. I was able to relocate the file. Sorry for the panic :-)

During the three and a half weeks of the course I received a total of forty-six panicked emails. As evidenced by the example above, these students were capable of doing the work and troubleshooting their issues, but their anxiety and fear of the technology was initially paralyzing.

On the final day of class, we gathered in the center of the lab to view a screening of each student's final iMovie video poem. We turned the lights down and enjoyed some popcorn and cookies. The tension and anxiety that had pervaded the room for over three weeks had finally vanished. As I clicked the play button on our video play list, I sat back and breathed an honest, weary sigh of relief. Even though I had seen all of the video projects in various forms of production, I found myself truly moved as I watched each of the poems. They were stunning. Each video showcased a true artistic vision, be it beauty, humor, or absurdity. And each video was a small, but triumphant victory.

* * *

Analysis

Within the Technology Averse predisposition, three factors emerged as possible influences on these students' willingness and ability to integrate technology into their teaching; 1) age of the student, 2) observed computer anxiety, and 3) select students' general rejection that computers should have a role in the art-making process.

As a factor influencing students' ability to integrate technology into their art teaching, I attribute only minor significance to age. When I worked for the medical management company after college and my job duties transitioned to that of technology coordinator, I made the narrow assumption that my coworkers' reticence towards computers was due strictly to their age. I didn't consider computer experience to be a factor for their timid approach to computers — after all, they did work on computers all day everyday. Clearly then, it must just be their age, I thought.

My assumptions regarding age and computer ability remained unchallenged, even through my first year of teaching EDHD 5007. There were three students that term who were older than their colleagues and returning to school to begin a second career. Each struggled with the technologies in the course in different ways, but it was their anxiety that was most similar. It was not until my second year teaching that my assumptions were challenged, or it even occurred to me that “computer anxiety” might be an actual, researched phenomenon. As Mahar, et. al., describes, “The ubiquitous observation that some individuals are unusually anxious about working with computers has led to the proposal of a condition called computer anxiety to describe this state” (Mahar,

Henderson, & Deane, 1997, p. 683). What is it specifically about technology that triggers this anxiety? The anxiety is real, palpable and sometimes physical. I witnessed several students over the years that would sit in front of the computer screen and visibly hesitate before grasping the mouse to click, sometimes glancing over for reassurance before proceeding. Roger often mentioned his technology triggered “cold sweats”. Emily would often need to leave the room to regroup. Ginny would also often become visibly anxious, preferring to work alone where others couldn’t observe her.

There is some evidence to support the theory that age is a factor in experiencing computer anxiety (Laguna & Babcock, 1997), and the common assumption is that younger students, or those born after 1980, are digital natives (Prensky, 2001) and will have been so immersed in technology since birth, that anything tech-related will be like second nature for them to adapt to. Prensky’s theory of the digital immigrant versus the digital native is overly simplistic and presupposes that those who qualify as digital immigrants, those born before approximately 1980, are the only individuals who will likely experience a steep learning curve when learning new technologies. In this regard, I would argue that art and art education students present as a complicated outlier. These students may know how to, or even be frequent users of technologies like Facebook, Twitter, or Instagram, but this form of technology usage does not necessarily translate to technology usage for teaching and learning. It is possible, and not at all unheard of, to go through an entire four-year undergraduate fine arts program, and have very minimal exposure to technology. I believe this is the case with the panic-stricken cohort I taught in my second year. The students of this cohort were all in their twenties, and “should” have,

by conventional wisdom, been perfectly comfortable with the technologies used in EDHD 5007.

So perhaps the appearance of computer anxiety does hinge largely on the level of computer experience a person has had. “There is already a substantial body of evidence on the relationship between computer anxiety and computer experience” (Mahar et al., 1997, p. 684). Level of experience appears to be a more telling indicator of computer anxiety. Research also shows however, that increased experience with computers may not necessarily decrease anxiety (Rosen, Sears, & Weil, 1987). Some studies suggest that computer anxiety will persist even with increased experience and training (Leso & Peck, 1992; McInerney, McInerney, & Sinclair, 1994).

As primarily former fine arts and art history majors, my students present as a unique exception to commonly held beliefs about age and its effect on technical ability and usage. Additionally, these students, regardless of age, sometimes present with what I believe to be computer anxiety. In some cases, this anxiety proved insurmountable, in others, merely a speed bump along the way. Some students respond well to a one-on-one approach with the instructor where they can get the assistance needed to begin to feel comfortable manipulating new computer programs on their own. Sometimes it is the support and technology mentoring from a classmate that eases the anxiety and makes the most difference. In cases such as Roger or Ginny, I’m not sure any type or amount of assistance would have lessened their fear or resistance. Computer anxiety can present a real challenge and barrier to integrating technology into the art classroom for some art teacher candidates.

The last factor that emerged as a possible influence to students' ability and willingness to integrate technology into their teaching is an observed general rejection of the idea that computers have a place in the art-making process. Arts educators have been interested in the prospect of integrating computer technology into their teaching since its earliest widespread availability in the 1980s. Many educators theorized about the benefits of including technology into art teaching (DiBlasio, 1983; Eisner, 1983; Ettinger & Roland, 1986; Gregory, 1989; Hanlon & Roland, 1983), yet there was still resistance from within the field to adopt these new tools. A pervasive feeling from arts educators was that the computer was in essence replacing the artist as creator (Greenfield, 1999). The art community has been slow to accept technology as a tool for creating art, just as a pencil or paintbrush is (Degennaro & Mak, 2002; Delacruz, 2004; Gigliotti, 2001; Mayo, 2007; McCulloch, 1984; Stankiewicz, 2004).

This resistance, or often times outright rejection, of the notion of technology as artistic medium is persistent. I felt it strongly during my undergraduate education as I shifted my concentration to photography and digital media. Somehow, spending hours in a computer lab manipulating images, or in darkroom mixing chemicals and perfecting a print, wasn't considered "art." A painting major once asked me, "If you want to play with chemicals all day, why didn't you just go into chemistry?" Questions like that, and the general rejection of digital art, stem from a very "traditional" definition of art and art making, wherein the only acceptable mediums are those manipulated directly *in hand*.

Some art education students still hold these beliefs (Lu, 2005), and many students throughout my time teaching EDHD 5007 expressed these reservations about technology in art education, but perhaps none as fervently as Roger, Emily, and Ginny. Each of them

displayed a strong dislike of the programs and applications we used in class, but their dislike was rooted in a disdain for technology having a part in art-making at all. Both Roger and Ginny had confessed to me the similar argument that they only wanted to teach traditional art classes, therefore they did not see any utility in these programs. Emily was more specific and to the point in her criticism in that she believed her job would be to “teach art” not to “teach computer skills.”

The rejection of computer tools in the arts as a part of art and art making, is still a very real issue for some students despite the fact that “the creative process is fundamentally the same as in any other field of creative work” (Candy, 2007, p. 366). Technology as a medium for creating art “does not stifle creativity or students' imaginations” (Black & Browning, 2011, p. 33), but rather offers both art teachers and students new ways of making meaning (McGuire, 2012). Digital and media arts incorporate elements of visual culture, an exploration of meaning of social constructs and an understanding of their representations in popular culture (Freedman, 2003). The inclusion of digital and media arts, as well as visual culture studies, can help students develop critical thinking skills about digital technologies and their uses, assist in forming safe computer and Internet practices, and build skills in content creation (Burton, 2014).

Chapter IV: The Technology Willing

This section illustrates the second observed predisposition of art teacher candidates, within the framework of technology integration, the Technology Willing. Technology Willing individuals often self-reported as moderate or minimal technology users and possess low to intermediate technology skills, but demonstrate a willingness to learn and use new technologies. Here I present the stories of two of my former EDHD 5007 students, Laura and Amy (pseudonyms), and their experiences integrating technology into their teaching practice during their student teacher placements. The narratives draw from individual interview data obtained in 2013 as well as class and teaching video data.

Laura

“I still struggle with how to really use the tools effectively. I would like to use it more, but there are always usage issues and tech glitches that make it somewhat difficult. I think it definitely has a place and a usefulness though.”

It may be inappropriate to admit this, but Laura was one of my favorite students. She had a boundless energy, and intense love of all things art-related, and a delightfully quirky wit. Laura had completed her undergraduate degree in studio art with a concentration in drawing and painting. She had experimented with digital media only fleetingly, and freely admitted she wasn't a “super tech nerd.” Her honesty in this regard was similar to other students such as Roger, Ginny, or Emily, but what set Laura apart was a lack of anxiety. She was *willing*. Laura did well in my class. She was always a hard worker and asked questions when she needed assistance. Her projects were certainly not

the most technically precise, some were even a little rough, but she always tried to reach beyond skills she currently possessed to learn something new. In this way, she was what might be considered an “ideal” student. She was willing to try, she was willing to fail, and she was willing to try again.

I was thrilled when Laura agreed to be a part of my dissertation study because she was, by her own admission, not well versed in technology, yet she had an interest in incorporating it into her art lessons. I was able to meet with Laura on two occasions. At our first interview, we discussed her thoughts on art and technology, as well as her experiences with technology in her teacher preparation program and in her student teacher placements. Laura was incredibly open about her experiences and willing to share any information with me she could. At this first meeting, Laura gave me two DVD recordings of herself teaching specific art lessons in her placement schools.

Here, I had to record these for other classes anyway, so you’re welcome to take a look at them if it helps. I don’t use a lot of technology, like, in one of them I only show a YouTube video to the class, so these probably really aren’t what you’re interested in.

Laura and I agreed that I would view the recordings and then we would meet for a follow-up discussion in a few weeks.

The first video of Laura’s that I viewed was recorded for a micro-teaching assignment where she was to introduce a new lesson to the class. This particular lesson on gesture drawing was in a high school drawing class. The video is eight minutes in

length and was edited by Laura for the assignment for which it was submitted.

Transitions were added, as well as text overlay of specific student and instructor verbal exchanges. The video opens as Laura is greeting students coming into the classroom and answering questions about what they would be doing that day, and about previous assignments. She quickly brings the class to order and begins to explain the lesson activity. There is an image of a skeleton already projected on the large screen at the front of the classroom as Laura begins to demonstrate gesture drawing. Once each student has grabbed a stack of paper and drawing pencils, Laura explains that there will be images on the screen that automatically change every thirty seconds and their task is to draw each figure quickly and loosely.

Laura starts the slideshow and the students begin their gesture drawings as the room falls silent. The students can be seen quickly drawing the figure, frequently looking back at the screen as they draw. As the first image disappears and is replaced by the second, an uproar of “Hey! Hey! Ah! I wasn’t done!” and “ Ugh, that’s not enough time!” and “Aw crap, I messed up!” is heard as Laura reassures the students that it is okay and encourages them to keep going. The figures Laura used in her slide presentation are mostly dancers and athletes, chosen specifically to highlight a moving, twisting human form. The video is edited to compress time and the full twenty-minute lesson is not shown. However, towards the end of the video, the students can be seen focused on the screen and their work, maneuvering seamlessly from one image to the next. The resistance of “not enough time!” has given way to a more efficient, attentive approach. As Laura concludes the lesson, and the students begin to shift back to working on a

previous assignment, a female student off-camera can be heard exclaiming, “Hey, I liked that!”

The second video of Laura’s that I viewed was of her elementary school student teacher placement. The complete unedited recording is forty-seven minutes in length and captures everything of the class period, from the children filing in and taking their seats, to them filing back out at the end. The lesson on this day was a continuation of a unit on Surrealism and Salvador Dali. As the class period officially begins, Laura is seen heading towards the front of the large art classroom full of what looks to be third or fourth grade students. She stands in front of the large screen where Salvador Dali’s *Feather Equilibrium* is being projected. Laura began by reminding the students that they had been looking at this image during their last class, and now they would be looking at a different, but similar image by the same artist. Laura advances the slideshow to the next image, *Apparition of a Face and Fruit Dish on a Beach*, also by Salvador Dali. Laura asks, “What do you see?” Many excited hands are seen thrust into the air. The first student shouts out, “A face!” another exclaims, “A dog!” Laura briefly turns back towards the image and appears to be studying it for a few seconds, then responds, “Wow! Even I didn’t see that at first! Nice job! What else do you see?” Other answers offered were a rope, and a small animal. Laura continues, “Great, what colors do you see?” The students reply with “white,” “grayish-brownish-bronzish,” “brown,” “red,” “whitish-bluish,” and “dark blue.” Laura then asks, “What kinds of lines do you see?” There is a slight silence as the students stare at the image and ponder the question. Laura then

prompts them with a few possibilities. “Well, you know, lines can be straight or jagged for instance. What do the lines look like in this painting?” One student shouts out, “They’re squiggly and wavy!” Another replies, “I see a circle, and loopy lines.” Another student declares, “These are lines that don’t have vertices.” Laura asks simply, “Feelings?” The first student to respond says, “Uh, it’s inside a temple, in the desert, like someone’s watching you with hidden eyes.” A girl sitting towards the back of the class answers, “It’s a deserted beach and it’s depressing because none of the faces are full. It’s weird.” Other answers shared by the students included, “lonely”, “evil,” and “angry.” A boy towards the front of the room offers, “It’s mysterious and uncomfortable, like in a war zone. It reminds me of Lord of The Rings. The Orcs squashed them all and abandoned camp. Maybe they’re the last survivors.”

The students appear to have run out of answers, but are still quietly staring at the piece. “See, there are so many different interpretations!” Laura continues by reviewing the characteristics of “surrealism” that they have been studying, and transitions the class to resume working on their own surrealist pieces from the class period before. The next 15 minutes or so of the video the students can be seen grabbing their drawings from the rack, scurrying around the tables, and talking with each other and with Laura. None of the conversations during this section of the video are discernable as the students are excited and vocal.

Towards the end of the class period, Laura reappears at the front of the classroom after making the rounds from table to table talking with her students. She gets her students attention after a few moments and instructs them to put their drawing materials away in the appropriate places, and if they do so quickly and neatly, she has a video she

would like to show them. Without hesitation, the students can be seen swiftly gathering their things and placing them in drawers on the other side of the room. When finished putting their things away, each student rushes to the front of the room and takes a seat on the floor in front of the projector screen, anxiously awaiting the video.

When all students were ready, Laura introduces the video by simply saying, “Since we’ve been talking about surrealism, I wanted to show you this video.” Laura then starts the YouTube video, “Interview with Dali” (alexanderbutera, 2008). The students initially sit in relative silence as they watch the black and white animation on the screen. As the video progresses, some students can be seen visibly “hopping” up and down a bit, pointing at the screen and laughing. As the video ends, the students are excitedly laughing and exclamations such as, “What was that?!” and “That was funny!” can be heard. The voice of the co-operative teacher is heard from the back of the classroom, off camera, saying, “Go ahead and play it again, Laura. I think they liked it!”

As Laura went to replay the video, there appeared to be some sort of technical glitch that occurred, the detail of which cannot be seen from the video. After a few seconds of trying to get the video to play again, a student can be heard saying, “Refresh the page! It’s that little arrow right over there!” Another student approaches the teacher’s computer and points to something on the screen. There appears to still be difficulty getting the video to replay, and the cooperative teacher then comes up to the computer. She restarts the Internet and logs into some application before re-launching YouTube and manually searching for the video.

Finally successful, the video begins to replay and the students react enthusiastically. With this second viewing, the children can be heard imitating a particular sound bite of the video that sounds like, “Uka-Taka, Uka-Taka! Uka-Taka!” Laura asks, “What makes this video surreal?” A girl sitting towards the front of the room springs to her feet and shouts, “Because all of a sudden he goes “Uka-Taka, Uka-Taka!” Another student offers, “Because he is interviewing him in the middle of nowhere! They’re on a big tree or something! He’s on a high cliff, and then suddenly he can reach down!” Laura says, “Yes, this video is very similar to the images we’ve been looking at. Things just don’t quite make sense.”

The class period has come to an end and Laura instructs the students to gather their belongings and line up at the door. Throughout the last three minutes of the video, as the students are preparing to leave, there is a chorus of “Uka-Taka, Uka-Taka! Uka-Taka!” that can be heard, even as they begin to file out the door.

Laura and I met a few weeks after I viewed her videos to discuss the technologies she used and how she felt things went during these two lessons. I appreciated Laura’s willingness to talk about her technology and teaching experiences with me. She was open and honest about everything. She was genuinely interested in discussing these issues, and I felt like she truly wanted to be helpful to me in my research. There was always an undercurrent to our interactions that she felt she wasn’t “techy” enough to be helpful. It seemed that she felt she didn’t actually know enough about technology to have an

opinion or for her experience to somehow be valid, or that technology integration in the art classroom meant using multiple technology tools *all* the time.

We met at a coffee shop in downtown Minneapolis and Laura was already seated when I arrived. As I greeted her and sat down at the table Laura and I had the following exchange:

Laura: So you watched them, huh? Yeah, sorry I don't really use much in the way of technology. I don't know how helpful this really is.

Ellyn: You told me that for one of the videos you only showed your students a YouTube video as far as technology was concerned, but at the very beginning of your lesson you opened a PowerPoint presentation that they were all totally engrossed in and interacted with for a solid fifteen minutes!

Laura: Oh. Right. Sometimes I forget that. It's just such an easy thing to use and I use it all the time that I forget that's it's a technology piece too.

Laura's tech skills and awareness were much keener than she realized. She was more than willing to use tools that she was familiar with or could learn easily. Any hesitation in using new software programs or hardware stemmed from frustration in not having the time to troubleshoot issues, or lack of access to tech support. Laura discussed with me at length the numerous technical problems she had encountered at both of her student teacher placements and acknowledged that these issues influenced what kinds of technologies she would use and how she would use them for her lessons.

Laura's high school placement. For student teaching at the high school level, Laura was placed at a large suburban high school in their 2D (drawing and painting) classes. This particular high school, as Laura described it was “absolutely huge”, and had three separate art classrooms. There was a 3D art studio, a 2D drawing room and a Mac computer lab for media arts. Despite the high enrollment in art classes and the large variety of art classes students could take, there was only one art teacher at the school. Laura recounted, “He kind of just runs around from room to room all day. He is seriously so busy I hardly see him.”

I wondered what effect this had had on Laura's experience student teaching. The cooperative teacher relationship is ideally meant to be a collaborative, mentor relationship — real world guidance from a seasoned teacher. Laura seemed to harbor no ill will regarding the situation, but instead offered that it was perhaps the most realistic student teacher experience she could have had. When I asked about what kind of technologies were offered in the classroom she taught in she listed: one PC and one Mac computer for teacher use, the projector and screen, and a wireless mouse and a document camera. There was no specific training involved for her as far as learning how to use the hardware and software available. “I just had to figure out how it worked on my own.” She described some of the technology issues she encountered, and while it seemed she wanted to minimize the inconvenience or frustration she experienced, by her own admission it had an effect on her use of technology in the classroom.

So at my high school placement, and this is probably stupid to get annoyed about, but the projector in the room wasn't set up correctly. Like, the screen didn't come down as far as the projection, so some of the image was always on the wall. It

made it difficult to navigate the computer to see where things were in relation to the projections because not everything was projected right. It's probably one of those things that could be easily fixed by repositioning the projector or something, but it never happened. It's on the ceiling. It's just one of those things that you never get to. But it was totally annoying and so sometimes I would skip using PowerPoint or something because I didn't want to deal with it.

Despite technical issues however, Laura indicated a definite admiration for the amount of technology that her co-op teacher integrated into his classes. He created and maintained class websites for all of his courses, and had just recently started to try a "flipped" classroom approach where online lectures were assigned as homework, and then class time was used to discuss and experiment with the material learned. Of the "flipped" classroom approach, Laura indicated that it seemed to use class time more effectively. "They get more time to actually create art, which I think is great!"

Laura's elementary school placement. The elementary school Laura was placed in for student teaching was an urban K-8 school with a mission of fostering a community of active learners. The teaching video I viewed of Laura giving a lesson on Surrealism and Salvador Dali was at this school. Laura had nothing but glowing words to describe her mentor teacher and students at this placement. In this environment, it seemed that Laura had received more of the ideal cooperative teacher mentor relationship. "Oh, [redacted] is so great! She's so great. I love her. I've learned so much from her."

When I asked Laura about the technology available at this school, she paused for a second and sighed deeply. She stated that the available technology itself was more than

adequate. There was a projector and screen, a Mac desktop for teacher use, and a document camera. “So in my Dali lesson video, I don’t know how well you could see, but there was an issue playing that YouTube video. It happens all the time. It’s so annoying.” Laura recounted that she had played the video once for her students, and then, upon the recommendation of her co-op teacher, went to play it for them again. Per Laura, that is when the district’s firewall popped up and locked her out of the Internet. Laura had discussed the issue with her co-op teacher, as it was clearly disruptive to the class. Her co-op teacher had explained to her that yes, it was very disruptive, but it was also far better than the set-up they had had a year or two prior.

Apparently, if she (co-op teacher) wanted to show a video from YouTube or something, she used to have to fill out and send a request to the district office at least a week in advance and tell them what the site was and why she wanted to use it. So no one knew who was actually reviewing the requests, but she said that they always, like, 100% of the time came back with a big fat no. Denied. No explanation, just no. No review process, no appeal. No one she could call and ask about it. I’d have lost my mind. So, yeah, this firewall thing they’ve got now is annoying, but at least they can access things on their own and override it when they get locked out.

I wanted to delve further into Laura’s experience with technology at this elementary placement. Based on what I was hearing from Laura, while there were some significant technical issues to grapple with, the need for technology in this classroom was not particularly high. Per Laura, this particular classroom was a mixed group of third and

fourth graders who get to have art class once per week. “They come in so excited, ridiculous energy! This is their time to draw and paint and I guess to a certain extent I don’t want to take that away by using too much technology, you know?” Laura had mentioned that her co-op teacher was not particularly tech savvy. In fact, the kids were often teaching *her* how to use the computer. But despite not using new software, or the kids having hands-on experience using the computer, Laura felt technology was being used well in the classroom.

My first day there, (co-op teacher) goes to play a video and the kids immediately start yelling at her to put in on full screen! Like, ‘Don’t you know full screen!’ and ‘It’s that button right there!’ It’s hilarious. So they already know a lot. She doesn’t play videos that often and they don’t have computers that the kids can work on themselves, so it’s a “traditional” art room, I guess. She uses the document camera a lot. The kids love that. They’ll have a critique and put their projects up there and some of them don’t even recognize their work when it’s projected that big. It’s a really interesting way to get them to look more closely at their work. They’ll notice details or something they feel is missing that they just don’t see when they’re working on it at the table. So I think that’s a good use of technology. I will probably do that too.

Amy

Amy was fresh out of her undergraduate degree when she began her licensure program having graduated just six months prior. While not unheard of, it was certainly

not the norm for my students in EDHD 5007 to be pursuing art teacher licensure as a first career. Amy credited her major in fine arts, minor in foreign language, and her many volunteering opportunities as forming her desire to teach art.

It all just kind of came together. Volunteering was kind of my little gateway into just helping people learn or being more of a mentor role sort of thing. I think I eventually just kind of merged what I was studying with those volunteering interests.

Amy was a quiet but always attentive student. Her desire to assist others was apparent from the very first day of class. Another student was struggling to access the course website and was quickly becoming frustrated. Without hesitation, Amy got up and sat next to this student and guided her through the steps to access the site. She had a very gentle manner and a genuine desire to help others.

Amy's undergraduate background in art was primarily drawing and painting, but she had experimented with a few digital media and photography classes as well. Amy expressed a desire to teach 2D art as that is where her interests primarily lied, but was open to the possibility of teaching media arts if the opportunity arose.

It wouldn't be my first choice, but I could do it. I'd need to do some research and brush up on some programs like Photoshop, and probably learn some new ones.

I've never used Illustrator, but I could figure it out.

Amy's focus towards 2D art was clear, but there was a willingness there to not only consider integrating technology components into her teaching, but to also learn skills necessary to teach technology classes. Given her willingness to use and learn new

technologies, I was curious how her student teaching placements and relationships with her co-op teachers had influenced and affected integrating technology into her lessons.

Amy's elementary school placement. At her elementary school placement, Amy indicated that there was a desktop computer for teacher use, as well as a projector and screen, a document camera, and a Promethean brand interactive whiteboard. Amy stated that she used the document camera everyday for her lessons, but did not use the Promethean board and was never shown how.

Yeah, the art teacher was like, 'If you want to try and learn how to use it, go ahead' and maybe he had had a basic rundown of how to use it at some point, but he didn't show me how and he didn't use it at all. I think he just wasn't comfortable or was like, 'I didn't have to before. I don't think it's going to enhance anything now.' I mean, he was open to me using it, but without any guidance or knowing how the board worked, I didn't think there was time to do that. So that was just kind of it. Those boards were in every classroom though. But I don't know how much they actually got used.

Amy seemed to shy away from using technologies she was unfamiliar with in her student teaching placements, not because she was unwilling to learn how to use them, but because she didn't feel there was the time to learn how to use the technology and then design a lesson that integrated it in a meaningful way. "So I basically just used PowerPoint or videos. I could easily pull up a website and show a video."

Amy's high school placement. When asked how she planned to incorporate technology into her teaching in her own classroom, Amy remained clear that she wanted

to use technology, but only in specific ways that supported the overall objective of the lesson.

So like at the high school that I did student teaching, they used Schoology, which looks like Facebook but it's like your group is your class. I think I would do things like that just because the kids are familiar with how that looks and so it's more fun than just submitting a journal or paper. So I think I would use technology in that way, not necessarily every day, but you can definitely have assignments where they have to post online or like say, show us a video that's interesting. Go out and find a cool video or something. They're using a computer that way anyways. For PowerPoint, I try to throw in a small group discussion question or something so it's not all, "Here's me and my PowerPoint. Absorb this information!" or whatever. So I stop and say, 'Okay, turn to your partner and discuss this.' So I try to break up PowerPoints so it's not solely what you're doing. I think videos work the same way. If your PowerPoint has a video or your lecture even had a video, I think kids respond well to that.

Analysis

I place Laura and Amy in my middle group of technology student categories, as they are not averse to or apathetic towards technology, but also not savvy computer users or early adopters. They exhibit a clear willingness to consider and use technology in their teaching. This section details the factors that may have influenced their willingness to integrate technology into teaching, as well as observed limitations and barriers.

Influences. Similar to my Technology Averse students, I would never describe Laura or Amy as tech savvy or even tech enthusiasts. What sets them apart in regard to technology is a lack of computer anxiety and a willingness to learn, experiment with and evaluate technology.

A pattern I observed over my four years of teaching EDHD 5007 was that the students who had only moderate technology experience but were willing to experiment, were also the students who were the most critical about the ways in which they would integrate technology into their teaching. Laura for example loved to try new tools and gadgets, but incorporated very few of them into her lessons. Her argument being that some of it was cool and even fun, but “if I can’t find a place for it, like, if it doesn’t make sense in the lesson, I’m not going to do it.” Of all of my students, Laura and Amy offered the most deliberate, reasoned and critical opinions of why they would, or why they would not use technology in certain cases. Amy offered a similar take that, “as long as [technology] doesn’t eclipse the content, I’m totally open to incorporating those types of things. As long as there is a purpose.”

Another influence that may have contributed to Laura and Amy’s willingness is age. At the time they entered the art education program, Laura was in her mid-twenties, and Amy in her early twenties. It’s an easy conclusion to come to that due to their youth, they were exposed to a variety of technologies growing up and in their undergraduate schooling. In the last fifteen years, much has been written theorizing the ways in which the Millennial generation, those born roughly between the early to mid 1980s through the year 2000, which would include both Laura and Amy, wholly embrace technology. Much of the literature includes broad theories, sensationalized data and sweeping

generalizations, pronouncing of Millennials that, “Apparently, these students learn differently and interact differently than former students and than their older classmates (McGlynn, 2005, p. 12) or that they are “fearless about adapting to new gadgets and consider life online second nature” (Levitz, 2015), and that “21st century students have been immersed in technology from birth and are accustomed to multi-tasking with several types of technology each day” (Marks & Marks, 2009, p. 1). My personal favorite comes from a Pew Foundation survey analysis stating, “more than 80% of Millennials sleep with a cell phone by the bed “poised to disgorge texts, phone calls, e-mails, songs, news, videos, games and wake-up jingles” (Street, et al., 2009).

These observations very well may be a factor, however I would assert that it is probably minimal at best. Both Laura and Amy majored in fine arts with a concentration in 2D drawing and painting. Each of them had taken a class or two in digital media in college, but chose to focus on 2D traditional art, thus limiting their exposure to certain technologies. At the time of interview, both Laura and Amy confessed to not being particularly involved in social media and each owned what many would consider only the basic technology needs for graduate school — a laptop. In this sense, despite their age, Laura and Amy had relatively limited use of, or need for, technology. Their measured approach to technology is more indicative of the use of critical thinking skills rather than the saturated exposure to and blind acceptance of technology attributed to their age group.

Another factor that appeared to influence both Laura and Amy’s willingness to integrate technology was their ability to research issues and problems they encountered.

When asked how she handles technology difficulties and broadening her knowledge of educational technologies Amy said,

I would say Google number one. Or I guess, like, further than Googling for finding stuff to try in my class, I'll start looking at art teacher blogs, specifically. I feel like when I Google something that's specific to the classroom, I'm looking to see if it's an art teacher blog because it's like tried and true. It's not just some random idea out there. And they'll say something about it, like 'This worked, this didn't.'

Laura indicated a similar approach saying, "I think I spend my life on Google. Like, I know the information is out there, I just have to find it." It may seem a trivial point that they were both quick to use Google, but it demonstrates their ability to seek information and problem solve, which undoubtedly contributes to their willingness to integrate technology into their teaching practice.

Barriers. In talking with Laura and Amy, two main barriers to integrating technology into their art teaching emerged: a lack of time to fully research, prepare and deliver lessons using new (to them) technologies, and a absence of technology mentorship from their co-op teachers. The first, lack of time to fully research, prepare and deliver lessons using technology, is an obvious conclusion that is already a well documented impediment to K-12 art educators (Buffington, 2008; Delacruz, 2004; Dilger & Roland, 1993; L. Galbraith, 1997; L. P. Galbraith, 2001; Gregory, 1996, 2009; Roland, 2010). Teachers often feel a tremendous pressure to integrate more technology into their teaching, but do not feel they have the time do so thoughtfully and effectively. Laura

grappled with this issue, but maintained that she would probably always default to what was easiest in the moment.

I know I'll just always fall back on PowerPoint or showing a video or whatever. It seems lazy I guess, but if it comes down to time I know I'll go the easier route. I mean, I don't necessarily want to, but I'd rather do what I know will work and will work quickly.

Amy offered a specific example of a time she chose to use a familiar tool instead of learning a new hardware system.

So my elementary placement had all those Promethean boards and there was one in the art room. Like, I really wanted to figure out how to use it and talked to him [co-op teacher] about it and he basically said, 'If you want to do something that uses it in a new way, I'm open to you doing that' which is great, I guess. But I guess I wanted to see how it was being used, maybe, or what could be done with it, you know? I mean, I've seen people use them, I know I could figure out how to use it. But seeing an example would have been really great... Yeah, so I ended up not using it at all because I would have had to start from scratch and everything is already so stressful. It just would have taken so much time for me to do it well enough to feel good about it.

Amy didn't feel that there was adequate time to learn how the Promethean board worked, research lesson ideas using the board, and select a lesson idea and write or modify a plan. There isn't an abundance of time within the art education initial licensure program. The program itself is only 15 months long and students are warned from the very beginning that there will be no time for anything other than school. Within those 15

months, art education students are required to take two technology courses, which, for this 2012 - 2013 cohort, totaled 16 class sessions and 3.5 credits between the two courses. The courses are meant to introduce as many technologies as possible to the students in a short amount of time. The quickened pace and nearly project-per-week schedule leaves little time for deep experimentation and leads to just getting the assignments done. The lack of time to spend learning new technologies and then translating that knowledge to designing a meaningful technology enhanced art lesson is a definite issue.

The second barrier identified for both Laura and Amy that limited their integration of technology tools into their teaching was a lack of cooperative teacher technology-specific mentoring. This in no way implies that Laura and Amy were not mentored within their student teacher experiences, or that they did not form valuable relationships with their co-op teachers. Specifically, within each of their two student teacher placements, both Laura and Amy indicated that they did not receive much, if any, instruction on how to use specific hardware or software systems within the classrooms, nor did their mentor teachers offer guidance on integrating technology into their lessons. Amy's example of wanting to use the Promethean interactive white board in her elementary school placement, but feeling she did not have adequate time to research and prepare a new lesson, is indicative of a lack of co-op teacher technology mentoring. The hardware was present right in the room and was fully operational, but because her co-op teacher did not use it at all himself, and therefore was not able to show her ways in which it could be used, Amy felt it best to go in a different direction, and instead chose lessons and projects that used tools with which she was comfortable and familiar.

In Laura's case, her elementary placement co-op teacher also did not use much in the way of technology, and in fact the students often taught her how to navigate the computer.

The kids are teaching her how to do stuff on the computer all the time, yelling out to her, 'Hit the refresh button! It's the little arrow right there!' So I didn't do a lot with tech there. But they also didn't have a SmartBoard or laptops for the kids to use or anything.

In this placement, the co-op teacher did not have access to extensive technology and possessed only basic computer skills that she used infrequently in her teaching. In this relationship, Laura seemed to serve as a technology mentor for her co-op teacher, showing her ways in which video clips and PowerPoint could be integrated into lessons.

Laura's high school cooperative teacher, on the other hand, did have advanced computer skills and used technology in his classes extensively. At the time of Laura's placement with him, he had recently implemented a "flipped" approach to his art classes, meaning that videos and online lectures were assigned as homework. The students then used their classroom time to try out the techniques they had learned and work on their projects. This co-op teacher also created and maintained websites for all of his classes where he uploaded or linked the lectures and videos and displayed completed projects. Laura was impressed with his use of technology and felt that both the flipped approach and the class websites were helpful for students.

It's actually really cool, like, he uses a lot of tech. I've seen the class websites and the flipped approach definitely uses class time more effectively. I don't know what he uses to do the websites or where he gets all the lecture stuff, I mean,

some of it is YouTube. I thought everything he was doing was really cool and seemed to work really well, but I don't know how long it was all taking him. I wanted to see how he did the sites but he was always so busy. He was the only art teacher for the school. I didn't really want to bother him with that, you know?

In this instance, both time and a lack of co-op teacher technology mentoring created a barrier for Laura in integrating new technologies into her teaching practice. She had the desire to learn how to use the technologies her mentor teacher had implemented, but didn't have the time to seek the guidance she felt she needed.

It is important to note that this section outlining limitations and barriers to technology integration that Laura and Amy encountered in their student teacher placements is in no way a criticism of their mentor teachers. The examples above serve only to illustrate the issues new art teachers often face when figuring out what role technology will play in their teaching practice. Teaching at the K-12 level is a complicated and labor-intensive venture and each of the teachers mentioned have provided a great service by volunteering to be a mentor.

Chapter V: The Technology Savvy

This section details the third and last observed predisposition of art teacher candidates within the framework of technology integration, the Technology Savvy. Technology Savvy individuals usually self-reported as extensive technology users, possess a high level of technology skills, and demonstrate an ease of use with technology tools. Here I present the stories of two of my former EDHD 5007 students, Michael and Jenna (pseudonyms) in regards to their experiences integrating technology into their teaching practice during their student teacher placements. The narratives draw from individual interview data obtained in 2013, as well as class and teaching video data.

Michael

“I think technology should be used as much as possible. Not so that it distracts, but it can just go alongside the curriculum and make it run smoother, more efficiently, and get the kids prepared to be in a world that is technology-based because it’s something they’ll have interactions with on a daily basis.”

The first one-on-one conversation I had with Michael was on the second day of class. He approached me towards the end of the class period to ask if he could leave a little bit early, as he had a friend’s rehearsal dinner to get to across town. He assured me his project was already completed and uploaded to the Moodle class site. “Sure, that’s no problem” I said. “Great, thank you! Hey, you said you were getting married soon, didn’t you?” I had said that. During our introductions the week before I had mentioned that I was getting married in about 8 weeks, and that my fiancé and I were in the final stretch of planning. I was surprised he remembered that, and replied “Yes, in August. It’ll be here before I know it.” His response surprised me even more, “Absolutely. I got married in

August last year. The last few weeks leading up to it are the worst. Crazy! Just remember, it goes by so fast the day of, remember to actually enjoy it. Like, one of my friends told me that, and I think if he hadn't I just would have gone through the whole thing and not even really realized it. It's such a whirlwind. So, definitely, remember to slow down and enjoy it."

Michael was a genuinely kind person. He didn't have to say that to me, we had only just met, but he had this little piece of advice that he thought might be helpful to me, and I truly appreciated it. I witnessed his kind and reassuring nature many times over the next year both in person and in the videotaped teaching lessons he provided to me. In our class he was always quick to help a fellow student figure out an issue with the software they were using. In his student teaching videos I could see him calmly redirecting students to the task at hand, or reassuring them that they were indeed doing it just "right."

Skill-wise, there was no reason for Michael to take my course. His undergraduate degree was a double major in studio art with an emphasis in photography and digital media, and business. His skills in the Adobe Create Suite far surpassed mine. Every project assigned in EDHD 5007 he would have done before the end of the class period in which it was assigned, and every project was technically perfect and well conceived. I had had students in previous years that had similar art and technology backgrounds to Michael's who would ask if they could somehow skip my course entirely saying, "Yeah, I already know all this. Can I test out of this or something?" Michael, however, never complained. Instead he spent his time completing his projects, and assisting other students work with the programs we were using.

Having witnessed Michael's patience and reassuring nature both in the classroom and from viewing his teaching videos, I was curious what motivated him to pursue becoming an art teacher.

I worked at [Insurance Company] for two and a half years and I just really didn't enjoy my time at all. I just decided I really wanted to go towards using my art degree somehow and being able to teach and get in a classroom and working with kids seemed like a great way to be able to use that knowledge.

Michael's high school placement. For student teaching at the high school level, Michael was placed at a large urban high school on the northeast side of the city. Michael admitted to me that at first he was a bit nervous about the placement. He had heard from a few people that this school was "rough" and that the mentor teacher was difficult to work with. At the time of my interview with Michael, he had completed the high school placement and shared a video of himself teaching a lesson that I viewed prior to our discussion.

I know some people have had problems at that school. I guess it's not the easiest school to teach at. I mean, the place is practically on lockdown all the time. Everything is so regimented; they [the students] have no freedom whatsoever. Like, none. The whole place is totally no nonsense. I mean, I know you can't tell from the video, but after class starts, the doors lock. That's how tightly controlled everything is.

When speaking about the students he taught at this high school, Michael praised their interest level and dedication to their projects and acknowledged that learning in such a

strict environment couldn't be easy on the students. He was committed to making his classroom a haven of sorts, a place for students to focus on art.

The video begins with a view of the empty computer lab. A few voices can be heard off screen, and then a steady stream of students begins to file into the room. This particular class was a Digital Imaging where students use Photoshop to design and create their images. Michael is seen at the back of the room in front of a large projection screen, waiting for the students to get situated. The configuration of this particular classroom was a bit odd, but probably not out of the ordinary for a computer lab. There were several rows of tables with Apple iMac desktops that faced away from Michael and the screen. As students took their seats, with seemingly ruthless efficiency, each student twists their body over the back of their chair to face Michael and the screen.

Class begins with a review of a lesson on Describe versus Interpret. The review is, per Michael's explanation, based on results of a quiz from two weeks prior. This particular class period did quite well on the quiz, however due to the fact that the other period of the same class had significantly more difficulty with the quiz (approximately a 50/50 pass/fail rate) the school requires an "intervention" for *all* classes. Even though this particular class did quite well, they must also participate in the intervention. "I know, I know" Michael tells the class, "let's just get through this as quickly as possible." Michael asks the students to give the definition of "describe." Two students quickly respond, "It can be visualized" and "What something looks like. It's appearance." Michael asks, "Characteristics of 'describe'?" A student responds, "It's visible to everyone." Michael

and the students swiftly go through the remainder of the review on ‘Describe’ and move on to ‘Interpret.’ “It’s like an explanation of the meaning of something. An assumption”, a student offers for the definition. The students demonstrate that they have a firm grasp of the definitions and concepts of the lesson.

For the next phase of the intervention, Michael directs the students to the class website, and passes out a worksheet. As Michael explained to me later, the students viewed an example work of art posted to the class website, and then filled in the worksheet questions in response to the image. After only about five minutes, the students have completed the worksheet and he begins to go over the answers with the class as a whole. Michael reads aloud the questions from the worksheet one-by-one, and the students can be heard droning the answers in unison.

With the intervention complete, Michael now transitions to introducing the next assignment, a promotional poster project. Michael’s mentor teacher had partnered with a community organization several years prior, and every year his students complete a promotional poster project for their summer festival. Michael begins explaining the project by asking the students if they have heard of the organization. A few students raise their hands, and one student replies, “Yeah. I think I’ve heard of them.” Michael opens Google Maps on the instructor computer and inputs the location of the high school and the community organization to show the locations and distance between the two. “Oh! That place! Oh yeah. I’ve heard of them.” Michael uses this as an opportunity to emphasize that this is a community project. “This organization is part of our community here, and one of your posters could be selected as this year’s poster!” Once again Michael

directs the students to their class website and asks them to locate this assignment under the 'Projects' tab. Michael reads through the project description and emphasizes that this builds on the technical skills of the last project, but this time with specific requirements of the organization. For the remainder of the video, Michael is seen walking around the room to students as needed as he helps them locate image assets on the network, clarifies print specifications, and troubleshoots issues with Photoshop.

Michael's elementary school placement

"Kindergarteners aren't really known for their great impulse control, you know? I used the SmartBoard a lot and sometimes they'd all just jump up and try to move stuff around. They really just wanted to touch it."

Michael was placed in a suburban school district for his elementary teaching, and spent some time at the middle school as well. As he put it, the schools were "decked out" with all the latest technology. There were SmartBoards in every classroom as well as computer labs with the latest versions of the Adobe Suite, screen sharing capabilities, and a voice amplification system. "They had a lot of pretty cool technology and it was great to have experience with it." Michael described using a lot of technology in his lessons, even at the kindergarten level.

I used the SmartBoard a lot, even if it was just to project images, but I'd always use it to display something. Usually it was to display step-by-step instructions for students, like 'this is what you're going to do during work time'. I would also have interactive thing and they could come up and move something on the screen. So I used that quite a bit.

Michael provided me a video of him teaching a lesson to kindergarteners about the sculptures of Louise Nevelson. The video began as the students began to file into the classroom. Michael had started his PowerPoint presentation so that the students could see the title slide and images as they walked in. The allure of the SmartBoard was apparent. Michael described it as a “moth to flame” relationship. Many of the kids visibly slowed as they passed the SmartBoard, staring at the images. Some paused entirely as if contemplating whether to sneak in a quick touch without getting caught. As the students congregate in organized chaos on the carpet square in front, the last boy to enter the room surreptitiously swipes his finger along the bottom corner as he passes, clearly unaware that his small indulgence has been caught on camera. Throughout the lesson, Michael switches back and forth between using the SmartBoard, reading a children’s story, and showing real examples of sculptures to the students. When using the SmartBoard, he shows the class examples of Nevelson’s work, or asks review questions about what sculpture is and how it can be described. As students call out answers to his questions, Michael taps the SmartBoard to reveal the answer. Each time there is nearly a visible jolt of excitement.

Michael’s relationship to technology was seamless, like second nature. In contrast to Laura and Amy’s experiences student teaching, where they would often shy away from using technologies they didn’t feel completely comfortable with, I wondered what impact Michael’s technology savvy skills had on his student teaching experiences. Of his mentor teacher’s use of technology, Michael noted,

Both of my co-op teachers had experience using the technology in the school and encouraged me to use it, but I was able to teach them things because I don't think they were using it to the degree in which they could.

In his high school setting, Michael had been placed with a mentor teacher who taught media arts and therefore already possessed a relatively high level of technical skills. Their working relationship, as intimated by Michael, seemed perfectly average. There was no friction between the two of them, they seemed to be open to ideas from one another, and were able to accomplish the teaching goals and projects they had set out to complete at the beginning of Michael's placement.

There was one area however where Michael was able to use his skills to advance technology usage at the high school. In their first planning meeting for lessons during his placement, Michael suggested setting up and using a class website. His mentor teacher had considered doing this for some time, but as with most projects that fall outside the day-to-day necessities of lesson planning, teaching, and grading, time had been a limiting factor. Michael agreed to set up and maintain the website using the same free web building application that was used in EDHD 5007, weebly.com. Michael created the website with pages for all three of his mentor teacher's digital arts classes, and uploaded class syllabi, project descriptions and guidelines, as well as project examples. As seen in Michael's teaching video, the website was used extensively with the classes, and is actually still used today.

In his elementary school setting, Michael was able to assist his mentor teacher in using the SmartBoard for more than just projecting images. His co-op teacher used the

SmartBoard frequently, but had not designed interactive presentations. Michael was able to show her how the Notebook application worked, and what features could be used in PowerPoint to make it interactive. Similar to his high school mentor teacher, this teacher had excellent tech skills and used technology frequently, but due to common time constraints, was unable to fully explore the tools in order to use a broader range of features. In this way, Michael was able to serve as a technology mentor to both of his co-op teachers.

Jenna

There are very few people in life that I would describe as a force of nature, but Jenna is definitely one of them. Whip smart, a fast talker, and insanely energetic, Jenna was the kind of person who seemed to careen from one life event to the next with little to no planning, but instead merely an unwavering faith that things would work out as they should. Jenna had begun her undergraduate career as an art and graphic design major, but quickly switched to graphic communications in digital design when she felt she wasn't getting enough computer-specific training.

I figured I'd be more employable after college with more knowledge of specific design software. But then I got the kind of job I thought I wanted and I hated it. I worked at a little bank, sat at a desk all day and made brochures. Basically someone told me what to do, I'd do it, then they'd come by later and 'yay' or 'nay' it. That was it. It was awful. So I did what anyone would do. I quit that job, moved back home, and got a job as a guide on a tourist train. Normal, right?

During the off-season from the tourist train, Jenna would return to her hometown to be with her parents. Her father still taught in the same school she had attended herself. Her mother was now retired after having suffered a stroke several years earlier. Both of her parents were well-loved teachers in their small community, and her father gave her a not-so-subtle nudge one day, “Well, if you’re here, you might as well start subbing.”

So I started substitute teaching, not really thinking it would go anywhere, but then it turns out after almost a full year of subbing, I got attached to it. It just kind of happened. And my dad, he watched me teach one of my classes and he said I was a lot like my mom. That pretty much clinched it. She was such a fantastic teacher. It just kind of snowballed from there and I started thinking about maybe going back to school for teaching.

Jenna’s path to choosing a career was certainly unconventional, but not as unconventional as how she chose which school to attend.

I was in the middle of a road trip from Alaska to Florida with a friend and just for fun we stopped in Minnesota and I was like, “I think I’m going to stay here” and two months later I was enrolled in the program. So, okay, it sounds really random. But I did research different schools! I’m a firm believer in things happening for a reason, and I was reading about his program and I knew I wanted to do art because I’ve always had a passion for it, and specifically media arts. So it was perfect and it all just lined up perfectly for me.

In class, Jenna was always full of seemingly boundless energy. The course schedule and workload for the initial licensure program is notoriously brutal, and yet Jenna maintained

an evening and weekend job as a bartender. Much like Michael, there was technically no need for her to take my class. Her technical skills also far surpassed mine in the Adobe Suite, and she certainly didn't need my help creating a PowerPoint presentation. Her project reflection papers were full of lesson plan ideas and different ways she would use each of the kinds of software. She had a natural ability to balance the art content she had such a passion for, and the technology she had extensive training in, with teaching.

In her elementary student teaching placement, Jenna wasted no time implementing technology into her lessons. In fact, she set out to complete a very ambitious four-week stop-motion animation project with students in fourth and fifth grade. Her mentor teacher did not use a lot of technology in his art teaching, but offered his full support as she planned and taught the unit.

He's amazing, he's just fantastic all around. He never uses technology though. Like he uses his document camera as his end-all everything and then he'll show YouTube videos maybe. He's open to it but he just never really uses it because he's been doing it this way for 25 years. I mean, he's definitely interested, I just think he needed someone to show him what was out there and how to use it. So, I like, totally smothered him with it.

The stop-motion animation project was complex to say the least. With six total classes and seven groups per class, Jenna reserved as many iPads at the school as possible, including ones from other departments.

So every group had a director, writer, producer, and set designer and they had little nametags with their little roles on it. Then I took these old wine boxes and I made these stands for the iPads and I talked with the tech guy and he downloaded this free application called iMotion HD, just a really really simple stop motion app that I have on my phone that I used forever. So basically it's just like you hit capture and you capture every image. It's super, super, super easy to use. So the kids had to make a 30 second stop motion animation movie and they filmed everything themselves and did their whole thing on the table and the camera was mounted above and they just pushed a button. Then I uploaded them to YouTube from the iPad and posted them to a website I made on Weebly. They had to think of their own production team name. Every video was posted and then at the very bottom, I put up a poll so they could vote for their favorite video in the class and they could take them home and show their parents. There was even a comment section so parents could connect with me directly if they had any questions about the project and then I took photos while they were working on it and put it on the website, so the parents could see. Then, yeah, every page had the poll and then whoever won by the end of the week or something, I made these little ANI Awards, I called them, like Animation Awards. Then we did an awards ceremony. It was so cute and they had to do a little speech. It was hilarious.

Jenna spoke a mile a minute when she spoke about the project, as if she didn't want to leave out any of the details. During the interview we circled back to the project

several times as Jenna would exclaim, “Oh wait! I forgot about this part!” Her excitement and deep sense of pride was apparent, and likely due largely to the overwhelmingly positive feedback she had received on the project. Jenna taught at least one class section each weekday, and introduced the project to a new class each day. By the time Friday came around, the last class section had already heard from their peers what they would be doing in art class.

They were so cute. They already knew we were starting animation and they all just like, flew into the class. They were so excited! It was so great. Even [my mentor teacher] said that he hadn’t seen those kids that excited over something in art class in a really long time.

At the end of the unit, Jenna gave the students a reflection sheet to complete about the project. They were simple questions they could answer that would help Jenna revise the project if she were to teach it in the future.

The reflection was just for me, so I could know what to do differently. I had a few questions of like, “What was your favorite thing about the project? If you could change something, what would it be?” and all of them said they wanted more time and they wanted to do it again.

When Jenna set up the website to showcase the final animation projects, she added a ‘Contact Me’ section for parents and invited them send her a message if they had questions about the project or general comments. “It’s kind of a standard thing to put on a website. I really didn’t expect to hear from any parents.” But she did. Several parents had

contacted her through the website form to tell her how much they enjoyed seeing the projects or how excited their child had been about working on it in class.

One mom even messaged me that she really wanted to see the videos, but was having some kind of trouble viewing them in Firefox or something. So I told her how to use a different browser. I mean, that was a real little thing, but it was nice having that open communication with parents, just to write a quick little message. I was surprised but it was really great.

Jenna was deeply reflective of how her lessons had “worked” during her student teaching and her mind was already swirling with ways she could update or broaden the project. When she set up the website to showcase the students’ work to teachers, administrators and parents, she set up a polling feature on each of the classes project pages. The “voting” then determined winners for their awards ceremony.

It was crazy and it was really funny because in one specific class, this group won. They blew the rest of the class out of the water with how many votes they got and it wasn’t really the best one in the class and I asked the group and I was like, “Wow, you guys got so many votes” and she was like, “Yeah, my mom put it on Facebook and all our family went to it.” I’m like, “Good for you.” I mean, that’s smart. Like if I had longer to do that project over again, I totally would’ve talked about the power of advertising and the power of social media. I thought of a good project for like a high school class is making a YouTube video on anything, anything at all that’s appropriate obviously, but then the goal of it is to get as many views as possible, like what’s the process you go through to get views?

Then talking about social media and all those conversations come up too, and those are really important conversations at that age I think.

Jenna's mentor teacher was just as enthusiastic about the project as the students and their parents. Specifically, he appreciated the level of planning Jenna had put into the project. The students were guided step-by-step through the process of creating their videos by working as a team to create their story, plan their characters and props, and outline the stop-motion movements.

He loved it so much that I taught him how to do everything. He's doing it for his summer program right now. He's using the same stands that I made, same setup, everything. He actually emailed me the other day asking something about YouTube because he was having trouble uploading everything. Like, I'm so proud of him! He's never done anything like this before and now he's super committed to it.

It was clear from the way Jenna spoke about him that she and her mentor teacher had formed a strong professional relationship, and perhaps even a friendship. She had nothing but glowingly positive things to say about him and what she learned from him during her placement. She described him as the "consummate" art teacher, one with a deep passion for art, his students and the community. Their relationship was one where they were able to learn from each other, and much like in Michael's case, Jenna was able to function as a technology mentor for her elementary co-op teacher.

For Jenna, there was no need to figure out ways to incorporate technology into her art teaching; technology was already ingrained in her process. She described it as a reliance on technology in general, both personally and professionally. “It’s just how I start anything, really. I immediately go to the computer and start pulling examples. It’s how my mind thinks. Then from that mess, I start organizing them in a way that makes sense.” Given her background in digital design, Jenna’s preference was to teach media arts classes, however, even when teaching more traditional drawing or painting classes, she was still committed to using technology in some form. For lessons in painting, she would still use PowerPoint as a way to introduce the class to specific works of art or to talk about technique. “At the very least I think I would always have a class do their own image searches to find artists they like or other types of inspiration.”

More specifically though, Jenna was interested in how traditional art forms could be combined with media arts.

Right now I’m really really interested in how you can blend the two together by drawing something, scanning it in, putting it into Illustrator and creating something that’s like a hybrid of both. I did a seventh grade project in drawing where we did self-portraits but these kids have never used Photoshop ever. So it was very basic. So I would take them out in the hall and take a picture with the digital camera, then upload it, give it to them, and then we did really high contrast self-portraits. So I’d teach them how to do high contrast and we’d print them off black and white and then we did tracing paper over them and they would basically

color in all the positive space and they'd have these crazy high contrast self-portraits. So it was kind of like a blending of both of them, using like, "traditional" skills and media.

The concept of "hybridity" ("Art Today," n.d.-a) in art-making and art teaching was of great importance to Jenna. She still felt the apprehension about media arts from colleagues and even art teachers she had worked with — that somehow art created with a computer wasn't "true" art.

People still don't view the computer as a tool for art like a paintbrush is a tool for art. There's a tactile response to a paintbrush, I get it, but the computer isn't doing the work for you. It's a tool, just like a paintbrush, just like a pencil.

Jenna felt strongly that introducing hybrid projects in the art classroom could help erase the disconnect between traditional and media arts. "Personally, I'm really excited about all you can do with technology and how you can combine things, I mean, think of the possibilities!"

At the conclusion of my discussion with Jenna I felt nearly dizzy with excitement. Our interview had lasted twice as long as with other participants and she had spared me no thought or opinion on art and technology, for which I was truly grateful. To her, teaching art was all about balance. Balance between old and new ideas, traditional and cutting-edge tools, techniques and processes. I never had any doubts that Jenna would be a force of nature in the teaching world. Her passion and expertise in art would serve her

well wherever she ended up. While I have not maintained personal contact with Jenna since she completed the program, I heard from a mutual friend that she recently moved to Europe on a whim, and now teaches art in a coastal town. I can think of no transition better fitting for her next adventure.

Chapter VI: Discussion and Recommendations

Summary

The purpose of this study is to better understand the factors that influence art teacher candidates' ability and willingness to incorporate technology into their teaching, and to make recommendations based on those findings. My experience as an instructor of EDHD 5007 Technology for Teaching and Learning sparked my initial interest in this issue. As the core technology course for initial licensure students, EDHD 5007 was meant to offer a concrete introduction to the programs, applications and skills necessary to become knowledgeable and comfortable with technology in the classroom. Through four years of teaching the course, my curiosity grew as to why some students readily used technology in their lesson planning, and others forcefully resisted. What factors influenced or caused these reactions?

In order to begin to understand these issues, general data from my EDHD 5007 course from 2009 – 2012 was compiled and analyzed for patterns or trends. The initial analysis was simple, looking at total enrollment for those years, gender composition, approximate age range, and the self-reported technology experience level of each student. This cursory initial analysis revealed that of the 54 total students who I had instructed in EDHD 5007, 15 were male, and 39 were female. Approximate ages ranged from early twenties to late forties. In total, across all four years, 8 self-identified as minimal technology users, 29 as moderate technology users, and 17 as extensive technology users.

Based on these results, the major factor that emerged as a possible influence on art teacher candidates' ability and willingness to integrate technology is what I have termed "technology predispositions." These predispositions of art education teacher

candidates are: Technology Averse, Technology Willing, and Technology Savvy. These predispositions were developed in alignment with student self-reporting of technology use and experience.

To further investigate these observed predispositions, class data, email correspondence, and submitted assignments were reviewed to find evidence of these trends. Requests for interviews were made to the 2013 art education initial licensure cohort, and four students responded and were interviewed for this study. Interviews were semi-structured allowing participants to focus their answers on questions they found most relevant to their experience. The interview questions were open-ended and asked the participants to elaborate on their experiences with technology in their initial licensure classes, student teacher placements, and in their personal lives. Each interview was transcribed and hand reviewed for themes, patterns, and influences. Common themes that were observed in the interview transcripts were issues and influences from the participants' personal background, general initial licensure program, EDHD 5007 course, student teaching placements, and art education-specific initial licensure courses. Barriers to technology integration and future technology planning were also observed within each participant's interview data.

In *Chapters III, IV, and V*, I present three narrative constructions that illustrate the observed technology predispositions of Technology Averse, Technology Willing, and Technology Savvy. Through these stories I combine data from correspondence, personal recollection, video recordings, and interview data to provide a fuller picture of the personal and professional experiences that influence technology integration. The Technology Averse section is created strictly from personal recollection, correspondence,

and submitted EDHD 5007 assignments, with an embedded analysis section. The Technology Willing section presents the stories of Laura and Amy as they consider what role technology plays in their teaching, also with an embedded analysis section. The Technology Savvy section presents the stories of Michael and Jenna and how their high level of technology skills affected their student teaching experiences.

Interpretation of Findings

As a result of the data collection and analysis process, certain factors influencing an art teacher candidate's ability and willingness to integrate technology into their teaching surfaced. This section will review identified barriers to technology integration as observed in the Tech Averse and Tech Willing predispositions and present recommendations to these issues. I will then outline additional suggestions based on observed successes as presented in the stories of Michael and Jenna that could be applicable to art education initial licensure students as a whole.

Barriers and recommendations. Issues of computer anxiety (Bozionelos, 2001; Laguna & Babcock, 1997; Leso & Peck, 1992; Mahar et al., 1997; McInerney et al., 1994) presented themselves in the Tech Averse narrative, and remains an issue students and educators should remain mindful of. While there is no clear solution, from an instructor's perspective, acknowledgment and understanding of the potential added difficulties a person who experiences computer anxiety faces is a crucial first step. This in no way means "diagnosing" students with a condition, but merely recognizing that experiencing anxiety in relation to working with computers is not uncommon. Patience and an increased exposure to various technologies, while initially difficult, is likely to lessen individual's anxiety over time (McInerney et al., 1994). EDHD 5007 was designed

to give a quick overview of available technologies and skills that can be applied to the classroom. My goal was always to make the course as “low stress” as possible believing that a more relaxed atmosphere for experimenting would lessen initial anxiety levels in certain students. This approach proved effective in several instances such as Emily who did, eventually, concede that technology could be used in certain cases. However, it is important to note that not all individuals will accept technology as a part of their teaching practice. For instance, despite my best efforts, an increase in exposure to technology through EDHD 5007, and even assistance from their peers, Roger and Ginny appeared unlikely to integrate technology into their lives in any capacity, personal or professional.

The second identified barrier to technology integration for art education students is a general rejection that digital and media arts should be considered “art.” This issue presented in the stories of Roger, Emily, and Ginny. There is a long-held resistance and negative attitude towards the use of technology in art education, most specifically as a medium for art creation (Degennaro & Mak, 2002; Delacruz, 2004; Gigliotti, 2001; Greh, 1986; Mayo, 2007; McCulloch, 1984; Squires, 1983; Stankiewicz, 2004). As evidenced by Lu’s (2005) study, some pre-service art teachers still believe that computer generated art is somehow artificial, or that these works require no time or real effort to create. Acknowledging that this rift within the field of arts education still exists, and a commitment to continuing to expose art teacher candidates to digital and media arts through their licensure program, is likely the most effective way to gain wider technology integration acceptance.

The third identified barrier to technology integration for art education students is a lack of technology mentorship within their student teaching placement experiences. Both

Laura and Amy demonstrated proficiency for and an interest in software programs and applications, but seemed to need more specific guidance in how these tools could be integrated into teaching. Each were placed with mentor teachers who did not incorporate technology into their teaching to high degree, if at all. In these instances, both Laura and Amy expressed interest in using technology more fully in their student teaching placements, but did not receive the necessary support or guidance to attempt more complex uses of technology. Their mentor teachers, through no fault of their own, were not well versed in technology integration practices themselves, and therefore could not offer technology-specific mentoring. This presents what I logically assume is a common barrier to technology integration for initial licensure candidates. Students frequently ask for examples of how to do something before attempting it themselves, be it an assignment, lesson plan, or teaching strategy. This is not an indication of laziness or a desire to copy the work of others, but rather a need to see successful models of teaching and learning.

To address this barrier, there are two solutions that can assist in providing more concrete examples of successful technology integration to art teacher candidates: 1) match art teacher candidates and mentor teachers based on technology skill level, and 2) when possible, ensure that the instructor of core technology integration courses for art education, such as EDHD 5007 (now CI 5307) is a K-12 art teacher with extensive classroom technology experience. The first recommendation, to match art teacher candidates and mentor teachers based on technology skill level has the potential to be mutually beneficial. As seen in the stories of Laura and Amy, both women could have benefitted from placements with mentor teachers with advanced technology skills.

Student teachers are eager for real-world examples of how materials and tools can be implemented into the classroom, and veteran art teachers are in the perfect position to guide them.

Conversely, conversations with Michael and Jenna revealed that they were able to serve as technology mentors to their co-op teachers and demonstrate to them ways in which technology can be used in the art classroom. During the interview process, all four participants spoke about how busy and overworked their mentor teachers seemed. Some mentor teachers may be the only art teacher at a particular school, teach multiple classes or volunteer to run extracurricular activities. Factor in the daily demands of lesson planning, classroom management, and grading, just to name a few, and it is no wonder many art teachers have little time to devote to researching or experimenting with new technologies. In Jenna's case, her mentor teacher had little free time to plan for technology integration, but was interested in the prospect. Jenna was able to design and implement a new unit for fourth and fifth graders that her mentor teacher has now adopted into his own teaching.

This recommendation of matching teacher candidates with mentor teachers based on tech skills is not meant to say that technology integration is of the utmost importance when arranging placements. Placing candidates with mentor teachers is already an inordinately complicated process, and technology skills in no way supersede other placement criteria. Part of the placement process could include, if it is not already, a place for candidates and mentor teachers to indicate their technology skill level, and their interest in being matched with someone of a higher skill level. As an added consideration

to the placement process, this recommendation could aid in more technology knowledge sharing between candidates and mentor teachers, and vice versa.

The second recommendation, ensuring instructors of core technology courses are, or have been, a K-12 art teacher with extensive classroom technology experience, is one that is already place at the University of Minnesota. This recommendation is important, as it is a concrete way to introduce teacher candidates to a variety of technologies that have been used in the art classroom, and as a way to directly model successful technology integration.

When I concluded the data collection process for this study, I stepped down as the instructor of EDHD 5007. My replacement is a current art teacher with a clear passion for art and technology, and she was kind enough to share her most recent course syllabus for CI 5307 from summer session 2015. In reviewing the revised curriculum, there are numerous changes that have updated the content and delivery, and better contextualized and modeled technology integration in the art classroom. The first major change is that the course syllabus now functions as an interactive Google Document with embedded links to course materials such as class presentation slide decks, assignment sheets, readings, and the course management system. This change streamlines access to important course information while modeling effective use of multiple computer applications such as Google Docs and presentations. The second change to the course is the use of Edmodo as the course management system. Edmodo is an online platform that serves as a course management system like Moodle, and also as a social media network like Facebook. Using Edmodo in CI 5307 is an effective way of modeling course management systems in art education, as it is a free and easy to use application that

students can readily implement in their future teaching. The most extensive changes to the curriculum were in revamping the lessons and assignments to use more updated technology systems and applications. Current assignments in the course include: building a professional learning network (PLN) on social media sites such as Twitter, Pinterest and Facebook; creating a professional blog for teaching; using Critical Response protocol to respond to works of art using VoiceThread; and creating an instructional video to include in a flipped classroom lesson. These changes to the core technology course for art education initial licensure students provide a much needed update to approaches and tools for technology integration in the art classroom, strengthened by the expertise of an experienced art educator.

Effective modeling and knowledge sharing. The barriers and recommendations outlined above point to a need for an increase in effective modeling and knowledge sharing amongst art educators in regard to technology integration. Instructional practices in both art and technology tend to favor a Constructivist approach wherein a space is created in the classroom for learning as a community, with facilitation and guidance from a more experienced teacher. Expanding the application of this approach to include student teaching experiences has the potential to benefit both student and mentor teachers as it recognizes that technology experts exist both as established art teachers in schools, and also within the initial licensure cohorts.

Limitations

Although I have attempted to piece together an authentic representation of the experiences and needs of art teacher candidates when considering technology integration into their teaching, there are limitations to this study. The first limitation is that of limited

scope. All data comes from members of the art education initial licensure cohort from a single university, and while four years worth of EDHD 5007 class data was compiled and used as the basis of this research, only four in-depth interviews of participants from one cohort were conducted.

There are also limitations to the available data for this research. The findings and recommendations of this study are formulated, in part, based on discussions with four individuals. Alternate insights may have emerged if conducting interviews with an increased number of participants across multiple cohorts had been feasible. A second possible data limitation is that no students whom I would categorize in the Tech Averse predisposition volunteered to be interviewed for this study. The Tech Averse narrative was therefore constructed based solely on my own recollections of student interactions with corroborating evidence from email communications and submitted assignments.

A third limitation to this study is the use of self-reported data, from both myself, and my interview participants. The autoethnographic section of this study is entirely self-reported data from my personal and professional experiences with technology, teaching and learning. Interview data are also self-reported by my participants, Laura, Amy, Michael, and Jenna. I rely on their accurate recounting of events and experiences in their initial licensure program and interactions with their mentor teachers during their student teaching placements.

The goal of this research is to understand what the pre-service art teacher technology experience is from their perspective, and makes recommendations based on observed issues and trends. The use of qualitative methods, and specifically self-report interview data, is the ideal approach to understanding the complexity of their unique

experiences, situations and interactions (Merriam, 2009; Patton, 1985). The interpretations and findings of this study are strengthened by first hand descriptions of personal experiences of these art teacher candidates that would not have been as rich or detailed had other data collection methods been used.

Suggestions for future research

The findings of this study provide opportunities for further research. This section outlines areas for additional research in technology for teaching and learning in art education: 1) broader scope to include multiple university art education licensure programs; 2) investigation into the experiences and perspective of mentor teachers and the potential benefits of technology mentor relationships through student teaching placements; 3) the impact on technology preparedness when core technology courses are taught by experienced K-12 educators.

Further examination into technology integration preparation practices for art education licensure students would require a broader research scope to include multiple programs across several universities and colleges. Expanding the scope in this way would necessitate access to art teacher licensure program curriculum as a whole, and technology preparation courses specifically. An inventory of this kind would document similarities and differences in technology preparation approach and allow for the development of generalizable best practices.

To better explore the potential benefits of a technology mentor relationship in student teacher placements, pursuing research that includes cooperative teachers experience and perspectives would be beneficial. This study relies on self-reported interview data from participants regarding their experiences using technology in their

student teacher placements. Due to the absence of mentor teachers' direct feedback in this study, conclusions that less technology skilled teachers would directly benefit from placements with more highly technology skilled student teachers can only be inferred, but not confirmed. An assessment of whether student teacher candidates and mentor teachers would find this type of mentoring meaningful and mutually valuable would need to be conducted.

The last suggestion for further research is to assess the impact core technology courses taught by experienced K-12 has on student teacher candidates' level of technology preparedness. Interviews with art education initial licensure students who have taken CI 5307 with the new instructor were not possible within the confines of this research study. An investigation into the possible effect being instructed by an experienced K-12 art teacher has on a student's ability and willingness to integrate technology into their teaching is warranted. An understanding of this possible effect could contribute to the development of best practices.

As a society, we have witnessed and are still in the midst of, a tremendous technological shift. This shift is represented in the ways in which we access, gather, sort, and process information, as well as how we stay connected to friends, family, and the world around us. As educators, we have a responsibility to prepare our students to function within the world in which they live. Technology integration education is a vital part of preparing our future teachers to teach. Integration preparation for arts educators is a complex endeavor, which must take into account the multiple applications and uses of

technology, both as a means of information gathering and presentation, as well as a medium for art creation. Students come to us to become art teachers for a variety of reasons, a passion for the arts, a desire to share knowledge and experience, the ability to be immersed in the arts on a daily basis. Each student also comes with his or her own individual history, expectations, and desires. As educators, we know it is often impossible to fully address the needs and predispositions of each student, but it is our ceaseless desire to understand and advocate for them that is of the greatest importance.

Addendum: Literature Review

The acceptance and inclusion of technology into the fields of art and art education is a topic that has been written about extensively for over thirty years. Art educators have written specifically about the importance of technology integration into the art curriculum, theorized about the benefits of technology usage in the art classroom, as well as provided guidelines for successful incorporation (Anderson, 1985; DiBlasio, 1983; Dilger & Roland, 1993; Eisner, 1983; Ettinger & Roland, 1986; Gregory, 1989; Hanlon & Roland, 1983; Stankiewicz, 1996). In the 1980s and 1990s, educators wrote of the potential technology held for expanding the way students learn about art. Primarily these assertions focused on the ability of technology to aid in furthering inquiry and subject matter interest in the art classroom. “A good reason for bringing computers into the art classroom is that their presence constitutes an attraction and a bridge to many students who presently may find little of interest or value in the realm of art” (DiBlasio, 1983, p. 46). For instance, new technologies of the 1980s would allow art teachers to present supplemental lesson material via a laser disc or CD-ROM, or have their students manipulate images in a graphics program (Anderson, 1985). At the time, these “new” technologies provided art teachers the opportunity to purchase pre-packaged “lessons” or “modules” to present to their students as a way to supplement information that may be in a text book or slide library. It was a new way to present information in a straightforward manner. In the 1990s, educators began writing more about the potential power of integrating the World Wide Web into their classrooms (Dilger & Roland, 1993; Freedman, 1997; L. Galbraith, 1997; Gillingham & Topper, 1999; Gregory, 1996; Keifer-Boyd, 1996; Moursund & Bielefeldt, 1999; Stankiewicz, 1996). Using the Internet,

teachers could access images and information from around the world with the added benefit of not being constricted to the mostly linear nature of a pre-packed CD-ROM curriculum. Ideas about how the Internet could be used for in-class inquiry and collaboration began to flourish (Dilger & Roland, 1993; Galbraith, 1997; Gregory, 1996; Stankiewicz, 1996).

When considering the adoption of any new educational tool, issues and challenges will inevitably arise. As the demand for technology development and integration increased, arts educators began to voice their criticisms and frustrations. While the general consensus remained positive and hopeful regarding the potential of technology to enhance the teaching and learning experience, the central question shifted from *whether* technology should be incorporated into the curriculum, but rather *how* it should be incorporated. Diane Gregory (1996) notes, “We don’t need more stuff. We need to learn how to use wisely the stuff we already have and to consider carefully how we plan to use any new technological tools that become available to us” (1996, p. 50). Her frustration with a reflexively pro-technology argument is quite evident. She makes clear that technology should be approached critically and strategically, and urges us to remain mindful of our educational goals when integrating new technology tools. Numerous art educators have echoed the frustrations and caution expressed by Gregory and there has been a shift in the research and writings about technology and art in recent years. More current literature focuses on the need to educate art teachers on how to effectively use technology within their teacher licensure programs. If art educators are overwhelmed by the technology available and lack the technical skills to implement them successfully, little progress will be made toward classroom integration. The assertion that “a logical

response to a lack of creative utilization of electronic technologies among art teachers would be to focus on pre-service art teacher education,” (Delacruz, 2004, p. 8) clearly points to the need for re-thinking and re-imagining the way teacher candidates are exposed to technology. Technology itself may change rapidly, but the pedagogical approach to technology integration remains far more stable. Teacher candidates should have the opportunity to gain a deep understanding of the benefits, issues, challenges and approaches to incorporating technology into art education at the pre-service level. This is the most logical approach to preparing our future art teachers to teach with technology.

Technology in Contemporary Art Education

There are four broad categories of benefit to using technology in art education: 1) Access to information, 2) Increased interest and engagement, 3) Collaboration and sharing and 4) Exposure to Media Arts. The K-12 art classroom is a complex environment for teaching and learning with technology as the use can be twofold in that

Art teachers searching for appropriate, i.e., pedagogically advantageous applications of computer-based instruction in their class- rooms may begin by noting the difference between computer-assisted art instruction and computer-generated artwork. The former employs the computer to teach about art; the latter regards the computer as a medium for producing art”(DiBlasio, 1983, p. 41).

An examination of the four categories of benefits of the use of technology in the context of art education is discussed below.

Access to information. The advent and mainstreaming of the Internet has had a marked effect on education for all disciplines. Information on any topic imaginable can be located, downloaded or presented via the Internet and is now largely a primary source for research and information gathering for many educators today. Specific to art

education, the Internet has provided innumerable resources for teachers to locate works of art, find artists' biographies, research art movements, techniques and genres, access lesson plans and even take students of virtual tours of famous art museums from across the world. No longer must teachers rely on collecting posters, art prints or books to showcase a specific work of art. A simple Google search of a famous artist will return biographical information, collections of images, articles, exhibition lists, videos, lesson plans and more. The time commitment required of an art teacher to search for and retrieve information for in-class presentations and activities is reduced to mere minutes.

In addition to Internet search engines as tools for art educators, there are several specific websites such as the Google Art Project, The J. Paul Getty Museum, Art21 and ArtsConnectEd that are of particular benefit for art teachers. The Google Art Project (www.googleartproject.com) for example, "is an initiative to provide thousands of high quality, high resolution images from museums across the globe in one place, making art's history, meaning and beauty available in ways never possible before" ("Google Art Project," n.d.). Within the Google Art Project website, teachers can access and download images by browsing specific museum collections or searching by artist name, or by the title of the artwork.

Additional features of the website that make it particularly appealing to art teachers are the 'Compare', 'Discover', and 'Collections' features. The 'Compare' tab allows users to select two works of art from the website by dragging them into the 'Compare' work space. Once the images have been dragged into place, a new screen opens with the two images side by side. Each image also offers a zoom window for scrolling through and closely examining details of each work. The 'Discover' tab allows users to scroll through images and filter results by title or medium. The search results in the 'Discover'

tab can be viewed by scrolling through an image-only grid, or by selecting a larger view that also displays title, artist and medium. The 'Discover' tab would be a useful addition to the art classroom for allowing students to select works of art for study based on what interests them. Whether it is the title, artist, the visual look or the medium used, students can browse works on their own to find what interests them most. Lastly, the 'Collections' tab of the Google Art Project allows students and teachers to save specific works of art to their own "collections." Here students can browse through works of art and save things that interest them and view them in one specific space within the website. This feature is also valuable for teachers as they can save numerous works of art by any given theme that they choose. If it is a lesson on Pointillism, the teacher can save multiple images that best illustrate that particular style of painting.

The J. Paul Getty Museum (www.getty.edu) has an extensive section of educational resources on their website providing information for adult learners, college faculty and students, K-12 teachers and students, children and families, and community groups. Here, art teachers can take advantage of the wealth of resources under the K-12 heading that include lesson plans, online games and activities and videos ("The J. Paul Getty Museum," n.d.). Art21 (www.pbs.org/art21), is a website companion to the PBS television series of the same name. "Art21 is a non-profit organization that illuminates the creative process of today's visual artists through the production of documentary films, interpretive media, and live programs that stimulate critical reflection as well as conversation" ("Art in the Twenty-First Century Season' Six Educators' Guide | Art21 | PBS," n.d.). This website provides free educational materials such as access to artist

documentaries, screening guides for students, and educator's guides. Art21 is source for art teachers for more in-depth study and practice of contemporary art.

Last, ArtsConnectEd (www.artsconnected.org) is an interactive website hosted by the Minneapolis Institute of Arts and The Walker Art Center that provides educators the ability to "browse the museums' digitized items including Works of Art, Texts, Audio and Video, and Interactive Resources" ("ArtsConnectEd," n.d.). Users can also save, edit, share and present "art collector sets" which are published presentation materials available to all registered members.

Art teachers have a tremendous number of resources available online to support teaching and learning with technology in the art classroom. These are just a few examples of these resources and tools that provide access to images, artist information, lesson plan ideas, and artist documentaries. Access to these resources is just one step in effectively integrating technology into art curriculum. Teachers must use the wealth of information that is available to them in a few mere keystrokes to provide opportunities for their students to gain interest and truly engage in the world of art.

Increased interest and engagement

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 (Roland, 1990, p. 60).

In 1990 when Craig Roland wrote of the promise of technology and art, I can only assume that he and other art educators likely did not anticipate the all-consuming influence technology would have over our lives a mere twenty-six years later. Today it

feels as though everyone is connected to everything via a Smartphone, tablet device, email, Facebook, Twitter and Skype, just to name a few. Unlike twenty years ago, a vast majority of school-aged children have access to these types of technologies on a daily basis. Educationally speaking, the issue of using technology may no longer be that of presenting tools that are new and novel for students to use, but rather to incorporate the technologies they are already familiar with into their educational experience. When discussing classroom technology usage and the importance of using meaningful tools, Richard Ferdig points out, “the innovation must contain authentic, interesting and challenging academic content. It is important to have authentic, real-world problems, because they are interesting and meaningful to the students and thus engaging (Ferdig, 2006, p. 750).

One recommendation for incorporating technology into the art classroom that utilizes students’ knowledge and awareness of media as an authentic, real-world problem is to address the overwhelming wealth of visual representations in their everyday lives. Students are exposed to visual representations on a daily basis through television, the Internet, movies, commercials and other forms of advertising. Kerry Freedman (1997) asks, “In this world of imagery, how should we teach art?” (1997, p. 6) in her article *Visual Art/Virtual Art: Teaching Technology for Meaning*. Freedman asserts that a student’s ability to analyze and construct personal meanings of the visual images they are exposed to is vital to the learning process. Using popular culture images in the art room is a powerful way to instruct students on how to look at and evaluate images. Advertising images could be presented and students asked, what do you see? What does it mean to you? What do you think is the message the advertiser is trying to convey? Is it effective? What makes it effective? From this discussion, students will gain the necessary knowledge to truly *look* at the images that they encounter everyday. This activity can lead to a computer-based photo imaging assignment that practices editing techniques,

followed by a critique of the intentional and unintentional messages that can be created through photo manipulation.

When technology is incorporated effectively, meaning connective and meaningful to students, “it both enhances and provokes the focus and purpose of art instruction and learning to be expansive and personally relevant” (Carpenter & Taylor, 2006, p. 149). Technology use in the art classroom has the capability to engage students in the learning process that far reaches the subject matter itself. Students, who may not exhibit a particular interest in art as a discipline or practice, may become engaged in the art learning process through the use of technology. “When students create computer graphics, they often find that the most stimulating aspect of their work is the “trial and error” capability of technology” (Freedman, 1997, p. 8). Working with technology as a method of creating art can engage students in the learning process by allowing them to experiment and try multiple techniques quickly and easily. Using graphics programs, students can manipulate images, create collages, try new color combinations, shapes, layer options, filters and more, all while being able to easily display previous versions of their work. This iterative process allows students to showcase and discuss their learning and artistic process in small groups or entire class critiques in ways more traditional art media simply cannot afford. As a student discusses their finished piece, they can display the original image, and variations of the image through the process of their work and discuss the specific decisions they made along the way in regard to content, editing, meaning and final product.

Collaboration and sharing. Artwork is created so that it can be seen and thus shared with an audience be it a classroom, a gallery, a city, or the world. Sharing art as a community is an inherit theme in the field of art and it is only reasonable that in teaching art, we share not only our own work, but the work of others to increase our knowledge and understanding of the world. “Making meaning is central to what artists do. In art

education, students engage in the pursuit of their own artistic creations through the use of technique and media in the process of understanding, relating, and responding to meaning in their and others' works of art" (Carpenter & Taylor, 2006, p. 150). Today, technology enables art educators to collaborate and share work with others in ways never before imagined.

Web 2.0. Web 2.0 tools have perhaps had the greatest impact on teachers' and students' ability to collaborate and share their work with others. These tools can most easily be defined as a group of Internet "technologies [that] allow and encourage user-created content, collaboration, social interactions, tagging, and remixing of existing content" (Buffington, 2008, p. 304). In contrast to the format of Internet webpages of the 1990s when content was primarily static and information meant to be merely consumed, Web 2.0 tools allow for authoring and creating of content by any interested individual. "We now live in a world in which everybody...has the capacity not only to consume media but to create, share, remix, and redistribute it – to be media" (Reich & Solomon, 2007, p. vii). Web 2.0 tools may include: blogs, wikis, social media, video hosting and sharing, commenting, RSS feeds, tagging, podcasting, and personalized website creation. Many of these technologies are popular for personal use, but also hold tremendous opportunities for educational use.

By exploring and incorporating Web 2.0 tools in the art classroom, art teachers can expand the learning experience far beyond the confines of their classroom walls. Here, educators can connect with each other to share lesson plan ideas, collaborate on new lesson plans, discuss problems and successes of their teaching experience, and generally create a learning community. Art Education 2.0 (<http://arted20.ning.com/>) is a social media site, set up on ning.com, which was created for art educators to connect with each other and share their experiences and expertise. Resources provided on the site include

discussion forums, current and ongoing collaborative projects, video tutorials, slideshows of student work, links to blogs, and featured websites. In addition to these resources, Art Education 2.0 offers a “Groups” feature that allows members to form smaller discussion areas that are dedicated to specific topics. One specific group, “Connected Classrooms” is dedicated to the idea of connecting all art teacher members of the site to “partner” teachers in different cities, states or even countries. The challenge for this group is stated as,

“The goal here is to really start using the power of this technology and community to connect with others, foster collaboration, and build more global awareness among our students. There are already lots of examples on Art Education 2.0 of this happening, i.e., teachers collaborating with other teachers and classrooms exchanging work with other classrooms. The challenge for this group to find and develop other ways and reasons to connect” (“Connected Classrooms - Art Education 2.0,” n.d.).

This particular group has over eight pages worth of wall comments in which teachers are sharing their ideas, resources, links to additional information and creating professional partnerships. By partnering with other art teachers, not only are they increasing the depth of their own knowledge, but they are also providing unique collaborative project opportunities for their students. In one particular user response comment, an art teacher offers the possibility of a joint class critique via Skype. Art teachers are connecting themselves and their students with fellow artists from across the world. This type of collaborative work allows students to truly see the relevance of their work as they build a community that is much broader than that of their own classroom (Buffington, 2008).

In addition to collaborating with other art educators and students, Web 2.0 tools allow for easy sharing of completed work. The Internet provides innumerable tools for creating student galleries via blog, classroom website, or a social network such as ning.com. Parents, students, school administrators, partner schools, and even the general public can interact with the artwork that is created when it is posted online. Many art teachers have begun to create classroom websites for this purpose such as Suzanne Tiedemann and Tricia Fuglestad. Their collaborative website focuses on the uses of mobile technology in the art classroom, specifically the iPad, and showcases student work (“Student App Art - iPads in Art Education,” n.d.). This particular website was created using the free website editor weebly.com. Weebly offers basic editing with an easy to use drag and drop interface that produces professional grade websites quickly and easily. Displaying student artwork in this manner gives students a sense of responsibility, ownership, and pride for their work. As Craig Roland points out, Web 2.0 tools “permit students to engage in innovative forms of communication, expression, and learning using contemporary media rooted in their everyday lives” (Roland, 2010, p. 22).

Exposure to media arts. The above three categories of benefit, Access to information, Increased interest and engagement, and Collaboration and sharing, focus primarily on student involvement in learning about art. The study of media arts in K-12 art classrooms however, combines all of these elements of student learning and applies them to both the discussion and understanding of real world issues, and the creation of works of art. Media arts assist in examining the wide range of modes of human communication through photography, digital video and film, audio, digital and computer arts and interactive media (Bequette & Brennan, 2008). The use of these tools broaden

our understanding of Visual Culture, the images and objects that carry aesthetic meaning that surround us in our daily lives. These images and objects can include, fine art, popular films, toys, architecture, television programs, commercials, print and web advertisements, websites, and environmental design. “Visual culture is social, political and economic as well as personal, and involves the connections between and among various contemporary and historical forms” (Freedman, 2003, p. 39).

As the first state in the nation to include media arts as a form of art education (Bequette & Brennan, 2008), technology plays an important role in K-12 art education in state of Minnesota. The Walker Art Center in Minneapolis, Minnesota provides a list of five new elements and principles of art that assist art educators in clarifying the more complicated nature of creating and understanding art in this new highly visual and digital era. Titled *Art Today*, the Walker proposes *Appropriation*, *Time*, *Performance*, *Space* and *Hybridity* to the list of more conventional elements and principles of art (“Art Today,” n.d.-b). Each of these new elements incorporates some form of media arts. For example, *Appropriation* refers to the bombardment of images we encounter in our daily lives from television, Internet, books, advertisements and how these words and images can be used and incorporated into new, reimagined works of art. The element *Time* discusses how “New global technologies such as satellite TV, cell phones, and the Internet have transformed our conception of time and made the instantaneous experience of time across distances commonplace. It is not surprising that it has become a key element in the work of many artists today” (“Art Today,” n.d.). *Performance* often includes as element of media arts in the form of audiovisual components, or the filming of a performance for later critique and analysis. The element of *Space* can focus on the limitless virtual space

of the Internet, or use “materials such as electric light, film, video, or digital media can also transform, document, or create spaces” in a work of art (“Art Today,” n.d.). The last of the new elements, *Hybridity*, highlights the use of multiple mediums in creating artworks. This combination of materials could include more traditional media such as paint or clay, with new media elements such as audio, video, photography or digital media. The fact that all of the Walker Art Center’s new art elements include some form of new media, as describe above, speaks to the pervasive nature of digital technology in the arts and the importance of gaining and understanding of and a proficiency in media arts.

Media arts standards in the state of Minnesota focus on preparing students to understand media arts as a form of communication as well as a means of artistic production. Specific media arts standards include, identifying how hardware such as digital still cameras, digital video cameras and computers are used for creation of media arts, identifying the functions of software such as photo-editing, video-editing and sound-editing tools, in creating original products for expressive intent, and analyzing how a work in media arts influences and is influenced by the personal, social, cultural and historical contexts, including the contributions of Minnesota American Indian tribes and communities (“Minnesota Department of Education,” 2008). These standards, when implemented effectively, provide aesthetic-based information and experience necessary to understand digital communication and artistic production.

The integration of technology tools in art education is of the utmost importance. These tools have had a tremendous impact on the ways in which art teachers and students engage in the study and production of art. Whether it is by increasing ease of access to

information, encouraging interest and engagement among students, collaborating with partner schools in another city, state, or country, or sharing their insights, experiences and artwork with the broader arts community, educators and students alike have greatly benefitted from the use of these tools. As artists, our purpose is to create meaning, critique meaning and deepen our understanding of the world around us. Technology provides the access needed to collaborate, share, and broaden that understanding.

Learning Theory

Early research on technology for art education focuses on the question of *whether* technology should be included in the art curriculum (Anderson, 1985; DiBlasio, 1983; Dilger & Roland, 1993; Eisner, 1983; Gregory, 1989; Roland, 1990), while research of the last several years shifts its focus to the question of *how* to incorporate technology most effectively (Buffington, 2008; Carpenter & Taylor, 2006; Delacruz, 2004; Freedman, 2003; Gregory, 2009; Roland, 2010; Taylor & Carpenter, 2007). Teaching and learning with technology is a complex process as both teacher and student must acquire an aptitude and skill set with the technology itself either before, or in conjunction with, its usage as a learning tool in the classroom. This complexity can present a definite challenge to both teacher and student throughout the process. How best can these challenges be minimized? Or even better, how can these challenges be leveraged to experience meaningful learning? First we must examine the foundations of learning theory, specifically a constructivist approach to teaching and learning with technology. Second, a discussion of Technological Pedagogical Content Knowledge (TPCK) and its application to art education provides a deeper understanding of the complexity of balancing the technology used with pedagogy and art knowledge. Third, I will look at the

currently accepted standards for technology integration as provided by The International Society for Technology in Education (ISTE) in relation to art education. I will close with an assessment of how these theories and frameworks have influenced technology usage in the art classroom as well as how they can shape future art education practice.

Constructivism. A great deal of literature on technology integration for art education focuses on constructivist approaches. Constructivism differs from the more traditional teaching and learning point of view that “a discipline of knowledge is composed of “facts” that are true and considered constants, existing in a hierarchy that represents the structure of the discipline. Curriculum involves creating a sequence of objectives that expose students to the “facts” of a discipline in a manner that reflects their hierarchy” (Prater, 2001, p. 44). Constructivism instead focuses on the social aspects of learning as a community, and relies on the students themselves to construct meaning and direct their own learning process. This approach lends itself well not only to the teaching and learning of art, but also to the usage of technology within the classroom.

Constructivist learning theories are primarily attributed to the cognitive developmental theorists Jean Piaget and Lev Vygotsky. Piaget (1971, 1977) claimed that individuals gain knowledge by grouping similar experiences into mental structures referred to as “schema.” As more experiences are grouped into each schema, an individual experiences an increased understanding of the concept. These schemas are also interconnected, and therefore create larger concepts. As we encounter experiences that do not fit our predetermined schemas, the learner enters the state Piaget referred to as disequilibrium. Disequilibrium refers to a problematic mental state where the input from

the environment does not match any existing schema, creating a conflict between an individual's current experience and ability to understand. "A learner resolves this form of mental stress by ignoring the experience, beginning a new schema, or revising the existing one" (Prater, 2001, p. 44).

Vygotsky, in contrast to Piaget, focuses more on a socially-oriented developmental model wherein individuals learn as a product of social interaction. "From a Vygotskian perspective, cognitive development is studied by examining the processes that one participates in when engaged in shared endeavors and how this engagement influences engagement in other activities" (Palincsar, 1998, p. 353). Vygotsky posits that learning occurs in social contexts in which individuals share and build upon each other's knowledge and personal experiences. The process central to this theory is experience-gathering as it is the central motivator for guiding inquiry and the co-construction of knowledge (Prater, 2001).

More contemporary arts educators have built upon Piaget and Vygotsky's theories of schemas and knowledge construction. As stated by E. Louis Lankford, "Knowledge is organized in memory as structures which summarize and relate information gathered over time" (1992, p. 35). Lankford discusses the research of Judith Koroscik indicating that, specific to art, understanding is dependent upon "prior knowledge, expectations, and modes of seeing and understanding, all of which are derived from past experience and applied to present experience" (1992, p. 35). Koroscik continues her study of art and cognition and states, "...a work of art is in part a reflection of what the art viewer already knows, that individual's prior knowledge. This facet of cognition includes all of the knowledge, skill, and experience that individual has previously acquired" (1996, p. 8).

Koroscik echoes the Piaget's initial assertion that the way in which individuals process information is typically by trying to place it into some sort of familiar framework. Specific to art, Koroscik further discusses the strategies and process of learning by describing Knowledge-Seeking Strategies, stating that "...art cognition depends on that individual's procedural or strategic knowledge... These are the cognitive steps a person takes to construct new understandings and to direct the search for new knowledge, thereby facilitating the individual's use of his or her knowledge base" (1996, p. 9).

In a constructivist-based art classroom, the traditional roles of teacher and student are transformed. Instead of acting as a knowledge authority, teachers instead assume the role of facilitator. Students are no longer the recipients of instruction, but rather co-creators of knowledge. "Teaching in the discipline of aesthetics seems to be inherently constructivist in nature. Students' personal aesthetics represent their beliefs in relation to ideas such as beauty, artistic value, ethics and morality in artworks" (Prater, 2001, p. 47). The use of constructivist methods in the art room more accurately reflects the ways in which students learn. By presenting subject matter in a more open-ended format, teachers allow for students to assume more ownership of their learning process. "Instead of telling students the answer, the teacher asks questions to help them discover the answers themselves. For this type of teaching to be successful, teachers need to give students time to explore the material and construct meaning from those experiences" (Sprague & Dede, 1999, p. 7).

Given the opportunity, students can explore topics and resources about a given subject matter and form their own questions, critiques, and conclusions. Constructivist

approaches, in conjunction with the study of art, go hand in hand. Constructivism encourages students to explore information and form opinions based on their own self-guided inquiry. Emphasis on one “correct” answer as a result of direct instruction is avoided. The study of art often works in much the same way. There is often no “right” answer when studying a specific work of art, its historical context, social implications, or media choices. All factors that play into a completed work of art are up for consideration, debate and interpretation. By using a constructivist approach in studying these art issues, students are exposed not only to a wealth of information that will help guide their own decision-making, but also exposed to the thoughts and knowledge-base of their peers.

Technological Pedagogical Content Knowledge. The use of technology can be a tremendous asset when utilizing constructivist pedagogy in the art classroom so long as it is implemented thoughtfully and with purpose. Mishra & Koehler (2007) describe technological pedagogical content knowledge (TPCK) as framework for evaluating technology integration. TPCK builds on the work of Shulman’s (1986) pedagogical content knowledge to include technology skill into the framework of pedagogical content knowledge. As described by Mishra & Koehler *pedagogical knowledge* is in reference to the process and understanding of teaching methods. *Content knowledge* refers to the specific subject matter that is to be learned or taught. *Technology knowledge* requires a broad understanding of technology uses and capabilities and the ability to successfully apply that knowledge to achieve pedagogical goals. Mishra and Koehler illustrate the intersection of each of the domains using a Venn diagram (Mishra & Koehler, 2007, p. 2221).

The framework of technological pedagogical content knowledge focuses on the equal intersection of all three domains, technology, pedagogy and content.

“TPCK is the basis of effective teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones” (Mishra & Koehler, 2007, p. 2221).

Teachers must remain aware of the intersection and interplay of pedagogy, content, and technology knowledge and strive for a balance between the three in order to teach effectively using technology tools. Roblyer and Doering (2009) outline four essential questions that allow teachers to place themselves within the TPCK framework, and assess how they might balance the three domains: 1) What is my knowledge of technology? 2) What is my knowledge of pedagogy? 3) What is my knowledge of content? 4) Where do I see myself in the TPCK model? By addressing these questions, teachers can assess which of the three areas in which they are the strongest and weakest. Perhaps they have strong content knowledge about a specific subject matter, but do not have the broad understanding of technology necessary to teach with a specific tool. By assessing their placement within the framework, teachers can adjust their own knowledge base to best represent all three domains.

Specific to art education, how can technological pedagogical content knowledge assist us in wisely integrating technology into the classroom? The answer to this question should always begin with an assessment of *relative advantage* (Rogers, 2004). How will the use of technology enhance the teaching and learning experience for a specific subject matter? Art teachers must assess the advantages of incorporating technology elements into their teaching in terms of their specific learning objectives. For example, an art teacher is designing a lesson on the work of a specific artist that requires students to have a contextual understanding of their work. Here, the relative advantage of incorporating technology tools comes in the form of quick access to artist biographical information, visual examples of their body of work, and social and historical contexts of their work available through Internet searches. Relative advantage can be assessed for any learning objective — these might include; introduction of new concepts, students needing quick access to information, or students need skills working collaboratively (Roblyer & Doering, 2009). The relative advantage of using any technology tool should always be assessed in order to ensure that solving learning problems remain the primary objective of teaching, and that the technology selected supports efficient solutions to these issues.

As a framework, TPCK focuses on the balance between pedagogy, content and technology knowledge. Once *relative advantage* has been assessed, it is important to be mindful that the technology tool remains subordinate to the learning objective of the lesson. Mayo (2007) discusses the potential for technology to overshadow or dominate a lesson and recommends not focusing on teaching the software itself, but ensuring that lessons using technology remain focused on the project goal.

It is not essential that students learn every feature of a software package.

It is more important that the lesson is project-driven. Students will easily lose interest in learning a software package without creating a project.

Understanding the goal of the project and how the software is a valuable tool in achieving that goal is most important (2007, p. 49).

Here again, constructivism plays a vital role in the integration of technology into the classroom. When an art teacher has assessed their placement within the TPCK framework, and recognized the relative advantage of using a technology tool, they can then begin implementation of that tool. It is not essential for students to learn the software feature by feature. In fact, presenting the learning problem in an open-ended, constructivist format will allow students to work together, share their own knowledge and problem-solve together.

TPCK emphasizes the importance of using technology as a tool in *support* of learning objectives. Having clearly defined instructional goals is of primary importance, and consistent self-assessment within the TPCK framework will assist an educator in understanding their strengths and weaknesses as well as the ways in which technology can *support* their learning goals.

Technology integration standards. With the aim of incorporating technology into K-12 curriculum, certain standards of effective practice are needed to evaluate appropriate usage of these tools. The International Society for Technology in Education (ISTE) provides technology integration standards for teachers, students and administrators, as well as essential conditions necessary “to effectively leverage technology for learning” (“Nets Standards,” n.d.). The National Educational Technology

Standards (NETS), as set forth by the ISTE, state that students should be able to demonstrate the following through the use of technology: 1) Creativity and Innovation, 2) Communication and Collaboration, 3) Research and Information Fluency, 4) Critical Thinking, Problem Solving and Decision Making, 5) Digital Citizenship, and 6) Technology Operations and Concepts (ISTE, 2007). Through *Creativity and Innovation*, students are charged with demonstrating creative thinking, constructing knowledge and developing innovative processes and products through the use of technology. *Communication and Collaboration* requires the use of digital media to communicate and work collaboratively. This can mean within the classroom or through distance learning, to contribute to the greater body of knowledge. Within the *Research and Information Fluency* standard, students demonstrate the ability to collect, assess and utilize digital information. *Critical Thinking, Problem Solving and Decision Making* ensures students are able to effectively plan and conduct research, manage projects, solve problems, and make appropriate, informed decisions regarding technology use. Through *Digital Citizenship*, students understand their role in the global digital community, including social and ethical issues relating to technology. Last, through *Technology Operations and Concepts*, students demonstrate a fundamental understanding of technology, including concepts, systems and operations (ISTE, 2007).

The role of the teacher in ensuring students can demonstrate mastery of these standards is to “model and apply the NETS-S as they design, implement, and assess learning experiences to engage students and improve learning; enrich professional practice; and provide positive models for students, colleagues, and the community. All teachers should meet the following standards and performance indicators” (“Nets

Standards,” n.d.). The Essential Conditions as outlined by the ISTE can assist teachers in this endeavor. The Essential Conditions are the practical issues that must be tackled in order for successful technology integration to occur such as: empowered leaders, implementation planning, adequate funding, skilled personnel, support policies, technical support and curriculum framework. These conditions provide the outline of the necessary elements that must be considered and put in place in order for technology integration to be successful. Without dedicated support from administration and technical personnel, as well as carefully planned curriculum objectives, and some form of funding, technology integration may be doomed from the start. The ISTE provide these standards, guidelines and conditions as a way to best prepare educators for using technology in the classroom.

Technology can be used as a presentation or information gathering method, or as a means of art production through digital media software, and therefore has the capacity to influence every aspect of understanding and creating art. For example, a teacher could plan a unit on the relatively common theme of story-telling in art. An image is selected by the teacher and presented to the students via LCD projector from a website or PowerPoint slide. The students are asked to describe the image; what do you see? What might the artist be trying to convey to us? What objects or symbols do you see that make you think that? The teacher can then give a brief presentation on the history of narrative and story-telling art, giving specific examples of artists, their work, and the ways in which they tell a story through their art. Students can be asked to take what they have learned and do their own digital research. What other artists use story telling in their work? Students will select an artist whose subject matter, style or history is relevant to

them and create an image in that vein that tells their own story. A teacher must decide what medium is most appropriate or available for the completion of this project.

Photography classes or general digital media classes would be appropriate for this particular project as students could use graphics programs to create, layer or collage images and elements for their final piece. Finished pieces are critiqued by the class and assessed for their use of imagery, symbols and objects in telling a visual story.

In this example, NETS standards are being addressed at each level. Technology is being used to make the presentation of material and requirements more efficient and accessible. Students are utilizing digital tools for their own research and content gathering. Both teacher and student are demonstrating mastery of graphics programs to create their final works of art. Throughout the process technology is being used to teach, learn and create art in a thoughtful, purposeful manner that enhances the learning objectives.

Conclusion

As the fundamental question in art education has shifted from *whether* or not to integrate technology into education practice to rather *how* to incorporate technology effectively, learning theory, theoretical frameworks and standards of effective practice have emerged to guide educators' decision-making process regarding the integration of technology *in support of learning*. Constructivism provides a theoretical foundation for effective teaching and learning in art as it supports the common educational approach in art education of community learning, co-construction of knowledge, and a focus on student inquiry and meaning making. In addition to a constructivist approach, technological pedagogical content knowledge assists teachers in identifying their

knowledge strengths and weaknesses, and provides guidance for balancing the necessary teaching and learning knowledge domains of technology, pedagogy and content. Lastly, the International Society for Technology in Education offers clear standards for teachers and student engaged in the use of technology in the classroom that demonstrate mastery of technical skill as well as the critical thinking skills necessary to actively and responsibly participate in the digital world. Combined, these theories provide the necessary processes and guidelines that must be considered for successful technology integration in the art classroom that will ensure the continuation of the purposeful and meaningful inclusion of technology into the visual arts curriculum.

References

- alexanderbutera. (2008). *Interview with Dali*. Retrieved from <https://www.youtube.com/watch?v=Ay7ER3TGSoM>
- Anderson, F. E. (1985). Electronic Media, Videodisc Technology, and the Visual Arts. *Studies in Art Education*, 26(4), 224–231.
- “Art in the Twenty-First Century Season” Six Educators’ Guide | Art21 | PBS. (n.d.). Retrieved October 22, 2012, from <http://www.pbs.org/art21/learning-with-art21/materials-for-teaching/educators-guides/art-in-the-twenty-first-century-season-s>
- ArtsConnectEd. (n.d.). Retrieved October 22, 2012, from <http://www.artsconnected.org/>
- Art Today. (n.d.-a). Retrieved January 28, 2013, from <http://schools.walkerart.org/arttoday/index.wac?id=2135>
- Art Today. (n.d.-b). Retrieved January 28, 2013, from <http://schools.walkerart.org/arttoday/index.wac?id=2365>
- Art Today. (n.d.-c). Retrieved February 10, 2016, from <http://schools.walkerart.org/arttoday/index.wac?id=2377>
- Barone, T. (2001). *Touching Eternity: The Enduring Outcomes of Teaching*. Teachers College Press.
- Barone, T., & Eisner, E. W. (1997). *Complementary Methods for Research in Education*. (R. M. Jaeger, Ed.). American Educational Research Association.
- Barone, T., & Eisner, E. W. (2011). *Arts Based Research* (1 edition). Los Angeles: SAGE Publications, Inc.
- Bequette, J. W., & Brennan, C. (2008). Advancing“ Media Arts” Education in“ Visual Arts” Classrooms: Addressing Policy Ambiguities and Gaps in Art Teacher Preparation. *Studies in Art Education: A Journal of Issues and Research in Art Education*, 49(4), 328–342.
- Black, J., & Browning, K. (2011). Creativity in Digital Art Education Teaching Practices. *Art Education*, 64(5), 19-34.
- Bozionelos, N. (2001). Computer anxiety: relationship with computer experience and prevalence. *Computers in Human Behavior*, 17(2), 213–224.

- Britton, B. K., & Pellegrini, A. D. (1990). *Narrative thought and narrative language*. Lawrence Erlbaum Associates.
- Bruner, J. J. (1985). *Learning and Teaching the Ways of Knowing*. (E. Eisner, Ed.). University of Chicago Press.
- Buffington, M. L. (2008). Creating and Consuming Web 2.0 in Art Education. *Computers in the Schools*, 25(3), 303–313.
- Burton, L. (2014). Getting to Know Media Arts. *Screen Education*, (75), 46-55.
Retrieved from
<http://login.ezproxy.lib.umn.edu/login?url=http://search.proquest.com.ezp3.lib.umn.edu/docview/1652691791?accountid=14586>
- Candy, L.. (2007). Constraints and Creativity in the Digital Arts. *Leonardo*, 40(4), 366–367. Retrieved from <http://www.jstor.org.ezp2.lib.umn.edu/stable/20206448>
- Carpenter, B. S., & Taylor, P. G. (2006). Making Meaningful Connections: Interactive Computer Hypertext in Art Education. *Computers in the Schools*, 23(1), 149–161.
- Carter, K. (1993). The Place of Story in the Study of Teaching and Teacher Education. *Educational Researcher*, 22(1), 5–18.
- Chang, H. (2008). *Autoethnography as Method*. Left Coast Press, Inc.
- Clandinin, D. J., & Connelly, F. M. (2004). *Narrative Inquiry: Experience and Story in Qualitative Research* (1 edition). San Francisco: Jossey-Bass.
- Connected Classrooms - Art Education 2.0. (n.d.). Retrieved October 26, 2012, from <http://arted20.ning.com/group/connectedclassrooms>
- Connelly, F. M., & Clandinin, D. J. (1990). Stories of Experience and Narrative Inquiry. *Educational Researcher*, 19(5), 2–14.
- Degennaro, A., & Mak, B. L. (2002). A Diffusion Model for Computer Art in Education. *Journal Of Educational Technology Systems*, 31(1), 5-18.
doi:10.2190/B69J-FDFR-UKBY-4LEL
- Delacruz, E. (2004). Teachers' Working Conditions and the Unmet Promise of Technology. *Studies in Art Education*, 46(1), 6–19.
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (2005). *The SAGE Handbook of Qualitative Research* (3rd ed.). Sage Publications, Inc.
- DiBlasio, M. K. (1983). If and Where to Plug in the Computer: A Conceptual Framework for Computer Assisted Art Instruction. *Studies in Art Education*, 25(1), 39–47.

- Dilger, S. C., & Roland, D. C. (1993). *Preparing Students for the Twenty-first Century: A Rationale for Integrating New Technology into School Arts Programs*. Retrieved from <http://www.eric.ed.gov/>
- Doyle, W., & Carter, K. (2003). Narrative and learning to teach: Implications for teacher-education curriculum. *Journal of Curriculum Studies*, 35(2), 129–137.
- Eisner, E. W. (1983). The Role of Technology and the Arts in the Invention of Mind. *Visual Arts Research*, 9(2(18)), 60–65.
- Elbaz, F. (1991). Research on teacher's knowledge: the evolution of a discourse. *Journal of Curriculum Studies*, 23(1), 1–19.
- Ellis, C. (2003). *The Ethnographic I: A Methodological Novel about Autoethnography*. AltaMira Press.
- Ellis, C., Adams, T. E., & Bochner, A. P. (2010). Autoethnography: An Overview. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 12(1).
- Ettinger, L., & Roland, C. (1986). Using Microcomputers in the Art Curriculum. *Art Education*, 39(1), 48–51.
- Ferdig, R. E. (2006). Assessing technologies for teaching and learning: understanding the importance of technological pedagogical content knowledge. *British Journal of Educational Technology*, 37(5), 749–760.
- Freedman, K. (1997). Visual Art/Virtual Art: Teaching Technology for Meaning. *Art Education*, 50(4), 6–12.
- Freedman, K. (2003). The Importance of Student Artistic Production to Teaching Visual Culture. *Art Education*, 56(2), 38–43.
- Galbraith, L. (1997). Enhancing Art Teacher Education with New Technologies: Research Possibilities and Practices. *Art Education*, 50(5), 14–19.
- Galbraith, L. P. (2001). Teachers of Teachers: Faculty Working Lives and Art Teacher Education in the United States. *Studies in Art Education*, 42(2), 163–181.
- Garvey, A. (2015). The Oregon Trail Generation: Life before and after mainstream tech. Retrieved July 22, 2015 from [http:// mashable.com/2015/05/21/oregon-trail-generation/](http://mashable.com/2015/05/21/oregon-trail-generation/)
- Geertz, C. (1973). *The Interpretation of Cultures: Selected Essays*. Basic Books.

- Gillingham, M. G., & Topper, A. (1999). Technology in Teacher Preparation: Preparing Teachers for the Future. *Journal of Technology and Teacher Education*, 7(4), 303–21.
- Google Art Project. (n.d.). Retrieved October 22, 2012, from <http://www.googleartproject.com/>
- Gregory, D. C. (1989). Hypermedia: Laser Video/Audio Technology and Art Education. *Art Education*, 42(1), 66–70.
- Gregory, D. C. (1996). Art Education Reform: Technology as Savior. *Art Education*, 49(6), 49–54.
- Gregory, D. C. (2009). Boxes with Fires: Wisely Integrating Learning Technologies into the Art Classroom. *Art Education*, 62(3), 47–54.
- Greh, D. (1986). Using Computers in Secondary Art Education. *Art Education*, 39(6), 4–9. Retrieved from <http://www.jstor.org.ezp3.lib.umn.edu/stable/3192967>
- Gudmundsdottir, S. (1991). Story-maker, story-teller: narrative structures in curriculum. *Journal of Curriculum Studies*, 23(3), 207–218.
- Hanlon, H., & Roland, C. (1983). Artists, Educators, and Microcomputers: An Annotated Bibliography of Software and Publications. *Art Education*, 36(4), 22–27.
- Hollingsworth, S. (1989). Prior Beliefs and Cognitive Change in Learning to Teach. *American Educational Research Journal*, 26(2), 160–189.
- ISTE | Visual Arts Units for All Levels By Mark Gura. (n.d.). Retrieved November 5, 2012, from <http://www.iste.org/store/product?ID=680>
- Keifer-Boyd, K. T. (1996). Interfacing Hypermedia and the Internet with Critical Inquiry in the Arts: Preservice Training. *Art Education*, 49(6), 33–41.
- Koroscik, J. S. (1996). Who Ever Said Studying Art Would Be Easy? The Growing Cognitive Demands of Understanding Works of Art in the Information Age. *Studies in Art Education*, 38(1), 4–20.
- Laguna, K., & Babcock, R. L. (1997). Computer anxiety in young and older adults: Implications for human-computer interactions in older populations. *Computers in Human Behavior*, 13(3), 317–326.
- Lankford, E. L. (1992). *Aesthetics, issues and inquiry*. National Art Education Association.

- Leso, T., & Peck, K. L. (1992). Computer Anxiety and Different Types of Computer Courses. *Journal of Educational Computing Research*, 8(4), 469–478.
- Levitz, J. (2015, June 23). At the Office, Millennials Are the Boss When It Comes to Technology. *Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/at-the-office-millennials-are-the-boss-when-it-comes-to-technology-1435020052>
- Lu, L.-F. L. (2005). Pre-Service Art Teacher Negative Attitudes and Perceptions of Computer-Generated Art Imagery: Recommendations for Pre-Service Art Education Programs. *Visual Arts Research*, 31(1), 89–102. Retrieved from <http://www.jstor.org.ezp3.lib.umn.edu/stable/20715371>
- Mahar, D., Henderson, R., & Deane, F. (1997). The effects of computer anxiety, state anxiety, and computer experience on users' performance of computer based tasks. *Personality and Individual Differences*, 22(5), 683–692.
- Marks, D., & Marks, D. (2009). Literacy, Instruction, and Technology: Meeting Millennials on Their Own Turf. *AACE Journal*, 17(4), 363–377.
- Mayo, S. (2007). Implications for Art Education in the Third Millennium: Art Technology Integration. *Art Education*, 60(3), 45–51.
- McCulloch, W. (1984). A Change of Image: Computers in the Art Room. *Art Education*, 37(4), 44–46. <http://doi.org/10.2307/3192753>
- McGlynn, A. P. (2005). Teaching Millennials, Our Newest Cultural Cohort. *Education Digest: Essential Readings Condensed for Quick Review*, 71(4), 12–16.
- McGuire, A. (2012). Media Arts: A Shifting Paradigm?. *Arts Education Policy Review*, 113(3), 119-122. doi:10.1080/10632913.2012.687342
- McInerney, V., McInerney, D. M., & Sinclair, K. E. (1994). Student Teachers, Computer Anxiety and Computer Experience. *Journal of Educational Computing Research*, 11(1), 27–50.
- Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation* (3rd ed.). Jossey-Bass.
- Minnesota Department of Education. (2008). Retrieved February 7, 2013, from <http://education.state.mn.us/MDE/EdExc/StanCurri/K-12AcademicStandards/>
- Mishra, P., & Koehler, M. J. (20070326). Technological Pedagogical Content Knowledge (TPCK): Confronting the Wicked Problems of Teaching with Technology. *Society for Information Technology & Teacher Education International Conference 2007*, 2007(1), 2214–2226.

- Moursund, D., & Bielefeldt, T. (1999). *Will New Teachers Be Prepared To Teach in a Digital Age? A National Survey on Information Technology in Teacher Education*. Retrieved from <http://www.eric.ed.gov/>
- Nets Standards. (n.d.). Retrieved November 5, 2012, from <http://www.iste.org/standards>
- Ngunjiri, F. W., Hernandez, K.-A. C., & Chang, H. (2010). Living Autoethnography: Connecting Life and Research. *Journal of Research Practice*, 6(1), Article E1.
- Palincsar, A. S. (1998). Social Constructivist Perspectives on Teaching and Learning. *Annual Review of Psychology*, 49(1), 345–375.
- Patton, M. Q. (1985, April). *Quality in qualitative research: Methodological principles and recent developments*. Presented at the Invited address to Division J of the American Educational Research Association, Chicago.
- Piaget, J. (1971). *Structuralism*. Harper & Row.
- Piaget, J. (1977). *The development of thought: equilibration of cognitive structures*. Viking Press.
- Polkinghorne, D. E. (1995). Narrative configuration in qualitative analysis. *International Journal of Qualitative Studies in Education*, 8(1), 5–23.
- Prater, M. (2001). Constructivism and Technology in Art Education. *Art Education*, 54(6), 43–48.
- Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon*, 9(5), 1–6.
- Reed-Danahay, D. (1997). *Auto/ethnography: Rewriting the Self and the Social* (First Edition). Berg Publishers.
- Reich, B., & Solomon, D. (2007). *Media Rules!: Mastering Today's Technology to Connect With and Keep Your Audience* (1st ed.). Wiley.
- Richert, A. (1992). *Teachers, Their World and Their Work: Implications for School Improvement*. (A. Lieberman & L. Miller, Eds.). New York: Teachers College Press.
- Roblyer, M. D., & Doering, A. H. (2009). *Integrating Educational Technology into Teaching* (5th ed.). Pearson.
- Rogers, E. (2004). *Diffusion of Innovations, 5th (fifth) edition*. Free Press.

- Roland, C. (1990). Our Love Affair with New Technology: Is the Honeymoon Over? *Art Education*, 43(3), 54–60.
- Roland, C. (2010). Preparing Art Teachers to Teach in a New Digital Landscape. *Art Education*, 63(1), 17–24.
- Rosen, L. D., Sears, D. C., & Weil, M. M. (1987). Computerphobia. *Behavior Research Methods, Instruments, & Computers*, 19(2), 167–179.
- Sarbin, T. R. (1986). *Narrative psychology: The storied nature of human conduct* (Vol. xviii). Westport, CT, US: Praeger Publishers/Greenwood Publishing Group.
- Shaw, B., 1856-1950 ,. (1903). *Man and superman* (First Edition). University of California Libraries.
- Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, 15(2), 4–14.
- Sprague, D., & Dede, C. (1999). Constructivism in the Classroom: If I Teach This Way, Am I Doing My Job? *Learning & Leading with Technology*, 27(1), 6–9,16–17.
- Stankiewicz, M. A. (1996). Art Education Reform and New Technologies. *Art Education*, 49(6), 4–5.
- Squires, W. (1983). Creative Computers: Premises and Promises. *Art Education*, 36(3), 21–23. <http://doi.org/10.2307/3192695>
- Stankiewicz, M. A. (2004). Notions of Technology and Visual Literacy. *Studies in Art Education*, 46(1), 88–91. Retrieved from <http://www.jstor.org.ezp3.lib.umn.edu/stable/3497098>
- Street, L., NW, (2009, December 10). The Millennials. Retrieved from <http://www.pewresearch.org/2009/12/10/the-millennials/>
- Student App Art - iPads in Art Education. (n.d.). Retrieved October 27, 2012, from <http://ipadsinart.weebly.com/student-app-art.html>
- Taylor, P. G., & Carpenter, B. S. (2007). Mediating Art Education: Digital Kids, Art, and Technology. *Visual Arts Research*, 33(2(65)), 84–95.
- The J. Paul Getty Museum. (n.d.). Retrieved October 22, 2012, from <http://www.getty.edu/museum/index.html>
- Twin Cities Course Details : University Catalogs : U of M. (n.d.). Retrieved April 10, 2012, from <http://onestop2.umn.edu/courses>

Yin, R. K. (2008). *Case Study Research: Design and Methods* (4th ed.). Sage Publications, Inc.