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The Perceptions of High School Art Teachers on their Experiences with Digital Art

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The Perceptions of High School Art Teachers on their Experiences with Digital Art

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Dedication

To my precious grandchildren, Teddy, Mosie, and those yet to come. You were and are my inspiration.

To my wife, Heather Akins.

For sharing your life with me.

To my Lord and Savior, Jesus Christ.

For the gifts you have given me to share.

Abstract

This phenomenographic study was conducted to investigate the perceptions of high school visual arts teachers on their experiences with digital art. It was conducted in the context of a growing creative industry in Georgia including professions that rely on technology to utilize and create digital art. The perceptions of seven high school visual arts teachers with varying experiences from two districts in Georgia were gathered using in-depth semi-structured interviews. The data collected from these interviews were interpreted to generate an outcome space that represented the voices of this group of participants. The outcome space of this study was arranged in a hierarchical order that reflected a central idea in which high school art teachers perceived that digital art is an important medium to be included alongside other more traditional mediums in high school art instruction. Other supporting categories of description within the outcome space under the primary outcome included (a) perceived deficiencies in preservice preparation and professional development for the purposes of teaching digital art, (b) perceived preparedness to learn new skills due to an art mindset instilled by preservice training, (c) perceived barriers to digital art instruction in the high school art class, and (d) perceived solutions to these barriers. It was concluded that changes could be made in policies such as school funding, curriculum, and professional development to encourage the teaching of digital art as an additional medium within the high school art class to prepare students for careers that increasingly rely on digital art as a medium.

Key words: *digital art, high school art education, creative industry, professional funding, art education standards, technology funding, preservice training*

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Chapter One: Introduction

I began my education career as a science teacher and transitioned to art education late in life. Providentially, my art educator career began at the same time I became interested and involved in freelance illustration as a potential second career. Upon trying to enter the difficult yet rewarding profession of freelance digital art, I learned that to be competitive and successful I needed to learn how to use software to produce digital art. This field often requires a back-and-forth dialogue between art directors and artists about what is desired in a particular piece of work. This means many revisions and alterations over time. Unfortunately, it is often difficult to revise work that has been completed traditionally. I needed very technical skills in painting programs like Photoshop and Illustrator. I had one glaring problem. I did not have these digital skills. Like many other art teachers I know, I was very much of a traditional artist with relative strengths in drawing and painting.

As a complete novice to digital image-making software, I began an arduous two-year journey to learn how to paint digitally. I enrolled in informal online classes. I watched online tutorials. I bought tablets and hardware as well as software. It was a frustrating experience for me because the software was difficult to manage, and this created a tremendous barrier to learning. I slogged through daily exercises and practice pieces until I became proficient enough to earn commissions and to attempt to teach digital illustration in my classes. It was a unique learning experience for me because I am not used to having difficulty in learning anything. The rewards of being able to create digital art for both monetary gain and for the individual satisfaction I enjoy in its creation has spurred me to research this medium. It has led me to wonder if digital art has a place in the curriculum in the high school art classroom and in classrooms throughout the state.

Introduction

The aim of this chapter is to furnish a synopsis of the organization of this study that explores the attitudes and perceptions high school art teachers have concerning digital art and the implications those perceptions have on teaching digital art in the schools. The chapter introduces the problem and research questions as well as the purpose of this study. Additionally, definitions of major terms are supplied as well as assumptions, delimitations, limitations, and significance of this study.

Rationale for the Study

One of the responsibilities high school visual arts teachers have is preparing future artists with the skills they will need to equip them for success in the art industry. A growing demand in the creative industry is the need for artists who can produce quality digital art, especially in fields such as concept art, animation, graphic design, and character design (Concept Art Empire, 2021). Art teachers were informed at the 2018 Georgia Association of Art Educators (GAEA) conference that the creative industry has become one of the lead industries in the state of Georgia, generating 62.5 billion dollars of revenue (Georgia Council of the Arts, 2019). This has resulted primarily from production companies such as Marvel and Netflix coming to Georgia to film their blockbuster movies and television shows as well as the burgeoning video game industry (Williams, 2021). Matthew Silva, the keynote speaker at the GAEA conference, lamented that the industry has difficulty finding qualified candidates within the state of Georgia (Silva, 2018). He inferred that a primary focus of art education in the state ought to be to be preparing Georgia students to enter this growing field.

Given the growing demand for artists with digital skills, it could be assumed that high school art programs would be saturated with lessons on creating digital art. The reality is the

opposite. According to Strycker (2020), technology use in the art classroom is largely limited to research and curating art, not the production of it. In fact, according to The Art of Education's (2021) national survey of over 1000 art teachers, digital art is the one medium that most art teachers deem themselves least competent to teach. There are many potential reasons for this that are explored in forthcoming sections. It could be that visual arts teachers may not be preparing students to produce and understand digital art because of lack of adequate training, lack of access, and lack of proficiency with the software used to produce it, or the general practice among art educators to focus on the hands-on aspects of learning various traditional media (Song, 2020). It very possible the lack of instruction in digital art potentially hampers students' future success if they desire to progress in the creative field of the 21st century (Lesage & Smirnova, 2015). It is beneficial to understand the current technology usage in the high school visual arts classes, and how the art teacher's experience with technology, and digital art specifically affects how it is taught as a medium.

The core perceptions that are shared by high school art teachers directly influence what is taught in the classroom (Baker, 1979). Being relatively new to the subject, despite my years of teaching experience, I wanted to further explore art teachers' perspectives. I was interested in studying the perceptions of other high school art teachers on digital art and how that affects whether or not they teach digital art. I wanted to know if my initial frustration with learning digital image making software was a unique perspective or is a shared perception among art teachers. Was my fascination for the medium my own or is it shared by others? Was my understanding of reality the same as theirs? I wondered what the factors are that affect the teaching of digital art in the high school art classroom.

Problem Statement

The 9-12 teaching standards of Georgia for visual arts currently center around four sub-standards of creating, presenting, responding, and connecting (Georgia Department of Education, 2017). In the painting standards, for example, the standards address the need to "engage in an array of processes, media, and techniques, and technology" (Georgia Department of Education, 2017, p. 65) to create works of art. Specifically, in the creation of mixed media, students and teachers are encouraged to use digital means to create paintings (Georgia Department of Education, 2017). Additionally, ISTE (2016, para 3) standards for knowledge construction necessitate for students to use digital tools to produce creative artifacts. This conforms to the National Core Arts Standards (NCAS) as well in which the media arts are emphasized as being part of the process in creating, presenting, responding to, and connecting with art (National Core Arts Standards, 2014). To adhere to this interpretation of these standards, teachers of 9-12 visual arts students in painting classes would need to be proficient on at least a basic level with digital image making software such as Photoshop or Procreate. However, high school visual arts teachers are not generally using technology in the classroom for student creation of digital art (Strycker, 2020). There are many possible reasons for this dilemma which might include factors such as lack of resources, lack of proficiency, lack of professional development, lack of interest, or difficulties presented by learning digital art. This phenomenographic study was conducted to examine the perceptions of the experiences that high school art teachers have with digital art and to glean insight on the state of digital art instruction in the high school art class. The underlying research question of this study is provided below.

Research Question

1. How have high school visual art teachers experienced the phenomenon of digital art?

The following areas of interest related to this question were explored:

- The perceptions that high school visual arts teachers have about digital art
- How the preservice preparation and ongoing professional development of high school visual arts teachers affects their perceptions of digital art
- How high school visual arts teachers' use of and access to technology affects their perceptions of digital art
- How high school visual arts teachers' perceptions of the purpose and benefits of art education affect their perceptions of digital art
- How high school visual arts teachers' perceptions of digital art affect the teaching of digital art as a medium to students in the high school art classroom

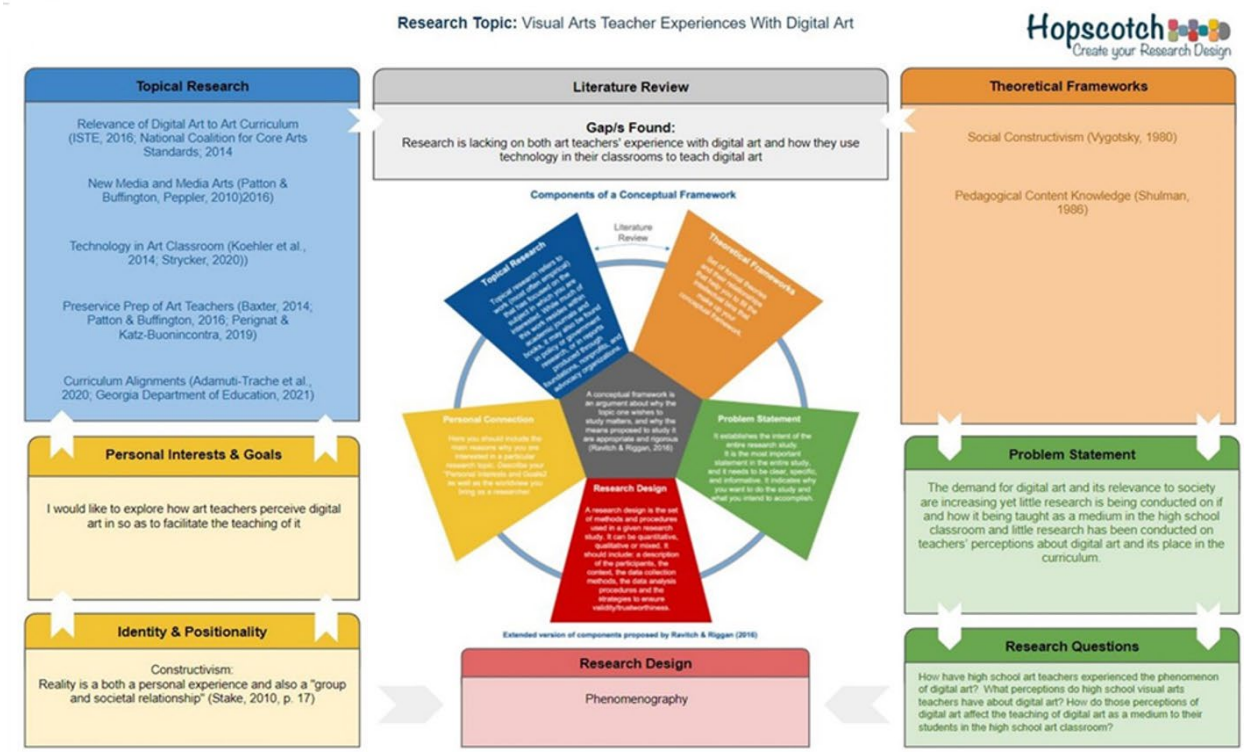
The Organization of this Study

The conceptual framework of this study is patterned after Ravitch and Riggan's (2016) understanding of a conceptual framework as a method of establishing and justifying the research process through an examination of theory and topics related to the study which in turn leads to gaps in the research that invite further inquiry. This study focused on understanding how art teachers perceive digital art and how those perceptions affect their teaching of it. In chapter two, I explain how the theoretical frameworks of social constructivism, pedagogical content knowledge, and visual literacy provide the lenses through which I examined the way in which teachers experience this phenomenon. I conducted a topical review that explored the place of digital art in the curriculum, the media arts, technology in the classroom, preservice preparation of art teachers, and curricular alignments. This exploration led to the identification of gaps within the literature pertaining to visual arts teachers and digital art. This conceptual framework was built within the Hopscotch framework created to complement Ravitch and Riggan's (2016)

model of building a conceptual framework. Figure 1 provides a visual representation of the conceptual framework.

Figure 1

Conceptual framework built within Hopscotch (Jorrín-Abellán, 2016)



In chapter three, the methodology of the study is described, specifically how a qualitative study grounded in the research traditions of phenomenography best fits this type of study. The results of this study are important to help educators understand the role of technology use by visual arts educators especially as it relates to how digital art is being taught as a medium at the high school level.

Nature of the Study

A qualitative research design was employed to investigate the perceptions art teachers have of digital art and how that affects their teaching. Interviews were conducted with seven art teachers. Artifacts pertaining to technology and digital art were collected from the participants in

order to understand their perceptions regarding these phenomena. The data were collected, coded, and analyzed according to a phenomenographic research method. Conclusions and interpretations were drawn from this collective data.

The reasoning behind collecting qualitative data is that extensive and thoughtful questioning can facilitate a greater understanding of the complex factors that underlie the perceptions of art teachers regarding digital art. Artifacts created by these participants added to the thickness of the data (Stake, 2010) by providing visual representation of verbal perceptions. These kinds of understandings simply cannot be expressed as numerical data and therefore eliminate a quantitative research method as a viable approach.

Assumptions

A major assumption of this study is that the participants gave honest and truthful answers to the interview questions asked by the researcher. Qualitative data were primarily gathered by interviews and questions, as well as the interpretation of artifacts generated by the participants and gathered by the researcher. Proper analysis and interpretation of the data was grounded in the assumption that the data gathered were truthful. Only if the data are truthful can thoughtful conclusions and fruitful discussion occur.

Furthermore, it is assumed that the participants supplied artifacts that truthfully represent their interactions with digital art. The interpretations of the artifacts are only meaningful if the artifacts are truly indicative of the participants' experience with the phenomenon of digital art.

Another assumption is that subjectivity cannot be completely controlled in a qualitative study (Brantlinger et al., 2005). In this study I attempted to bracket my biases and experiences with the topic of digital art and attempted to interpret the data as neutrally as possible, yet

recognize that even so, my bias could have shaped how I questioned individuals, interpreted answers, and reached conclusions about the data.

Scope and Delimitations

This study focused on the perceptions high school visual arts teachers have of their experience with digital art and how that affects the instruction of it. Primarily, I was interested in exploring what the perceptions of high school teachers are regarding digital art to understand how digital art is taught as a fine art medium at the high school level. This study focused on digital art as a medium, which is the creation of fine arts images or illustrations through digital means such as computer drawing with programs or using tablets and apps (Black, & Wiliam, 2009; Marcos et al., 2009). The focus of this study centered in the state of Georgia due to its nexus of creative renaissance in several industries that depend on digital art as a foundation such as video gaming, animation, and cinema. The participants were high school visual arts teachers in non-charter public high schools to narrow the focus of the study to those teachers most likely to engage with all students who might enter the creative field, regardless of their pursuit of a college degree. These teachers are also beholden to state and national standards whereas in my observation, private schools and charter schools may be relatively free to choose the nature and scope of their curriculum. These teachers were chosen from a wide base of viewpoints and experience to best represent the broadest range of voices to the end that a realistic depiction of experiences shared by high school art teachers as a group may be uncovered. The timeframe of the study was conducted over six months during the school year when teaching is freshest on the minds of the participants. This was a qualitative study relying on the research tradition of a phenomenographic study. Accordingly, the analysis was conducted using phenomenographic methods of interpretation.

The study did not primarily cover the use of technology as an instructional tool in the manner of grading, curating, presenting, or evaluating art, even though those topics were discussed as a general trend of technology use among visual arts teachers. Rather, within this study, I sought to explore the role technology has as an artistic medium and how that impacts the educational roles of teachers. I did not explore graphics arts per se as a subset of art, unless it was used in the context of a fine arts curriculum. This delineation impacted the selection of participants as it may have eliminated teachers who teach graphic design but not art; however, special consideration was given to teachers who by virtue of their experience teach both or have training in both fields.

Limitations

This study was limited in the following ways:

- Having only two school districts in the study reduced the number of voices available to speak to their perceptions.
- The diversity of the voices who shared their perceptions was limited to the voices of five white females, two white males, and one Asian female.
- Time constraints of participants that prohibited further inquiry.
- The interpretation of the data and the conclusions drawn from it could have been shaped by my personal biases and experiences.
- A lack of studies in this area of research in digital art reduced the context of the study.
- The scope of the study only included high school visual arts teachers and not other stakeholders.

- The timing of this study was restricted to Spring semester and this choice reduced the number of districts available in which to conduct research.

Significance of the Study

This study is primarily significant because it identified the relationship between the perceptions art educators have regarding digital art and digital art instruction. The study is significant in the following ways in that it:

- Highlights how digital art is currently incorporated into the curriculum by art educators;
- Expands understanding of digital art instruction in the secondary art classroom as there is very little research centered around digital art use and creation in high schools;
- Provides some insight into how high school art teachers currently use technology as both a medium and an instructional tool since digital art technology is uniquely situated as both a potential instructional technology tool and an artistic medium;
- Provides the context for further research into how art educators use and perceive technology use as a general instructional tool; and
- Addresses a gap in the literature which exists in art education regarding technology use among art teachers, specifically at the high school level.

The results of this study have potential significance for the future in that they inform potential:

- New research into methods of digital art instruction, student use of technology, digital inequities in art education, and funding policies for art classrooms;
- Professional development and preservice training for teaching digital art;

- Changes in technology funding for the art classrooms;
- Catalysts for changing fine arts course standards or developing new fine arts course standards to include digital art instruction; and
- Changes in legislation to promote digital art instruction.

Definitions

The major terms used in this study are given here and defined according to how they were understood and used in this study.

Digital art – The creation of a visual artwork through the means of a computer or other technology in which software or an app is used to construct the elements of the art (Black & Wiliam, 2009; Marcos et al., 2009).

Discipline-based art education (DBAE)– a theoretical framework for teaching art based on that the premise that the means of making art and the means of understanding art are skills that can be taught to students (Eisner, 1987).

Fine arts – the traditional methods of producing art which typically includes painting, ceramics, drawing, photography, and sculpture. These methods are different from crafts in that they do not necessarily have a function separate from their aesthetic qualities (Shiner, 2001).

ISTE standards – The standards for instructional technology use in education by teachers and students developed by the International Society for Technology in Education (ISTE, 2016).

Media arts – (Also called new media) The use of all kinds of technology such as computers, television, and cellular devices for the creation of and interaction with various media such as images, video, and audio (Bequette & Brennan, 2008; Buckingham, 2007; McGuire, 2012; Peppler, 2010).

National art standards – The set of standards set for art educators for the purpose of defining requirements need to be taught in the visual arts classroom (National Art Education Association, 2009; National Coalition for Core Arts Standards, 2014; National Core Arts Standards, 2014).

Phenomenography – A qualitative research tradition in which participants are interviewed to gather second order data regarding the perceptions of those individuals with a certain phenomenon (Marton & Dahlgren, 1976; Marton, 1981; Richardson, 1999).

TPACK – a framework for understanding how instruction with technology is built upon the foundation of three overlapping areas of content knowledge, pedagogical knowledge, and technological knowledge (Koehler et al., 2014; Mishra & Koehler, 2006).

Visual arts education – the study of the methods of teaching historical understandings and analyses of art and the processes and skills of creating visual art which usually includes traditional media such as painting, drawing, sculpture, and architecture but can also include modern developments like photography and digital art (Georgia Department of Education, 2017; Lockee & Wang, 2014; Marton & Dahlgren, 1976; Marton, 1981; Richardson, 1999; Wilks et al., 2012).

Visual culture – The understanding that the creation of images and the resulting interpretation of them is situated in a societal and cultural context (Darts, 2004; Duncum, 2009; Heise, 2004).

Visual literacy – The ability to understand, interpret, create, and interact with the visual information inherent in images (Eisner, 1987).

Summary

One of the aims of an art educator is to prepare students to enter society with the skills necessary to thrive in it. Today's art students are entering a world dominated by technology and the digital imagery embedded in it. Digital art instruction in the high school could prepare students to enter this world. Unfortunately, there are limited studies showing how digital art is being taught in the classroom, and an absence of studies asking for insight on teachers' views on the matter. This study was designed to address this gap in the literature and provide insight into this critical issue.

This chapter provided an introduction into a current problem in visual arts education in which digital art instruction, despite its major function in society, is generally missing in the high school visual arts classroom (Art of Education, 2021; Strycker, 2020). It provided a rationale for the design of the study as well as a short discussion of the limitations and significance of the study. The next chapter explores the literature and theory that informed this study and provides a conceptual framework for it.

Chapter Two: Literature Review

In this chapter, I elaborate on the conceptual framework that informed this study. The first section, the theoretical framework, shows the theoretical underpinnings of such topics. Specifically, I describe and discuss the relevance of social constructivism (Vygotsky, 1980) to building content knowledge. I examine Pedagogical Content Knowledge, the framework that undergirds TPACK (Mishra & Koehler, 2006; Mishra, 2019). Lastly, I address Visual Literacy.

The next section looks at the topics pertinent to this with a narrative explaining how they are relevant to this study. First, I discuss, based on ISTE, national, and state standards, how there is an implicit need and place to teach digital art in the high school visual arts classroom. I explore how teachers are prepared to teach art, and the implications of this preparation in the classroom. I discuss how art teachers use technology in their classroom and the effects that might have on the teaching of digital arts. I also discuss TPACK as a potential model for teaching digital art and how curriculum alignment may impede digital art instruction.

Lastly, I discuss the implications of the topical review in teaching digital art. I discuss the gaps in the literature I have discovered. I make the case that this study may help fill in some of these gaps and may provide the beginnings of a future foundation of research.

Literature Review Search Strategy

To carry out my review of the literature I used two search engines, Google Scholar and EBSCOHOST through the Kennesaw State University Library, and the Association for Education Communication and Technology's online handbook of research articles. The initial focus of my research centered around the terms *digital art teaching* and *digital art instruction*. My research into digital art was driven by trying to understand one central idea: How digital art is being taught in high schools. This question was particularly difficult to answer from the

literature, as results were limited that touched on this topic. I did uncover a few seminal pieces by researchers such as Roland (2010) and Black and Browning (2011). Realizing my topical search was perhaps too narrow and upon the advice of professors, I expanded my search to *visual arts preservice preparation*, *media arts, STEAM*, *visual culture,* and *digital learners*. In my search, I also included terms such as *visual arts technology*, *digital painting,* and *digital art making.* I also researched *visual culture* and *visual literacy.* This resulted in a richer field of data and research connecting technology and visual arts. Additionally, I narrowed my search to two art journals (e.g., *Art Education*, *Arts Education Policy Review*) and did specific searches pertaining all the terms I had used prior within these journals. This helped me develop a much clearer picture of the research surrounding my topic and showed some clear gaps within the literature that I could address in my topical review.

Theoretical Foundations

According to Ravitch and Riggan (2016) the purpose of a theoretical framework is to "advance the argument beyond where the previous research has taken it, or to introduce new questions, considerations, hypotheses, or explanations into the inquiry" (p. 8). To understand an art teacher's role in potentially teaching digital art, it is important to understand how certain theoretical frameworks raise questions about what art teachers do as teachers of their content.

There were two theoretical frameworks that informed this study, social constructivism espoused by Vygotsky (1980) and pedagogical content knowledge or PCK by Shulman (1986). Together, these formed a theoretical framework through which I examined what is taught in the art room. Social constructivist theory addresses how teachers teach and the implications for student learning. PCK is an underpinning for TPACK and provides a framework for how learning and instruction occurs.

These frameworks were chosen because the individual classroom art teacher has the greatest impact in the classroom (Baker, 1979). Baker (1979) articulated that because so much of the art curriculum is in the affective domain and is almost impossible to quantify, the art teachers themselves are a vital part of the curriculum. In other words, all the interactions with the media, the students, the ideas, the aesthetics, are intertwined with the art teacher and can only be vaguely implied in the standards (Baker, 1979). Furthermore, he argued that it is the preparation of the teacher whether through staff development or preservice that has the greatest impact on the classroom (Baker, 1979). Teachers who have been prepared to deal in subjects like aesthetics, psychology, sound pedagogy, bring all these skills into the classroom and into the interactions with the students and the curriculum in their classroom (Baker, 1979).

Social Constructivist Theory of Learning

Learning is a crucial part of the classroom and is facilitated primarily by the teacher (Shulman, 1986). For this study, learning was defined and described according to the social constructivist theoretical framework originated by Lev Vygotsky (1980). According to Vygotsky (1980) all knowledge is constructed socially because the language in which one expresses their knowledge is essentially a social construct and the interactions that necessitate learning occur in a social context. A constructivist view of learning recognizes that learning is not a linear process but a complex and constant reorganization of development (Fosnot & Perry, 1996). According to Baviskar (2009), “social constructivism states that cultures or groups construct their knowledge bases through the discourse and interactions among their members rather than through the discoveries of individuals or the dictation of authorities” (p. 542). Furthermore, this knowledge is connected with all the other knowledge a person possesses as a literal cognitive construct that sums up what the individual understands about the world. For a person to learn, this a priori

knowledge must be accessed (Baviskar et al., 2009). Wood (1976) called this scaffolding or building on prior knowledge. If an individual is presented with information by a more capable other (Vygotsky, 1980) that is at odds with the construct, the person enters into what is known as cognitive dissonance. At that point the person must either reject the new information or reconstruct their knowledge to include the new information (Baviskar et al., 2009). Learning also occurs when the individual receives it in a "zone of proximal development" (Vygotsky, 1980, p. 84) which is explained and defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1980, p. 86). This is similar to the idea presented by Baviskar (2009) that there must be application of the knowledge with feedback in order to be considered constructivist learning. In other words, a learner validates the learning in a context of other learners or the teacher in order to integrate the new knowledge into their previous learning construct. By comparing what they understand to what others understand misinterpretations are reduced. Teachers and more advanced peers then are the experts in the content knowledge and intervene in the student's learning (Bermejo et al., 2021). Baviskar (2009) added a fourth component, in which a learner must reflect on the learning. This forms a sort of metacognition in which the individual understands that they have learned something.

To apply social constructivism to the process of learning in an art class involves the teacher providing students the opportunity to encounter problems that they have to solve. This might involve learning new skills or applying skills already learned in novel situations. Students must construct their own knowledge of how to create digital art, for example, and a knowledgeable teacher can help them construct it (Polly, 2011). In learning how to create digital

art, students must learn new skills such as using software with digital artmaking tools. Knowledgeable teachers or more experienced peers would assist novice students in developing their own methods of digital artmaking as the students solved problems such as constructing an illustration that tells a story. They would scaffold this new knowledge on top of prior knowledge such as the use of color theory in a composition. For the purposes of this study, the art teacher is the knowledgeable other who is able to assist students with learning how to create digital art.

Pedagogical Content Knowledge

This kind of expertise is called pedagogical content knowledge (PCK). The theoretical framework of PCK developed by Robert Shulman (1986) informed this study because of the necessity of visual arts teachers being able to use the skills of teaching to instruct students in visual arts. This includes all the plethora of knowledge and techniques teachers use in order to help build the learning constructs in students. Teachers are different from other experts in various content such as law or medicine in that they must be able to confer to others their expertise. This requires many different skills in communication such as the ability to transform information into forms suitable for an intended population to learn (Shulman, 1986). It is not enough for teachers to simply have content knowledge or pedagogical knowledge; it is best for instruction when they have both. An effective teacher has the ability to provide relevant instructional strategies and a deep understanding of the content (Nuangchalerm, 2012). These work in tandem especially in inquiry-based models of pedagogy such as what informs the teaching of science or art (Nuangchalerm, 2012).

The PCK framework is one of the foundations of Technological Pedagogical Content Knowledge or TPACK (Koehler et al., 2014; Mishra & Koehler, 2006; Mishra, 2019) and is a critical element of this model of teaching. The TPACK model is defined as the intersection of

pedagogical content knowledge, technological content knowledge, and subject content knowledge. TPACK is used as a lens in which to understand this study because of the unique way that digital art interacts with and encompasses each of its components of knowledge.

Pedagogical Content Knowledge and Social Constructivism. To exemplify pedagogical content knowledge in the context of the previous section on social constructivist learning, a high school visual arts teacher must be able perform a variety of tasks in order to promote learning such as the concept of color theory. First, they must ascertain and access the student's prior knowledge of color. Do the students understand complementary colors? Are they familiar with the construct of a color wheel? Do they know how to mix colors? Teachers must know formative assessment techniques to assess the student's prior and current learning. Then they must use scaffolding techniques to build additional levels of information to help students learn the material in Vygotsky's zone of proximal development (1980). Art teachers, for example, might have students construct and label color wheels with paint and use them to discuss terms such as complementary and analogous colors. This expertise is visibly different from an artist who is not a teacher because of the transformation of the material. An artist might know how to use color theory in their work, but a teacher must be able to explain it to their students so that they can apply it.

These theoretical frameworks (e.g., PCK, Social Constructivism) work in tandem with each other. As a primary influence in the classroom, the art teacher through their expertise in the field helps students construct knowledge and meaning from their experiences with various media and through interactions with artwork and artists. They help students develop the critical skills of visual literacy to guide students in how to conceptualize, problem-solve, create, and analyze visual images in the form of art and artistically generated images. This visual literacy is

especially relevant as the importance of the image is increasing in society due to the powerful influence of technology. Because of technology, digital art plays a significant role. In the next section I examine the literature relevant to the discussion of digital art.

Literature Related to Teaching Digital Art in High School

Ravitch and Riggan (2016) explained that a literature review and specifically a topical review is primarily about finding out "what is known about a topic, what is not known, and how others have attempted to answer relevant questions related to that topic" (p. 29). The topical review serves to help the readers understand the discourse that has already taken place in the area of study and also shows the different ways other researchers have studied the question (Ravitch & Riggan, 2016).

This section details a representation of the literature that provides insight into the factors that affect the extent and manner that digital art is taught in the classroom by high school art teachers. In the topical review I first review the history and definitions of what digital art is. Then I demonstrate how the art standards situate digital art as a natural part the art curriculum. I also show the strong relationship of the media arts, in which digital art is well-placed, to traditional art instruction. In the literature review, I also explain potential barriers to the teaching of digital art by Georgia art teachers due to the constraints of both preservice art teacher preparation and curricular alignment issues within the Georgia CTAE and Visual Arts Curriculum.

What is Digital Art?

Digital art, according to Black and Wiliam (2009), is defined as a medium in which the production, storage and presentation all happen on a digital platform and in a digital format. This would include computer graphics, modern animation, special effects, and even many forms of

modern music making. Digital art is unusual because, unlike other traditional methods of artmaking, there are no seminal works to describe the entry of digital media into the art world (Manovich, 2002). Despite the lack of academic literature on the subject, it has become a major medium in recent years. Compared to other traditional art forms such as oil painting or even acrylic paints, digital art is a relatively new phenomenon. The first picture generated by a computer was created in 1956 using dot matrix technology (King, 2002); however, digital art as a medium did not really begin until the mid-1960s (Dietrich, 1986). Early images were computer generated using software designed for text and did not have the graphical nature of current technology (Dietrich, 1986). The development of digital image-making software revolutionized the medium in the 1980s (Dietrich, 1986). Industries like Industrial Light and Magic pioneered new technologies that transformed and created new media in a single generation (Montante, 2018). Cinema and other media used technology to enhance, replace, or even invent new images not possible with traditional media. By the 1990s computer generated imagery (CGI) became a stable and in some genres an essential part of the cinematic world (Montante, 2018). This revolution continued in other media such as illustration, graphic design, and photography. For example, many, if not most illustrations today are produced digitally, with artists even trying to capture digitally the effects and textures of traditional media such as ink or paint (Black, 2019).

Digital Art's Role in Society.

One aspect that has increased the popularity of digital media is the ease of access to image creation. Unlike traditional media, which can require the purchase of sometimes expensive materials and frequently requires formal training to master, digital image making software can be completely free or relatively inexpensive to purchase and the ease of access makes it available to anyone with a tablet or even a smartphone (Du et al., 2010). Add to this the explosion of tutorials

available on social media and video websites and these factors have a transformative effect on digital art creation. Due to this ease of access, digital artmaking is not limited to professional artists and has generated a whole generation of self-taught artists (Du et al., 2010). Many of these self-taught artists develop their digital image making skills out of a desire to create fan art (Manifold, 2009; Olson, 2016). Younger budding artists, intent on relating to their characters in genres such as manga and anime, draw characters repeatedly and often until they become quite proficient at reproducing the look and effects of the artists by whom they are inspired. This fan art is done both digitally and traditionally (Manifold, 2009). Software such as Clip Studio Paint Pro (Clip Studio, 2021) have been developed to facilitate this kind of image making (Lanier, 2019).

Despite the ease of access, there are hurdles to the creation of digital art. Adobe Photoshop, commonly referred to as just Photoshop, a primary industry standard for digital painting as well as photo editing, is difficult to learn how to use, and an artist's ability to use the program can be a mediator of success in the creative industry (Lesage & Smirnova, 2015). Artists, both formally trained and self-taught, are forced to continually update their digital artmaking skills as the software evolves (Lesage & Smirnova, 2015). Because of the rapidly changing nature of the software development, which would negate the formal instruction in digital software of an artist, there is a leveling effect in that eventually all digital artists trend toward being self-taught as they continue work in this media (Lesage & Smirnova, 2015).

Standards Relating to Art Education.

This brief history provides the context of digital art as a medium that could be used and integrated in the visual arts classroom. Because digital art is a technology-driven medium, the use, appreciation of, and creation of it, in education circles, falls squarely in many of the domains

of ISTE standards for students (ISTE, 2016). Additionally, digital art finds its place in the same types of technological practices that are advised for in the media arts standards embedded within the NCAS (National Coalition for Core Arts Standards, 2014). In this section, both sets of standards are explored more in depth as they pertain to the potential teaching of digital art.

ISTE Standards. Relevant standards within the ISTE standards include empowered learners, knowledge construction, and innovative designer (ISTE, 2016). The ISTE student standards for the relevant strands are listed in Table 1 (ISTE, 2016, para. 3).

Table 1

ISTE Standards and Digital Art

ISTE Standards Pertaining to Digital Art	
Standard	**Descriptor**
Empowered Learner	Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences
Knowledge Construction	Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others
Innovative Designer	Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions

Empowered Learner. The ISTE standard for empowered learners is pertinent to the teaching of digital art because students preparing to enter a 21st century world will be encountering, creating, and consuming digital media and digital art on a massive scale.

According to this standard, visual arts students wishing to be prepared to enter this world are able to leverage the kinds of technology, such as digital image making software, and thus are able to take an active role in the creative industry. A specific part of the standard that encapsulates this idea is Standard 1d: "students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies" (ISTE, 2016, para. 3). Such technologies in the digital art world would be software such as the Adobe Creative Suite (Adobe, 2021), along with programs for illustration, web design, and animation, among others, as well as apps like Procreate (Savage, 2021) for iOS products (Hooks, 2018).

Knowledge Construction. Knowledge Construction is relevant to teaching digital art because artifacts in the art curriculum usually encompass all the different expressions of artwork, ranging from 2D work like paintings to 3D productions such as sculpture or ceramics. In the visual arts classroom, one of the primary digital tools to create artifacts would likely be digital-imagery software and the accompanying hardware of drawing tablets. Creative artifacts that demonstrate their learning might be digital pieces of artwork that showcase the various techniques and skills they have achieved (Black & Browning, 2011).

Innovation Designer. The ISTE student standard for innovative designers is situated in the teaching of digital art because creating art intrinsically features the design process. This strand closely aligns with the studio habits of mind (Winner et al., 2020) present in the NCAS (2014). In the design process, teachers are focusing on process not necessarily by looking at quality of the student work, but by assessing studio habits of mind (Hogan et al., 2020). These habits are soft skills that are vitally important to producing and appreciating art. These skills are actions which include things like engaging and persisting with media, envisioning a future

artwork (e.g., planning, solving problems), and solving problems (Hogan et al., 2020; Winner et al., 2020). Table 2 lists more detail about the art studio habits of mind.

Table 2

Art Studio Habits of Mind (Winner et al., 2020)

Studio Habit of Mind	Description
Develop Craft	I can learn to use tools and materials and practices of an artform
Engage and Persist	I can learn to embrace problems of importance and develop focus within my work
Envision	I can learn to mentally picture the next steps of my work
Express	I can learn to create works that convey an idea, a feeling, or a meaning
Observe	I can learn to look more closely and see things that may otherwise not be seen.
Reflect	I can learn to talk about the process of working and honestly assess my work/process.
Stretch and Explore	I can learn to reach beyond my capacity and embrace the opportunity to learn from my mistakes.
Understand Art Worlds	I can learn about art history and learn to interact as an artist with other artists.

Digital artmaking could link the design process of art with the design process of technology. This approach, focusing on the process of artmaking and design, is also validated by and corresponds to numerous teaching standards within the national standards (National Art Education Association, 2009; National Core Arts Standards, 2014).

National Core Arts Standards. The NCAS (2014) address four primary areas or standards of teaching: creating, presenting, responding, and connecting. Each of these standards

represents a primary focus of instruction for the visual arts teacher. It is notable that only one standard is focused on the actual artmaking process. See Table 3 for a list of strands.

Table 3

Strands of the NCCAS

National Core Art Standards	
Creating	• Generate and conceptualize ideas and artwork • Organize and develop artistic ideas and work • Refine and complete artistic work
Presenting	• Select, analyze, and interpret artistic work for presentation • Develop and refine artistic techniques and work for presentation • Convey meaning through the presentation of artistic work
Responding	• Perceive and analyze artistic work • Interpret intent and meaning in artistic work • Apply criteria to evaluate artistic work
Connecting	• Synthesize and relate knowledge and personal experiences to make art • Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding

The first strand, creating, serves as the lone standard for the artmaking process. For high school students, this standard, as well as the others, is subdivided into three levels. This subdivision acknowledges that some students are proficient, some are accomplished, and some are advanced. All levels of student creating involve working with materials to generate and refine artwork using a range of artistic mediums, practices, and approaches and yet more advanced students working collaboratively to effect change in society (National Core Arts

Standards, 2014). This strand is commonly implemented and is often the primary focus of art teachers in the classroom (Baxter, 2014). The strand for "presenting" encompasses how art might be presented according to the medium used and how to curate the art for future generations. Visual Literacy (Fransecky & Debes, 1972) is introduced in this standard, as a part of understanding how preserved artworks communicate a record of society, cultures, and experiences. Whereas Visual Literacy is introduced in the third strand of the NCCAS standards, it becomes an integral part of the third strand, "responding". This strand is about engaging students with art that leads to an appreciation for themselves, for other people, and for their world in which they live. It is also about learning how to critique and evaluate art for meaning. The last strand, "connecting", is a continuation of the ideas of the first three but relates them to the students' own understanding.

These standards all can be applied to the teaching of digital art. Digital art functions as a medium that can be created in the classroom just like other mediums such as painting or drawing. The images created are easily shared with others through technology. Students can connect with digital art on a personal level and can easily access myriads of examples of it created by other artists through social media (National Core Arts Standards, 2014). In fact, the ways in which students interact with digital art to create meaning, really are evidence of a greater paradigm shift toward the understanding and development of visual culture within students.

Visual Culture

Visual culture, a phenomenon that has permeated art instruction and preservice training of teachers in the last 25 years (Heise, 2004), is difficult to define neatly because rather than being a single entity with recognizable parts, it is instead an extensive network of interconnected ideas that form a vast web of thoughts and ideas (Duncum, 2001). Duncum (2001) defined visual

culture in terms of art education with a two-faceted approach. The first is to recognize that society produced visual artifacts in all its various forms of media ranging from traditionally produced art to television, print materials, and cinema (Duncum, 2001). The second is to understand that there must be:

> an interest in the social conditions in which the artifacts have their being, including their production, distribution, and use. Images are viewed in their contextual richness, as part of an ongoing social discourse that involves their influence in social life. (Duncum, 2001, p. 106)

Visual Culture is an important phenomenon to art because it addresses one of the underpinnings of modern society which is the power and dominion of the image on culture (Duncum, 2001).

Difficulty in Incorporating Visual Culture in Classrooms. Even as academics stress visual culture's importance to the field of visual arts education and promote it in academic circles, school systems and individual teachers are more likely to embrace a standards-based curriculum that may be at odds with teaching visual culture and the emphasis in many school systems and classrooms is often still on fine arts and traditional methods of producing these arts (Duncum, 2009). Furthermore, teachers may not even truly understand visual culture or be able to apply it to their curriculum. Duncum (2009) illustrated this by giving examples of teachers presenting at conferences who conflated any image with visual culture, rather than understanding how visual culture is not merely about an image, but how that image emerges from the context of the society and agent which who produced it. Heise (2004) concurred with this sentiment and added that:

> some educators, preservice educators, and art educators question the relationship between arts education and visual culture. Some educators do not think visual culture is important,

while others are not comfortable including it in the art curriculum because they simply do not know how. (p. 42)

Relationship Between Standards and Curriculum

In addition to the struggle with defining what is to be taught in an art classroom, there is the ongoing struggle by teachers and school systems to be relevant to 21st century learning especially regarding using technology and the new media in the classroom (Delacruz, 2009). Besides the traditional range of tools at their disposal to be effective teachers such as collaborative learning, project-based learning, and differentiated instructions, Delacruz (2009) argued that art teachers could add instructional technology to the mix to create a "dialectical and collaborative approach to the classroom" (p. 17). She later highlighted several case studies of how specific art teachers effectively used technology in their classrooms (Delacruz et al., 2014).

This technology use has a place in the standards. In Georgia, for example, the Georgia Performance Standards for Visual Arts, which has its basis in the NCAS (2014) has sections of the standards that align to the design process (Georgia Department of Education, 2017). The core art standards are listed as creating, presenting, responding, and connecting which echoes the NCAS. In the creating portion of the standards there is an emphasis on experimentation, investigation, and exploration. Students are explicitly encouraged to "engage in an array of processes, media, techniques, and technology through experimentation, practice, and persistence" (Georgia Department of Education, 2017, p. 65). Thus, the very nature of the ISTE standards and the Georgia Performance standards suggests there is a natural place for teaching digital arts in the visual arts classroom. According to Lockee and Wang (2014), "from an instructional design perspective, the act of creating visual art is at once an instructional strategy

and a learning outcome" (p. 586). This would especially be true when applied to teaching digital art as a medium.

Media Arts

Digital art falls in the domain of the media arts as well. In this next section I explain the phenomenon of the media arts and the role it plays in the visual arts. I describe the different definitions of media arts from the literature and examine how the definitions affect what is taught. I also expound on the potential benefit of integrating the media arts into the visual arts curriculum.

Definitions of Media Arts. The ISTE and NCAS, and the emphasis on visual culture in art, all closely align with the standards for the media arts, which provide another justification for the teaching of digital art. The media arts, sometimes referred to as new media, are described by Patton and Buffington (2016) as a new arts discipline that is often treated as separate from the traditional classification of visual arts which includes classical media such as painting and drawing as well as newer media such as photography and digital art. The separation is described as an arbitrary and artificial one because art teachers naturally could be using the skills of the media arts as an emergent part of the process of teaching visual arts (Patton & Buffington, 2016). This is because the visual arts are about the elements of art (e.g., line, value, color) that are used as symbols to create meaning and to communicate (Darts, 2004). Understanding how these images and artworks convey this meaning is described as visual culture and is broadly influenced by a variety of factors in society (Darts, 2004). In the same way, the new media use these same sorts of images, albeit in digital form, to create and communicate meaning. Therefore, Patton and Buffington showed through an evolution of the arts standards that there is a "visible shift that recognizes technology should be used as an artmaking medium, a pedagogical tool, and as a

means to document and display student work" (Patton & Buffington, 2016, p. 4). McGuire (2012) defined the term for media arts as the use of media such as computers, software, and video, as a tool in instruction in the classroom rather than a focus in and of itself. The definition of what constitutes the media arts is ambiguous and changes based on the branch of arts using the term (McGuire, 2012) as well as the researcher (Lockee & Wang, 2014).

The Relationship Between the Media Arts and ISTE. Peppler (2010) defined the media arts as a distinct branch of art which is separate from visual arts but to be used in conjunction, stating that "the professional field of media arts encompasses all forms of creative practice involving or referring to art that makes use of electronic equipment, computation, and new communication technologies" (p. 2119). Peppler (2010) further clarified that the media arts would generate a curriculum that developed new visual and media literacies that are "central to functioning in the 21st century" (p. 2121). Furthermore, she stated that the foundational elements of the creation of this new media are threefold:

> (1) active engagement in the learning process; (2) youth's personal connection to their work, which inspires a general love of learning and builds upon their prior experiences; and (3) the creation of projects that are of value to a larger community. (Peppler, 2010, p. 2122).

To sum up, her definition places the concept of media arts in a distinct category that focuses not on the creation of art so much as the use of technology in its creation as its own form of visual literacy.

Students Need Media Arts Instruction. Whether as a distinct category separate from visual arts or fully integrated with it, Peppler's focus on technology still aligns with the ISTE Standards for Students' ideals for empowered learners, digital citizens, and knowledge

constructors (ISTE, 2016). The ISTE Standards for Students state that learners actively construct their learning by leveraging technology; they understand how to operate responsibly in a digital world; and they employ technology to use, create, and make meaning of their knowledge in the context of their culture (ISTE, 2016). The argument that the media arts is essential learning builds upon work by Buckingham (2007), who made the case that the use of technology in education is inherent on being able to develop the skills of digital literacy, in other words, not just know knowing how to operate the software and components but being able to discern when and how it could be used. He further argued that the media arts ought to be an integral part of education because students tend to shift away from using technology as a means of education and will often use it for leisure activities like gaming. Students are often touted as digital natives but in fact they need instruction in technology and its applications if they are to use it properly (Kirschner & De Bruyckere, 2017). Therefore, students can be educated on how to become the digital citizens, knowledge constructors, and empowered learners that are elucidated in the ISTE Standards for Students (ISTE, 2016). Digital citizenship benefits art students who are creating the very images that are becoming part of the visual culture.

The Role of Media Arts in Visual Arts. Lockee and Wang (2014) argued that the two entities, media arts and visual arts, should be under the same umbrella of research, contending that doing so provided a more inclusive definition allowing for a more comprehensive perspective. Buffington (2008) made the case that many of the tools that would be used in the media arts are Web 2.0 tools that can be used in conjunction with the visual arts to become part of the artmaking process in and of itself.

The History of Media Arts. For some context in understanding the role media arts play in the visual arts, it helps to examine the history of the media arts. Technically, the media arts

emerged with the development of new media in the mid-twentieth century with the advent of technologies such as radio, television, and film (Jensen, 2016). Specifically, in analyzing and understanding the media of film, by the 1960s educators were treating film as an artistic medium to be studied in the same sense as other traditional media (Jensen, 2016). The real impetus for the institution of new media in education came, however, at the advent of the computer age (Bequette & Brennan, 2008). Software and hardware advances such as network systems, computer coding, desktop publishing, and CAD (computer assisted drawing) became commonplace in the workplace and then filtered down into career and technical education (Bequette & Brennan, 2008).

Introduction as a New Set of Standards. As these technical advances became commonplace and firmly established in the technical fields, some began to lament that there was an increasing divide between the experts who had technical proficiency and those who used the same digital technologies for aesthetic purposes (Penny, 2004). Penny (2004) argued that there was the need for an interdisciplinary approach in which practitioners become experts in both the technical side of computers such as coding or programming, as well as being an expert in the artistic aspects of creation like design and composition. As a result, in 1997, Minnesota became to first state to codify a set of media arts standards in order to promote and develop digital literacy in the media arts (Bequette & Brennan, 2008). Later it was followed by the Los Angeles School System who also created a similar set of standards based on Minnesota's model (Bequette & Brennan, 2008). The creation of a national set of standards for visual arts teachers by the NCCAS which includes a section on media arts as part of its requirements was based solely on the work of these few entities, and not on a set of national standards or any seminal works (Hebert, 2016). Jensen (2016), one of the leaders of the committee to create these national

standards, expounded on her reasons for spearheading this effort to create a national set of media arts standards by sharing that she was highly influenced by the TPACK model (Mishra & Koehler, 2006) and immediately saw the implications for art education.

Media Arts Incorporated into Art Standards. Jensen (2016) noted in her explanation that she:

> observed that in most cases schools of education, and the general field of teacher education, participate in siloed conversations about technology (computer design, information technologies) meaning making (English, Humanities) and artmaking (dance, music, theater, visual arts, and media arts). (pp. 153-154)

This isolation between school of education accounts for a trend in visual arts instruction in which non-artist personnel such as technology instructors are teaching classes heavy in media arts such as photography and graphic arts rather than art instructors who would have the artistic knowledge and skills (McGuire, 2012). This discrimination between the various subjects serves as an obstacle to be resolved if educators are to best prepare students for the kind of thinking essential to success in the integrated world of the 21st century (Jensen, 2016). Jensen's solution was to not only incorporate these standards into the NCAS published in 2014 (National Coalition for Core Arts Standards, 2014), but to develop a framework similar to TPACK uniquely housed in a discussion specific to the fine arts (Jensen, 2016).

The NCAS developed specific standards which elucidate and describe how the media arts could be used in conjunction with visual arts instruction (National Coalition for Core Arts Standards, 2014). In its media arts standards for high school students, it lists two standards, conceive and develop, which are detailed in Table 4.

Table 4

Media Arts Strands Within NCAS

National Arts Standards Relating to Media Arts at the High School Level (National Coalition for Core Arts Standards, 2014, p. 1)	
Conceive	• Use identified generative methods to formulate multiple ideas, develop artistic goals, and problem solve in media arts creation processes • Strategically utilize generative methods to formulate multiple ideas, refine artistic goals, and increase the originality of approaches in media arts creation processes • Integrate aesthetic principles with a variety of generative methods to fluently form original ideas, solutions, and innovations in media arts creation processes
Develop	• Apply aesthetic criteria in developing, proposing, and refining artistic ideas, plans, prototypes, and production processes for media arts productions, considering original inspirations, goals, and presentation context • Apply a personal aesthetic in designing, testing, and refining original artistic ideas, prototypes, and production strategies for media arts productions, considering artistic intentions, constraints of resources, and presentation context • Integrate a sophisticated personal aesthetic and knowledge of systems processes in forming, testing, and proposing original artistic ideas, prototypes, and production frameworks, considering complex constraints of goals, time, resources, and personal limitations

These standards were designed to impart "enduring understandings" of concepts such as how "media arts ideas, works, and processes are shaped by the imagination, creative processes, and by experiences, both within and outside of the arts" (National Coalition for Core Arts Standards, 2014, p. 1). These standards are a natural fit for digital art instruction especially as they relate to

the creation of art through various media, keeping in mind that in this context media refers to computers, television, and other technology.

Media Arts Interconnected with Visual Arts through Technology. Technology and the visual literacy to use it is becoming a foundation of modern society. Understanding the role of media arts in the teaching of visual arts, especially regarding the inclusion of technology in the pedagogy, is crucial to the development of 21st century learners. Students are expected to leverage technology to grow in their understanding of their world and this includes art students. They are expected to have both media literacy and visual literacy. The two disciplines of media arts and visual arts are intertwined so closely together that many researchers think they ought to be under one umbrella and taught as a single discipline by visual arts teachers (Patton & Buffington, 2016). These connections are becoming more accessible as the technologies of the new media continue to evolve. Therefore, it could be advisable for visual arts teachers to embrace the media arts and its technological tools and include it as one of the many tools to prepare their students to operate in society.

Increasing Need for Media Arts Instruction in Schools. The need for media arts instruction for both students and teachers is not decreasing but rather increasing (Gómez-Galán, 2020). Gómez-Galan (2020) noted that the information and communication technologies (ICT) are shaping and molding modern life and that this most certainly applies to education. The need for media arts has evolved because technology has evolved. For example, in the last two decades computers have become very powerful and are being used to create AI and other tech that is becoming the dominant force in society. Social media, digital platforms such as YouTube, and tech giants like as Google use complex algorithms to shape politics, drive markets, create fiscal policies, and even change an individual's thinking (Firth et al., 2019). Technologies have

become mobile. Optic and wireless technologies have made it possible so that people live in a futuristic society in which live video and multimedia simulations are possible on a device on their wrist (Bates, 2001; Peper & Harvey, 2020). Because the development of ICT in the last twenty years has substantially revolutionized society as much as the initial development of cinema, radio, and television, there is an urgency created to educate students in the proper use of these new technologies if students are to be prepared to become a functioning part of society (Gómez-Galán, 2020).

Because of this impact, it could be fruitful if visual arts educators understand how to prepare students for a world that has become increasingly dependent on visual media and technologies. Some specific areas of concern for visual arts teachers might be (a) how to navigate an environment in which students are increasingly turning to media such as YouTube for instruction in art rather than traditional methods of instruction; (b) how to build fine-motor skills in students who are more often than not relying on technology; and (c) how to instruct on ethical practices of curating and respecting intellectual property of other artists when the ability to infringe in (Isa, 2020). In addition to this there is a growing creative industry that relies on digital art.

The possibilities of careers in the digital art field are numerous and varied. Students could be graphic designers, industrial designers, illustrators, concept artists, editorialists, story board artists, animators, product illustrators, comic book artists, web designers, and more. The list could go on. As independent artists they could create their own work and sell it on digital platforms such as www.etsy.com and www.patreon.com. Many digital artists get venture capital from sites such as Kickstarter and Indiegogo for their projects. Often, artists have multiple streams of revenue that include a combination of many of these jobs (Tapscott & Tapscott,

2017). In previous generations there were risks associated with the creation of digital art. Digital art and other intellectual property could be stolen or misused by others. Another factor is that artists were paid slowly and poorly for their work because of the bureaucracy of centralized institutions which all take a cut of the profit before the artist is finally compensated (Tapscott & Tapscott, 2017). However, promising applications of blockchain technology is making it possible for future artists to create work that will be protected from theft, lack of attribution, or unreasonable compensation by blockchain-based digital content management (Tapscott & Tapscott, 2017). These types of transactions make it possible for future artists to be active managers of all aspects of their own professional careers (Tapscott & Tapscott, 2017). Students prepared to enter this world with technological art tools in their toolbox could have a huge advantage over those without them.

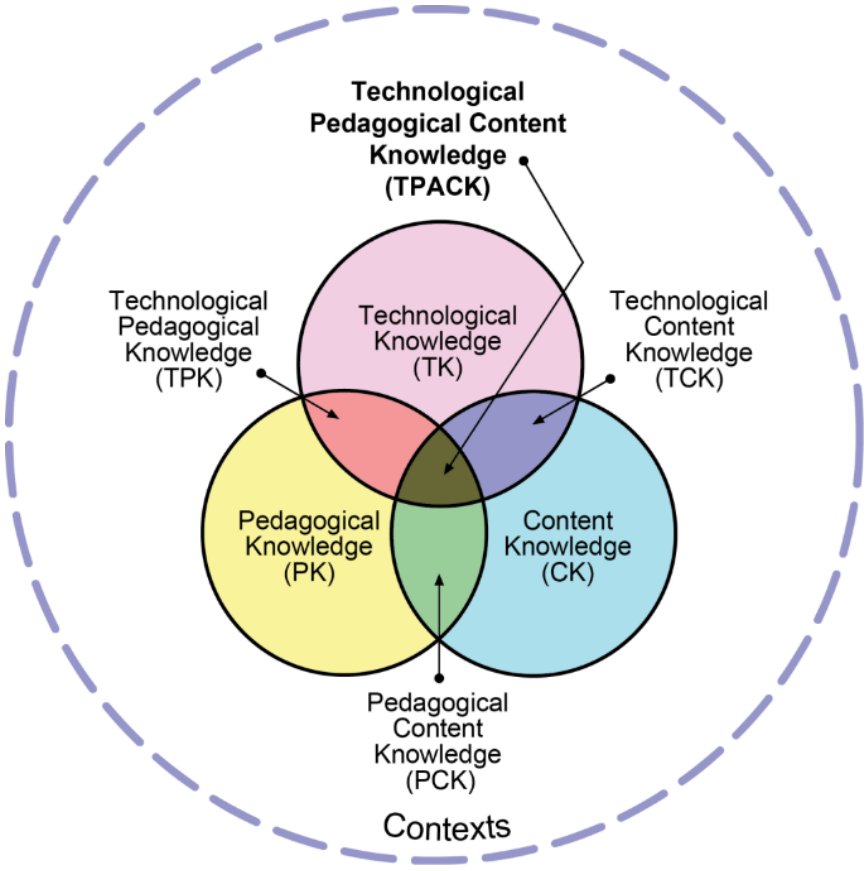
Technology and the Art Teacher

In this section I explain the potential reasons why technology may or may not be used in high school art classes. It is useful to comprehend other factors that affect high school art instruction. Variables such as (a) teacher preparation, skill, and desires; (b) curriculum standards; and (c) school curriculum choices are all instrumental in determining what is taught in day to day in the art classroom. This leads naturally to a discussion of the model of TPACK in which the variables of pedagogical content knowledge, content knowledge, and technological know-how come in to play.

TPACK and the Art Classroom. When visual arts teachers teach digital art in the classroom, they can be described as using Technological Pedagogical Content Knowledge or TPACK (Koehler et al., 2014; Mishra & Koehler, 2006; Mishra, 2019). TPACK is often presented by the Venn diagram shown in Figure 2.

Figure 2

TPACK Model



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TPACK involves a combination or intersection of three different areas of knowledge. Pedagogical knowledge is defined as knowledge of the teaching aspect of education. It is knowing how to teach irrespective of the content or the technology that might be used. Examples of pedagogical knowledge might include knowing various strategies for vocabulary acquisition or the benefits and drawbacks of collaborative grouping. But in art it also is about the instillation of art habits of mind such as problem-solving, creative thinking, and getting over the fear of

failure (Hogan et al., 2020). The second circle, content knowledge, is the teacher's knowledge of the subject. For a visual arts teacher, this would involve knowing such things as color theory, art history, and perspective as well as the components of visual design and composition. The last circle is technological knowledge. This is the knowledge of how to use technology as a tool. It is the teacher's understanding how to use the various programs and use them in the curriculum (Koehler et al., 2014). Various skills such as proficiency at word-processing programs or spreadsheets, knowledge of Web 2.0 tools like Padlet or Flipgrid (Roland, 2010), and especially understanding and the ability to use productivity software such as Adobe Creative Cloud could all be considered as examples of technological content knowledge.

Specifically, when it comes to teaching digital art, TPACK would involve all three areas. First, the teacher would have to have a grasp of the fundamentals of the hardware and software of producing digital media. This is the technological content aspect of this model, and it overlaps with the second, content knowledge. For content knowledge, the teacher must understand the production of digital art. This includes both the elements of art and the principles of design as well as how to use the digital media as an artform. For example, knowledge of the digital brushes of the platform that will produce the intended effect is essential and ties in with how the artwork is read as a composition. Lastly, the teacher must have the knowledge of how to teach the content of digital art to the student. Any of these areas of TPACK could be potential barriers to successfully teaching digital art if the expertise in the aspect is missing or deficient.

Preservice Preparation of Art Teachers

Baker declared that the preservice training of a teacher was the most influential factor of how an art teacher runs their classroom (1979). In this section, I will demonstrate how the preservice preparation of art teachers may be a hinderance to the technological knowledge of the

art teacher in the classroom. To do so I will first explain how art teachers are prepared to teach art, a subject with a broad range of subjects and skills.

Art Is a Discipline Like Other Subjects. In the early 1980s in the US, Discipline-based Art Education (DBAE) was introduced in the k12 classroom and became a foundational aspect of art education (Heise, 2004). It was argued by some that in order for the arts to survive in the context of a school setting, there needed to be a justification for their existence in the curriculum beyond positive feelings about the arts (Madeja, 1984). DBAE as a movement was about developing the skills within students to create, respond to, and connect with art for the purpose of creating a visually literate society (Eisner, 1987). Even though initially criticized for being too rigid, Eurocentric, and focused only on fine arts, DBAE has since evolved to become more inclusive and has embraced more disciplines such as folk art and non-western art (Heise, 2004).

DBAE shifted art education away from self-expressionism (Heise, 2004) and refocused art education on what many deemed are a natural goal of visual arts teachers: to concentrate on artmaking and the pedagogical strategies that assist in that process (Baxter, 2014). Simply put, artmaking is the process of creating a work of art with a medium (Baxter, 2014). To facilitate this process, art teachers start with a foundation of knowing the elements of art and principles of design, knowing the materials with which one creates art, and knowing the history behind art (Baxter, 2014). To this end, most art education programs are devoted to the development of the studio skills of their students, making classes that help develop and instill proficiency with a certain medium, which is a pillar of their curriculum (Patton & Buffington, 2016). This focus on mediums is evident in Georgia with the state requirements for art education preservice teachers mandating that they have mastery of at least one discipline such as photography, painting, drawing, or ceramics. (University of Georgia, 2020)

The Primary Focus of Art Instruction Is Not Making Art. Yet despite the focus on studio skills, art education is not really about the end product (i.e., the artwork produced by the students), but about developing the process skills such as creativity, problem-solving, and critical thinking that allow artmaking to take place (Perignat & Katz-Buonincontro, 2019). According to Perignat and Katz-Buonincontro (2019) "creativity development is fostered, not through the art materials or products, but through a process of exploration, play, risk-taking, making mistakes, self-evaluation and feedback" (p. 41). Art educators must also know how to assist students in the construction of knowledge within themselves and help students with the process of meaning-making (Baxter, 2014). Finally, art teachers must use modeling and set up a classroom structure that fosters an environment that promotes risk-taking, reduces fear of failure, and the out-of-the-box thinking that is critical to creativity development and problem-solving that is desired across all academic fields (Perignat & Katz-Buonincontro, 2019).

These aspects are the pedagogical knowledge skills and content knowledge skills framed by TPACK. These are usually well embedded in art preservice programs. The third component, technological content knowledge, may not be embedded in the preservice programs.

Technology Preservice Preparation

In terms of the technological knowledge, Patton and Buffington (2016) laid out a timeline for how national visual arts standards have evolved since 1994 to include the media arts and the infusion of technology, notably in the NAEA's professional standards for art educators (2009). Patton and Buffington (2016) noted that even with the updates in the standards there is only one standard devoted to the use of digital technologies, rather than technology being infused throughout the standards. Based on this change it is generally expected that art teacher programs would require prospective art teachers to take classes on technology in order to align with the

TPACK model; however, research shows this not necessarily the case (Patton & Buffington, 2016). Patton and Buffington (2016) reviewed the art programs at 26 universities that offered art teacher preparation programs and found that though most of these programs offered one technology class, they varied in what the class required, either focusing on the creation of digital art if the prefix for the class was an art class or focusing on instructional technology if the class fell under the education umbrella (Patton & Buffington, 2016).

University System of Georgia's Art Teacher Preparation. I reviewed art education requirements at the top five universities in Georgia since this is the context and setting for this study. I felt that a deep dive into the curricular offerings could illuminate whether or not Patton and Buffington's (2016) findings were consistent with the University System of Georgia's (USG) offerings. This analysis might also illuminate what preservice preparation is typical for many art teachers in the public schools.

The reason for selecting these five institutions for review is that, while it is true that art teachers can come from anywhere in the country or the world, as the largest universities in the state of Georgia, they are likely to be the largest contributors to the population of art teachers in the state of Georgia (Tio, 2018). Their programs probably have the greatest impact on the pedagogy of the teachers that are teaching visual arts in Georgia. The five largest four-year universities in the state of Georgia that offer a degree in art education are in order of enrollment: Georgia State University, Kennesaw State University, the University of Georgia in Athens, Georgia Southern University, and the University of North Georgia (Board of Regents University System of Georgia, 2021). In order to produce certified art teachers in the state of Georgia these schools have to meet the requirements of the state requirements and standards for educator

preparation programs (Georgia Professional Standards Commission, 2021). These requirements necessitate that the schools to produce candidates who:

1. Understand the processes of creating, presenting, responding, and connecting to visual and media arts
2. Understand the major art styles and periods of art history, the development of past and contemporary art forms, and the importance of art creation process, and how all of these go together in producing art
3. Show technical mastery in at least one studio area of art
4. Understand and have a basic competency in visual design in both 2-D and 3-D; and
5. Understand the educational processes necessary to teach art effectively (Georgia Professional Standards Commission, 2021).

The approved art education preparation programs at these state schools by necessity adhere to the above standards for teacher preparation. It is noteworthy that the Georgia Professional Standards Commission (GaPSC) specifically puts visual arts and media arts under one umbrella in element one (Georgia Professional Standards Commission, 2021). This addition reflects a current understanding of the importance of the media arts in the NCAS as noted in the prior section.

Another set of standards which guides schools is the National Association of Schools of Art and Design (NASAD) which accredits schools offering degrees in art, including art education. In the basic competencies summary, the standards dictate that prospective art teachers understand the “basic technologies involved in printmaking, photography, filmmaking, and video” (National Association of Schools of Art and Design, 2022). Listed below are ways in which the USG major art schools interpret and fulfil these standards.

Specific Examples of USG Preservice Teacher Preparation. Georgia State University, in downtown Atlanta, offers a Bachelor of Fine Arts (BFA) in art education along with many other BFA degrees not related to education. The education courses offered are courses on critical theory, pedagogy, issues in education, and special education. There are specific art education courses for the different learning levels such as preschool through fifth, high school, and middle school, as well as student teaching courses. There is also a required course called Media Technology and Visual Representation that specifically looks at how to use technology to produce art, how art is presented, and how technology can be used in the classroom (Georgia State University, 2020).

Kennesaw State University, which also offers a BFA degree, offers an art education concentration. In the major requirements for a BFA with an art education concentration there is a required course on computer applications in art. This course provides an opportunity for students to work with production software. The course is described as studying the computer technology employed by professional artists, specifically detailing digital presentation and documentation. In the concentration area there are courses on materials and methods, special populations, intercultural curriculum, and critical and contemporary issue in education. In addition, there are other education requirements such as classes on diversity, teaching and learning, human development, as well as student teaching. There is not a specific technology class for art education, although individual courses and professors may utilize technology in ways not delineated on the course description. Students are expected to take additional course work in studio areas or mediums, several of which could be specifically related to digital art and digital media (Kennesaw State University, 2022).

The University of North Georgia, which offers a Bachelor of Science (BS) degree in art education, has one studio class devoted to computer graphics. There are other classes on learning as well as courses on critical issues, visual literacy, and similar offerings. It offers no instructional technology or media arts class (University of North Georgia, 2020).

Georgia Southern University offers two distinct classes pertaining to the media arts. One class is an art class looking at how the new media (e.g., different forms of technology) can be used to produce art. The other class is an instructional technology class which looks at how technology is best utilized in classrooms to promote learning (Georgia Southern University, 2020).

In contrast to the other universities, the University of Georgia offers a BFA in art education with 48 required hours in art education but there is no course devoted to exclusively to media and technology or its uses in education or in the creation of art. The required classes cover subjects such as contemporary issues in education, visual culture, pedagogy, critical theory, and educational psychology or are classes in the studio arts. There are required student teaching courses, but there is not a single technology class listed in its required program of study (University of Georgia, 2020).

Georgia Preservice Art Teacher Education Curriculum in Line with National Findings. The review of five art educator preservice programs in the state of Georgia that I conducted does not address how technology may be used in the classes offered by these universities. Technology is often infused in the curriculum in these classes by the individual professors and if so, the university may not see the need for specific courses in technology (A. Munson, personal communication, December 6, 2021). Yet, the review of these Georgia course programs *is* consistent with Patton and Buffington's (2016) findings about preservice preparation

of art educators in terms of coursework in that the majority of these institutions. In their study, 81% of colleges and universities offered a single required course on technology for art educators (Patton & Buffington, 2016), whereas in the analysis of the five institutions in Georgia noted here, it was 60%. The computer classes offered were either a technology class devoted to instructional technology or to the production of computer art. Only one program, Georgia Southern, offered both types of classes.

These findings may have implications for Georgia visual arts classrooms. A lack of technology use by visual arts teachers has been observed or self-reported in visual arts classrooms across the nation (Patton & Buffington, 2016; Roland, 2010; Strycker, 2020). If preservice teachers are only getting a rudimentary exposure to technology and the uses for it in the art classroom, or possibly, no instruction on technology at all, the likelihood of these technologies being included in meaningful ways by art teachers in the classroom diminishes. The preservice preparation may be a factor that would need to be explored in further research (Patton & Buffington, 2016; Roland, 2010; Strycker, 2020).

Preservice Training as a Potential Barrier

In the previous sections I explained how the preservice preparation of art teachers is influential on the readiness of teachers in using technology in the art classroom. Because the content knowledge needed to teach art is so broad, I argue there may be limited room in the curriculum for the kind of intensive and intentional coursework in digital artmaking technology and its applications that might be required for mastery. As a result, many teachers may not have the skill set to use technology in the art classroom, especially in teaching digital art as a medium.

Feeling competent with a medium is important for an art teacher to be able to adequately instruct students in it. With the focus of art teachers directed towards process and the emphasis

on foundational skills and traditional artmaking (e.g., drawing, painting, printmaking), there is little time left for art teachers to devote to a new medium as difficult and time-consuming to teach as digital art. Additionally, since some university preparation programs may not adequately instruct preservice art teachers in technology use (Patton & Buffington, 2016), these factors work together to potentially impede digital art instruction in the high school classroom despite its natural place in the curriculum. Other barriers are discussed in the next sections in which I address how student curriculum pathways affect whether or not students are exposed to digital art instruction.

Curriculum Alignment in Schools: Career Pathways v. Fine Arts Pathways

A second aspect that possibly works to impede the teaching of digital art is alignment of career pathways in high school curriculum. Often, technical aspects of creating digital products such as digital art with computer programs usually fall in the domain of career-oriented classes and programs such Georgia's Career Technical and Agricultural Education (CTAE) program (Georgia Department of Education, 2021). CTAE is a program that creates specific career pathways that offer courses in various fields designed to create a career-ready workforce upon graduation (Georgia Department of Education, 2021). CTAE is based on the Perkins IV Act which in other states is designated simply as CTE (Adamuti-Trache et al., 2020). This act was passed specifically to integrate vocational education with academic education, integrate high school with postsecondary programs, and build strong relationships between industries and the school systems (Adamuti-Trache et al., 2020).

CTAE Offers Numerous Career Pathways Relating to the Arts. Various pathways include fields such as architecture and construction, business management and administration, and Health Science (Georgia Department of Education, 2021). There is a program of study called

Arts, AV, Technology and Communications that includes five different pathways: Animation and Digital Media, Audio Video Technology and Film, AVTV production, Graphic Communications, Information Technology, and Graphic Design (Georgia Department of Education, 2021). These programs are designed for students to be able to complete the industry-recognized student credentials as well as national credentials such as Adobe's National Industry Credentialed assessment offered online (Georgia Department of Education, 2021). Classes to complete the Animation and Digital Media pathway, for example, include required classes in digital media, animation, computer science principles, game design, and an internship (Georgia Department of Education, 2021). Similarly in the Web and Digital Design pathway there are web design and digital design courses (Georgia Department of Education, 2021).

Focus on the Technology. Based on a preliminary analysis of CTAE standards, I find that the standards of CTAE classes focus mostly on the technical aspects of using the technology and programs, and do not fully address the aesthetic aspects of creating such as rules of composition, color theory, or the principles of visual design. Individual teachers may include these, but they are not explicit in the standards. In the course description of the digital design class, for instance, there are detailed standards for learning how to "identify and develop model digital products that reveal a professional layout and look by applying design principles to produce professional quality digital products" (Georgia Department of Education, 2013, p. 5). There is one descriptor of using color principles with the rest of this standard devoted to items such as branding and the difference between print and digital media (Georgia Department of Education, 2013). The remainder of the standards are devoted to technical production skills of items such as photo-editing, animation software, and audio creation (You-tian Yel, 2016).

In contrast, courses with the same name, Digital Design 1 and 2, are listed as courses under the Georgia Visual Art Standards of Excellence (2017). These classes do teach the artistic principles behind creating "digital illustration as it applies to sequential art and animation" (p. 40). Even though these courses are built around the NCCAS standards of creating, presenting, responding, and connecting, they require the same technical proficiency as the CTE courses. For example, the standards require students to engage in "an array of processes, media, techniques, and technology through experimentation, practice, and persistence" (Georgia Department of Education, 2017, p.41). This involves demonstrating understanding "of the importance and strategic use the different programs and applications, based on their capabilities, in the creation of digital works of art and design" (Georgia Department of Education, 2017, p. 41). Even though both classes, the CTE and the Visual Arts class, may seem to be achieving the same ends, the art class standards focus specifically on the artistic process and ideation (Georgia Department of Education, 2017). Yet, even though this class is offered as a choice for students to take, it is rarely offered except in magnet schools specifically devoted to the fine arts (Bell, 2015). Most high schools in Georgia offer basic courses in visual arts comprehensive, painting, drawing, and ceramics with some schools integrating photography based on the faculty expertise and availability of interested students (Bell, 2015).

Art Requirement Lacking within CTE Pathway. It is notable that in none of the CTE educational plans for these career pathways (Animation and Digital Media, Audio Video Technology and Film, AVTV production, Graphic Communications, Information Technology, and Graphic Design), which are designed for fields of study saturated with artmaking and production, is there a requirement for a fine arts elective. By not including the visual arts component, the contribution that the visual arts play in the media arts may be lost. The focus is

almost completely on the computer skills and technical aspects rather than the deeper understanding of the visual communication soft skills and visual thinking which the visual arts classes provide. Intangible skills such as risk taking, critical thinking, and problem-solving are developed in fine arts classrooms (Hogan et al., 2020) as well as artistic skills such as using color theory, drawing, painting, and 3-D sculpting. Finally, in the art classrooms, students are instructed in the visual design principles of emphasis, contrast, balance, and unity which are critical to understand if one is to develop effectively designed visual media. In conclusion, it would appear, based on the standards alone, that the CTE curriculum is focused on the technical aspect of creating digital art whereas the visual art curriculum is focused on the aesthetic aspect. Incorporating the two together is important if students are to have the skills necessary to create meaningful and impactful digital art.

The Silo Effect. Conversely, one study showed that art students are not taking CTE classes at all (Adamuti-Trache et al., 2020). This means that art students may not get the kinds of technical skills to develop the digital art and media literacy that would be required of them if they endeavored to enter the art industry in the future. There seems to be a silo effect of technology and industry on one side and the arts on the other, when in fact the two could integrate.

Many in educational circles have recognized this need to integrate the technological and industrial field with the arts if society is to develop the creative problem solvers it desires (Perignat & Katz-Buonincontro, 2019). The development of STEAM or Science, Technology, Engineering, Arts, and Mathematics, which adds the “A” to STEM, is the acknowledgement that the arts add critical elements missing from STEM instruction. Critical thinking, innovation, and specifically creativity, are highly sought-after traits to be developed (Liao et al., 2016) that the

addition of the arts may help to build in students. Perignat and Katz-Buonincontro (2019) argued that the arts must not be subservient to the fields in STEM but must be recognized as a crucial part of a whole "pedagogical approach that integrates five disciplines (Science, Technology, Engineering, Arts, and Mathematics) equally" (p. 40). Ideally, a curriculum could include arts standards as well as STEM standards as both a basis of instruction and outcome (Perignat & Katz-Buonincontro, 2019).

Summary and Implications of Literature Review

This section explains the implications of the findings in the literature review. The section summarizes the natural partnership between art instruction and technology. It also clearly identifies areas in which the literature contains gaps pertaining to the use of technology in the art classroom. More specifically this section indicates how additional research would be beneficial to those who would desire to teach digital art in high schools.

The Natural Partnership Between Art and Technology

High school art teachers are faced with a task that can be both daunting and freeing at the same time when it comes to making curriculum and instructional choices. The standards they are required to teach are open-ended and can be interpreted broadly. By human nature, teachers will default to media and techniques with which they feel comfortable and equipped to teach. Since art teachers are prepared to teach a wide range of media and are generally focused on process rather than on a specific media, it is logical that art teachers would skip instruction in digital art if they were not proficient in it and choose to focus on more accessible and traditional media such as painting, sculpture, or drawing. These media are more immediately available for students and have a more established curricular presence. Teachers may assume that the digital skills will

be taught in CTAE classes making it unnecessary to teach digital art as a medium. Together, these factors may contribute to the absence of teaching digital art as a medium.

Logically, the visual arts and technology could be partners. Both ISTE and NCCAS promote critical thinking, designing, production, and experimentation. The new media standards intrinsically link visual culture, visual arts and technology. Art teachers, of all teachers, could be the most comfortable with technology and its applications in their field.

The Relationship between Art Preservice Teacher Technology Training and Inservice Practice

Unfortunately, Patton and Buffington (2016) showed that art teacher training in the institutes of higher education may not preparing teachers to instruct in this manner. According to Patton and Buffington (2016), when they reviewed 26 institutions with art education courses, none of the institutions adequately prepared art educators to teach in a way that aligns with the accepted national standards in terms of the media arts. Art educators across the country typically use technology for publishing student work, for researching works of art, and/or for instruction on art techniques, but do not generally use it for digital art making (Patton & Buffington, 2016). Patton and Buffington's (2016) article called for some general action on the part of higher education. They petitioned for more preservice training for art-teachers and an expansion of training for art educators in the use of technology, not just for research and archival purposes but for actual artmaking in the classroom with technology. Roland (2010) echoed this opinion and showed that art teachers, along with all teachers in general, are reluctant to embrace technology in the classroom. He suggested the following: technology could be a natural part of the educational process; it could be a tool to get outcomes and not an end of itself; and teachers could think of ways to situate Web 2.0 tools into the curriculum so that students use the technology naturally (Roland, 2010). Delacruz (2009) argued that art teachers are underprepared

to teach technology in any meaningful way, and it is often the students who are guiding the use of technology. In the last decade, there has been limited research conducted in technology use in the visual arts classroom to see if this has changed (Milbrandt et al., 2018).

Research on Digital Art will fill a Gap in the Literature

When it comes to the teaching of digital art, a large majority of teachers nationwide do not feel competent with teaching digital art as a medium (Art of Education, 2021). Despite the compelling evidence presented in the topical review that digital art is natural fit and could be taught at least in the high school level, a national survey of over 1000 art teachers revealed that digital art is one of the mediums that teachers feel least competent to teach (Art of Education, 2021). In fact, only 25.23% of teachers felt "most comfortable" teaching digital art. Also, according to the survey, 58.57 % of teachers desire more professional development in digital art. This reveals a weakness in the area of teaching digital art in visual arts classrooms in general. Stryker's (2020) study showed that technology use in 9-12 classrooms was largely limited to the creation of portfolios and research, not production of art. His study agreed with previous research that showed that the use of technology by art teachers is decreasing rather than increasing (Black & Browning, 2011). The number of teachers who actually teach digital art in the classroom is not clear in the literature. While there is evidence that students are learning digital art outside the classroom (Manifold, 2009; Peppler, 2013), there seems to be a gap in the literature on visual arts educational research as to what extent digital art is taught at the high school level. This is consistent with the gap in literature regarding art education and technology use in the classroom in general (Strycker, 2020; Wang, 2018). There appears to be even less research on the reasons why high school visual arts teachers are not teaching digital art to a large extent, which is a gap I sought to address in this study.

It is critical to address these gaps in the literature given the extent visual arts teachers are preparing their students for their role in a digital society that is dominated by digital visual media. The lack of visual arts research regarding technology in education means that stakeholders in visual arts education do not understand what, if any, perceptions about digital art are possibly precluding it from being taught in the classroom. The perceptions of these visual arts teachers could be explored further to move visual arts education to be more in alignment with ISTE standards (ISTE, 2016). In the next chapter, I explain in detail the methods that I used to examine and explore these perceptions.

Chapter Three: Methodology

The purpose of this qualitative study was to investigate the perceptions of high school visual arts teachers about their experiences with digital art. The purpose of this chapter is to explain the qualitative research tradition and methods that were employed to better understand what the perceptions of visual arts teachers are regarding experiences with digital art. This study provides a more thorough understanding of the perceptions of high school visual arts teachers regarding digital art and its potential role in the classroom. The collection of thick qualitative data provides insight into why and how visual arts teachers engage with digital art and how that affects their classrooms.

This chapter gives an overview and detailed discussion of the rationale and design for this study. The chapter explores and discuss the components of the qualitative study including the role of the researcher, the research setting and context, participant selection, data collection strategies, and the plan for data analysis. The chapter ends with ethical considerations and a discussion of the procedures used to create trustworthiness.

Research Design and Rationale

I conducted this research from a qualitative research approach. The reason I chose qualitative methodology is grounded in my worldview. Since human experience is difficult to quantify and numbers are not able to construct the richness of meaning that is inherent in words and their meanings, a qualitative approach works best when investigating human phenomena such as the interface of art teachers with the digital world. In qualitative research, the focus is deriving data from the text and not converting it to numerical data for analysis (Carter & Little, 2007). Additionally, qualitative research “aims to understand the meaning of human interaction

and asks open ended questions about phenomena as they occur in context rather than setting out a predetermined hypothesis" (Carter & Little, 2007, p. 2).

Phenomenography as a Research Tradition

Phenomenography is a distinct form of qualitative research first pioneered by Swedish researcher Ference Marton (Richardson, 1999). It is distinct from phenomenology in that according to Marton (1981), this approach looks at the second order perspective of individuals on a given phenomenon rather than on a first order experience. In other words, rather than looking at the experience itself of a particular phenomenon, the researcher seeks to understand the participants' perception of that experience. By examining participants' perceptions, the researcher eventually comes to logical relationships among the sets of data. These data sets are called the outcome space or the different ways in which the participants in a given study have experienced the phenomenon under study (Richardson, 1999).

Phenomenography is grounded in a constructivist epistemology (Richardson, 1999). This worldview holds that while reality exists in an external form, the individual constructs meaning from it by their own experiences. According to Marton (1981), this form of research is also non-dualistic in its epistemological approach: the phenomenon and how the individual perceives it are not separate. Although some such as Richardson (1999) argued that this non-dualist understanding is not possible, by comparing and compiling data of the different perspectives of the participants, it is possible to understand and describe common experiences of the phenomenon.

Rationale for Phenomenographic Study

This research tradition was a suitable research approach for this study because the perceptions of teachers about digital art by visual arts teachers are constructs of the participants'

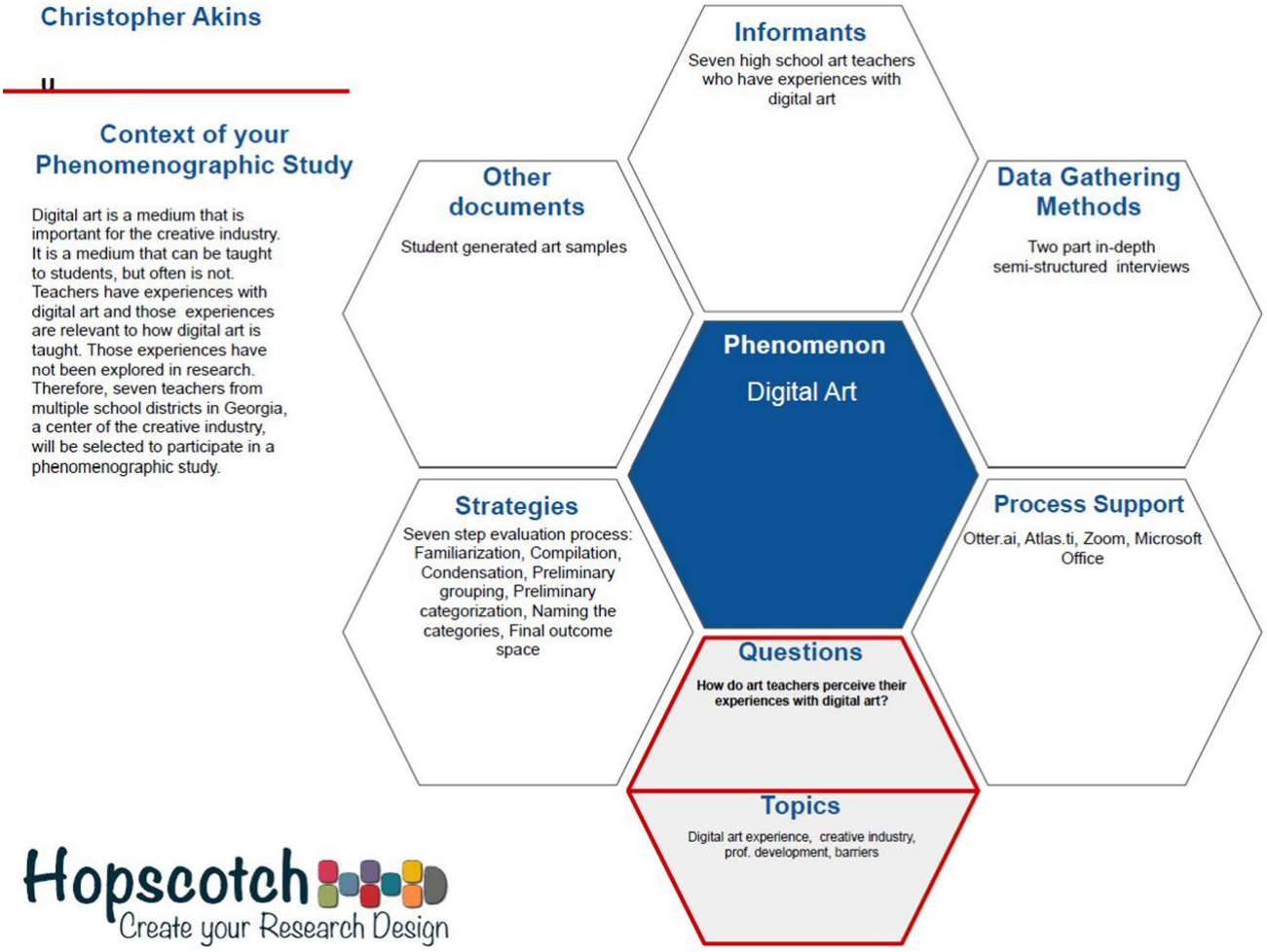
realities. The premise of this phenomenographic study is that if many participants' perceptions about a phenomenon, such as teachers' experience with digital art, are documented, the commonalities among the group are most likely a common experience shared by those in this field (Marton, 1981). An individual case study might shed light on a singular person's perceptions, but not be a viewpoint commonly held by many individuals which in turn diminishes authenticity. A phenomenographic study is more suited to this endeavor based on the assumption that the outcome space generated is a shared experience by members of the group. Therefore, the outcome space is a shared experience that is more likely to yield naturalistic generalizability. In other words, the experiences emerging from a phenomenographic study are likely to resonate with a larger swath of members inside and even outside the group of participants (Smith, 2018). Additionally, a phenomenographic study is more suitable for this research question than a phenomenological design because it would be impossible to define the essence of not teaching something. I cannot, for instance, discuss the essence of glassblowing as I have never directly experienced it on a first order level. I can, however, discuss my perceptions of the experience based on my second-order observations of other people involved in this craft. I could discuss my perceptions of barriers prohibiting me from blowing glass. In reality, there might not be any barriers at all, just my perception that they exist. This is relevant in this study because a teacher's perception about digital art might be that they could or would not want to teach it or conversely that they could teach it, even if they had never tried to do so. This analysis of second-order level of perception is what defines a phenomenographic study (Marton, 1981). Additionally, Marton (1981) explained that in any given phenomenon there are limited numbers of experiences held by individuals, and these limited perceptions can be compiled into a single outcome space. Art teachers, like most of the society, likely have been at the very least, passive

consumers of digital art. They will likely have had experiences with digital art that range from being mere consumers and critics to producers and instructors of it. They have perceptions about those experiences. By understanding and analyzing these experiences, it is possible to then understand how those perceptions have shaped their teaching practices surrounding this medium.

A visual representation of this justification and the overall structure of a phenomenographic study is provided in Figure 3.

Figure 3

Visual representation of the key components of phenomenography developed using Hopscotch (Jorrín-Abellán, 2016)



Research Question

The research question for this phenomenographic study is:

1. How have high school visual art teachers experienced the phenomenon of digital art?

The following areas of interest related to this question were explored:

- The perceptions that high school visual arts teachers have about digital art
- How the preservice preparation and ongoing professional development of high school visual arts teachers affects their perceptions of digital art
- How high school visual arts teachers' use of and access to technology affects their perceptions of digital art
- How high school visual arts teachers' perceptions of the purpose and benefits of art education affect their perceptions of digital art
- How high school visual arts teachers' perceptions of digital art affect the teaching of digital art as a medium to students in the high school art classroom

Role of the Researcher

To bracket and account for potential biases on my part, it was important to note the background and experiences I brought to this study. I am a certified art teacher who specializes in drawing and painting. Additionally, I am a freelance illustrator who uses digital art almost exclusively in that role. I am not formally trained in either field having acquired a Bachelor of Science in Middle Grades Education from Kennesaw State University. I also have a master's and educational specialist's degree from Brenau University, also in middle grades education. After teaching for many years, I pursued alternative certification in both high school science and P-12 art. Both certifications were a result of studying for and passing the rigorous state certification exams for the subject.

I pursued the art certification based on my years of experience as a freelance painter and muralist, believing that the skills and natural talents I had acquired in this arena would prepare me for this certification. The art certification required that I understand art history, art techniques, the principles of art and design, and possess a foundation of art pedagogical knowledge. My art teaching career began at first as a part-time teacher, but since has become my full-time profession. In this role I teach high school students. One of the highlights of my career is establishing a digital painting and digital illustration curriculum within my advanced drawing and painting classes.

My short time as an art teacher coincides with learning how to use digital art as a professional endeavor. After becoming an art teacher, I enrolled in online classes to learn the basics of Adobe Photoshop, Adobe Illustrator, Procreate, digital storytelling, composition, and digital painting. I have used these skills to create illustrations for clients across North America as a freelance illustrator. I also use these skills to teach my own students the potential commercial value and career opportunities that art, and specifically digital art, affords them. This context has also caused me to evaluate what skills are beneficial if they are taught at the high school level. I do not believe that students should have to wait until university to learn digital art skills. It is my opinion that students could be afforded the opportunity to develop critical skills at a time they are more ready and have time to receive them. Former students of mine have shared that having to learn digital art programs while in art school was a hindrance to them. They lamented that they did not have those kinds of technical skills.

I am proud of my accomplishments as an art teacher, artist, and illustrator, but I recognize that these biases and experiences are my own and may be somewhat of a unique experience. I have attempted to bracket these experiences even as I recognize their role in shaping the

direction of this study. I sought to understand the perspectives of other high school art teachers as they relate to technology and the teaching of digital art as a medium. I have endeavored to understand their perspectives based on their lived experiences and convictions. Even as I have sought to bracket my biases, I believe that my experience as both an artist and art teacher was a potential strength. It may have added a measure of trustworthiness to the study as teachers connected with me as someone who has similar teaching experience within art and has experience as an artist.

Research Setting and Context

The setting of this study were two districts in the northern suburbs and urban areas of a major metropolitan area of Georgia in the United States. Although the teachers were currently in two districts, Two Rivers and Lakeside, one teacher had significant experience in CityVille School District before coming to Two Rivers. This area is the ninth largest and one of the fastest growing areas of the United States (Metro Atlanta Chamber, 2020). Additionally, it has a growing and thriving art industry with the film industry being the centerpiece (Feaster, 2021). The population of this area is 6,020,364 with a median age of 36.6 (Metro Atlanta Chamber, 2020). The ethnic makeup of the metropolitan area is 52.8 % white, 10.9 % Hispanic, and 34.4% Black, with other populations such as Asian or Native American, making up the rest (Metro Atlanta Chamber, 2020). There are 37 school systems in the area with 1,100 elementary, middle, and high schools (Metro Atlanta Chamber, 2020). The schools are mixed in their racial diversity, ranging from predominately white in the more rural zones to more diverse in the schools located in city centers. They predominately serve middle class students, many of whom will attend a four-year college. Even so, only 39.4% of adults aged 25 or older have a college degree (Metro Atlanta Chamber, 2020).

The school districts that I reference in this study I have named CityVille, Two Rivers, and Lakeside School Districts. All of these districts have six or more high schools that serve a cross section of the populations of the northern suburbs of Atlanta. The schools and participants represent a typical cross section of the diversity of north Georgia.

Participant Selection and Recruitment

For this study I intended to use purposive sampling to obtain the broadest perspective possible despite the small numbers of informant necessary for a phenomenographic study (Stenfors-Hayes et al., 2013a). Ideal candidates were public high school art teachers with at least three years of classroom experience to eliminate the potential skewed data of the COVID-19 effect on the classroom that occurred when schools across the state closed and learning shifted to online and blended models. I was as inclusive as possible in my selection by inviting potential participants with a variety of experiences ranging from no digital art experience at all except as a consumer or critic, to teachers who were actively teaching digital art as a normal part of their year.

To recruit participants, I took into account geographic distance as a factor in selection because I desired to study school districts that were in driving distance from my location. This reduced the pool of potential districts to six districts. Another factor was the window of time I was planned to conduct the study. Spring semester was the timeframe I had selected. There were two districts which had deadlines in February and one that had a deadline in September for persmission to research in the spring semester. I was unable to meet these deadlines because of the timeframe I had selected. This eliminated CityVille as a district from consideration even though this district is mentioned by one participant in her interview. Ultimately, I applied to conduct research in three districts. One of these districts, which I shall name as Hilltown district,

initially received my application for research conditional upon some modifications to the study including limiting the number of interviews to one and for a duration of only 30 minutes. They gave me a timeframe that limited my interview window to March and April. A research committee was to have reviewed my proposal to see if it was a fit for their research priorities. The widow they gave me for research passed and I did not hear from them again. No reason for was given for not being accepted. I was able to obtain permission to research in two districts: Two Rivers and Lakeside.

This presented practical difficulties since in an individual high school there may be only one art teacher. This effectively limited the number of participants I could pull from and also limited the diversity of voices. The participants were seven teachers from a broad spectrum of backgrounds but were not diverse in race of ethnic group, simply because the teachers within these districts were homogenous in their racial and ethnic demographics. Ultimately there were five female participants and two males who elected to participate in my study. One teacher was of Asian descent and the others were Caucasian. Years of experience was a factor to consider, so I tried to find participants who were veterans (e.g., more than ten years of teaching experience) of which I found three. I also wanted novice teachers (e.g., three or less years of teaching experience) and I had two participants who fit this category. The other two teachers' experience ranged from five to nine years. The teaching experience that these teachers had in common was experience teaching the introductory visual arts class. Their current teaching loads at the time of this study ranged from classes that included digital art (e.g., media arts, graphic arts, photography) to more traditional classes (e.g., ceramics, drawing, painting, visual arts comprehensive).

To recruit suitable participants for this study, I first identified potential participants by examining school and teacher websites. From this list of people, I had hoped to gain a list of potential candidates who were interested in participating in a study investigating the phenomenon of digital art and how it affects the high school classroom. When reaching out to these individuals via email, I gave them a brief synopsis of the scope and plan of my study to establish a trustworthy connection with them. I informed them of the type of participant I hoped to interview. A sample email is included in Appendix E. These teachers were asked to participate in face-to-face meetings or virtual meetings via a platform such as Zoom or Microsoft Teams. All the teachers elected to interview with virtual meetings due to convenience. The meetings occurred outside of contract hours and lasted 30 to 60 minutes in length. Teachers shared lesson plans and student art samples with me. Examples of these artifacts are located in Appendix I.

Portrayal of the Participants

The seven participants of this study were all high school visual art teachers with professional experience teaching in public high schools that employ at least one full time art teacher. The participants taught in two different districts, but two participants had experience in other districts and in public charter schools. Six of the teachers had non-traditional routes to art education: three worked in various aspects of the creative industry before becoming teachers, whereas one worked out of the teaching field before continuing their education to become a certified art teacher. The participants all had either a bachelor's or master's degree in fine arts.

Five of the participants were female and two were male. They ranged in age from the youngest being in his mid-twenties to the eldest being in her mid-fifties. Six of the participants were Caucasian and one of the participants was of Asian descent. I assigned pseudonyms to all

the participants and to all the districts and schools in which they teach. Table 5 shows a demographic table of the participants

Table 5

Demographic Table of the Participants

Pseudonym	Age	Gender	Race	Years of Art Teaching Experience	School District
Erick	Late 30s	Male	Caucasian	3	Lakeside
Quentin	Mid 20s	Male	Caucasian	1	Two Rivers
Susan	Early 30s	Female	Caucasian	9	Two Rivers
Anna	Late 30s	Female	Caucasian	11	Two Rivers
Michelle	Late 30s	Female	East Asian	11	Lakeside
Imogen	Early 40s	Female	Caucasian	10	Two Rivers
Clara	Mid 50s	Female	Caucasian	21	Two Rivers

Quentin is the youngest teacher with the least amount of teaching experience. In his mid-twenties, he has a Master of Fine Arts (MFA) from a highly reputable art school and is non-traditionally certified in art education. His work in the creative industry led him to pursue his advanced art degree. When his interview was conducted, he had completed one year of teaching. He was teaching mostly introductory classes (e.g., Visual Arts I), but was also teaching one upper-level class in preparation for possibly adding applied design as a course to the Two Rivers District course list. He has extensive experience with digital art in the form of AutoCAD (Autodesk, 2022) and Adobe (Adobe, 2021).

Erick, the other male participant, was also from a non-traditional route to art education. After nearly twenty years in non-art related work, he pursued a degree in art education and at the time of his interview, had been teaching for three years in the Lakeside school district. He has been teaching both visual arts as well as the visual arts course of graphic arts, which is distinct

from the similarly named course under the CTE curriculum pathway. He is an avid consumer of digital art and is proficient in Adobe Suite. He was using Adobe Suite in his classroom with his students.

Susan is the youngest female participant, in her late twenties. Despite this, she is the only participant with experience in multiple districts. Originally having taught for seven years in CityVille School district, when her interview was conducted, she was teaching Advanced Placement (AP) art, painting, and drawing in the Two Rivers School District, where she had been for the last two years. She is also one of three teachers in this study who went straight from the university into the classroom. She has a Bachelor of Fine Arts (BFA). She had some experience with digital art, mainly Adobe Suite, in her former district, but was not using it in her classroom or personal art pursuits.

Anna, a teacher in her late thirties, also has a BFA. Like many of the other participants, she began teaching after years of other art related pursuits. She has experience in multiple school levels of art education, having taught in both middle grades and high school. She was teaching at a high school in the Two Rivers district when interviewed. She was teaching AP art, painting, drawing, and ceramics. Her background in photography provides her some level of proficiency with digital photography tools like Photoshop.

Michelle, also in her late thirties, has a BFA. She is unique in that in the timeline of this study she was teaching media arts as well as other visual arts courses such as AP art, drawing, and visual arts. She has 11 years of teaching experience in both middle school and in high school. She was teaching in the Lakeside school district at the time of this study. She is proficient in Adobe Suite and was using it in her classroom with her students.

Imogen is a teacher in her early forties. She has a BFA and taught private art lessons and painting courses outside of the public school system before she began teaching in the Two Rivers school district. She had the most experience solely at the high school level with ten years of experience. She was teaching drawing, painting, and AP art. She is proficient in Photoshop, having learned it in college and was using it as a tool to assist her students but not as a tool available for general classroom use.

Lastly, Clara, a teacher in her mid-fifties, has the most experience in the art classroom with 21 years of experience. She has taught in elementary, middle school, and high school. She has been teaching high school art for seven years. At the time of the interview, she was teaching AP art, drawing, painting, and visual arts. She has the least experience with digital art, having no formal training with it, but as a consumer of it she is, in her words, “fascinated by it”.

Data Collection

Data collection for a phenomenographic study primarily consists of answers to interviews and examination of corroborating artifacts to explore the second order perspective about a specific phenomenon. In this study I conducted nine different semi structured in-depth interviews with a protocol of questions geared to prompt the participants’ perceptions and understandings of their experiences with digital art. Two of the participants elected to complete the interview in two sessions, but the others desired to conclude them in one due to time constraints in their schedules. In addition to the interviews, I gathered artifacts that corroborated their interviews to triangulate the data. I collected photos of artwork, lesson plans, and visited art shows of student work.

Interview Process

In this study I attempted to use a two-round interview process. The reasoning for this is to establish trust and credibility between myself and the participants, to ensure more trustworthiness is generated from a wealth of data, and to build a better foundation for interpretation of the data (Wengraf, 2001). Trust between the interviewer and participant is an important factor in in-depth interviews because of the potential preconceived notions held by the interviewee of the interview process (Wengraf, 2001). According to Wengraf (2001), interviewees often hold negative perceptions of interviews from previous and imagined scenarios in which the interviewer holds power over the interviewee and answers can be incriminating, much like a police interview, or being questioned by a superior at work. By conducting multiple interviews in a friendly setting, this may be mitigated somewhat, and genuine communication can occur. This genuine communication in turn ensures more trustworthiness of the data because the answers are more likely to be candid and open, revealing the thoughts and intentions of the person more clearly to the interviewer. Also, multiple interviews build trustworthiness because it allows the researcher to verify and clarify previously given information as well as investigating potential areas of interest generated in prior interviews. Lastly, a better foundation for interpretation occurs as the researcher gets to know the person more intimately. Non-verbal clues can be gleaned from body language and facial expressions (Creswell & Poth, 2016). The trust established provides a safe space for the interviewee to "pull off their mask," to borrow a colloquialism (Mears, 2012). Any "masks" worn can be compared to each other in the three separate interviews. For example, if the interviewer is wary of the interview or is tired or preoccupied, or any has any other mitigating circumstance, these might skew the data of a single

interview. By triangulating two or more interviews, a more credible interpretation can be generated.

Even as I recognized the importance of multiple interviews, many candidates could only participate in an initial interview that combined both protocols due to time constraints in their schedules since the interviews were conducted in the late spring which is a busy time of the year for many teachers. I was still able to build trust with my participants by visiting student art shows of all of the participants except Erick's. This enabled further dialogue and promoted communication. At the conclusion of each interview, I emailed a transcript for the participants' interviews to review for them to clarify, edit, or even change their answers. One person elected to make edits to clarify their wording but did not make any significant changes in content.

As I interviewed the participants, I asked to see examples of student artwork and/or lesson plans if participants taught digital art to triangulate data from their interview. I viewed 40-50 examples of student work which corroborated teacher responses to interview questions, including seeing works in person on display at two different district art shows where the student work was displayed publicly.

Setting of Interviews

The interviews were set up for a mutually beneficial time that was outside of school contract hours. They were semi-structured in-depth personal interviews conducted through teleconferencing. Ideally, the individual's classroom would have been the setting for interviews because that would have facilitated immediate access to corroborating artifacts such as student work and teacher lesson plans; however, when teachers were given the choice on where to meet, all of them chose virtual interviews conducted over personal laptops with the Zoom teleconferencing app.

I conducted two-part in-depth interviews to acquire data. In-depth interviews are defined by Mears (2012) as:

> Purposeful interactions in which an investigator attempts to learn what another person knows about a topic, to discover and record what the person has experienced, what he or she thinks and feels about it, and what significance of meaning it might have. (p. 170)

Mears explained that in-depth interviews allow the researcher to cross the invisible barrier that is often present in another's mind that exists to protect the individual from misunderstanding and potential ridicule. By crossing this "membrane" (Mears, 2012, p. 171) the interviewer gains better understanding as they glean insight into another's perspective about a phenomenon. In-depth interviews are conducted by asking open-ended questions in a semi-structured format. The interviews are semi-structured because of the necessity of following up with other questions based on the answers of the individual being interviewed.

The questions were open-ended questions designed to elicit thick data (Ponterotto, 2006; Ryle, 1949). Three of the questions were piloted in a practice interview with a practicing digital artist in October of 2020. From that initial interview, I set out to develop questions related to the topics I that emerged from my literature review. Specifically. I designed the questions of the protocol to examine high school visual arts teachers' (a) use of technology, (b) perceptions of digital art as a medium, (c) experiences with digital art, (d) preservice preparation with technology and digital art, (e) classroom experiences with digital art, and (f) potential barriers to teaching digital art. The sample protocol is included in Appendix D.

The interview was conducted in two parts. The first part focused on participants' teaching and preservice experiences. The second was about their perceptions of digital art. To encourage participation in both interviews, I offered an incentive of a $50 gift card. The interviews were

recorded with participant consent and transcribed via Otter for Education software (Otter.ai, 2021). A sample consent letter is located in Appendix B. Otter works with Google and facilitates direct verbal transcription with the additional benefit of being able to upload pictures as artifacts. Participants were provided a copy of the transcript so that they could check it for accuracy.

Artifacts to Support Triangulation of the Data

Aside from collecting answers from interview questions, artifacts (e.g., student artwork sample, lesson plans) generated by participants of the study were examined and included as examples of proficiency and as ways to engage and generate self-reflection of the participant's own learning and proficiency. The artifacts consisted of samples of student work from lesson plans described by the participants. I was able to gather different 18 artifacts from the various participants either through teacher emails, publicly viewable displays in which I took photos, and a flyer from an art show containing images of student-created digital art. These artifacts were used to triangulate the responses of the participants. I did not conduct a document analysis of the artifacts as it would have been outside of the scope of the research questions posed. The artifacts corroborated the data generated by the participants in the interviews. To ethically display these works within this study I secured IRB permission from Kennesaw State University, and from each of the districts involved in order to use their teacher's data and student data. Only one eighteen-year-old student consented to their work being included formally in this study. (See Figure 8.)

A description of the artifacts submitted or gathered in the study are listed in a table in Appendix I. Please note the artifacts listed in appendix I are not visually included because even though these were publicly viewable within an educational context, consent was not obtained for their use. Examples of the artifacts I was able to view included

- Posters of environmental causes created with Adobe Illustrator
- Fine art pieces created with digital software
- Stop motion animation
- 2-D animation
- Mixed media pieces
- Character designs by students
- Colorized artwork that was originally black and white ink
- An article on a car-wrapping contest (This was not published in this study to protect confidentiality)

Data Analysis

I followed the data analysis in qualitative research plan that is thoroughly described by Creswell and Poth (2016) who described the process as that of "organizing the data conducting a preliminary read through of the database, coding and organizing themes, representing the data, and forming an interpretation of them" (Creswell & Poth, 2016, p. 181). Creswell and Poth (2016) explained that these processes of data analysis form a spiral of activities that are interconnected and often occur concurrently with each other. This so-called Data Analysis Spiral is a process of a continuous going back and forth between the different steps of analysis rather than a smooth linear process. The spiral narrows as the researcher approaches the account or narrative that the research generates (Creswell & Poth, 2016). In the sections below I elucidate how I completed this data spiral in the context of a phenomenographic analysis tradition.

Coding

In analyzing data, I first bracketed my preconceived notions of the experience of digital art by including discourse about my experiences, which is documented previously in the *Role of*

the Researcher section of this paper. I started my analysis by entering the data into Atlas.ti (Cleverbridge Inc., 2021). This is important because of the sheer volume of data generated by qualitative research. The system organized the data into a coherent and efficient method of file naming and retrieval. Using this software, I was able to name files and categorize data into discrete units such as words, phrases, or quotes, or digital images of artifacts (Creswell & Poth, 2016).

In the data analysis, I followed the steps prescribed by González and Sjöström (2010) and Dahlgren (2002) for a phenomenographic study. These steps are listed below and an explanation of how this occurred is detailed in each step:

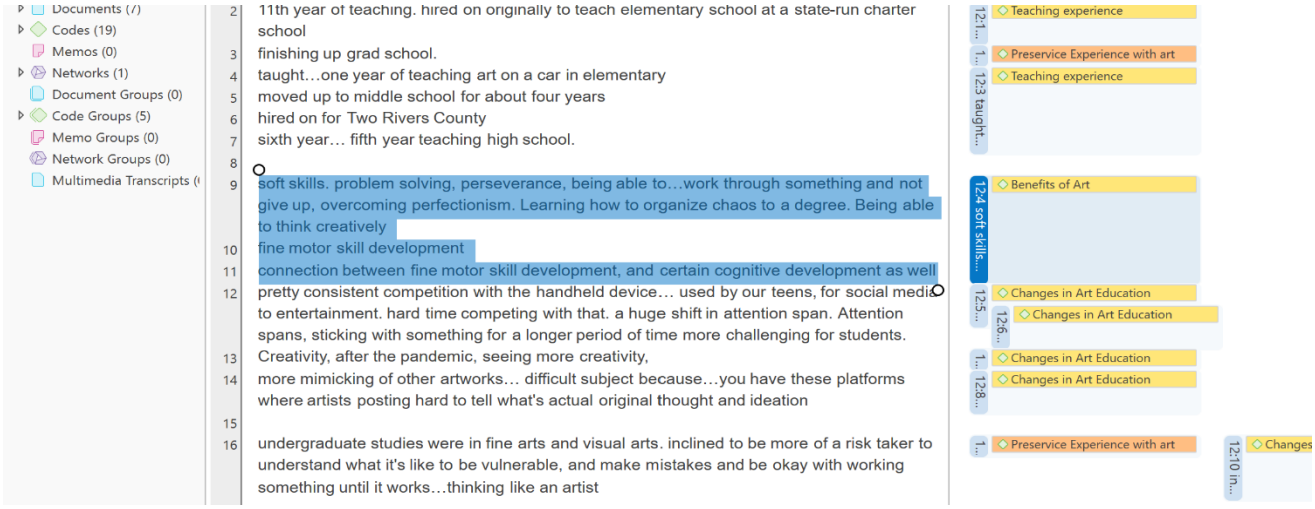
1. Familiarization Step: I read the transcripts of the interviews generated by Otter software (Otter.ai, 2021) several times and examined the artifacts provided by the participants, without making notes, to get an overview of the data (Alsop & Thompsett, 2006). I edited the transcripts to clarify mistranslations by the software. I also edited the transcripts to remove or alter any potentially identifying information of the participants. This aligns with Creswell and Poth's (2016) idea that I had to "get a sense of the data" (p. 185) through a process of reading and memoing emergent ideas. This happened as I read through the data multiple times.
2. Compilation step: I engaged in a more focused reading of the transcripts to lump teacher answers to the questions into categories based on their answers to the questions. As I read through the data, I made notes, literal memos, of my thoughts about what I was reading. This included ideas, phrases, or other concepts that are emerging from the data. Memoing helped increase validation by

providing an “audit trail that can be reviewed and examined” (Creswell & Poth, 2016, p. 188)

3. Condensation step: I selected portions of the transcripts that reflect relevant data to the study. I attempted to find the central elements of the participants’ answers. These portions were cut and pasted into new documents that were filed as “relevant passages” and were filed in a different location than the primary documents. Although some researchers suggest building a list of codes before embarking on their study (Creswell & Poth, 2016), I chose not to do this. I think that the emergent codes from the data should guide the study rather than introducing cognitive and confirmation bias into the study. I created the code book after this step based on my initial and in-depth readings of the transcripts. I imported these into Atlas to code and sort the data.
4. Preliminary grouping step: I looked for and identified significant and basic categories of description and included the best and most relevant quotes to substantiate them according to the methodology prescribed by Richardson (1999). This eliminated redundancy. The next crucial step of my analysis was describing and classifying codes into themes (Creswell & Poth, 2016). This involved a detailed description of what I saw in the data. I created a code book based on the answers to the interview questions. The important passages were created as quotes within Atlas.ti (Cleverbridge Inc., 2021). These in turn were grouped according to similarities and differences among the answers.
5. Preliminary comparison of categories: I used the grouping function within Atlas.ti to create groups of these codes. A copy of the code book generated by

this method is included in Appendix G. In Figure 4 below is an excerpt from Atlas.ti.

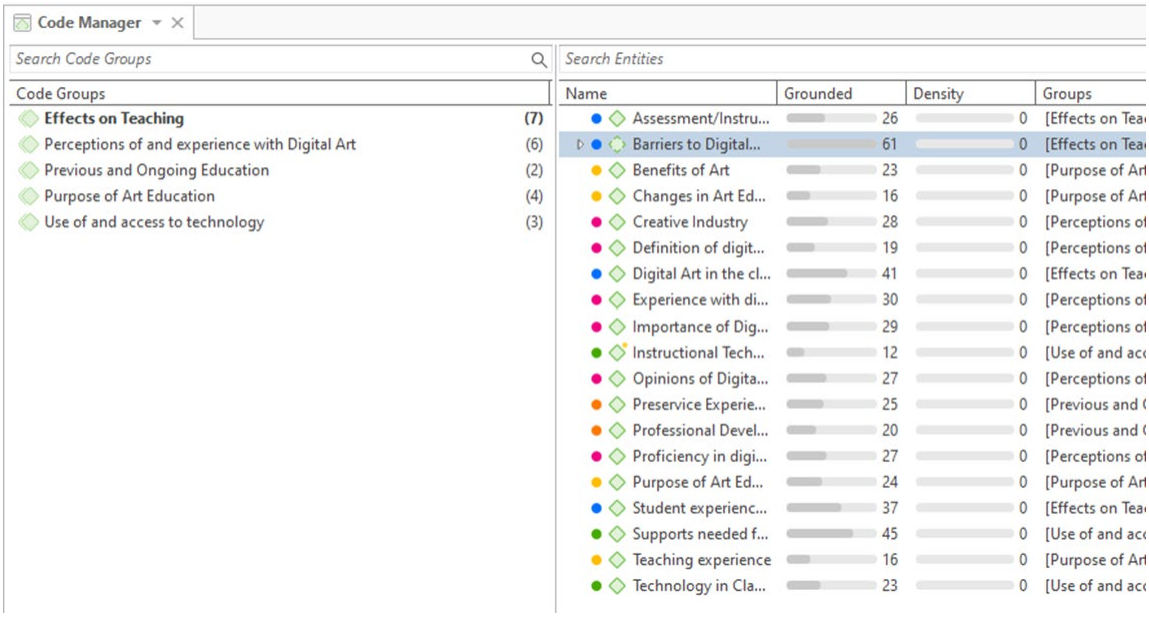
Figure 4
Excerpt from Atlas.ti showing how codes were generated



I coded these using Atlas.ti to preliminarily group trends and similarities among the answers in questions to get an initial list of categories of description (Creswell & Poth, 2016). I read through the transcripts again to make sure these categories accurately depict the content of the transcripts and are true to the intended meaning of the answers by the participants and are not a manipulation by the researcher. This was the point I finalized the code book. Figure 5 shows an excerpt from Atlas.ti that details how the codes were organized by category.

Figure 5

Categories of codes sorted by color within Atlas.ti



6. Naming the categories: This is the step in which I labeled the categories to identify the essence of the perception of the phenomenon. Lastly, I then sought to find the outcome spaces (Marton & Dahlgren, 1976) which are logical relationships among the different categories (Richardson, 1999). These relationships describe how the participants perceive the experience of teaching and learning digital art. This was be done manually by writing up descriptions of the outcome spaces in Microsoft Word using relevant quotes to support the conclusions derived from the data.
7. Outcome Space: This step involved finding the final results or outcome space based on the different ways of understanding this experience and arranging them in a hierarchy based on their relevance. These were arranged in a table showing the descending hierarchy of importance based on the model of Han and Ellis

(2019). The outcome space was organized into a table with MS Word (see Table 7).

This outcome space serves as a way to describe the perceptions of high school visual arts teachers on their experience with digital art. For clarity, the following section details how I collected and analyzed the data in a more sequential manner. I specifically explain how I determined codes and categories of description.

Description of Data Collection and Analysis

I used answers from the semi-structured in-depth interviews with the aforementioned participants as the primary data source for this study. I supplemented this data with examples of student artwork provided by the participants. These were used to triangulate the data generated in the interviews. I interviewed the participants in the spring of 2022 using Zoom conference calls. By a careful examination of the data sources, I was able to exegete the perceptions and understandings of the participants of their experience with digital art (Marton, 1981). I recorded the transcripts of the interviews using Otter.ai software. I imported the transcripts into Atlas.ti 22 software for Windows. I read the transcripts several times to familiarize myself with the content as per Sjöström and Dahlgren's (2002) phenomenographic qualitative data analysis process which I described in more detail in earlier sections of this chapter. I triangulated the data by viewing examples of student artwork sent to me by the participants and by viewing student generated art samples on display in person at public high school art shows from April to May 2022. I then concluded the condensation step in which I selected relevant passages from each transcript, editing for clarity and eliminating extraneous details. I completed the steps of familiarization and condensation by placing the new and edited transcripts into new documents and then uploaded them to Atlas.ti.

Determining Codes and Categories

During the initial coding process, I generated 21 codes and subcodes that were assigned to the 114 different quotes. The codebook is included in Appendix G. During the preliminary grouping process, I grouped the codes into groups based on the topics under consideration. When forming these groups, I compared the groups to one another and determined discrete boundaries between the different groups so that I could name and define them. In Appendix H are two examples of the nodes and networks created in Atlas.ti to assist with the visual interpretation of the data.

As an illustration of how I established discrete categories between the different experiences of participants of the phenomenon of their experience with digital art, in this section I provide an explanation of the two figures that appear in Appendix H. The first figure depicts the relationship between being formal education (e.g., preservice art training as art teachers, professional development) and their experiences with digital art. When these are displayed as nodes in a network it is visibly evident that there is not much overlap and connection drawn between the education and experience with digital art. This indicated that the two elements of education are discrete and separate experiences from the participant's experience and proficiency with digital art. Upon analysis I was able to identify that the teachers as a group had less experience with digital art in preservice training and professional development than they did in their professional experience in the classroom. I determined that there was not a real relationship between their perceived proficiency with digital art and their formal educational experiences.

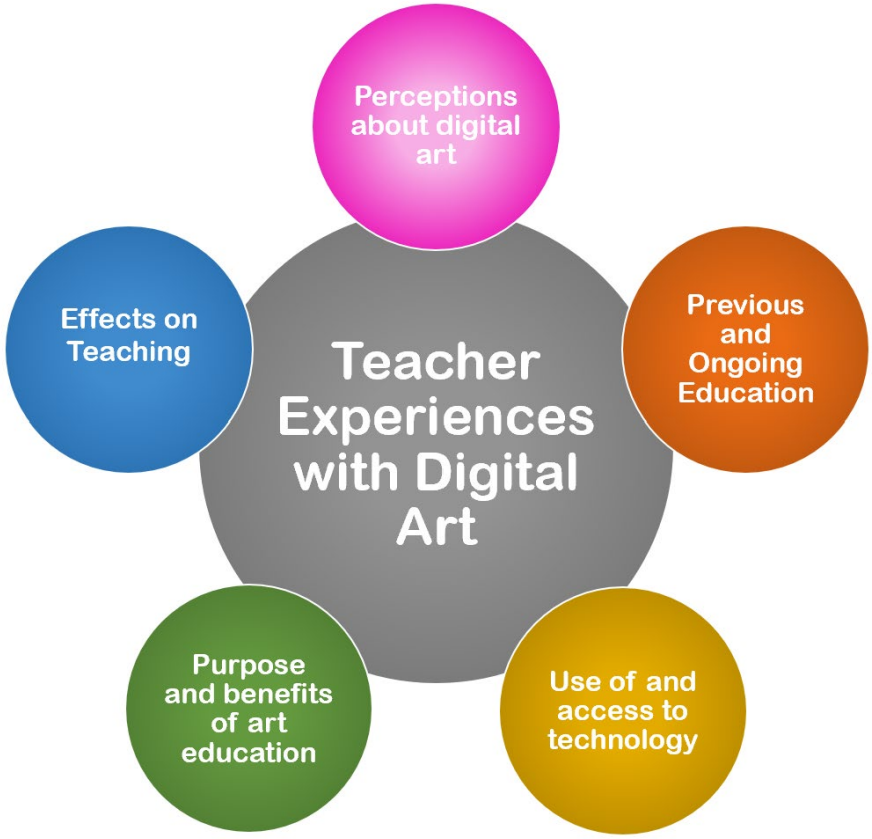
The second figure is a network of nodes depicting three discrete barriers described by the participants. Each of these is connected to the overarching idea of barriers to digital art because they all represent experiences of barriers that were perceived by the different teachers.

Collectively, each barrier became a sub-category because they were strongly defined by the group. Yet, they are apparently discrete from each other because the nodes did not overlap. Further analysis of these subcategories yielded a more nuanced interpretation. For example, proficiency with digital art did not correspond to lack of technology, nor with lack of funds. Initially, I had a node called other barriers that seemed discrete and disjointed, but as I tried to discern what common element linked the codes and comments within this group, I realized that there was a connection between lack of resources and technology. After generating this network, I ascertained that more connections between were the two nodes were needed, which would show a perception by the teachers of a connection between lack of funding and lack of access. Yet each of these is discrete because the lack of access was not universal but rather perceived to be dispersed inequitably among the students of the participants.

I color-coded these groups to correlate with the areas under investigation. I assigned pink to represent the teachers' perception on digital art and blue to represent those teachers' perceptions of digital art in their teaching. I chose orange to represent previous and ongoing educational experiences. Yellow represents the teachers' perceptions of the purpose of art education, and lastly, green represents the teachers' use of and access to technology in their classroom. The groups that emerged are depicted graphically in Figure 6.

Figure 6

Emergent and named categories



Definition of Initial Categories

The first category I described is the general perceptions art teachers have about their experience with digital art. I had six codes in this category, which was the largest category. The first code, creative industry, included the teachers' experiences within the creative industry outside of education as well as their understanding of what is required to be a functioning member of this workforce. The second code was the teachers' definition of digital art. The third, experience with digital art, contained the data about the participants' personal experiences with digital art whether as a consumer or producer of it. A fourth code described the importance art teachers place on role of digital art as a medium to be taught and used in the future. Teachers'

personal opinions of digital art as a medium comprised the fifth code and their perceptions of their own personal proficiency was the last code.

The second category provided details on the previous and ongoing education of the participants that prepared or prepares them for teaching visual arts. The category included two codes: preservice experience with art and professional development. Preservice experience with art included data about college experience before entering teaching as well as any post bachelor's degree information. I created a separate code for preservice experience with digital art. Professional development included the data teachers provided about ongoing learning opportunities provided by the school systems and professional organizations.

The third category was use of and access to technology. This category had three codes of description that together account for how the teacher uses technology in the classroom. The first code was instructional technology, in other words, how the teacher uses technology to conduct the educational day-to-day enterprises of a classroom, such as grading and submitting lessons. The second code was the supports needed for digital art in terms of technology, software, access, and technology assistance. The last code, technology in the classroom, included the information teachers provided about their current technology set-up in their classrooms.

Purpose and benefits of art education was the name I gave to the fourth category which described the teaching role of art teachers. This category included four codes: benefits of art, changes in art education, purpose of art education, and teaching experience. Two codes, benefits of art education and purpose in art education are similar; the benefits of art education described the non-tangible skills students derive from taking art, whereas the other described the data in which teachers defined why art is taught in the first place. The code, teaching experience, was a simple description of what subjects and how long the participating teachers have taught. Changes

within art education was a code which cataloged participants' observations of how art education has changed since they first started teaching.

The last category is defined as the effects of the perceptions teachers have about digital art on their teaching of it in the classroom. The first of the four codes was digital art in the classroom, or a general description of how the teacher facilitates digital art instruction in the class. The second code, assessment/instruction was similar but emphasized more of the pedagogical aspect of how digital art is taught. Student experiences with digital art was a code that described the teachers' perceptions of how students perceive and experience digital art. Lastly, barriers to digital art, the final code, was split into three subcodes: technological barriers to digital art such as lack of equipment or access, proficiency barriers such as lack of time for teachers to learn it, and other barriers that were mentioned such as lack of curricular supports. A list of codes by category is provided in Table 6.

Table 6

List of Codes Sorted by Emergent Categories

Category	Code
Perceptions about digital art	Definition of digital art Experience with digital art Importance of digital art instruction Opinions of digital art Proficiency in digital art
Previous and ongoing education	Preservice experience with art Preservice experience with digital art Professional development
Use of and access to technology	Instructional technology Supports needed for digital art Technology in classroom
Purpose and benefits of art education	Creative industry Purpose of art education Benefits of art Teaching experience Changes in art education
Effects of perceptions of digital art on teaching	Digital art in the classroom Assessment/instruction of digital art Student experiences with digital art Barriers to digital art • Technology barriers • Proficiency barriers • Other barriers

The codes and categories generated from this study were used to determine the final outcome space which are the findings of a phenomenography. The findings of this study are discussed in detail in Chapter Four.

Quality of Evidence

Unlike quantitative research, which vies for validity and generalizability, qualitative research is primarily about credibility and dependability (Creswell & Poth, 2016). To achieve this aim, I used multiple data sources such as data from semi-structured in-depth interviews with seven different art teachers having diverse voices, perspectives, and different lived experiences with digital art. These participants in turn had experience with digital art in multiple school districts. I triangulated the data accumulated in these interviews by viewing and discussing student work samples supplied by the participants. I engaged in member-checking after compiling the transcripts to make sure that the participants' voices were represented accurately. To show how I determined the outcome space emerging from the data, I provided a detailed description of the coding and analysis process as well as visual aids to assist with communication.

Ethical Procedures and Considerations

Since this study was a phenomenographical study, I followed the established methods outlined for a phenomenographic study (Richardson, 1999). I described these methods in detail in an earlier section of this chapter. I have a somewhat extensive background in art, and I am a beginning digital artist. I have endeavored to withhold my own experiences and biases when interpreting the data in the attempt to fully understand the experiences of the phenomenon of the participants rather than relate them to my own experiences or how I know those experiences are

validated by prior research (Stenfors-Hayes et al., 2013b). My own experiences have been bracketed by disclosing them fully in the role of the researcher section of this chapter.

Ethical Considerations

Orb et al. (2001) wrote a strong justification of the ethical considerations needed for qualitative research. Although the ethical considerations iterated in their article related primarily to nursing research, the principles espoused are quite applicable to educational qualitative research. They stated:

> The purpose of qualitative studies is to describe a phenomenon from the participants' points of view through interviews and observations. The intention of the researcher is to listen to the voice of participants or observe them in their natural environments. (Orb et al., 2001, p. 94)

For qualitative research to be trustworthy, the individuals in the study must be recognized as autonomous individuals who share information voluntarily (Orb et al., 2001). They further argued that many ethical dilemmas are avoided by adhering to the standards elucidated in the following paragraphs.

Ethical Principles

In this section I discuss the ethical principles that guide qualitative research. The three different guiding principles are autonomy, beneficence, and justice.

Autonomy. The first principle is that of maintaining the autonomy of the participants (Orb et al., 2001). Participants must be free to elect to participate or not in the study without repercussions. They should also be able to do so being fully informed of what the research involves. In this study an informed consent letter and agreement was signed by the involved parties discussing what their roles will be. They were informed in the consent letter that they will

be interviewed. Additionally, when student work was displayed in the study as an artifact, informed consent of both students and parents (when the student was a minor) was obtained by written permission forms detailing how their artwork would be used in the study.

Beneficence. The second principle is beneficence, which Orb (2001) described as "doing good for others and preventing harm" (p. 95). This means researchers have a duty to protect the privacy and identities of the participants. Accordingly, I used pseudonyms for both districts and individuals. Also, I eliminated any factors that might otherwise expose the identities of the participants, or I used them with permission of the participant. I obtained permission to use quotes in the publishing of the study, as well as permission to use photographs or digital copies of artifacts generated by participants or their students. I advised participants that any information gained that is subject to mandatory reporting laws for educators was excluded from confidentiality and anonymity (Orb et al., 2001).

Justice. I maintained Justice, a third principle, by using diverse voices of teachers who are in the minority when possible and available. By including a diverse set of voices, the thoughts and perceptions of these individuals contributed in meaningful ways to the research by broadening the perspective of the study. In a phenomenographic study, it is important to describe the perceptions of the experiences of the participants rather than to try and explain them (Stenfors-Hayes et al., 2013). A phenomenographic study is limited in the number of participants to accommodate the large volume of data, usually between seven to ten participants. This factor of small participation may produce limited perspectives and could reduce the justice of the study. Hopefully, in selecting a broad range of participants, the diversity of the participants more fully defined the commonalities. In other words, the trends that emerged across the range of

participants, despite their differences, are probably shared experiences by most art educators regardless of their background and identities.

In addition, a phenomenographic study relies on the principle that the semi-structured interview questions allow for further questioning until both the researcher and participant come to a mutual understanding that the participants' perceptions are fully understood and will be communicated accordingly (Stenfors-Hayes et al., 2013). Since the premise of a phenomenographic study is that the "reality" of the experience and the perceptions about the phenomenon being experienced are so intertwined as to be inseparable (Marton, 1981), the "credibility in a phenomenographic study is therefore mainly about the relationship between the categories and the data and is thus strengthened by quotations" (Stenfors-Hayes et al., 2013, p. 47). By collecting sufficient data and supporting the outcome space with quotations, internal validity and trustworthiness was possible.

Summary

This chapter shared the methodology that was used to investigate the perceptions art teachers have regarding digital art and how they use it in their classrooms. In this section I discussed the research design and rationale for conducting a qualitative research study in the phenomenographic tradition. In doing so I made the claim that perceptions of human phenomena are best studied qualitatively because experiences are difficult to quantify. I also supported the use of phenomenography by explaining how the second-order approach is best to observe and analyze the experiences of high school art teachers with digital art. I bracketed my experience by explaining my role as a researcher. I included details about my rationale and motivations for this study.

Additionally, I explored and expounded on the specifics of methodology such as the research setting and context, participant selection and recruitment, and data collections and analysis. I explained how I selected high school art teachers from the north Atlanta region of Georgia based on its criteria of a growing and thriving creative industry. I explained how data collection and analysis occurs within a qualitative study. I gave specifics on how I collected data using in-depth interviews and analyzing it and interpreting the results with the phenomenographic method of data analysis.

Lastly, I showed how I endeavored to follow the ethical considerations necessary to conduct ethical qualitative research. I showed that my study followed the principles of justice, beneficence, and autonomy. I also explained how the internal trustworthiness of my study is maintained using the principles of a phenomenographic study.

This chapter showed how I conducted a phenomenographic study. Chapter Four describes in detail the findings of this study, the outcome space. I also elucidate the perceptions high school visual arts teachers have regarding digital art and the implications of those findings.

Chapter 4: Findings

I conducted this phenomenographic study for the purpose of examining the perceptions of high school visual arts teachers regarding their experiences with digital art. I explored how these perceptions were shaped and informed by the teachers' preservice preparation and ongoing professional education, their proficiency with technology, their notions of the purpose of visual arts education, and their perceptions about the nature of digital art. I conducted the analysis according to the seven-step process as described by Sjöström and Dahlgren (2002). This process ensured that I provided answers to the primary research question: *How have high school art teachers experienced the phenomenon of digital art?* Additionally, the process elucidated answers to the specific areas of interest listed below:

- The perceptions high school visual arts teachers have about digital art
- How the preservice preparation and ongoing professional development of high school visual arts teachers affects their perceptions of digital art
- How high school visual arts teachers' use of and access to technology affects their perceptions of digital art
- How high school visual arts teachers' perceptions of the purpose and benefits of art education affects their perceptions of digital art
- How high school visual arts teachers' perceptions of digital art affect the teaching of digital art as a medium to students in the high school art classroom

In this chapter I describe the research findings in a way that provides thick detail (Stake, 2010). I explain the rationale for the structure of an outcome space. I then summarize the results of the analysis as an outcome space and provide a narrative account of the categorical descriptions that emerged from the data (Han & Ellis, 2019; Sjöström & Dahlgren, 2002).

Outcome Space

In a phenomenographic approach to research, the final categories of description are listed as a way of providing a "description of how the phenomenon is experienced" and do not represent the actual phenomenon, but instead "people's various way of thinking about their experience" (Sjöström & Dahlgren, 2002, p. 340.). According to Marton and Booth as cited in Han and Ellis (2019), each category should have three characteristics. First, there should be a distinct separation from the other categories either in characteristics such as focusing on different parts of an experience or differences in meaning. Secondly, there should be parsimony in the categories. Thirdly, there should be a logically defined relationship between the categories. According to Han and Ellis (2019):

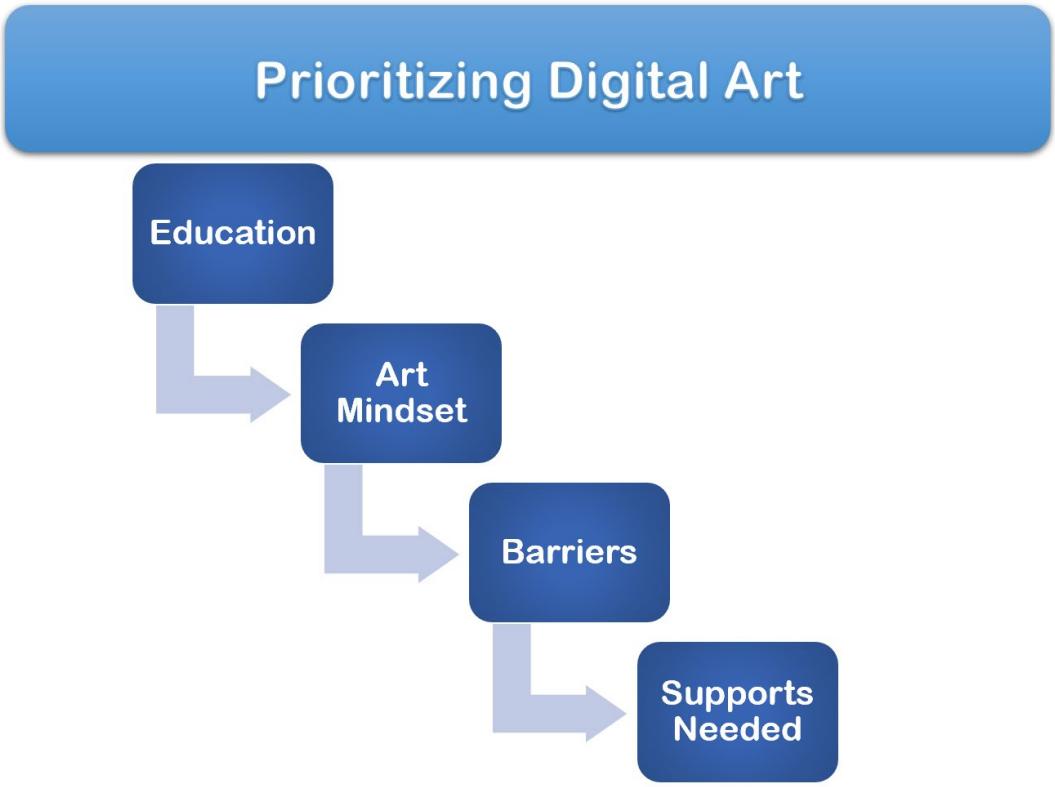
> The process of specifying logical relations amongst the categories helps pinpoint whether the variation is caused by: (1) failure to distinguish the phenomenon from its context; (2) unawareness of some parts of the phenomenon; (3) having different perceptions of the structural relations between the parts; or (4) a combination of these. (p.5)

Also, the premise of phenomenography is that the outcome space represents the possible experiences of the members of the group (Alsop & Thompsett, 2006).

In the case of the outcome space emerging from my analysis of the data generated by this group of participants, the categories were arranged in a descending hierarchy of importance with the most significant expression of experience being in the climactic spot. This hierarchy was in turn placed under an umbrella of an overarching response to the research question: *How do high school art teachers perceive the experience of digital art?* A visual representation of the outcome space is shown in Figure 7.

Figure 7

Visual representation of the outcome space



The categories of description do not necessarily represent the experience of all the teachers but are the different distinct categories of perception generated by the data. For ease in communication, I have designated the names of the outcome spaces in similar terms to the topics of interest defined in the research question. I have adapted the visual representation to the style presented by Han and Ellis (2019) to best illustrate a hierarchical organization of the outcome space. Table 7 depicts the relationships between the categories.

Table 7

Outcome Space of High School Art Teachers' Perceptions about Digital Art

Categories	Descriptions	Representative statements
Prioritizing digital art	Teachers believe that digital art is an important medium that should be taught to their high school students to prepare them for a 21st century creative workforce	"The media arts is technology integration, but also the design and the arts industry is really booming. And it's what's really needed as far as the student's knowledge, to get jobs later on, and to allow that creativity…school, I feel, is a starting ground with what we offer in classes." Michele
Education	Many teachers feel preservice training and professional development do little to prepare them to teach digital art	"Most of those relate a lot to academic subjects more like learning about animals, these things really are good for academic subjects. I don't find that many of them help anything." Imogen
Art Mindset	Teachers feel that they could learn to make and teach digital because of the studio habits of mind apply to all media	"I naturally am already more inclined to be more of a risk taker to understand what it's like to be vulnerable, and make mistakes and be okay with working something until it works." Anna
Barriers	Teachers believe that digital art is not accessible to all students due to barriers of access, proficiency, and funding	"I kind of feel like we're selling them short. Because I don't feel like I can fully prepare him for the future in the creative industries, because they need that technology component that we don't have in the art room on a regular basis." Clara
Supports needed	Teachers are aware of the technological and curricular supports needed to teach digital art	"I think on the most basic level, if the school is equipped for those types of technology, I think Adobe Illustrator, Adobe InDesign and Adobe Photoshop, I think that is a very good scope of vector and pixel based work…teachers should have a basic knowledge and understanding of AutoCAD." Quentin

In the sections that follow I provide a narrative account of the outcome space. The narrative is organized to correspond to the subtopics under deliberation relative to the research question: *How have high school art teachers experienced the phenomenon of digital art?*

Prioritizing Digital Art

The overarching category for the outcome space is labeled prioritizing digital art. This category is described thusly: teachers believe that digital art is an important medium that should be taught to their high school students to prepare them for a 21st century creative workforce. It is overarching because the belief in the priority of digital art guided the discussions of the teachers throughout the interview process. Exceedingly, and unprompted, there were multiple times during the interviews when the participants would center their responses on one central idea: digital art is an important medium. Under this theme they would situate all other responses. Therefore, I organized this category into three groups: the teachers' definition of digital art, the teachers' experiences with digital art, and the importance teachers place on digital art as a medium. I broke down the last into two subsections that explain why they think it is important.

Teachers' Definition of Digital Art

The participants in this study were clear in their assessment of digital art as a medium: it is a medium in the same way as other medium such as painting with oil or drawing with pencil. Clara summarized it succinctly:

> Digital art is just another medium. Whether it's acrylic paint or watercolor, it's another media choice.

When asked what her definition of digital art is, Imogen summed up what the other teachers also shared:

Imogen: Art that's made on a device such as a computer, a phone, an iPad, any kind of tablet. Something that's not made by hand but made by an electronic device.

Researcher: What about digital photography and stuff like that? Is it digital art, then?

Imogen: I mean, if it's photography, that's all digital. Yeah.

It was the participants' experience that any type of art medium that is created on a computerized platform is art, including photography and 3-D modeling. Even artwork that is manipulated digitally at some point would be placed under this definition by all the teachers. Michelle broadened the definition by expanding it to relate to all the media arts:

> Media Arts is focusing more on video production, animation, stop motion, and just a mix integration of technology. So especially with the different changes and shifts in technology, different web based and digital arts, I feel the difference between Visual Arts and Media Arts is being able to use technology to create art. And there's a lot of hybridization and fusion of different technology platforms.

The use of technology to create art defines digital art.

Teachers' Experiences with Digital Art

The teachers' definitions of digital art were uncomplicated and forthright; however, their experiences with it were not. The range of experience with digital art varied widely. There were different levels of proficiency with digital art and different personal preferences as to its aesthetic value. On one end, Quentin rated his proficiency with digital art as very competent. He supported his self-assessment by describing in detail how he created works for his master's thesis using digital art:

> What I do is I take it (a found object) back to my studio, and I deconstruct the sculptures. And what I do with them, is I study each of those objects by their parts. So, then this is

> where the digital component comes in, I actually draw each of those shapes through Adobe Illustrator. So, I'm creating vector files of these flat silhouette pieces that represent different parts of these nostalgic objects. And then I use a CNC machine on acrylic plastic, I use acrylic plastic, because the machine works very well. With a CNC machine. A CNC is like a laser cutter. It's a specific type of laser cutter. And what it does is basically, you put your sheet of acrylic into this machine, and then the vector file is transferred to the machine, and it cuts out the silhouette pieces for you.

On the other hand, Clara, rated herself as a complete novice:

> And I'm fascinated with what I see kids doing. Like I said, I don't really teach them anything about it. They teach me more about it, show me stuff when they bring their stuff in and do it. And I'm just fascinated with what they can come up with and all the layering that happens, and how they can edit it so quickly, and change it just by pulling out one layer or adding another layer. Yeah, I mean, I'm just I've just started learning about all that stuff a little bit.

Most of the others had some level of proficiency, especially with Adobe Photoshop. Susan for example, shared:

> I would not call myself a producer of it. I did it for that college class. I have basic working knowledge of Photoshop and Illustrator. And I mean pretty basic. I definitely admire it. But yes, (I'm) not a creator of digital art, but (I) definitely appreciate people who do. I know it's a huge skill set. I know there's a lot to be learned in order to be successful with it.

Several teachers had classroom experience teaching digital art in various forms. Erick taught Graphic Arts I and did collaborative work with a local car wrap company. Michelle taught media arts, a class that incorporates a plethora of technology to create various digital media.

> And then in media arts now we do stop motion. The students have created some awesome stuff. This they do collaboratively, like animations or film.

I was able to view her students' animations, films, and digital artwork at a public art show. Quentin taught applied design units to his students. Surprisingly, even teachers who currently taught digital art as a high school course were hesitant to assess themselves as completely proficient. Erick, who teaches graphic design, said:

> I need to spend my time actually getting good at digital art so that I can teach it.

And Michelle, who teaches media arts, also responded with:

> So, we look at, like the foundational aspects of using the technology in the classroom and then the technical aspects. Honestly, I'm just not innately super confident in it myself. So honestly, I use the students a lot more to help each other out.

Teachers varied in their personal preference for creating or desiring to teaching digital art as well. Clara admitted she is "fascinated by it". And Erick documented that he had collected 1300 images of art that he displays on his screen at school, most of it digital, cycling through the images one a minute:

> I get all this crazy artwork. And I can't tell you how many times over the year kids will look up in the middle of their work…they'll just stare at my wallpaper and be like, "That's awesome!" Like, yeah, that's digital art. "Who's that artist?" I'll give them it. I always look it up and make sure I save the names. And I'll show them the artists and I'd

> say six out of 10, three out of five times, the art is digital. Because that's what I collect. That's what I like.

Yet others preferred traditional mediums like oil painting. Anna admitted this preference explicitly:

> It's not something I personally am very interested in. Really, I've always been someone that just loves the smell of paint, the smell of an art studio, like getting my hands dirty and clay, just really kind of having the rawness of materials. And as just an artist and individual, I usually try to really disconnect from technology when I'm in my studio space. Just because it's kind of like, I just have these unlimited creative freedoms. But that's me personally.

Despite the wide variation in opinions of the medium as a personal choice, all the teachers were in agreement that it should be taught as a medium. This importance is explored in the next section.

Importance of Digital Art as a Medium

Teachers were united in their belief that digital art is an important medium to teach at the high school level. Their reasoning behind the level of importance of it was twofold. First, the participants recognized, based on their understanding of and experience with the creative industry, that the creative industry is dominated by the use of digital art. Second, they understood that many students are interesting in digital art as a medium and that those students are seeking opportunities to learn and become proficient in digital art.

Creative Industry Use of Digital Art. The participants agreed that the creative industry is growing and demanded a workforce skilled in digital art. The participants demonstrated a cohesive understanding of what defined the creative industry and how the appeal of the creative

industry was growing in Georgia. For example, Clara described several fields within the creative industry and the importance of digital art to the industry:

> There's always going to be fine artists that that use paint, that draw, that create, make sculpture, that use traditional (methods), that have found objects, and make art, you know, but if you're talking about a career industry like graphic arts, or even in the movie industry or something, they need that digital component. And I think to really prepare them for creative industries, we should have at least the availability to use some digital.

Imogen was a bit more explicit and gave a more detailed examples of possibilities of careers within the creative industry that involve digital art. In several instances she described how this will affect the potential university preparation for this industry:

> Students that I'm teaching now want to study graphic design and animation. I have students who want to go into interior design. They need to know how to use these programs, because that's what they're going to be using in college, especially things like, you know, animation or definitely graphic design.

And also:

> I think that art is all going (to technology). A lot of students who I have now are going on to study art in college…they've already been evaluated, students who are accepted into different schools. They've been accepted into their art programs, and they're going to study things like illustration, they're going to study graphic design, animation. They're all based on technology.

Imogen shared a detailed explanation of where she thought the industry was going when she described specific details of the industry and how people are making a living using digital art in

various ways as diverse as the creation of non-fungible tokens (NFTS) to the movie industry to architecture:

> Everything's going to be more digital. If you look at things like Art Basel in Miami this past year, we start reading about the art, it was all NFTs… everything was done, the art that was selling, it's all related to NFTs…right now where people are making money and art is selling these imaginary digital ideas that they that they're getting in. That's where it's going right now. I don't know how long or how sustainable that is. But that's where people are really like making money is things like that digital things. Gaming industries, huge designing games, animation, things like that…even if you want to go into things like working with film, it's all going in with such tools. So, I think even things like interior design, I've got a bunch of kids that want to do Interior Design. And they've done some architecture classes, but they also want to learn, and they need to learn to draw, so they take drawing, and it's still going to all end up like, you know, everything, every mockup you're doing for a client, is still going to be done on your iPad, it's not going to be done like old school ink and watercolor to show them their room. They want to see a digital copy of it. So, yeah, it's all it's all going to that.

Other teachers were in agreement. Michelle recognized that the shift toward technology is going to require a workforce that is also just as creative and technologically inclined and that there is a gap between how schools are preparing students and the demands of industry:

> I feel like within the visual arts classroom, artists are designing these technology fields or new platforms. And so, I feel there's a lot of different possibilities of what it could be. But as far as where we start with the training for the kids, they're already in it, but then it could really develop and elevate even more. It's kind of surprising to see. I always feel

> like there's such a huge gap in education with the way the economy, and the technology industry is moving… but also the design and the arts industry is really booming. And it's what's really needed as far as the student knowledge to get jobs later on, that, and to allow that creativity.

Quentin summed up the views of the participants when he said:

> It's an applied art. And it's an art form that is going to continue to evolve and become even more dominating in the art industry. So, it is just as big of a medium and of importance as any other medium that we use as students or teaching for teachers as a medium.

Student Interest in Digital Art. Not only did teachers adamantly feel that digital art is a skill necessary for students as they enter the creative workforce, but they also recognized digital art's intrinsic value to the students simply as an artform. Every teacher in this study described instances where students were already using digital art. Teachers recounted that students were using art on their personal devices because of their personal preference for it as a medium. Anna illustrated this:

> I think it's playing a huge role in students when you start talking to students…I really discovered that there are quite a few students who are using digital platforms, right off of their phones. Not even necessarily on an iPad or computer, but more like even just on their phone to create art …they enjoy it, and they connect with it.

Imogen echoed her sentiment and illustrated with a typical scenario in which she observed the students using digital art on their own:

> They have their own iPads. And some of them get them for Christmas or birthday, whatever, and then they get Procreate, and they do it (artwork) on their iPads, which is

> great. And some of them know a lot more about Procreate than I do. Sometimes I'll look, and they'll teach me some stuff I didn't know about it, because that's what they're using. And I'm more than happy for them to use that.

The participants described multiple cases where students were asking to use digital art in assignments as an alternative to traditional mediums such as graphite or painting. For example, Clara told of a typical situation in which students might ask to digital art, such as when completing their AP portfolio:

> They asked me, "Hey, can I use my tablet to do this and do (it) digitally?" Then I'll say, "Sure, you can."

She explained that the students are already using digital art:

> A lot of my students already do that, and I allow them to do it…I just allow them to use it as a media choice. Because they have it. They have it themselves. They have a tablet. They have Procreate, or some of this software and stuff that they can do it. So, I allow them to use that, because the way I look at digital art is, it's just another media, you know, whether it's acrylic paint or watercolor, it's another media choice. So, go ahead.

On the other end of the spectrum, Michelle, in a very technologically-equipped art classroom setting in which she is teaching her Media arts class, described her student's thoughtful reactions to being able to use and create with digital art:

> My students create phenomenal works. They are really engaged. And it's really beautiful to see some of the different styles. They really connect with like, "Oh, I can paint with a paintbrush online and it gives off that look!" And it takes a lot of layers and understanding of organizing and stuff. And it gives them a little bit more control. But it creates beautiful work.

Lastly, Imogene told how students and parents are asking for these classes in particular because they feel it should be an important part of the curriculum to prepare them for the future. She agreed. She explained how this occurs during course recommendation times:

> I think it's a class. We need to teach it. People come to me all the time. And they're like, "In the spring when we do course recommendations, I really want to take digital art next year." I'm like, "Well, we don't have that." And parents will ask about that. And they're very surprised that in the year 2022, we as a school don't have a digital art class, …because they're all like, "That's what my kid wants to study. They want to study animation. They want to study digital. That's what they want to go into."

Anna summed up both the student enthusiasm for digital art and the relevance of it to potential creative careers:

> I definitely think that it's important. I think it's a huge hook into the arts. I think that it's, it's a huge wave of the future. I mean, how many kids that you talk to want to be a video game designer? How many kids you talk to that, you know, they want to do something having to do with concept art, like, art is something else. You know, even illustration, you know, it's like moving in that realm, animation, any kind of anime.

In summary, the outcome space, prioritizing digital art encompasses the idea that the participants in this study believed strongly that digital art is an important medium to be taught in the classroom. It is vital to the curriculum because not only is it a valuable skill for future artists to learn to be successful in their career, but it is also natively important to students as an enjoyable medium to explore in the art classroom. In the next sections, I describe how the other categories of the outcome space proceed from this overarching category. I also explain how the categories

progress as a descending hierarchy of importance that flow from each other into a final concluding category.

Previous and Ongoing Education

The category of description called *education* is defined by how most teachers within this study feel that their preservice training and current professional development opportunities do little to prepare them to teach digital art in a technical sense. Their preservice training did provide other skills that do help with digital art such as an art mindset. The relevance of this mindset is discussed in later sections. This category of description specifically addresses the university preservice training or their subsequent advanced degrees within the art education field and also the professional development opportunities provided to them through their districts and professional development. It is the first category because it addresses the commonly held notion that preservice training and subsequent professional development are usually foundational pedagogical knowledge (Baker, 1979).

The first subsection of this category, preservice training, had the widest diversity in experience, with the newest teacher being least likely to feel unprepared by the university which they attended. The other, more veteran teachers were positioned along a spectrum in which they were in agreement that their preservice experience did not adequately equip them to be proficient enough with digital art to teach it adequately. At the end of the spectrum, the most veteran teacher did not feel that their preservice training provided any instruction in digital art mostly due to the fact that the technology (e.g., computers) at the time of their training did not really exist. Secondly, concerning professional development, none of the teachers within this study thought that the districts in which they were employed offered suitable professional development relevant to teaching art, much less any professional development that would equip them for

producing or teaching digital art. I break down each component of this category in the next two sections.

Preservice Experience

The teachers in this group are highly educated. Only one teacher, Erick, does not have a master's degree. One teacher, Clara, has a specialist's degree. Despite the education levels of the individual teachers, there was a consensus that their degrees were not helpful to specifically teach digital art. As was mentioned before, the opinions on this ran on a spectrum. Quentin, the youngest teacher and the only teacher who specifically attended a school completely devoted to art felt the most prepared by his preservice training. He described his preparation in this way:

> I feel really prepared to teach digital art. It's important, as a teacher to not only know the skills, but how they apply to what you're doing. So, what I mean by that is, "great, you created a graphic design." But now what I think with my experience using graphic design in many different industries, as a window display artist, in a branding perspective, as a sculpture major, I've kind of applied it to different areas of the art world. So, I think by having that experience of "where does that go next?" and then also the experience of taking the time to learn the platforms, I'm well prepared to teach graphic design fully one day.

However, his preparation did not stem as much from his undergraduate degree as from outside professional opportunities. In the quotation above he mentions his outside experience in the creative industry as opportunities to learn digital art rather than his undergraduate degree. He described another similar opportunity:

> Before I was a teacher, I did a summer program. That's where I was exposed to digital art called the Creative Circus in Atlanta. It was a 10-week program. It's basically a portfolio

> school. And it's meant for people who want to work in branding and advertising. So, there, I was exposed to the basic platforms of how to use Adobe Illustrator, InDesign, and Photoshop.

He was very confident in his ability to teach digital and create digital art but not necessarily because technical skills learned in his undergraduate degree.

On the other end of the spectrum is Clara. In her words, she was completely unprepared to teach digital art:

> Because when I went to school, it wasn't offered. Now, the college I graduated from, they have an animation program. They have a whole computer lab in the art department. But back in the 80s that didn't exist.

In the middle of the spectrum, Imogen, Susan, Erick, and Anna, all had some exposure to a form of digital art in at least one class but their assessments of them were that they learned how to use Adobe Photoshop or Adobe Illustrator on a basic level but not generally to the level they felt would be sufficient to teach it. Erick explained:

> Pertaining to digital art, I took one graphic design course in college. And our instructor, wasn't a professor, he was a freelance graphic designer who would agree to come in and just teach. And it honestly was pretty awful. It was pretty awful. And I think a large part of that, too, was that it was an intro level graphics course. And so, there were 20 of us in the class, and maybe five or six kids had a lot of experience with digital artwork with Adobe software. And the instructor…would really cater to the kids that knew how to use the Adobe software. So those kids got a really good experience with it. …Those of us like me that had no background in it, we really, really struggled. I tried to go to a couple of tutorial courses for Photoshop, and they were okay. But a lot of times what happened is

> that as they were, they were so specific on what they were trying to teach, that they would go off on whatever it was…informative, but it didn't help me complete my assignments. And so, it was it was rough.

With the exception of Quentin, as a group, these art teachers expressed the thought that the education from their respective universities during the time of their enrollment, was unsatisfactory in preparing to teach digital art.

Professional Development

If there was a broader range of views on preservice development, there was unanimity in their assessment of district-level professional development's role in preparation to teach or create digital art. Some teachers thought that their professional opportunities were sufficient for instructional practice related to teaching art in general terms. Quentin expressed this sentiment about his professional learning community model provided by his district:

> I think that's really that's been a really positive experience for me and my own professional development. Because what's great is, all three of the art teachers at our school do something different. I'm very graphic oriented, my other colleague is very ceramic/sculptural-oriented. And then our other colleague is drawing-oriented. So, we actually meet up once a month, and we kind of do our own projects together, where one of the teachers will guide us to work on a project and learn a new skill that we can eventually apply in the classroom.

Most of the others believed that the professional development opportunities were limited to unrelated material and not necessarily suitable for art instruction. Imogen expressed this point of view:

> Most of those relate a lot to academic subjects more like learning about animals. These things really are good for academic subjects. I don't find that many of them help anything.

Susan echoed her sentiment and more explicitly tied it to digital art:

> In Two Rivers County, I have not gotten any opportunities, at least from the county, to further my knowledge. And digital art, it would be something that I would pursue on my own looking for workshops.

None of the teachers said that their current district provided professional development specifically related to digital art in high school although Susan did have opportunities in CityVille School District:

> In CityVille County… we actually did have some professional development, where all of the art teachers would get together on PD days, and different professors would come in and actually train us on, on using some of those (computers) in our classrooms. And that was, I would say, maybe three or four different sessions we had in CityVille County that were like that.

There was a general dissatisfaction with professional development opportunities related to teaching art and teaching digital art specifically.

While teachers were generally less enthusiastic with the level of instruction on digital art in their preservice training and professional development, this does not mean that the preservice experiences were lacking. Indeed, in the next section I describe how many of the aptitudes and competencies that they learned in getting their art degree is beneficial and necessary in teaching digital art.

Art Mindset

The outcome space category, art mindset, a skill mentioned earlier, is described as how teachers feel that they could learn to make and teach digital art because the studio habits of mind (Winner et al., 2020) apply to all media. They believe these habits of mind are instilled in them through their education and experiences and that they in turn instill them in their students. Studio habits of mind are discussed in more detail in the review of literature, but they consist of critical soft skills such as being able to problem solve, stretch and explore, engage and persist, and persevere through difficulty. Teachers strongly felt that these were skills that they instilled in their students. Michelle said:

> I think art gives them an innate confidence as well as [a] guide in order to discover more naturally with everything that's around them. Art also allows them to express their creativity and to discover and create new things. That's constantly where the world is: constantly combining, infusing new things, learning how to be creative, taking ownership, and learning the steps on how to do those, as well as seeing how to elevate your skills. I think it's very powerful. And art also has the ability to give you a lot of freedom. But with all that freedom comes a lot of responsibility to be able to figure out and navigate how to do all of that and express it in what you think and how you interpret it.

These skills, mentioned above, were instilled in the participants both by their education and aptitudes that led them to pursue these art degrees. Anna applied these skills to herself when responding to a question of whether art prepares her for a changing art world that included digital art:

> I think because my undergraduate studies were in fine arts and visual arts, I naturally am already more inclined to be more of a risk taker: to understand what it's like to be

> vulnerable, and make mistakes, and be okay with, you know, working something until it works. So, I would definitely say some problem solving, thinking like an artist definitely. It is part of my daily grind.

This art mindset specifically addressed how teachers felt about teaching digital art and learning it themselves. When asked whether she could teach digital arts, Susan responded:

> I think it would be one of those things where I'd be learning a lot as I as we go, which I'm fine with, I'm comfortable with that. I taught the class, the course called digital design…I taught that for two years in CityVille County, my first year. And so that was Photoshop and Illustrator. And I felt okay about it. The kids also were really good about finding tutorials, online and undirected. So, it worked well. But I was very much learning with them. It would just be something where I would have to make sure I had enough time to really prepare, in order to do it justice, and to really help the students and I don't think there's anything wrong with being with your students and making it a collaborative effort. But you do want to maybe be one or two steps ahead, you know, just to have a bigger picture, you know, kind of where the class is going.

In their experience, the habits of mind such as developing craft and understanding the art world relates to all media, including digital media. Erick extrapolated on this position with an illustration from his teaching experience when he explained how these studio habits of mind specifically relate to digital art:

> I have a story for this, …we were doing perspective drawing, you know, two- and three-point perspective. And he (a student) was making a big stink about, he didn't need to know this, because he could just do it on his tablet. He didn't think he would actually use it. He might have been using Procreate—it's not really important. But he was fully

> convinced that he didn't have to use any of our in-classroom software, because he's like, "Well, I can just do this digitally. I could just do this digitally." And I'm like, "Actually, the foundational skills that we teach in traditional hands-on art translates directly to the software, like you might be able to use a perspective grid and Photoshop or whatnot, but it's not the same as knowing how that works." So, I think that the stuff that the ancients or the old masters figured out from the Renaissance to Baroque, like Caravaggio. I love his contrast, like that stuff. Well, that can be fabricated with digital art, and it can be taught in any way. I think what happens with the kids…is they try to be dismissive of the art techniques that have been established for thousands of years, or for hundreds of years, whatever. And my big thing is no, if you can learn to use a pencil to create, you know, value and scale and perspective, that translates over to digital.

In general, the participants observed that the skills that they teach and instill in their students, whether hard skills (e.g., drawing techniques, rendering value) or soft skills (e.g., problem-solving, creativity) are suitable for all media, including digital art. They recognized that the mindset was a native part of both their training and current classroom structure. This mindset translated directly into the belief that they could learn or teach digital art given enough time and resources to do so. In the next section, the teachers discussed specifically the barriers that they perceive impede high school teachers from teaching digital art.

Barriers

The fourth outcome space category is described as how teachers believe that digital art is not accessible to all students due to barriers of access, proficiency, and funding. This section is broken into these three facets to better explore them.

Barriers of Access

Access to technology is a perceived barrier to teachers teaching digital art and for students to learn it. Teachers in the Two Rivers district largely felt that they did not have the resources at all. Susan explained as she answers the question about how she uses technology in the classroom:

> I currently don't use a lot of technology in my classroom, because our resources are so limited. The extent of what I use technology, the way I use it right now is students can access all the course materials through our learning management platform through modules. And then they also turn in work electronically, learning how to edit their photos. So that's just really the extent that I use them. I might show a video or tutorial in class or link it in the module, but in terms of actually creating [digital art], that's not something I'm able to do right now. Because I don't have the resources.

For most of the teachers in this study from this district, technology was limited to Bring Your Own Device (BYOD) for students. Imogen explained how this works:

> I can teach them drawing, I can teach them painting, but if they want to work on any kind of digital art, they have to have their own technology. I do have a lot of students—I've got at least six of my AP students—doing digital, mostly digital based portfolios for their art. But it's not because of any technology we have. As far as a district, we don't have anything. So, they have to bring them. They have their own iPads.

Clara noted that even this is an obstacle because not all students have the software, even if they have the device:

> So just because I have an iPad doesn't necessarily mean I have the software on my iPad to do it…So, they don't have the software on the on those things …The ones that that

have been used in in my class, usually bring their own device, and they have the software.

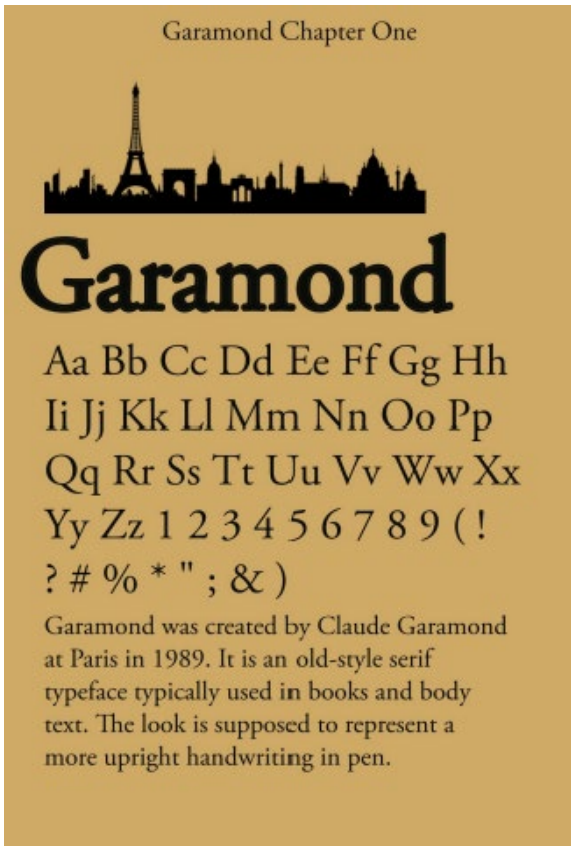
Some teachers had class sets of laptops, but that these were not sufficient to run the robust programs required for digital art. Quentin explained how he has to work around this issue:

> Right now, we do have laptops. What I would like to do for the future is I would like to teach my students, just the basics of Photoshop, InDesign and Illustrator, and then probably my advanced courses in AutoCAD. I think those are solid foundational graphic platforms that all students should learn, especially if they want to go out into the field and be creative. But for right now, for most of the resources I use, I use Canva a lot.

An exemplar of a student work from Quentin's classroom is shown in Figure 8 below:

Figure 8

Student work sample of typography infographic designed on Canva



Quentin also used other resources to try and accomplish his goals:

> What I have done so far is I use a lot of graphic platforms that are embedded in websites. So, things that are kind of user friendly with not only computers, but also mobile devices, because it kind of gives that accessibility to every student in the class.

Another issue is the reliability of the technology in general. Anna opined:

> I think it would be really frustrating, because I don't like not having control over a device. And knowing what computer teachers go through. I mean, just like a regular laptop cart, where it won't boot up, the student can't log on. They're logging on to this to this computer, and it's taking forever. And you know, what, if you have power outage, so then you've got a whole group of students that are just sitting there for that day. And that's what I think would be, to me the most frustrating and reason why I wouldn't want to do it is because of that.

The participants lamented the fact that even if technology was available, it was not in adequate numbers or suitable power to run the software. For example, Imogen shared her resource availability by saying:

> We literally do not have anything. I have two computers in my classroom. I think the other art classroom might have two computers as well. So mostly what those are for are just for students, if they need to research something, and don't have their own phone or something.

Michelle added:

> A lot of those students have some of their own computers and like technology that they bring in. But to be honest, there's quite a bit that don't have the technology and the Chromebooks that our school provides, which is, you know, we're fortunate to have, but

> just it doesn't have like the Adobe suite or the bigger producing kind of software. So, I don't necessarily have like big cameras or like the lighting,

The perceived barrier to access is a matter of digital equity. Simply put, some students have access to the technology that other students do not as a matter of economics. Some students have iPads, for instance, and use them in class to do digital assignments. This is perfectly acceptable under the BYOD policy of the schools. The students with personal tablets have access to learn digital art, but students who do not have this technology have no way to learn it, because the technology is not available to them. Imogen voiced this opinion strongly:

> I don't know that it's doing some of these people a service…It's good for the kids who can afford that. But what about the kid whose parents don't have enough money to buy them an iPad for Christmas, and they also want to do digital art? And I can't offer that to them. Because they can use pen so that you can do art or animation on paper with ink, which there's nothing wrong with that. But it almost creates…it's not equitable, because it's not their fault that their parents don't have enough money to buy them.

Even when schools provide the technology and equipment to learn digital art in the schools, such as the one of schools from the Lakeside district, there is still a matter of digital access at home. Erick explained when asked what kind of supports were needed:

> The big one that I can think as far as kids is, of course, going to be potentially home access. Because that's kind of already a problem. What happens with Graphics I is you get a couple of kids that fall behind in class. And then we make the whole pitch to all the to the admin and to the parents like, "Well, you know, you can access the Adobe Creative Suite from your home computer." And then you'll get the word back, like, "Well, our

> home computer can't run it." Or "my dad's doing work on it, so I can't use it." So, home access would kind of be a problem.

In Lakeside district, the software is available to download at home. Unfortunately, students without the technology at home are at a disadvantage when compared to their peers. They cannot download the software and are unable to complete projects that they get behind on.

Barriers of Funding

Several teachers brought up funding for technology in the arts as a perceived barrier. According to these teachers, technology is not funded by the general educational funds available to them through QBE (Quality Basic Education) funding. Imogen explained:

> Getting the actual equipment, the technology to use? They don't…It's not like…that's the main thing: we don't have it. And there's not any funds set aside to buy it. The budgets that art departments have are taken out of QBE, and you can't use QBE money to buy technology. So, I tried to buy even through…every year, because I teach AP class, then you can get money from the gifted budget for instructional resources. But, also, that money can't be used to buy technology either. So, it's like, nothing that we really have access to, can be used to buy technology.

Other programs such as CTE are funded well, but the technology is strictly used for that program and are also not available for use by art teachers to purchase the needed technology. Michelle said:

> I feel like I visually see a huge gap in the integration of technology within the classroom now, because it's an arts program. I feel like the state doesn't necessarily fund the arts as well as like, for instance, CTE, they get a lot of technology integration, which is a little bit surprising to me, because like, the media arts are technology integration

Teachers are forced to apply for grants to receive technology for use in the classroom. For example, Susan explained how she is trying to secure technology through these means:

> It's just, it's a lack of resources. I am working with our one of our media specialists, for writing a grant for ten iPads that would stay in my classroom, and we could incorporate them into the drawing curriculum. Not necessarily have a full graphics class or a digital design class but incorporate them into drawing and then the AP class as well.

The perceived barrier of inadequate funding was frustrating to the participants, especially to those who lacked even basic technology for student use.

Barriers of Proficiency

Even if the teachers were adequately supplied, there was concern among these teachers about their personal proficiency with digital art and their subsequent ability to teach it. Clara explained:

> They usually don't ask me, in fact, usually when they when we talk about them doing it, because usually they asked me, "Hey, can I use my tablet to do this and do digital?" Then I'll say, "Sure, you can. But just so you know, I don't know anything about this. So, I'm not going to be much help to you. But you can use it, you know?"

Several others voiced that although they do allow students to use digital art, they themselves are unable to help the student get better at it. For example, Anna illustrated this with a story:

> So last year, I had a student who was a digital artist, and she always wanted to be on her iPad… "I want you to be motivated, I want you to work with the materials that you choose, you know, and really create a portfolio." And she would, she would come, and she would work bell to bell on those digital pieces. And I just didn't see much growth. I really didn't see much growth with her textures, or her values, or even her knowledge and use of color was …it was just not the same as like if she was painting, and she hated

> painting she hated. … But man, she had such a work ethic on that digital platform that she would use. I mean, once she got in there, she was in the zone. And I did get some pretty good feedback from her because she said, "You know, you just don't critique me. It's like you're not able to critique me the same as these other students." And I thought, I think it's because I just don't know how to go about critiquing… But I think that's what it goes back to is I don't understand the technique. It's not like a drawing technique. And it's not like a painting technique. Like somewhere in between those. But it's not, it's almost like a combination of like, paint…Computer paint program.

Even teachers who teach digital art expressed a desire to be better trained in digital art. Erick expressed this thought in terms of his being able to continue to teach digital art:

> I need to personally buckle down and spend my time actually getting good at digital art so that I can teach it because like I said, I have this wonderful long-term goal. But if I don't get good, if I don't get good enough or confident enough that I can teach this material, it's not going to happen.

In total there were three major barriers to teaching digital art: lack of equitable student access to suitable technology, a lack of school funding to purchase these needed technologies, and a lack of personal proficiency with the medium of digital art. These perceived barriers to digital art frustrated and vexed the participants, and they expressed their desire to remove these obstacles.

Supports Needed

Even though these teachers perceived that there are significant hindrances to teaching digital art, they did not perceive them to be insurmountable. They articulated possible solutions. These solutions are described in the category of the outcome space called supports needed.

Expressly, the description is that teachers are aware of the technological and curricular supports needed to teach digital art. This category is separated into two distinct categories: technology needs and professional development needs. Technology needs are specifically the identified software, hardware, and other technical support that teachers envision as needing to successfully teach digital art. Professional development needs are those which pertain to equipping and training teachers for the endeavor of teaching digital art.

Technology Needs. The participants in this study agreed on many things, among them is the need for more technology in the art classroom if digital art is to be added to the curriculum. Teachers were very explicit in what they desired. Four of the teachers wanted iPads or tablets for their students with software such as Procreate and Adobe Suite. Imogen wanted iPads for example:

> I really want to just get some iPads, because…I think that's what we need. I think we need like a set. It doesn't have to 35. But I'd like to get like ten so the people who want to use them and want to learn things can have time to spend on that.

They wanted class sets of computers with sufficient capabilities to run these large programs. Additionally, they wanted equitable and quality Wi-Fi. Anna's needs were simple:

> Access to quality Wi Fi, and the access of updated…have a functioning set classroom set of computers where every computer works all the time.

Four of the teachers in this study did not have access to computers in the art room beyond what was available for checkout from the media center. Even the two teachers who worked in relatively well-equipped classrooms longed for equipment that they did not have such as lighting or webcams. For example, Erick said:

> I would like way more computers. I would like way more computers. I realized that's a big ask, especially because we they literally four months ago gave us 31 brand-new high-end computers, … I think there are at least eight to 16 gigs of RAM, so Illustrator and Photoshop do not slow them down. Which is amazing. Because at this time of the year before that when we had our older computers, you'd literally spend five to 10 minutes just trying to get everyone to log in now. Three minutes everyone's on. So that's a huge asset. I would like tablets or webcams if this was ever to come to pass.

The participants knew what programs should be taught in the art classroom as well. Quentin supplied a list:

> I think on the most basic level, if the school is equipped for those types of technology, I think Adobe Illustrator, Adobe InDesign and Adobe Photoshop, I think that kind of is a very good scope of vector and pixel-based work.

In summary, the participants of this study knew exactly what kinds of technology and software would be suitable for teaching digital art. They listed iPads and tablets as a priority followed by robust computers capable of running the industry standard programs such as Adobe Photoshop and Adobe Illustrator.

Professional Development Needs. In addition to technology, the art teachers interviewed in this study saw the need for professional training in digital art. As was mentioned in previous sections of this chapter, teachers felt that their professional development opportunities were largely unrelated to their actual needs in the classroom. Instead, they felt that they had to seek out any opportunity to grow in this area. They recognized that these opportunities would be an investment of personal time, rather than professional time. Therefore, the biggest need that

teachers saw was to have professional development days devoted to learning digital art. Below are several examples of how the teachers expressed this idea. Quentin said:

> I believe that there's got to be some form of training, I think if you were wanting to teach digital art, so if you go up to a teacher, and ask them to teach digital art, I think they would have to go through, I believe that school systems, public school systems should have some form of standardized graphic training that all digital art teachers need to go through before they begin working.

Susan added:

> Professional development days where maybe a chunk of that time was set aside for that purpose (learning digital art). Because in theory, Sure, I'd love to learn something new outside of school, but it's just that's easier said than done. I think an on-the-clock dedicated (to digital art) professional development would be really important.

Clara was enthusiastic about having opportunities to learn:

> I would be willing to take classes myself if they were offered to me if it were made available to me.

Erick was also eager about potential professional development days, especially if he could choose the subjects:

> I kind of wish it could be a little more like I could write the itinerary. If I could choose specifically to get a day long tutorial on Photoshop, Zbrush, Maya, that kind of stuff. That would be phenomenal.

These classes would be instrumental in teaching digital art skills as well as increasing the proficiency of the teachers. And these days would need to be allocated by the districts instead of involving personal time.

Summary

The findings in this chapter represent the outcome space of a phenomenographic study that I conducted to answer the question related to how high school art teachers experienced the phenomenon of digital art. The results I collected were obtained from in-depth semi-structured interviews with seven different high school art teachers from two different districts in north Georgia. This chapter analyzed the results in a manner consistent with the research analysis process consistent with Sjöström and Dahlgren's (2002) method of conducting phenomenography. By using their prescribed process, I was able to determine the outcome space of the art teachers' perceptions of their experience with digital art.

In the outcome space, I found that the art teachers placed high importance on digital art as a medium that should be taught to students because of its relevance to the creative industry as well as because of its intrinsic value to students. Teachers shared that they were not necessarily prepared to teach digital art based solely on their preservice and professional development experiences, but that those same experiences did provide them with the mindset that would prepare them to learn this medium. The teachers then expressed their concerns over perceived barriers to teaching digital art and yet also provided solutions to some of those barriers.

In the next chapter I discuss the relevance of these findings to previous research. I explore the implications of this findings for stakeholders. I explain the potential impact of the results of this study on theory and art pedagogical practice. I expound on possible implications for policy and standards. And lastly, I make recommendations for potential stakeholders based on the outcome space of this phenomenographic study.

Chapter 5: Discussion, Implications, and Conclusions

In this chapter I examine the findings to discuss three applications of this study. First, I summarize the findings of this study and describe how those relate to existing research that was first considered in the Topic Review in Chapter 2. I then explain the implications of the study to future art education practice and policy. Following that, I propose areas of research that could be conducted to build upon the findings of this study. Next, I discuss the limitations of this study. Last, I conclude with how I personally applied what I gleaned from this study in my classroom.

Introduction

Digital art as a medium is increasing in value as a skill for a 21st century creative workforce. Fields such as animation, character design, concept art, graphic design, and illustration all rely on digital artists (Concept Art Empire, 2021). The state of Georgia has become a hub for the recruitment and employment of these artists due to a rapidly growing and thriving movie industry that heavily relies on digital artists (Williams, 2021). In addition, high school art standards and ISTE standards provide support for the teaching of digital art in the classroom (Georgia Department of Education, 2017; ISTE, 2016; National Core Arts Standards, 2014). Therefore, it might be expected that high school art teachers would be at the forefront of educating this potential creative workforce, but this does not seem to be the case in many instances (Art of Education, 2021; Strycker, 2020). For these reasons, I conducted a phenomenographic study that investigated the perceptions seven high school art teachers in the state of Georgia have about their experience with digital art to understand what potential effects these experiences have on their teaching of digital art.

The research question that I attempted to answer in this study is:

1. How have high school visual art teachers experienced the phenomenon of digital art?

The following areas of interest related to this question were explored:

- The perceptions that high school visual arts teachers have about digital art
- How the preservice preparation and ongoing professional development of high school visual arts teachers affects their perceptions of digital art
- How high school visual arts teachers' use of and access to technology affects their perceptions of digital art
- How high school visual arts teachers' perceptions of the purpose and benefits of art education affect their perceptions of digital art
- How high school visual arts teachers' perceptions of digital art affect the teaching of digital art as a medium to students in the high school art classroom

To investigate this problem, I conducted a phenomenography, a type of qualitative research study that investigates the perceptions of participants on a phenomenon. It is an approach that looks at the second order perspective on a phenomenon rather than the experiences of the phenomenon (Marton & Dahlgren, 1976). I conducted semi-structured in-depth interviews with seven high school art teachers from two different districts in north Georgia in which I asked open-ended questions about their experiences with digital art, technology, art teaching experience, professional development, and preservice preparation. I gathered artifacts such as student work samples from the participants to triangulate the data generated from the interviews with the participants. I analyzed the data according to the phenomenographic research analysis process described by Sjöström and Dahlgren (2002):

1. Familiarization Step
2. Compilation step
3. Condensation step

4. Preliminary grouping step
5. Preliminary comparison of categories
6. Naming the categories
7. Outcome space

This outcome space is the findings of this study. I discussed the findings of this study in detail in chapter four. In the next section I provide a summary of the findings and discuss them in their relationship to the relevant literature and research.

Summary of Findings and the Relationship to Previous Literature

In conducting this study, I did find answers to the research question: *How have high school art teachers experienced the phenomenon of digital art?* The answers to this question are my understanding of the perceptions of these teachers related to their experiences with digital art. I have organized the findings for this study in an outcome space, which is an arrangement of the distinct categories of experiences configured into a hierarchy based on their relationship with each other. The outcome space that I determined from the results of this study has five distinct categories. The first category, which forms an overarching theme, is the importance high school art teachers place on digital art. The second outcome space is that the previous and ongoing education that art teachers have received do not necessarily prepare them to teach digital art. The third outcome space is the finding that preservice training did develop an art mindset of problem-solving and critical thinking that equips these teachers with the mental tools to learn digital art. The fourth outcome space is the finding that teachers perceived that there were barriers to teaching digital art. Lastly, the fifth and final outcome space is the solutions these educators perceive to the barriers. These outcome spaces are discussed in more detail in the next section when I relate them to the relevant literature. Table 8 provides a structure to the discussion.

Table 8

Outcome Space and Findings

Outcome space category	Findings
Prioritizing Digital Art	Digital Art is an important medium to be taught because of its usefulness in the creative industry Digital Art is important as a medium because it is valued by students and parents
Prior and Ongoing Education	Preservice education may not fully prepare art educators to teach digital art Ongoing professional development is often inadequate for learning digital art
Art Mindset	Art teachers have habits of mind that prepare them to learn new skills such as digital art
Barriers to Digital Art Education	Inequitable access to technology is a barrier to digital art instruction The art teacher's proficiency level in digital art can be a barrier Peculiarities of state and local funding can be a barrier to teaching digital art
Solutions	Specific professional development devoted to developing proficiency in digital art can be provided by districts Changes in funding rules could allocate more technology to art classrooms

Prioritizing Digital Art

The first outcome space is prioritizing digital art. In this category I describe how these high school art teachers place importance on digital art as a medium. I described this based on

their experience with digital art, their understanding of its importance to the creative industry, and their understanding of how it is important to students as a medium to be explored. This finding is relevant to the study's aim of determining how art teachers experience digital art because it answers the primary questions of how they understand their own experiences with digital art, and it explores how those perceptions provide the motivation art teachers have regarding the teaching of digital art in the classroom.

The teachers described their own experience with digital art in a range from being a novice to being proficient. Four of seven participants, even those that felt somewhat proficient at certain skills believed that they still needed to improve significantly if they were to try teaching digital art. This finding is consistent with similar results from Art of Education's national surveys in which they found that art teachers feel that they needed more instruction in digital art (Art of Education, 2021) and felt least comfortable with this medium.

Teachers in this study had a concrete grasp of the importance of digital art as a medium to be offered to students as a way of equipping them for potential career choices in the creative industry. This outcome is very important because it demonstrates that art teachers are professionals who are cognizant of the creative industry and the demands that it is placing on their students. They recognized the trends of how digital technologies such as digital art are shaping the creative industry. Their assessment shows that they understand the trends noted by Abbasi et al. (2017), who wrote:

> The increased Interaction of the creative sector with technologies has led to: (a) new forms of artistic expression and entirely new genres of art (e.g. new media art, digital art, video art); (b) new understandings of creativity (e.g. in-museum, in-theatre and in-gallery apps); (c) new materials, processes and tools for creative practices; (d) new business

> models, digital market places, consumer groups and distribution channels, as well as entirely new ways of marketing and selling creative products, tools, apps and services; (e) new forms of user—producer interaction and collaboration; (f) new virtual communities of creators and innovators; and (g) new forms of creativity, such as human-free and computational creativity. (p. 42)

This study showed that art teachers are aware of the huge potential for economic and career development of their students that is a result of the creative sector's burgeoning use of technology that is creating jobs. This link between creative industries and Information and Communication Technologies (ICT) is established in the literature (Abbasi et al., 2017). In fact, Schoales (Schoales, 2022) showed that there tends to be a clustering effect in which certain creative industries, such as film, attract and retain large pools of creative talent and services to a specific geographic area. Specifically, the film industry relies on artists for a variety of services. According to Schoales (2022), artists and related workers:

- Formulate design concepts and presentation approaches for visual communications media, such as print, broadcasting, and advertising. Direct workers engaged in artwork or layout design.
- Create or reproduce hand-made objects for sale and exhibition using a variety of techniques, such as welding, weaving, pottery, and needlecraft.
- Create original artwork using any of a wide variety of media and techniques.
- Create special effects, animation, or other visual images using film, video, computers, or other electronic tools and media for use in products or creations, such as computer games, movies, music videos, and commercials. (2022, p. 5)

Artists who work in these film industries benefit from the huge economic impact these films have. For example, *Black Panther* and *Avengers: Infinity War* which were partially filmed and produced in Georgia, grossed $1.3 billion and $2.0 billion respectively (Schoales, 2022). This study showed that participants were very aware of this effect in their home state of Georgia and wanted to prepare their students accordingly.

The art teachers also recognized that students are wanting to make digital art. Ramadhan et al. (2022) noted that although students still enjoy making traditional manual art, they enjoy making digital art because it is perceived as a hobby they can enjoy, it is more comfortable, allows for a more flexible timetable in its creation, and for some students it is easier and faster to create. Teachers' observations that students were already engaged with digital art aligns with observations of other researchers who note that adolescents are creating digital art and interacting with each other as a way of building community and exploring interests in cultural phenomena such as comics, anime, and manga (Manifold, 2009; Olson, 2016). This study illuminated more detail on how students are interacting with digital art specifically with personal iPads in the classroom, which builds on previous work by Wang (2018) who demonstrated iPads promote student engagement.

Prior and Ongoing Education

The second outcome space of this study indicates that teachers did not perceive that their preservice training nor their ongoing professional development opportunities provided adequate preparation to teach digital art. Although one teacher, Quentin, felt suitably proficient to teach it, he amended that the bulk of his proficiency was due to training outside his preservice training or professional development. This finding is important to the research question because it helps provided insight into reasons why art teachers may not teach digital art in the classroom. It

specifically addresses the point of interest of the roles of preservice and professional development and how that effects art teachers' experience with digital art. This finding supports Patton and Buffington's (2016) previous conclusion that art teacher preparation programs focused on things other than technology and its use in the art classroom. It is also consistent with research by Paquette (2018) in which he determined in his doctoral thesis that even university programs designed to produce proficient digital artists were consistently deemed by the industry to produce inadequately prepared artists. Furthermore, the outcome space aligns with Ingram (Ingram, 2019) whose research showed that professional opportunities to learn relevant art pedagogy, much less digital art, are extremely limited.

Art Mindset

The third outcome space is the finding that preservice training did develop an art mindset of problem-solving and critical thinking that equips these teachers with the mental tools to learn digital art. Art teachers give their students an opportunity to explore many different mediums. These experiences are not merely intellectual, but sensory encounters with different media such as clay, paint, fabric, and ink. Each medium comes with its own challenges and idiosyncrasies. One of the oft repeated phrases in the art classroom is "process not product". This statement refers to the mindset that is instilled in art teachers as they prepare to teach. This is a focus on experimentation, risk-taking, persevering through failures, and being open-ended in outcomes which are the traits sometimes called the studio habits of mind that are espoused as central to being an artist (Winner et al., 2020). Winner et al. (2018) also suggested, in an application of those habits, that pedagogically speaking, art is about pushing beyond expectations; being challenged to play and experiment with new materials and tools. These are the very traits that art teachers in this study perceive are characteristic of themselves when they reflected about whether

they could teach digital art in the future. From personal experience, I observe that art teachers often have to learn new skills in the classroom when they teach a new medium they would like to explore with their students. These art teachers understand that they could learn the skills because they have these studio habits of mind (Winner et al., 2020). This mindset is relevant to the teaching of digital art in that the tools for creating digital art are often difficult to learn and that often the artist eventually has to be able to teach themselves the skills of the ever-evolving software (Lesage & Smirnova, 2015). There are different experiential aspects in digital art than in traditional mediums. Yet, these teachers perceive that they understand the difficulty in learning digital art but are willing to take the risks and have the problem-solving skill set to do so.

This finding is relevant to the aim of this study because how the art teacher's understanding of the purpose of art education affects how they teach digital art. In this case the art mindset provides a supporting role in learning a new skill. Because teachers feel equipped and empowered by the soft skills that they teach, they feel equipped to learn a medium that can be challenging to learn for novices, such as using Photoshop to create digital art (Lesage & Smirnova, 2015).

Barriers to Digital Art Education

The fourth outcome space of this study entails the perceived barriers art teachers in this study determined hinder the teaching of digital art at the high school level. They understood that there were three significant barriers to teaching digital art in the classroom: barriers of access, funding, and proficiency. This outcome space answers a primary question raised in this study: why are teachers not teaching digital art at the same level as other mediums? The reasons

provided by the teachers are that these barriers hinder teaching digital art on many levels and frustrate their efforts to teach this important medium.

Barriers of Access. The barrier of digital inequity created by differing degrees of technology access was highlighted by the teachers as a primary issue. They felt that students did not have equal access to the tools necessary to work on digital art. For most of the teachers this was because they did not have the technology in the classroom, and therefore only students who could afford the technology personally had access. Even in schools generously equipped had issues of inequitable access to technology at home. This finding corroborates what Supovitz & Manghani (2022) uncovered after the Covid 19 pandemic:

> In normal circumstances school can, at least to some extent, ameliorate aspects of inequity because differences in family resources can be augmented by additional school resources and supplemental services. But the closing of schools during the initial phase of the pandemic meant that students had to have adequate technology, internet access, and technological capability to participate. Inequity of access to these resources exacerbated disparities in students' educational experiences. (Supovitz & Manghani, 2022, p. 274)

In visual arts classrooms there are disparities created in the educational experiences of students if technology is not provided by the district. This digital divide (Gorski, 2005) has been noted in general terms in the literature as a barrier created when differing resources are allotted based on factors such as income, gender, race, and class (Resta & Laferrière, 2008). This study helps shed light on specifically how access to technology affects art instruction. For example, it illustrates an unintended consequence of BYOD on art instruction. Those students with access to personal technology can explore digital art as a medium and those without it often cannot. The inability of some students to participate in digital art due to policies like BYOD is an important finding.

Barriers of Funding. The barrier of funding was seen by the art teachers as a primary reason why the inequities of access existed. Funding for art education has always been an issue noted in the literature with funding waxing and waning through the decades (Conkling & Kaufman, 2020; Dobbs, 1989). Delacruz attributes much of this defunding of arts education as being directly attributable to the institution of standards-based accountability programs such as No Child Left Behind, which place higher priority on subjects more suitable to testing such as core academics rather than the arts which are more in the affective domain (Delacruz, 2004). State models of funding also present challenges given variability across state lines and include either local raising of monies through taxation, state redistribution of taxes, or a mix of both (Epstein, 2011). The allocation of funds can create inequities if the availability of funds is tied directly to the socioeconomics of the individual districts. Richer school districts with broader tax bases will have access to more funding for such expensive educational resources such as adequate technology (Epstein, 2011).

Teachers in this study also note that certain funds are only allocated for CTE or Quality Basic Education (QBE) funds. Their observations are correct. Monies are obtained through state grants from the Perkins Act which are only available specifically for CTAE classes (Dortch, 2012). QBE funds are only available for direct instructional cost such as salaries, textbooks, and consumable materials, and equipment replacement and are not generally used for technology (Davis & Ruthotto, 2019). The results of this study reveal that peculiarities in funding can adversely affect art teachers in highly specific ways not accounted for in the literature and are worthy of investigation.

Barriers of Proficiency. The third barrier perceived by the teachers in this study were barriers in proficiency. The teachers in this study determined that a lack of teacher proficiency in

digital art skills is a present reality and could be improved. Even though one teacher in this study felt fully equipped to teach digital art, he stated that many art teachers would need significant education to be able to adequately instruct this medium. There is little research done in this area in the literature since the early 2000s, however this study does corroborate the most recent surveys conducted by the Art of Education University which found that art teachers were least comfortable with teaching digital art with only 25.23% of respondents feeling most comfortable with teaching digital art. 58.57% of responders reporting that they wanted to learn more about digital art in the upcoming year. Lack of training in the use of technology in the visual arts classroom has been noted by other researchers (Patton & Buffington, 2016; Strycker, 2020), but not specifically how teachers were trained to use technology for digital art. This study helps provide additional information about how art teachers use and want to use technology for the purposes of digital art.

Solutions for Digital Art Education

The last outcome space is important to the study's aim and focus because it depicts the perceived solutions art teachers have to the barriers that they described. Their solutions were simple: more allocation of technology to the high school art room and specific professional development tied to the objectives of learning digital art. This finding is important because the voices of art teachers regarding these two topics are to the best of my knowledge, not explored in the literature. These solutions are specifically the proposed resolutions provided by the participants. Other solutions (e.g., preservice preparation changes, legislation) are presented in the implications for practice in a later section.

There are limited studies on how art teachers might use technology (Delacruz, 2004) but there are no studies that I am aware of that raise awareness of the desire of art teachers to have

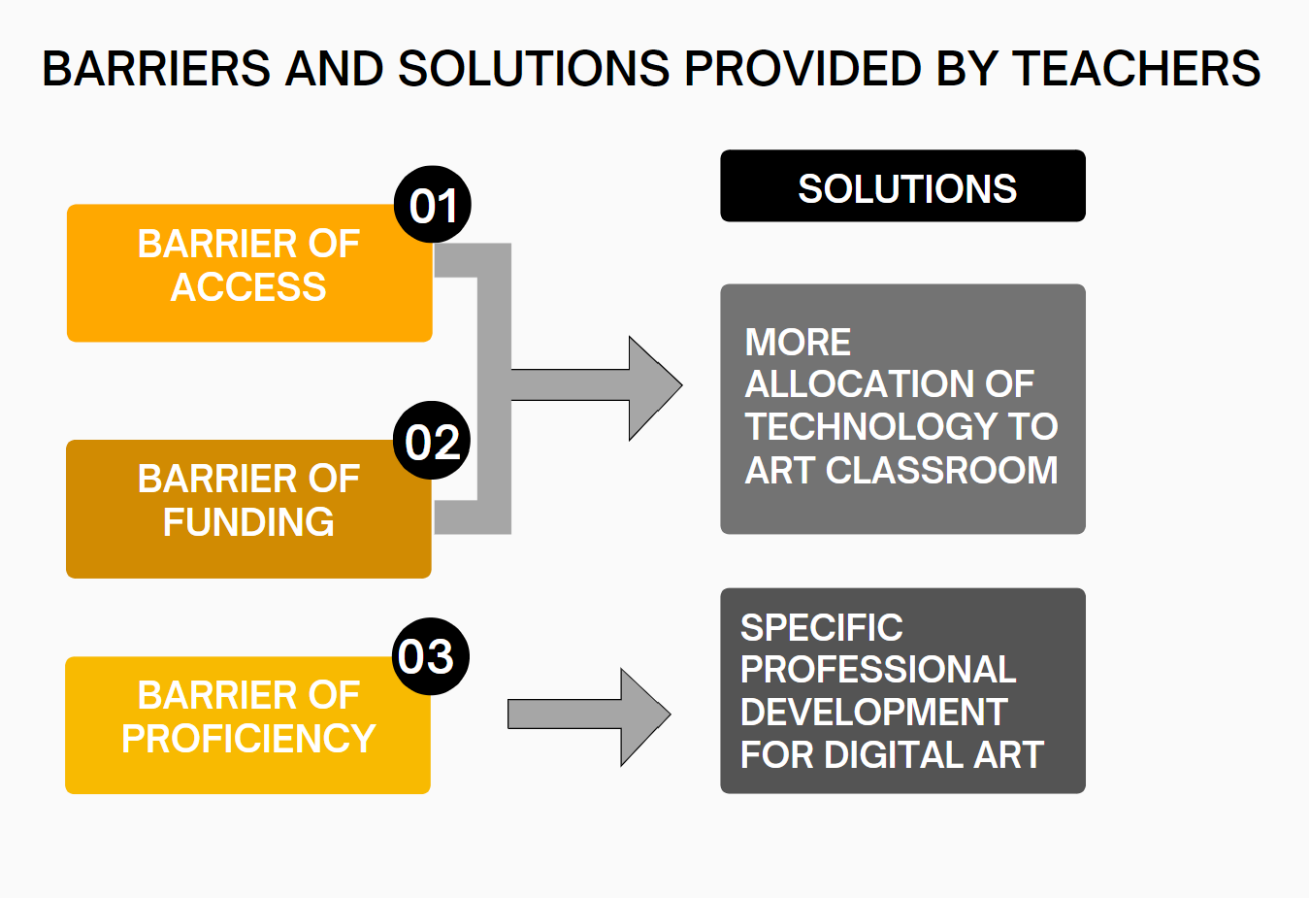
more technology and how they would use it if they had it. There is a significant study that looks at the professional development for art teachers and designs a model to address the professional needs of art teachers by incorporating national art standards and building up professional morale (Allison, 2013). In this study they concluded:

> In order for professional development to be effective, teachers must see the connection between the activity and their work as art teachers. There must be a perceived relevance of the content of these experiences to the skill set of the teacher's particular discipline. Designers of professional development experiences therefore should ensure that the content of their designs meets the needs of the individual teachers' situation. (Allison, 2013, p. 189)

Even though Allison's study did explore in depth a professional development model suitable for art teachers, it did not specifically explore the voices of the teachers and what they wanted to become more proficient in. This study on the perceptions of the experiences of high school art teachers with digital art is important because it provided a voice for some art teachers and those voices expressed that they wanted opportunities for art educators to provide students digital art instruction. These voices expressed a problem and also some solutions. The solutions provided by the teachers provide insight into the thinking of art teachers regarding complex issues such as funding for technology funding. Figure 9 shows the barriers described by the participants in this study and their proposed solutions.

Figure 9

Barriers and solutions provided by teachers for digital art



Outliers in Findings

There were outliers to the findings that bear discussion. As mentioned earlier, there was one teacher, Quentin, who felt very confident in his ability to teach digital art. His confidence came from exposure to an in-depth portfolio building program outside of his preservice experience. This exposure could have built upon and scaffolded his prior knowledge of digital art that he obtained earning his MFA. Even as he recognized his personal proficiency, he also spoke of the need for expertise he perceived was necessary for teachers if they endeavored to teach digital art. He was also the youngest teacher and least experienced. It is possible that being the

closest to his preservice exposure to digital art, he remembered more fully his training than teachers who were further removed from their experiences.

Other outliers are the two teachers who did not particularly want to use or learn digital art. Anna and Susan both expressed that digital art was not for them. They did acknowledge its importance and place in the curriculum and felt that it was a beneficial and relevant skill for students to learn. This is a notable finding because it shows that even though a skill is important, it does not necessarily mean that all should teach it. Instead, teachers could have the opportunity to teach to their strengths and also have the opportunity to develop their weaknesses into strengths. Teachers who wish to teach digital art and to improve their skills could be afforded the opportunity to do so if changes were made. These possible changes are discussed in the next sections.

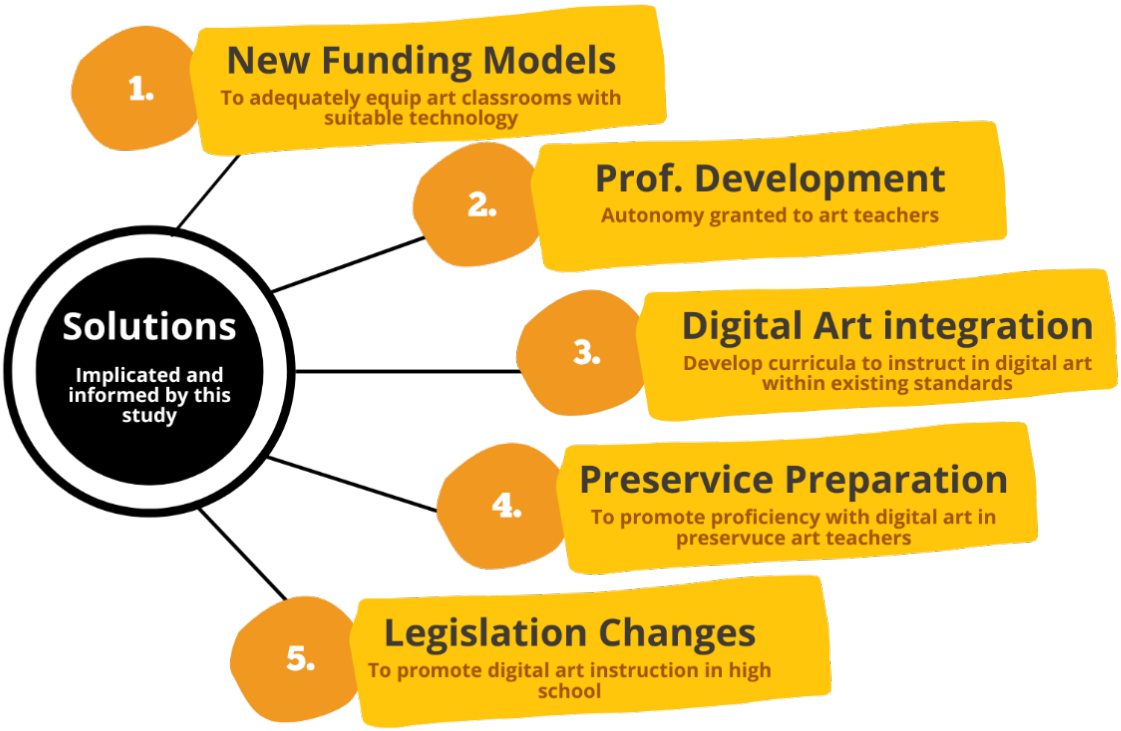
Implications for Practice

The solutions the art teachers proposed in the final outcome space provide an auspicious framework for the implications for practice. There are five major implications for practice in art education and each is addressed in the sections to follow. The first would be to develop a funding model for technology that would adequately equip art classrooms with suitable technology for developing technical skills for the increasingly technology-driven creative industry. The second would be to create a professional development model in which art teachers chose their own content and curriculum. The third implication is to design educational curricula within existing standards that empowers and equips the instruction of digital art to better prepare students to enter the creative workforce with experience using digital art. A fourth implication is a change in how art educators are equipped in preservice preparation at the university level could provide more opportunities for digital art proficiency. The fifth and final implication is changes in

legislation could be made to promote art instruction which specifically prepares students for entering the creative workforce. This last implication if implemented could provide the necessary impetus for the first four. I explain the rationale of each of these implications in this section by relating them to the outcome spaces in this study. Figure 10 provides an overview of these implications.

Figure 10

Implications for practice



New Funding Models for Technology

Traditional funding models for education in the state of Georgia were developed in the 1980s. This system is based on the number of students enrolled and monies are allocated to school districts based on their population and after deducting local fair share, or the amount the state determines is the jurisdiction of the local district. This money is used for salaries and

specific educational expenses. It does not include technology (Davis & Ruthotto, 2019). One finding of this study is that teachers perceived that there were barriers to teaching digital art because of lack of access to technology which was in turn created by a lack of funding available to them for said technology. This lack of funding is directly attributable to the state's outdated model of QBE. A new model of funding is needed in which technology is included in the funding models. Current models of funding only allocate approximately $45 dollars per student for textbooks and educational materials and is very specific in how the money can be spent (Davis & Ruthotto, 2019). This amount needs to be substantially increased and the writing of QBE needs to be amended to allow QBE funds to be used to purchase educational technology. An increase to even $300 per student for educational resources would allow schools to purchase quality equipment such as tablets and robust computers capable of handing the software needed for preparing students for careers in the creative industry. Even if QBE funds were not increased, simply rewriting QBE to allow more flexibility in how the funds can be spent would allow schools with needs for technology in their art rooms to purchase the necessary equipment.

If QBE could not be altered, potential solutions could be increasing awareness of grant opportunities to art teachers interested in obtaining technology for their classrooms. Conversely, developing resources lists of free or nearly free web-based programs might help teachers offer digital art opportunities to students with devices not immediately available for digital art. For example, websites like www.canva.com could be used to develop graphic art.

Empowered Professional Development

A second implication of this study is the need for empowered professional development. This implication arises from the outcome space, *solutions*, in which the teachers expressed specific kinds of professional development they want. The teachers wanted scheduled in-service

time to practice digital art as well as direct instruction on digital art. Specifically they wanted instruction in software such as Adobe Suite, Maya, and other digital art software. They also want to have professional development in which they set the agenda for learning so that the time was relevant to their specific needs. This could be accomplished by using professional development days to bring in professional digital artists or art teachers who are highly proficient in digital art to train teachers and teach how digital art can be taught in the classroom. Teachers could spend additional time on these days setting their own agendas to explore specific artistic and technical skills and develop ways they could teach these topics to their students. Research shows that in even very short periods of time, students can become proficient with digital art to industry standard levels if properly taught (Paquette et al., 2016). If teachers were allotted this kind of professional development, they could realistically increase their proficiency in teaching digital art to comfortable levels allowing for increased and improved instruction in this medium deemed an important and relevant subject by the participants in this study.

Digital Art Instruction Integration within the High School Curriculum

The third implication of this study is that it could be beneficial to revisit educational curriculum and standards that acknowledge the significant role that high school art education plays in the development of qualified artists for the creative industry workforce. The single most important outcome space of this study was the recognition of the fact that digital art could be a priority for high school art education programs because of its impact on educating and preparing students to enter the creative industry. Participants in this study iterated the importance of knowing how to use digital mediums as a prerequisite tool for being competitive in the future. An implication of this is that since current standards for visual arts already situate digital art in

the curriculum, instructional material can be developed that allows teachers to teach digital art within the high school art classroom.

In the NCAS and Georgia Performance Standards for the Visual Arts, strands exist that address the use of various technologies to create a variety of artworks. These artworks could include digital art. There is currently in the NCAS a section on the media arts. Within this strand, there are standards that can empower art educators to teach digital art to their students with the justification of the standards supporting their educational choices. These curricular changes need not be onerous burdens added to an already overwhelming load of material that could be taught. There are a variety of paths districts and teachers could take to begin to incorporate digital art within the existing structures of art education. I explore three of them in the next paragraph.

These pathways to integrating digital art could range from the creation of specific digital art courses to the development of instructional units, to the simple integration of digital art into individual lessons. As to the first suggestion and as an example, there are already courses developed within Georgia's Visual Arts Standards that provide for the instruction of digital art (Georgia Department of Education, 2017). Among these are Digital Design, Applied Design, and Graphic Arts. Districts within this state could add these to existing course offerings to provide teachers an opportunity to teach these classes. The second pathway is a pragmatic step. Teachers could develop an individual unit with lessons that instruct students in the basics of digital art. This could allow teachers a quick dive into digital art. Lessons in these units might include the basic vocabulary and tools used in digital painting or the method of using layers to achieve certain effects. A culminating project could be a practical real-world application of digital art such as an illustration for a book or an advertisement. The last suggestion may be the easiest to achieve and assist teachers in being successful. Educators could add digital art components into

already existing lessons. For example, art teachers could add digital typography to units they have on inking and calligraphy, and have students develop artwork that uses a digital font to be printed and added to a collage.

These are merely suggested ways of adding curriculum that instructs students in digital art. Art teachers, as demonstrated in this study, are capable problem-solvers. Given the resources, opportunities, and support, they are more than able to create other ways to add digital art to the curriculum.

Changes in Preservice Preparation for Art Educators

Notably, the participants in the study did not offer any suggestions that university preservice programs change how high school art teachers are prepared for teaching students digital art, even as six of the participants did not especially think that the degrees earned prepared them for this subject. A recommendation for practice could include adding specific courses designed to instruct potential art teachers how to teach digital art if such courses are not available in the college curriculum. This might also involve specific courses in the basics of digital art that might be encountered at a high school level. Many universities offer studio concentrations as elective choices (Georgia Southern University, 2020; Georgia State University, 2020; University of Georgia, 2020; University of North Georgia, 2020). Perhaps it would be beneficial to encourage potential high school art teachers to take classes in digital art. This could allow teachers, even those not inclined to teach digital art, an opportunity to instruct their students who do value it.

Changes in Legislation

A simple solution to sanction all the implications mentioned in the previous sections could be to enact legislation to build and encourage digital art instruction in the arts classroom.

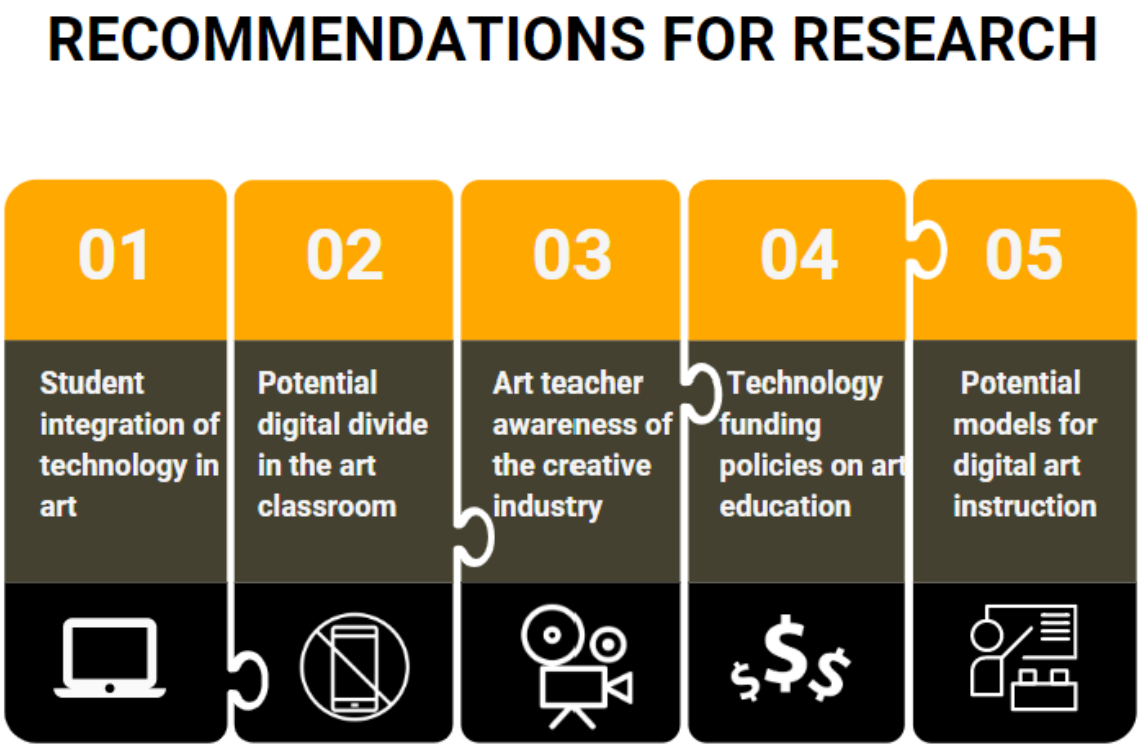
In the same way that the Perkins Act (Dortch, 2012) created the various CTE programs, an educational bill specifically directing schools to provide digital art instruction in high schools could enable districts to make the necessary changes in curriculum, funding, and professional development to teach digital art. The Perkins Act caused states to devote many resources to the development of specific standards for agricultural, technology, and engineering-based classes. Additionally specific funding was supplied to empower these programs. If a similar legislation was written for digital art in the context of the art classroom, programs could create pathways for digital art that include not only the technological aspects but the aesthetic principles. Funds dictated by this potential legislation could adequately fund many art rooms with robust technology suitable for the creation and instruction of digital art. And lastly, such legislation could also provide an impetus for universities to change or supplement programs to equip future art educators to teach digital art.

Recommendations for Research

In addition to the implications to practice because of this study, there are implications for further research as well. There are several areas of research that could be conducted that would extend or enhance the findings from this study. There could be more research into (a) technology integration in the high school arts classroom looking at specific ways students are using technology; (b) the potential digital divide that has not been explored in the literature pertaining to art education; (c) teacher awareness of the creative industry's technological demands; (d) policies that allocate funds for technology specifically as to how it relates to the arts; and lastly, (e) potential models for increasing digital art instruction in the classroom. Figure 11 shows the areas of potential research in a chart for clarity.

Figure 11

Recommendations for further research



Student Use of Technology to Create in the Art Classroom

Whereas this study primarily investigated how high school art teachers experienced digital art and secondarily looked at how they experienced technology in their classrooms, much was uncovered about how students are using technology to create art in their classrooms. Limited studies have been conducted which look at how art teachers are using technology in their classroom (Strycker, 2020). Few studies have also been conducted which examine how students have used technology to display their work in digital portfolios (Fahey & Cronen, 2016), but research is sparse that specifically looks at how high school students are using technology to create artwork. Studies of teacher interactions with students relating to technology informs educational models such as TPACK (Mishra, 2019), but these studies often leave out specifically

how TPACK relates to the arts. Further research in this area could show how pedagogical content skills relate to teaching art interact with technological content skills. Specifically, this could involve how to teach students who may be more proficient at the technological skills than the teacher such as a greater proficiency with digital art. Such research could be impactful in art education programs as they pertain to technology.

Digital Divide in the Art Classroom

Much has been written about the digital divide (Gorski, 2005; Resta & Laferrière, 2008). The digital divide is defined as the phenomenon where some students have home access to adequate technology for education and others do not. The inequity produces a "divide" in educational outcomes such as achievement, academics, and the ability to participate in their education. Researchers have looked at how inequitable distribution of technology to students affects various subjects including science, math, and even general education (Gorski, 2005). Studies have been conducted on how the digital divide affects certain sectors of society (e.g., race, socioeconomic status) and the resulting implications (Resta & Laferrière, 2008). There is, however, an apparent gap in the literature in how inequitable distribution of technology affects art students. More research could uncover the whether the claims of the participants of this study, namely, that digital inequity prevents some students from being able to make digital art, is a universal phenomenon experienced by many in different communities or an outlier. Research in this area could also examine other specific outcomes of this divide, such as whether this affects how art teachers use instructional technology. Further research could also uncover potential solutions to this divide.

Teacher Awareness of the Creative Industry

Another facet of digital art raised by this study was the perceptions art teachers had of the requirements of the creative industry. They deemed that the creative industry (e.g., movies, graphic arts, illustration) are becoming increasingly reliant on technology to produce art. It is almost cliché in education when teachers tell students that "in the real world" students will encounter such and such. Yet, how aware are teachers of the requirements of the real world? This might be a form of content knowledge that could be explored further. As far as I am aware, there is little research conducted on the perceptions of art educators on the creative industry. Studies could be conducted to examine how accurate this assessment is. Further research could discern the extent of teacher's knowledge of specific facets of the industry and how they acquired this knowledge. Research such as this might change how we prepare art teachers in preservice. If for example, research implied that art teachers were unaware of industry workings, universities might desire to require internships for potential art educators.

Policies for Technology Funding in the Arts

As I stated earlier, the results of this study uncovered how peculiarities in funding can adversely affect art teachers in highly specific ways not accounted for in the literature and are worthy of investigation. As a result, this study specifically raises questions about how state policies for funding such Georgia's policy for funding apply to the arts and technology. This invites study for examining how technology funding for the arts is taking place in other areas of the country and what impact this has on preparing students with the technological skills they might need to be prepared for the creative workforce. There could simply be research that (a) examines different school districts to compare and contrast how they raise funds for and use technology in the arts, (b) how different kinds of funding models have impacted the arts, (c)

exploring alternative forms of funding, and (d) how these alternative forms compare to traditional models of funding in terms of technology use and procuration. Research in this area could shed light on best practices for funding for the arts and promote policies that increase technology funding for art education.

Potential Models for Digital Art Instruction

A third area for research could be into potential models for pedagogical practices of digital art instruction. As I stated earlier, there are no studies that I am aware of that bring attention to the desire of art teachers to have more technology and how they would use it if they had it. Currently, there are very few models for digital art instruction in the high school classroom although research into potential models for teaching teachers how to teach digital game design has been conducted (Patton, et al., 2020). Patton et al.'s study looked at how video game design instruction in preservice education could potentially affect future digital game design instruction in the classroom. They recommended that more research could be done to collect data about this field. This study builds upon the work by Patton et al. (2020) by leading to questions about best practices for teaching digital art. The participants in this study queried specifically about how they could be better teachers of digital art. If models for digital art instruction at the high school level were created and examined by other researchers in classrooms, the results of these studies could provide valuable tools for improving instruction in digital media.

Personal Professional Applications in Practice

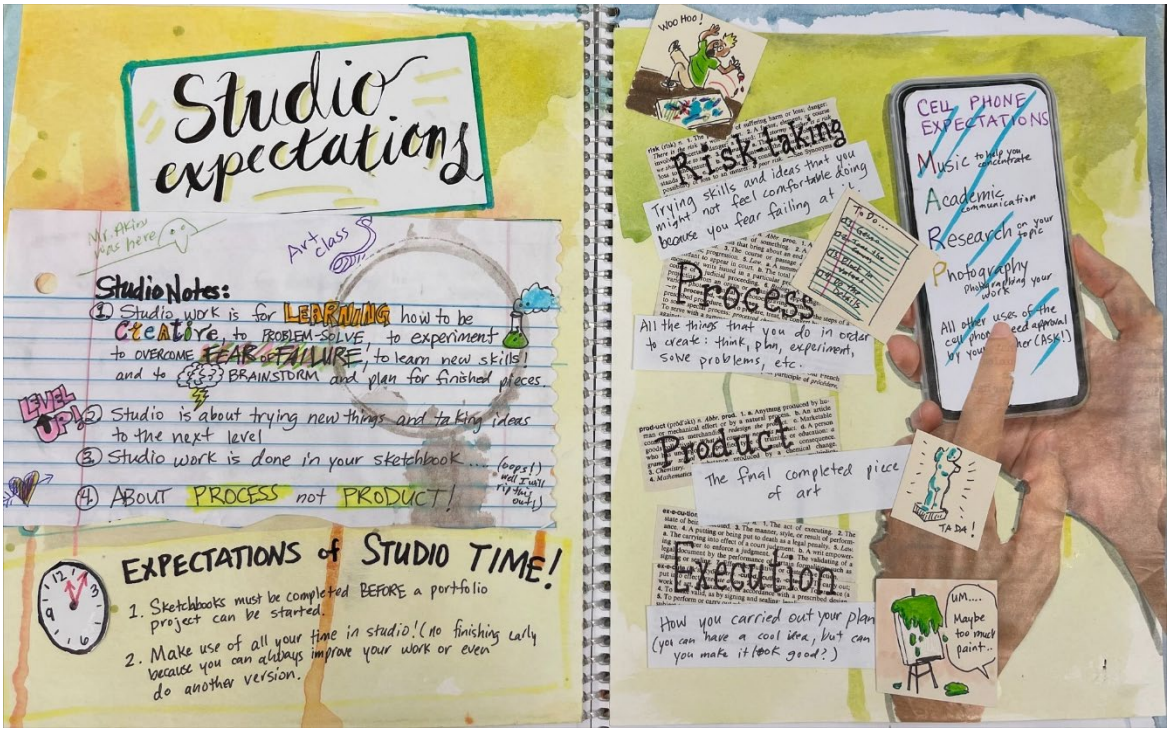
This study informed my personal practice as an art educator at the high school level. As a result of the knowledge gained from this study, I made several distinct changes in my own teaching practices and classroom. The first change I made is making a concerted effort on my

part to teach digital art within the existing curriculum. Needing technology to do so, I applied for and was awarded a grant for drawing tablets for my students. I developed units in my painting and drawing classes that used photoshop as a medium to create digital art. Still seeing needs, I petitioned my administration for newer and more suitable technology to further teach digital art. I advocated with the administration the importance of digital art for students. Fortunately, my administrator agreed. After much persistence and advocacy on my students' behalf, I was awarded a class set of iPads with Adobe Creative Cloud apps.

In addition to developing units on digital art, I have implemented a change in how I have students work in sketchbooks. I developed specific lessons to encourage students to use them as a place where they can develop studio habits of mind in relatively safe space. By exploring new mediums and encouraging play within the context of an assignment that develops artistic and aesthetic skills, I hope to instill within my students the art mindset that I found prevalent within the participants of this study. I want students to feel equipped and capable of learning and exploring anything, including digital art. Figure 12 shows an exemplar of how I use sketchbooks with my students to build an art mindset.

Figure 12

Sketchbook exemplar



Lastly, I have petitioned my administration to offer a digital design class as a pilot program for my district. If all proceeds as planned, I would develop a curriculum that teaches students digital art and its applications for the creative industry. I plan on sharing the experience of teaching this class with other teachers who want to pursue a digital art curriculum.

Limitations

Despite the immediate applications to practice, this study had several limitations. One unforeseen aspect of the participants' profession is the limited number of high school art teachers in a given area. High schools in general often have only one or two art teachers with some larger schools having three or perhaps four. This created a small pool of potential candidates from the start of my study. Due to timing and the scope of my research not fitting in with their district's prerequisites for research I was unable to conduct research in four counties I in which I had

desired to study. For example, CityVille district only wanted research that examined certain aspects related to achievement and social and emotional development. Since my study was looking at art education, it was not suitable for their approval. Hilltown district ultimately did not approve my study after taking in my study for review. There were no reasons given for not approving the study. Ultimately, I was only able to secure permission to research in two districts. This inadvertently limited the study because I was unable to use purposive sampling to the greatest extent. This created a second significant limitation which was the lack of diversity of the participants. Because I was only able to enlist two districts to participate in this study, the number of art teachers from whom I could interview was very limited. The districts in total had twelve regular high schools each with one to three art teachers. This limited the diversity of viewpoints because all of these teachers with the exception of one, were very homogenous, being mostly white, and mostly female. Perspectives from more diverse voices were not available for this study. Ultimately, I had to rely on the diversity of teaching experience and exposure to digital art as the criteria for the purposive sampling I conducted.

Another limitation I see is the diversity in school districts. It is possible that the two districts did not adequately portray the status of digital art instruction of the entire state, much less a broad swath of society. This limited the study in two ways. The two districts did represent extremes in course offerings of digital art, but there might be a significant spectrum of art curriculum pertaining to digital art. The teachers in these potential districts may have different experiences with digital art that are not given voice to in this study.

A third limitation is the influence of my own cultural and experiential biases. Even though I strove to reserve and bracket my biases, it is possible that they influenced the interpretation of the data gathered from the participants.

The lack of studies on the inclusion of digital art in secondary education was a limitation in terms of how this affected the analysis of the data by reducing the scope of context of the study to a relatively small group of research articles pertinent to this discussion. The lack of research in this area may have hidden significant variables that are present in visual arts classrooms that affect the teaching and perceptions of teaching digital art but are not immediately identified by the literature. These potential hidden variables, because of the lack of research, may have caused the focus of this study to be too narrow in scope and therefore not be of use to art educators and other stakeholders.

Another limitation of this study is the scope of this study. In this study I chose to only look at the perceptions of high school art teachers regarding digital art. Because of this choice, there is missing the potential perspectives of other stakeholders. Administrators, students, parents, community members, and potential employers in the creative industry are not provided a platform in this study to share their insights that could inform this study. Furthermore, other art teachers from other grades such as elementary school or middle grades are not given a voice in this study. Their perceptions of their experience with digital art could have had an impact on the findings of this study. Choosing only high school was a decision that I made to limit the scope of the study that I was particularly interested in.

A last limitation is the timing of this study. Ideally, a qualitative study is built upon the trust and rapport between the researcher and the participants. I had intended to conduct two in-depth interviews with each candidate. Due to time constraints and the decisions of the informants, I was reduced to one two-part interview with five of the candidates. A second or even third follow-up interview with a protocol based on the answers of the participants from the first interview would have been preferable. This was not feasible under the circumstances and

timelines of this study and so the study was limited to the answers generated by the two-part interviews I was able to conduct.

Conclusion

Upon reflection, as I consider the personal growth that I experienced from conducting this study, I perceived a shift in the paradigm of my thinking. This journey into digital art and digital art instruction has transformed me from a merely interested partaker to an invested advocate for art education and specifically digital art education. I have ascertained that the work I am doing as an art educator is significant, impactful, and highly relevant to future generations of students. I have been enlightened by the insights of other art teachers on the potential role that art education plays in the development of students who have been equipped to be problem-solvers, to be creative thinkers, to be skilled innovators, and influential contributors to the future needs of society. I am spurred on by these insights to want to know more about digital art and how to teach it to my students.

I think this study has been an important one because it provided a platform for the voices of art teachers who are striving to offer the best education possible for their students. The statements they declare, the questions they raise and the solutions they present are weighty. This study benefits these high school art teachers in that I have voiced their concerns and their hopes for their students. Specifically, I have shared their perceptions of their experiences with digital art. I have portrayed how digital art is an important medium to teach to students. I have given voice to the concerns of art teachers concerning their own proficiency and their perceived classroom needs. This voice needed to be heard since art teachers are a central stakeholder in art education. In providing this voice, I hope that further research can be conducted in the

intersection of art education and technology that could substantiate these voices, that could provide further insight, and most importantly, that could invite changes in policy and practice. If these substantiations, insights, and changes could be made it could positively impact the lives of students. Students could graduate high school equipped with significant technological and artistic skills that could propel them forward into a future that is prepared to explore digital art.

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Appendices

Appendix A

Parental Permission Form

Title of Research Study: Teaching of Digital Art in High School

Researcher's Contact Information:

Chris Akins (770) 630.9175 cakins@students.kennesaw.edu

Your child is being asked to take part in a research study. The information in this form will help you decide if you want to be in the study. Please ask the researcher if there is anything that is not clear or if you need more information.

Description of Project

The purpose of this study is to investigate the reasons why high school art teachers may or may not teach digital art in their classroom through interviews with art teachers. I will also be looking at physical ways your teachers use digital art in your classroom like lesson plans and student work samples.

Explanation of Procedures

Should you choose to let your child participate in this study, your child will be asked to give permission to examine their artwork and allow it to be published in the final paper as a student work sample.

Time Required

There is no time required of your child.

Risks and Discomforts

There is always a very small risk when publishing digital artwork that others may attempt to steal or copy the artwork. To mitigate this risk, a watermark will be placed over the work to render it useless to others.

Benefits

Although there will not be any direct benefits to your child in participating in this study, my research may help contribute to a larger body of research that helps teachers teach digital art in the classroom.

Compensation

No compensation will be provided for participating in this study.

Confidentiality

The results of this participation will be anonymous. The identity of participants will be protected as the school, location, and teacher will all be given a pseudonym within the research. Identifying information will not be collected on the students and students choosing to participate by having their work examined will be assigned a number known only to the researcher.

Inclusion Criteria for Participation

Any student who has completed digital artwork for the teacher.

If you have any questions or concerns regarding your child's rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Office at irb@kennesaw.edu.

Research Subject's Consent to Participate in Research:

To voluntarily allow your child to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire Parental Permission Form, and have had all of your questions answered.

Your Child's Name: _____

Your Signature: _____ Date _____

Your Printed Name: _____

Signature of Researcher: _____ Date _____

Printed Name of Researcher: _____

Please sign both copies, keep one and return one to the researcher.

Appendix B

Kennesaw State University Consent Form

Title of Research Study: Teaching of Digital Art in High School

Researcher's Contact Information:

Chris Akins (770) 630.9175 cakins@students.kennesaw.edu

You are being asked to take part in a research study. The information in this form will help you decide if you want to be in the study. Please ask the researcher if there is anything that is not clear or if you need more information.

Description of Project

The purpose of this study is to investigate the reasons why high school art teachers may or may not teach digital art in their classroom through interviews with art teachers. I will also be looking at physical ways you use digital art in your classroom like lesson plans and student work samples.

Explanation of Procedures

Should you choose to participate in this study, you will be asked to participate in

- 2 face-to-face or virtual interviews
- Show any examples of work you have regarding teaching digital art such as lesson plans or student work samples.

These meetings will happen through video conferencing or at your place of choice after contract hours. The interviews will be recorded in order to transcribe your answers. You will be provided a copy of the transcript to check for accuracy and review.

Time Required

The interviews is anticipated to last between 45- 60 minutes each. All interviews and focus groups will occur after contract hours.

Risks and Discomforts

There are no known risks or anticipated discomforts in this study.

Benefits

Compensation of a $50 gift card will be awarded to participants who complete both interviews. Also, this research may help contribute to a larger body of research that helps teachers teach digital art in the classroom. You may also benefit from connecting with other art teachers from across the region in the area of digital art.

Compensation

No additional compensation will be provided for participating in this study.

Confidentiality

The identity of interview participants will be protected in research reports as the school, location, and teacher will all be given a pseudonym. Identifying information will not be collected on the students and students choosing to participate by having their work examined will be assigned a number known only to the researcher.

Inclusion Criteria for Participation

Participants in this study art teachers with three or more years of experience teaching art in the public schools.

Consent to Participate

I, _____, give my consent to participate in the research project described above. I understand that this participation is

voluntary and that I may withdraw my consent at any time without penalty. I also understand that I may withdraw my assent at any time without penalty.

_____

Signature of Participant, Date

_____

Signature of Investigator, Date

PLEASE SIGN BOTH COPIES OF THIS FORM, KEEP ONE AND RETURN THE OTHER TO THE INVESTIGATOR

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Address questions or problems regarding these activities to the Institutional Review Board, Kennesaw State University, 585 Cobb Avenue, KH3417, Kennesaw, GA 30144-5591, (470) 578-7721.

_____

Appendix C

Minor Consent Form

Name of Minor: _____

Parental Permission on File:

☐ **Yes**

☐ **No****(If "No," do not proceed with assent or research procedures.)

Child Assent to Participate

My name is Chris Akins. I am from Kennesaw State University. I am inviting you to take part in a research study. Your parent(s) know we are talking with you about the study, but it is up to you to decide if you want to be in the study. This form will tell you about the study to help you decide whether or not you want to take part in it. I am inviting you to be in a research study about digital art in the classroom, specifically how your teachers teach digital art.

If you decide to be in the study, I will ask to look at your artwork and discuss it with your teacher. I may also ask to include a picture of it in my published paper. You do not have to be involved at all beyond giving me permission to use your artwork for research purposes. To avoid the risk of revealing your identity, every effort will be made to disguise your identity and protect your confidentiality. The artwork you give us permission to use may eventually be viewable by the general public but for educational purposes only.

You do not have to answer any questions or do anything that you do not want to do. Your artwork will be private while being reviewed, and your parents will not be shown your artwork while you are taking part in the study. When I tell other people what I learned in the study, I will

not tell them your name or the name of anyone else who took part in the research study. Also, please understand that as a mandated reporter, I will be legally required to make a report and notify the appropriate adults if a matter that threatens the safety of the participant is revealed regardless of whether or not this particular matter relates to the research.

Who can I talk to if I have questions?

If you have questions at any time, you can ask the researcher and you can talk to your parent about the study. We will give you a copy of this form to keep. If you want to ask us questions about the study, call or email

Chris Akins (770) 630 9175 cakins@students.kennesaw.edu

If you have questions about your rights in the study, or you are unhappy about something that happens to you in the study, you can contact the Kennesaw State University IRB Office at irb@kennesaw.edu.

If anything in the study worries you or makes you uncomfortable, let me know and you can stop. No one will be upset with you if you change your mind and decide not to participate. You are free to ask questions at any time and you can talk to your parent any time you want. If you want to be in the study, sign or print your name on the line below:

_____

Child's Name and Signature, Date

Check which of the following applies *(completed by person administering the assent.)*

☐ Child is capable of reading and understanding the assent form and has signed above as documentation of assent to take part in this study.

☐ Child is not capable of reading the assent form, but the information was verbally explained to him/her. The child signed above as documentation of assent to take part in this study.

_____

Signature of Person Obtaining Assent, Date

Appendix D

In Depth Semi-Structured Interview Protocol for Two-round Interviews

Participant Name_____ **Date:** _____

Initial Interview

Thank you for agreeing to participate in this interview today. I am Chris Akins and I am a graduate student at Kennesaw State University. I am conducting a research project for my dissertation which includes personal interviews. The interview is anticipated to last between 45-60 minutes and will include questions about your perceptions of and experiences with teaching digital art in the high school classroom. The interview answers are completely confidential and voluntary. All answers provided will be used only for research purposes and your name will not be shared.

At this time, I would like to obtain your verbal consent to record the audio portion of this interview for the purpose of ensuring accuracy when documenting your answers. You may ask me to stop the recording at any time and we will stop recording. Your participation in this interview will imply consent. Do you have any questions for me about the interview process or anything I have shared with you so far?

Let's begin.

1. Tell me about your teaching experience in the art classroom.
2. What do you think art provides for students that will help them in the future?
3. How has your job changed since you started out as an art teacher?
4. Can you describe for me your education as it pertains to art? (follow-up question: What kinds of experiences did you have with technology and art in college or university?)

5. What kinds of professional development are offered to you as an art educator? How relevant are they to you?
6. What role do you see technology playing in the visual arts classroom? How do you use technology?
7. What kinds of professional development are offered to you as an art educator? How relevant are they to you?
8. How would you describe your purpose in teaching art to your students?
9. Many people feel like our job as teachers is to prepare students for their potential future. What changes in the creative industry do you predict a future artist would have to deal with? How are you preparing them for this future?
10. Do you have any final thoughts you would like to share?

Second Interview:

Thank you for allowing for a second interview. I want to ask you some more in-depth questions regarding technology in the art classroom. This second interview is anticipated to last between 45-60 minutes. I specifically would like to ask you questions about digital art. The interview answers are completely confidential and voluntary. All answers provided will be used only for research purposes and your name will not be shared.

At this time, I would like to obtain your verbal consent to record the audio portion of this interview for the purpose of ensuring accuracy when documenting your answers. You may ask me to stop the recording at any time and we will stop recording. Your participation in this interview will imply consent. Do you have any questions for me about the interview process or anything I have shared with you so far?

1. Digital art is becoming a rising phenomenon in social media.

   a. How would you define digital art?
   b. What are your opinions on digital art as a medium?
2. What are your experiences with digital art? Are you a consumer or producer of it?
   a. (If they express little to no experience, probe why they do not have this experience.)
3. Can you tell me about any projects that you do in class that involve technology? Can you show me or describe examples of this?
4. What kinds of technology are available to students in you class? How does this affect your use of technology?
5. Do you teach digital art to your students?
   a. If so, how do you teach it?
      i. How do you plan for it?
      ii. What happens while you teach it?
      iii. How do you assess it?
   b. If not, why not?
6. How important/useful do you think it is to teach digital art to your students? Why do you think this?
7. How prepared would you be to teach digital art if it was required? Why or why not?
8. If a teacher wanted to teach digital art, what, if any, potential barriers do you see?
9. What supports do you think would need to be in place for teachers to teach digital art?
10. Are there any other thoughts you wish to express about this subject?

Appendix E

Sample Email to Participate in Research Project

Dear (art teacher),

My name is Chris Akins, and I am a doctoral student at Kennesaw State University. I am conducting interviews on high school art teacher's perceptions regarding teaching digital art. I am looking for participants who are high school art teachers from all backgrounds including those who have never taught digital art, would like to teach digital art, or are currently teaching digital art in their classes.

There will be two rounds of interviews. Each interview will take about 45-60 minutes. The interviews will happen outside of contract hours.

Compensation will be awarded in the form of a $50 dollar gift card. Participation in both interviews is requested for the awarding of the gift card.

If you are willing to participate in this interview, please respond to this email. Together we can work out details to interview at your convenience.

Thank you for your time!

Chris Akins

Kennesaw State University

Appendix F

Sample Email to District Personnel to Enlist Participants in Research Project

Dear (district personnel),

My name is Chris Akins, and I am a doctoral student at Kennesaw State University. I am conducting interviews on high school art teacher's perceptions regarding teaching digital art. I am looking for participants who are high school art teachers from all backgrounds including those who have never taught digital art, would like to teach digital art, or are currently teaching digital art in their classes.

There will be two rounds of interviews. Each interview will take about 45-60 minutes. The interviews will happen outside of contract hours. Compensation will be awarded in the form of a $50 dollar gift card. Participation in both interviews is requested for the awarding of the gift card.

I am asking permission to enlist teachers from your district to participate in this research. I will gladly complete any internal review board paperwork that is necessary to conduct this research in your district. If you could please respond to this email to let me know your decision I would really appreciate it.

Thank you for your time!

Chris Akins

Kennesaw State University

Appendix G

Codebook

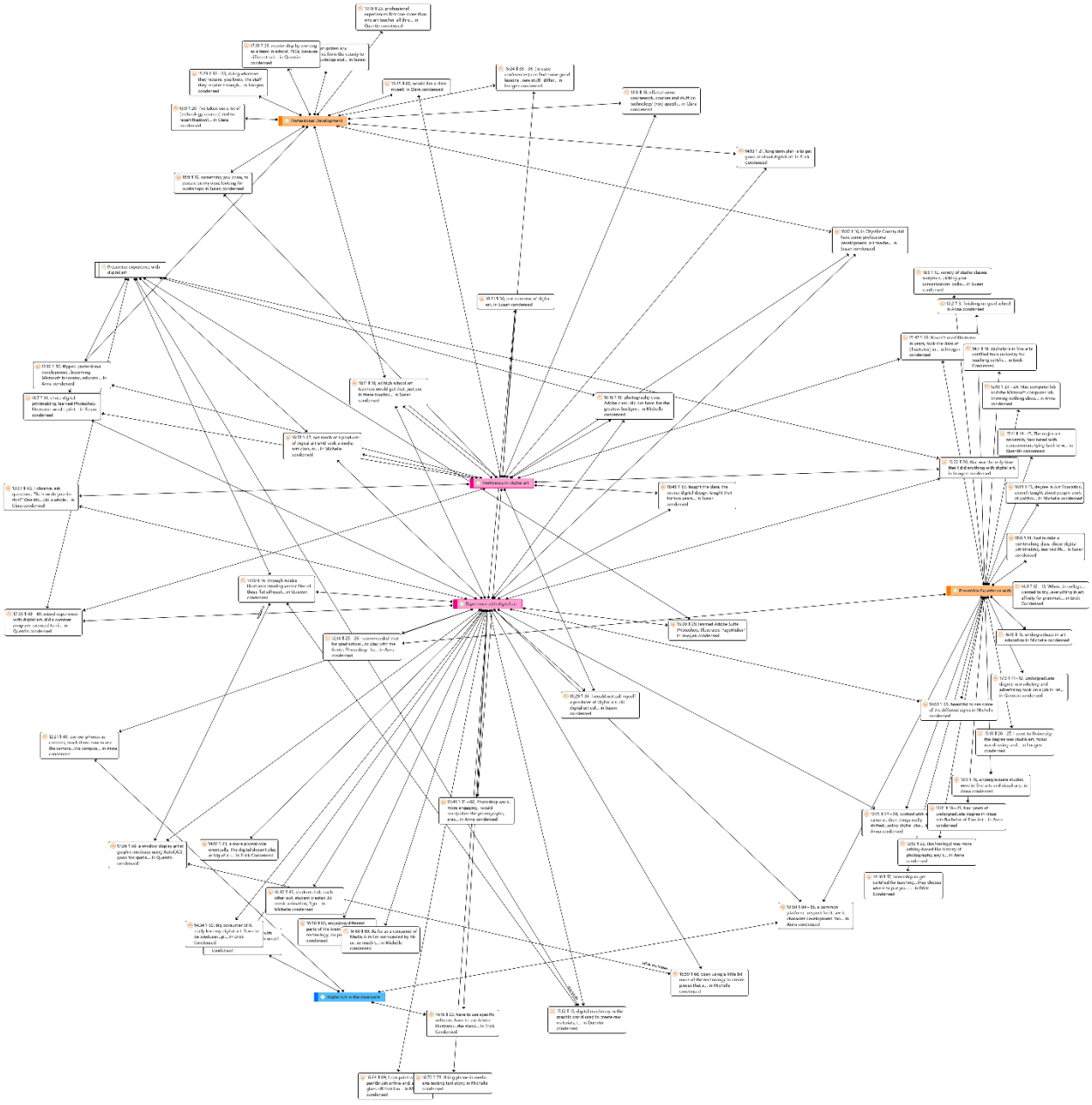
Code	Code Group 1	Code Group 2	Code Group 3	Code Group 4	Code Group 5	Code Group 6
Assessment/Instruction of Digital Art		Effects on Teaching				
Barriers to Digital Art		Effects on Teaching				
Barriers to Digital Art: Other Barriers		Effects on Teaching				
Barriers to Digital Art: Proficiency Barriers		Effects on Teaching				
Barriers to Digital Art: Technology Barriers		Effects on Teaching				
Benefits of Art					Purpose of Art Education	
Changes in Art Education					Purpose of Art Education	
Creative Industry			Perceptions of and Experience with Digital Art			
Definition of Digital Art			Perceptions of and Experience with Digital Art			

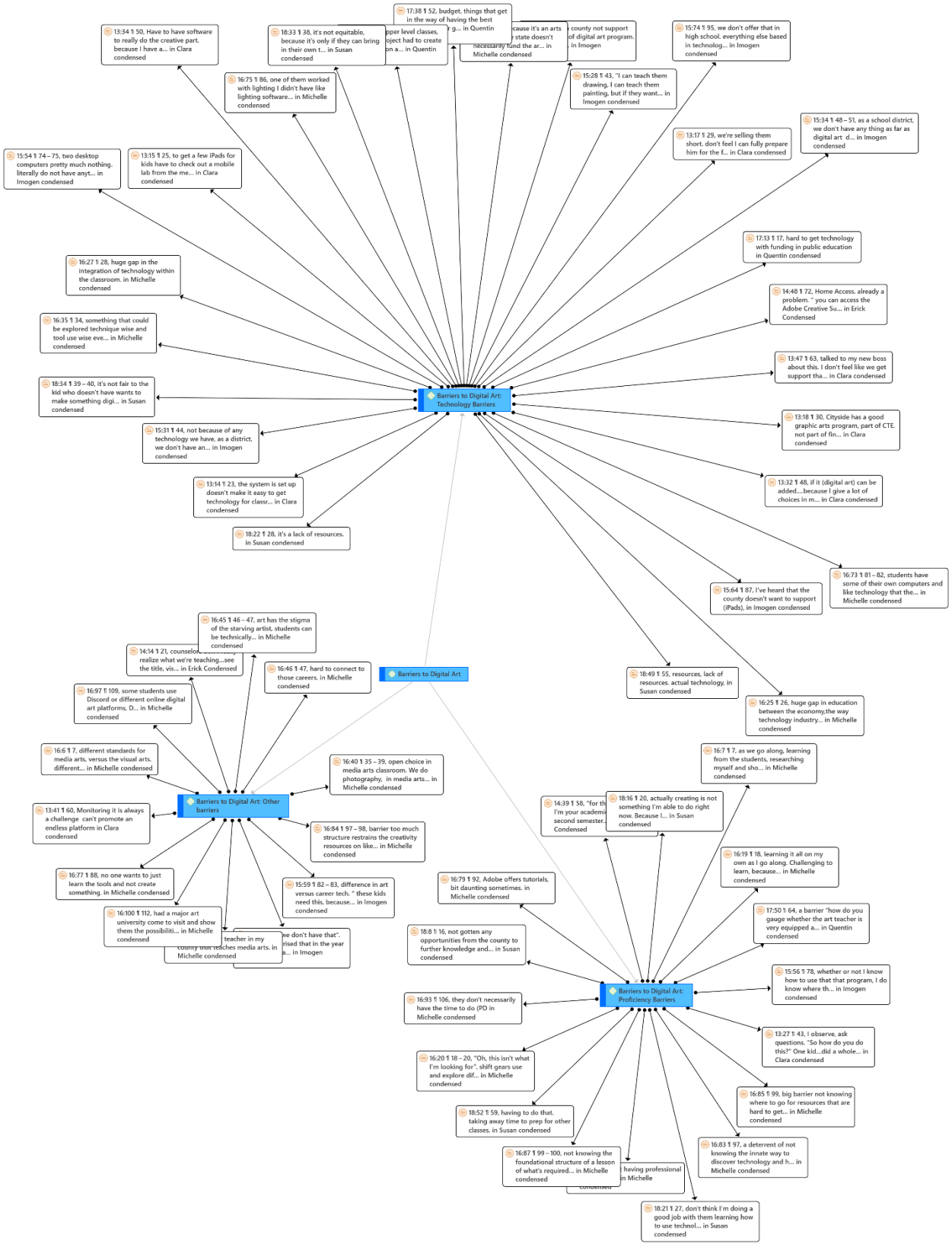
Code	Code Group 1	Code Group 2	Code Group 3	Code Group 4	Code Group 5	Code Group 6
Digital Art in the Classroom		Effects on Teaching				
Experience with Digital Art			Perceptions of and Experience with Digital Art			
Importance of Digital Art Instruction			Perceptions of and Experience with Digital Art			
Instructional Technology	Instructional Technology					Use of and Access to Technology
Opinions of Digital Art			Perceptions of and Experience with Digital Art			
Preservice Experience with Digital Art			Perceptions of and Experience with Digital Art			
Preservice Experience with Art				Previous and Ongoing Education		
Professional Development				Previous and Ongoing Education		
Proficiency in Digital Art			Perceptions of and Experience with Digital Art			
Purpose of Art Education					Purpose of Art Education	

Code	Code Group 1	Code Group 2	Code Group 3	Code Group 4	Code Group 5	Code Group 6
Student Experiences with Digital Art		Effects on Teaching				
Supports Needed for Digital Art					Use of and Access to Technology	
Teaching Experience				Purpose of Art Education		
Technology in the Classroom						Use of and Access to Technology

Appendix H

Network Views of Data Analysis Using Atlas.ti




Barriers to Digital Art: Technology Barriers
Barriers to Digital Art
Barriers to Digital Art: Other barriers
Barriers to Digital Art: Proficiency Barriers
13:34 ¶ 50, Have to have software to really do the creative part. because I have a... in Clara condensed
18:33 ¶ 38, it's not equitable, because it's only if they can bring in their own t... in Susan condensed
17:38 ¶ 52, budget. things that get in the way of having the best ... g... in Quentin
15:74 ¶ 95, we don't offer that in high school. everything else based in technolog... in Imogen condensed
16:75 ¶ 86, one of them worked with lighting I didn't have like lighting software... in Michelle condensed
15:28 ¶ 43, "I can teach them drawing, I can teach them painting, but if they want... in Imogen condensed
15:34 ¶ 48 – 51, as a school district, we don't have any thing as far as digital art d... in Imogen condensed
13:17 ¶ 29, we're selling them short. don't feel I can fully prepare him for the f... in Clara condensed
15:54 ¶ 74 – 75, two desktop computers pretty much nothing. literally do not have anyt... in Imogen condensed
13:15 ¶ 25, to get a few iPads for kids have to check out a mobile lab from the me... in Clara condensed
17:13 ¶ 17, hard to get technology with funding in public education in Quentin condensed
16:27 ¶ 28, huge gap in the integration of technology within the classroom. in Michelle condensed
14:48 ¶ 72, Home Access. already a problem. " you can access the Adobe Creative Su... in Erick Condensed
16:35 ¶ 34, something that could be explored technique wise and tool use wise eve... in Michelle condensed
13:47 ¶ 63, talked to my new boss about this. I don't feel like we get support tha... in Clara condensed
18:34 ¶ 39 – 40, it's not fair to the kid who doesn't have wants to make something digi... in Susan condensed
13:18 ¶ 30, Cityside has a good graphic arts program, part of CTE. not part of fin... in Clara condensed
15:31 ¶ 44, not because of any technology we have, as a district, we don't have an... in Imogen condensed
13:32 ¶ 48, if it (digital art) can be added....because I give a lot of choices in m... in Clara condensed
13:14 ¶ 23, the system is set up doesn't make it easy to get technology for classr... in Clara condensed
18:22 ¶ 28, it's a lack of resources. in Susan condensed
16:73 ¶ 81 – 82, students have some of their own computers and like technology that the... in Michelle condensed
15:64 ¶ 87, I've heard that the county doesn't want to support (iPads), in Imogen condensed
16:45 ¶ 46 – 47, art has the stigma of the starving artist, students can be technically... in Michelle condensed
14:14 ¶ 21, counselo... realize what we're teaching...see the title, vis... in Erick Condensed
16:46 ¶ 47, hard to connect to those careers. in Michelle condensed
18:49 ¶ 55, resources, lack of resources. actual technology, in Susan condensed
16:25 ¶ 26, huge gap in education between the economy,the way technology industry... in Michelle condensed
16:97 ¶ 109, some students use Discord or different online digital art platforms, D... in Michelle condensed
16:7 ¶ 7, as we go along, learning from the students, researching myself and sho... in Michelle condensed
16:6 ¶ 7, different standards for media arts, versus the visual arts. different... in Michelle condensed
16:40 ¶ 35 – 39, open choice in media arts classroom. We do photography. in media arts... in Michelle condensed
13:41 ¶ 60, Monitoring it is always a challenge can't promote an endless platform in Clara condensed
14:39 ¶ 58, "for th... I'm your academi... second semester... Condensed
18:16 ¶ 20, actually creating is not something I'm able to do right now. Because I... in Susan condensed
16:84 ¶ 97 – 98, barrier too much structure restrains the creativity resources on like... in Michelle condensed
16:19 ¶ 18, learning it all on my own as I go along. Challenging to learn, because... in Michelle condensed
16:79 ¶ 92, Adobe offers tutorials, bit daunting sometimes. in Michelle condensed
16:77 ¶ 88, no one wants to just learn the tools and not create something. in Michelle condensed
15:59 ¶ 82 – 83, difference in art versus career tech. " these kids need this, because... in Imogen condensed
17:50 ¶ 64, a barrier "how do you gauge whether the art teacher is very equipped a... in Quentin condensed
16:100 ¶ 112, had a major art university come to visit and show them the possibiliti... in Michelle condensed
18:8 ¶ 16, not gotten any opportunities from the county to further knowledge and... in Susan condensed
15:56 ¶ 78, whether or not I know how to use that that program, I do know where th... in Imogen condensed
16:93 ¶ 106, they don't necessarily have the time to do (PD in Michelle condensed
13:27 ¶ 43, I observe, ask questions. "So how do you do this?" One kid...did a whole... in Clara condensed
16:20 ¶ 18 – 20, "Oh, this isn't what I'm looking for", shift gears use and explore dif... in Michelle condensed
16:85 ¶ 99, big barrier not knowing where to go for resources that are hard to get... in Michelle condensed
18:52 ¶ 59, having to do that. taking away time to prep for other classes. in Susan condensed
16:83 ¶ 97, a deterrent of not knowing the innate way to discover technology and h... in Michelle condensed
16:87 ¶ 99 – 100, not knowing the foundational structure of a lesson of what's required... in Michelle condensed
18:21 ¶ 27, don't think I'm doing a good job with them learning how to use technol... in Susan condensed

Appendix I

Table of Artifacts Provided for Data Triangulation

Participant	Artifact(s)	Description
Michelle	• Flyer for art show • Media Arts Showcase • Art Exhibit (Photographs taken)	Student artwork displayed as an art exhibit and media showcase after school hours. Student work samples included 2D digital art, graphic art, mixed media videos, and animations
Quentin	• Art exhibit • Student work samples	Individual work samples sent by email depicting work from a single unit; Student artwork displayed as an art exhibit after school hours.
Susan	Art exhibit	Student artwork displayed as an art exhibit after school hours.
Imogen	Art exhibit	Student artwork displayed as an art exhibit after school hours.
Anna	Art exhibit	Student artwork displayed as an art exhibit after school hours.
Clara	Art exhibit	Student artwork displayed as an art exhibit after school hours.
Erick	Web article	Article that detailed how student artwork is used in collaboration with a car-wrapping company as a contest