

A QUALITATIVE STUDY OF THREE SECONDARY ART TEACHERS'  
CONCEPTUALIZATIONS OF VISUAL LITERACY AS MANIFESTED THROUGH  
THEIR TEACHING WITH ELECTRONIC TECHNOLOGIES

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## ABSTRACT

This qualitative case study examined and described three technologically competent, secondary-level visual arts teachers' insights into the notion of visual literacy in the information age, and how this notion manifests through these teachers' teaching praxis with art and technology in their classroom and school environments. The study participants included both the three art teachers and selected students who were in these teachers' art and technology courses at the time of the study.

The study results indicate that these teachers interpret visual literacy as a collective term that describes what students should learn in contemporary society, but that they do not engage the visual literacy language as it is framed in academic discourse. Rather these teachers derive their idea of visual literacy from their own teaching experiences with students, from their conceptions about the schools and communities in which their students live, and to provide a unified learning experience and prepare students for their future. Hence, these teachers' achievements go beyond developing students' visual competencies to embrace a holistic experience of teaching and learning that involves such themes as student voices, trusting relationships with students, community engagement, lifelong skills, connections with lives, contexts of particular teaching praxis, and richness of teacher knowledge.

The findings also show that these art teachers' notion of what students should learn in the information age (i.e., these teachers' *notion of visual literacy*) embraces a sociocultural approach, emphasizes student development of higher order thinking skills in connecting art and lived experience, and fosters student ability to integrate multiple literacy skills and multimodal communication in media production and analysis. In

response to the larger context of teaching and learning, the findings also suggest the need for a healthy human and technical infrastructure in public schools, recognition of the value of both old and new media in art and technology classroom integration, and a shift in staff professional development away from technically oriented workshops to more content-oriented modules that exemplify content-specific technological applications.

This investigation also produced findings and questions beyond the original research queries that contribute to the study significance. These findings imply that the situational and holistic engagement of learning with technology challenges the usefulness to teachers of the term *visual literacy* as it is posited in academic discourse and questions the value of predetermined educational ends that accompany that visual literacy scholarly discourse.

To the teachers that participated in this study, who have shown me the strengths of being  
an art teacher, and  
to those of them who strive to help students make sense of their lives through art

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## CHAPTER 1: INTRODUCTION

This study explores how three technologically competent secondary visual arts teachers define, interpret, adapt, engage, and teach about and with electronic technologies in their particular classroom and school settings, how their teaching practices with technology intersect with their conceptualizations of visual literacy, and how they view the role of the visual literacy concept in their professional practices. The answers aim to provide a pragmatic perspective about the notion of visual literacy in relation to art teaching with technology.

*Visual literacy* is a construct that has been accorded “many parameters” (Debes, 1968, p. 964) and whose origins and concepts remain diversely interpreted from one discipline to another (Avgerinous & Ericson, 1997; Elkins, 2008; Johnson, 1977; McDougall, 2004). For instance, the disciplines that cover the academic discourse of visual literacy include but are not limited to communication (Dondis, 1973; Kress, 1997), cognitive science (Eisner, 1991), visual and visual culture studies (Dallow, 2008; Messaris, 1994; Mitchell, 1994), and instructional technology (Debes, 1968, 1969; Fransecky & Debes, 1972; Horton, 1982). At the same time, *visual literacy* is an expression that has also been questioned because the marriage of *visual* and *literacy* may suggest an underlying hypothesis on the contested existence of a visual language (Braden, 1993; Boughton, 1986; Cassidy & Knowlton, 1983; Elkins, 2008; Geahigan, 1992).

The construct of visual literacy is conceived of differently in varied theoretical perspectives. For example, for one group of advocates who emphasize the “visual”

component of the concept, its definition connects to the study of *visuality*<sup>1</sup> (Dallow, 2008; Elkins, 2008; Mirzoeff, 2006). This aspect of the visual literacy construct has led to an understanding of the social, cultural, and political messages, particularly, that are embedded in imagery and its relationship to human activities (Dallow, 2008; Messaris, 1994; Muffoletto, 1994). For others who embrace a “literacy” emphasis with an interpretation of literary skill specifically, the notion of visual literacy can be broadly defined as a group of skills for understanding (reading) and composing (writing) images as visual text (Bamford, 2003; Brill, Kim, & Branch, 2000; Fransecky & Debes, 1972; Horton, 1982; Richardson, 1982). Likewise, advocates who recognize “literacy” as a form of social practice interpret visual literacy in terms of the visual communication and meaning construction that occurs in learners’ situated social and cultural context (Hugo, 2000; Lamberski, 1976). However, these examples represent only three of the many ways to conceptualize the visual literacy construct. Hence, as a result of such varied interpretations and connotations in the academic discourse of diverse fields of inquiry, the notion of visual literacy is both extensive and complicated.

Indeed, both literacy and visual literacy are complicated concepts, and the complexity of these two concepts has been expanded even more by the increasing influence of digital technologies on individuals and society. Consequently, scholarly writings have widely discussed the framework and consequence of visual literacy in the changing landscape of technological society (Bolter, 1998; Dallow, 2008; Metros &

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<sup>1</sup> Based on a summarization of several scholars’ definitions of *visuality*, art educator Walker (2005) “refer[ed] to vision as a physical/psychological process while *visuality* refers to the socialization of vision. This socialization is a network of cultural meanings generated from various discourses that shape the social practice of vision” (p. 24).

Woolsey, 2006; Stankiewicz, 2004; Stokes, 2002) and have indicated the interdisciplinary nature between notions of literacy and visual literacy.

Recently, moving beyond the literal definition of the literacy concept, advocates of “new literacies” have taken into account the changing nature of literacy in response to the development of information and communication technologies. Along this line of thinking, visual literacy is one of the many literacy forms associated with the concept of new literacies posited as needed competencies in contemporary society (Coiro, Knobel, Lankshear, & Leu, 2008; Lankshear & Knobel, 2003; Leu, Kinzer, Coiro, & Cammack, 2004). Likewise, out of concern for the unequal attention to learners’ visual and literary capabilities in the school system, some scholars have called for emerging attention to developing learners’ linguistic and visual communication skills in response to the expansive visual basis of contemporary culture (Bearne, 2005; Flood & Bamford, 2007; Goodman, 2005; Giffin & Schwartz, 1997).

Scholarly writings point to the visual literacy construct’s ties with its pedagogical applications in response to societal needs. Importantly, writings also indicate the need for emphasis on both the theoretical formulation and practical implementation of the visual literacy construct. Specifically, because many writings focus primarily on the use of visual images to enhance student understanding of specific academic subjects<sup>2</sup> and on the study of imagery and visual culture in higher education,<sup>3</sup> there is a need to enrich

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<sup>2</sup> A large body of scholarly literature, some associated with the applications of electronic media (Bleed, 2005; Brown, Bryan, & Brown, 2005; Kortes, 2005), has confirmed the positive consequence of developing students’ visual literacy skills in general education across subject areas (e.g., Begoray, 2002; Hubbard, 1989; Madeja, 1993; Robertson, 2007). In these cases, the role of images helps to stimulate and enhance student thinking and learning about the academic subjects visually.

<sup>3</sup> Dallow (2008) suggested that, because recent technological developments have led to an accelerated dissemination of image re/production that both creates and responds to an expansive visual form of contemporary culture, one “task for visual literacy advocates is to consider more particularly the communicative process of ‘the gaze’ in visual culture, and ‘the power and importance the visual sense

scholarly evidence on a range of pedagogical implementations of visual literacy. However, few studies address K–12 teachers in different subject areas and their attitudes, implementation, and understanding of the visual literacy concept. For example, teachers in earlier studies have been asked to reflect on the notion of visual literacy based on government policy documents of visual literacy agenda or preassigned scholarly definitions (McDougall, 2004; Robertson, 2007). Although such scholarly discourse indicates the richness and broadness of potential pedagogical implementations of visual literacy construct, my analysis indicates some limitations of this discourse, and confirms that research has provided little knowledge about practicing K–12 teachers’ own insights into their conceptualizations of and perspectives on visual literacy, especially in relation to their preparation in and adaptation to technology implementation. This void includes a lack of research into teachers’ contemplations about what students should learn through visual images given the power of imagery in students’ lives in the information age.

Recognition of visual literacy as having multifaceted parameters and rich descriptions in the information age does not suffice: practicing teachers’ voices and understanding about visual literacy should not be ignored. In other words, if the notion of visual literacy is a set of social practices that can be conceived of as situationally specific, explorations of teachers’ interpretation and implementation of this construct in their particular teaching and learning environment is imperative to understanding how they prepare their students with the skills needed in contemporary society. Therefore, this study investigates three secondary visual arts teachers’ conceptualization of visual

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exerts upon our lives” (p. 92). However, this aspect of the educational implementation of the visual literacy construct is mainly targeted at college-level courses to study the relationship between vision and visibility, mostly in the fields of visual/culture studies and film studies (Dallow, 2008; Elkins, 2008; Metros & Woolsey, 2006; Mitchell, 1994).

literacy in relation to their art teaching practice with electronic technologies. I selected visual arts teachers from among the teachers of various school subjects teachers because (a) art teachers are subject to the same demands for technology integration as teachers of other subjects, (b) art education is a field associated with visual images as major teaching and learning resources, including but not limited to the images of works of art, cultural artifacts, and everyday lives, (c) the applications of newer media in art education continuously transform how individuals perceive and communicate through visual images (Freedman & Stuhr, 2004; Gregory, 1996; Krug, 2002; Madeja, 1997; Stokrocki, 2007), and (d) visual arts teacher's insights contribute to the discussion of K-12 teachers' understanding of the visual literacy concept as they strive to connect students with the world through encounters with visual images in the K-12 school system. These reasons also shape and motivate my investigation, which attempts to enhance understanding of visual literacy from the contextual and practical perspective of three specific art teachers who have actively incorporated technology into their art curricula. Also important to art education theory and practice are the recent shifts in views about what students should learn in response to the proliferation of mass media, as well as speculations about the nature and role of electronic technologies in art education in relation to these shifts.

#### Statement of the Problem

The major motivation that drives this study is my concern for the numerical imbalance between scholarly studies on the theoretical understanding of visual literacy and those examining teachers' perceptions and practices that address what it means to be a visually literate individual in the information age. Admittedly, scholarly writings have argued that the significance for contemporary society is that learners develop visual



literacy skills in response to the impacts of the pervasiveness of electronically generated visual communications (Bearne, 2005; Breivik, 2005; Flood & Bamford, 2007; Metros & Woolsey, 2006; Spalter & van Dam, 2008). Indeed, as Bleed (2005) observed, “being visually literate will be a prerequisite in the future because visual media are integral to how we work, entertain, communicate, and educate” (Conclusion, ¶ 1). However, these writings, predominantly promotional and prescriptive, only describe the promises and values associated with the pedagogical implementation of the visual literacy construct in relation to the changing development of electronic technologies. Too little empirical evidence shows how these promises and values may occur and manifest through the specific process of learning about and with visual images in formal and informal technology-enriched learning settings.

At the same time, although scholarly writings have identified the need for visual literacy skills in the information age, the theoretical understanding of this construct is varied and situated across disciplines. Hence, the extensive interpretations and unclear definitions of the notion of visual literacy may be one possible reason for the lack of practical visual literacy implementations. As Johnson (1977) pointed out, the visual literacy construct is “a “confluence of theories” brought together to form a vague, unorganized concept” (p. 141). To avoid the confusion brought by the broadness of the visual literacy concept, the scope of this present study is limited specifically to the field of art education so as to provide a more subject-specific view of visual literacy, one that focuses on this notion’s relationship to new media and electronic technologies through art teaching and learning.

In the scholarly discourse of art education, visual literacy may be identified as a fluid concept that has evolved over time in response to changes in students' aesthetic and artistic development, curriculum theories, educational paradigms, learning contents and teaching methods, and the social contexts of students' lives. Normally, the notion of visual literacy in art education refers to student comprehension of works of art and other visual forms of expression and related cultural productions, as well as student ability to express and communicate ideas and experiences through various visual forms, including but not limited to new electronic media (Bamford, 2003; Boughton, 1986; Feldman, 1976; Lanier, 1980; Richardson, 1982; Stankiewicz, 1997, 2003). Thus, summarizing the interpretations of visual literacy concept based broadly on the theoretical discourse in art education, it alludes to a set of concepts, practical skills, and dispositions that enable communication, thinking, learning, and the visual construction of meaning to develop and strengthen an individual's social engagement and ability to meet communication needs. However, even though scholarly interpretations of the notion of visual literacy in art education have a long, rich history, little attention has been paid to whether practicing art teachers engage this academic language about visual literacy in their teaching practice or whether they have their own perceptions and interpretations of this concept. As Delacruz (2004) observed, the scholarly community in art education does not know why (or why not) "art teachers are engaging with dialogical inquiry processes and inventive multimedia applications in the innovative manner described in the art education literature" (p. 9).

To respond to this need to investigate not only art teachers' views about visual literacy but also their pedagogical practices related to electronic media, this study

approaches the task both conceptually and pragmatically. It aims to gain insights into how selected art teachers conceptualize and operationalize notions of visual literacy in relation to their engagement with art and technology in their given teaching environments. Hence, this study attempts to bridge the conceptual gap between theory and practice by revealing specific facets of three art teachers' insights into applying electronic technologies in their profession, as well as the ways in which such application shapes their perspectives about visual literacy and their ideas about the resulting impacts on student learning.

#### Purpose of the Study

In this study, the notion of visual literacy is examined in the context of teaching and learning art with technology by three dedicated art teachers in three different public secondary schools. The study purpose is to explore and describe these three secondary-level, technologically competent, visual arts teachers' insights about the notion of visual literacy in the information age and how this notion manifests through teaching and learning art with technology in these three teachers' specific classroom environments. This approach is predicated on the assumption that "literacy is never neutral; all texts contain particular views of the world along with associated attitudes and values" (Evans, 2005, p. 11). Consequently, in selecting the three case studies, this study specifically targeted visual arts teachers who are competent and active in their professional engagement of electronic media—whether computers, video cameras, multiple computer software programs, electronic peripheral devices, or the Internet. Nevertheless, by employing qualitative research methodology, this study does not intend to seek for a broad understanding of art teachers' general conceptions of visual literacy or to produce

exemplary teaching models about art and technology; rather, it aims to closely examine how teachers' pedagogical beliefs manifest through their teaching practices and then to provide an in-depth, contextual understanding of the unique cases of the three teachers.

### Research Questions

As this study unfolded, this investigation revealed that these three teachers do not use the academic language of visual literacy as found in scholarly texts but rather connect to ideas underlying such discourse in their teaching practice. This finding, illustrated in greater detail in the cross-site analyses and the conclusion, points to an inconsistency between theoretical formulations that reside primarily in the academic literature and the practical discourse of teachers. This finding also generated a new question about the usefulness of the visual literacy construct in teachers' practice and resulted in modification of the research question framework of this study. Specifically, shortly after the research fieldwork began, a second research question exploring the role of the visual literacy concept in these teachers' practice was added to the initial question about teachers' technological implementations in relation to their conceptualizations of visual literacy.

Therefore, the design and writing of the study was guided by two major questions and their subordinate questions that addressed these teachers' inspiration, beliefs, technology applications, specific school contexts, student responses, and professional development opportunities:

1. How do these three selected secondary art teachers' conceptualizations of visual literacy intersect with their classroom practices with electronic media?

- a) What sources of inspiration, opportunity, or incentive have stimulated these teachers to become technologically competent art teachers? And how do these sources impact their teaching practice with art and technology?
  - b) From these teachers' perspectives, what should students learn from their art- and technology-integrated curricula if they are to develop their students' visual literacy skills?
  - c) How do these teachers' particular school environments, larger communities, and cultural contexts influence both their teaching and their students' learning?
  - d) How do these teachers "keep up with new ideas about how to teach with these technologies when the technologies themselves regularly change" (Leu et al., 2004, p. 1600)?
2. What is the role of the notion of visual literacy in these teachers' teaching praxis?
- a) To what extent do these teachers engage the term and concept of visual literacy in their professional practice with art and technology?
  - b) How do these teachers interpret the construct of visual literacy and then translate this concept into their specific classroom practices?
  - c) How do these teachers' students view what they have learned from the art and technology-oriented lessons that are integrated into their art curricula?

It should also be clarified that throughout this study, phrases like *teachers' conceptualization of visual literacy* and *teachers' view on what student should learn*, as well as *students' visual literacy skills* and *students' competencies/abilities/skills* are used interchangeably during my conversations with the teachers according to the context of the discussion. That is, although these teachers do not use the *term visual literacy* very often in our conversation, they do interpret such terms as academic language that summarizes the complexity of what students should learn. Therefore, given that the purpose of this study is to garner the teachers' insights into the construct *visual literacy*, during the process of data collection, my use of the term *visual literacy* with these teachers is based on their own interpretations of the construct and not necessarily on those definitions derived from scholarly writings.

#### Limitations of the Study

The study methodology is subject to three major limitations. First, the sample of teacher participants is not only confined to secondary art teachers in the public schools but is deliberately constrained to those who intensively and confidently engage technology in art teaching in their specific school environments. Hence, because of the curricular time constraints typical to elementary-level art scheduling in U.S. schools, the study excludes elementary-level art teachers and their technology engagements. That is, whereas elementary art teachers meet with their students only once or twice a week, secondary art teachers engage with their students more intensively on a daily basis, which accommodates the study need to investigate teachers' engagement with technology over a sustained and continual period. Participant selection also excludes novice art teachers and art teachers who casually implement technology. Here, casual implementation of

technology refers to secondary art teachers that integrate technology devices or knowledge in their art teachings occasionally to meet curricular needs; whereas fuller implementation refers to the secondary art teachers who strive to adapt and integrate new media into their professional practice, who are concerned with the impacts of electronic technologies in art education, and who design and teach visual art courses that are purposely oriented to the implementation of art technology.

A second limitation is that such a small number of qualitative case studies (three) provides only context-situated and content-specified teaching and learning scenarios and thus limits the generalization of the research results. Nevertheless, because these selected art teachers' praxis did occur in regular public school classrooms, the results can be generalized to other art teachers' practices and may be applicable to other subjects' integrations with technology in this sense.

Thirdly, time constraints during data collection limited the number of student interviews and reflections about specific learning experiences and outcomes that could be included in the study. The data only describe specific students' experiences and views, and are not intended to represent a general overview of the learning results for an entire class.

### Significance of the Study

This study makes a fourfold contribution to the discourse in art education, primarily in the sectors of preservice and in-service art teacher education. First, by presenting insights into teachers' conceptualizations about and interpretations of visual literacy in relation to electronic technologies, it provides an alternative perspective to the understanding of visual literacy construct. More importantly, it thus stimulates academic

discourse to rethink the inconsistency between the academic language used in scholarly thinking and writing and the practical endeavors evolving from teachers' teaching praxis. Second, it contributes to the current theoretical and practical discussion about the competencies and ways of learning that students should engage in public school art education in response to the growing proliferation of electronic technologies. Third, it enhances understandings of the role of art teacher in art and technology engagement, and the changing nature of teacher thinking and teaching practice in the face of technological, social, and cultural changes. Finally, by reporting these three teachers' persistence with technology and their resultant accomplishment in their professional development, it may inspire other art teachers to begin or continue their own engagement with art and technology.

#### Dissertation Overview

The dissertation is organized as follows. Chapter 1 describes the complexity of the visual literacy construct, outlines the need to investigate art teachers' conceptualizations about visual literacy in relation to electronic technologies, and explains the significance of exploring the role of the visual literacy concept in the selected teachers' teaching art with technology. Chapter 2 reviews the relevant literature to provide insights about art education in relation to teaching and learning, visual literacy, electronic technologies, and literacy development. Chapter 3 describes the case study methodology and research design of this study, after which Chapter 4 presents three individual case reports, one for each teacher. Chapter 5 then provides a cross-case analysis and discussion that integrates the study findings within the framework of my research questions. Finally, to distance the reader from the findings presented in Chapter



5, Chapter 6 outlines the additional findings that emerged beyond the research questions, provides a general summary of the study findings overall, discusses the implications of these findings, and recommends possible avenues for future research.

## CHAPTER 2: LITERATURE REVIEW

This literature review is organized around three categories: (a) art teachers' use of electronic technologies in art education, with an emphasis on technology as a tool for art instruction and a medium for art production, communication, and meaning construction; (b) an overview of the notion of visual literacy and its definition and interpretation in art education over time; and (c) a discussion about the intertextuality of images and an expanded definition of literacy. This latter provides a framework for examining three secondary art teachers' conceptualizations of and practices related to developing their students' visual literacy skills through their art and technology integrated curricula.

### Art Teachers' Use of Electronic Technologies in Art Education

Over the past four decades, art teachers have integrated various emergent electronic media into both their art instruction and production. Whereas media in art education have traditionally been defined as “the techniques or materials of studio production in art” (Lanier, 1966, p. 5), an alternative conception moves away from physicality to highlight a medium's communicative function in the face of the growing development of newer electronic media. For instance, McLuhan (1964) viewed a medium as both creating and carrying its message,<sup>4</sup> while Buckingham (2003) perceived it as a channel for indirect communication. Such conceptualizations expand the forms that are considered media. Indeed, according to Krug (2002), “digital imagery, the Internet, and virtual environment” are all types of “electronic media” (p. 30). Nevertheless, even though art education recognizes the historical significance of each electronic medium—

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<sup>4</sup> McLuhan (1964) claimed that “the medium is the message” (p. 68) in which different forms of electronic media deliver information and produce knowledge in diverse ways in a technology-rich society.

including television (Feldman, 1985) and the film camera (Spoerner, 1981; Cope, 1981), this present study only addresses electronic media that act as electronically communicative devices and can convert to a digital representation of text.<sup>5</sup> Therefore, it primarily considers media such as computers, video cameras, digital cameras, cell phones, and handheld electronic devices.

In art education, these emerging forms of electronic media are not limited to the purposes of art production and instruction but also act as vehicles that facilitate learner exploration of technology's impacts on their cultural and lived experience and society. In particular, art educators have paid attention to the role of emerging electronic media in relation to how electronic technologies<sup>6</sup> function in the process and context of art learning (Feldman, 1985; Freedman, 1991, 1997; Keifer-Boyd, 2005; Madeja, 1993; Stokrocki, 2007).

As Madeja (1993) observed, “[technology] is a delivery system for instruction in art, and an art form itself” (p. 12). Thus, although the discourse of this study refers especially to art teachers' engagement of electronic media as an artistic medium, reviewing electronic technologies as both tool and medium provides a useful overview of their impact on art education. It is also worth noting that the study takes a broad view of an artistic medium. Rather than viewing it simply as a medium for producing art, it

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<sup>5</sup> Text, in this study, refers to Buckingham's (2003) concept of “media texts” (p. 5), which are comprised of various digital representations created and carried by electronic communicative devices. Text, in this view, includes visual images, audio sounds, gestures, films, Web text, and so on (see also Evans, 2005). For the purposes of this study, media text refers specifically to images, audio sounds, films, Web text, text messages, virtual environment, and other electronic forms of communication and representation created and carried by varied electronic devices.

<sup>6</sup> Discussions of the impact that evolving advanced technologies and media are having on the development of education employ a variety of broadly used terms, including “information and communication technologies (ICTs)” (Bruce, 2003b, p. 335; Buckingham, 2003, p. 95; Leu et al., 2004, p. 1853), “electronic technologies” (Delacruz, 2004, p. 6), “digital technologies” (Buckingham & Willett, 2006, p. 49; Metros & Woolsey, 2006, p. 80; Stankiewicz, 2004, p. 90) and “new technologies” (Krug, 1998, p. 26). This study elects to use the terms *electronic technologies* and *digital technologies* interchangeably according to the situated context.

considers as an educational means containing interwoven purposes of expression, communication, and meaning construction through learners' artistic encounters with particular electronic media. Therefore, the subsequent discussion addresses the implementation of electronic technologies in art education as instructional tools and art media.

*Electronic Technologies as a Tool in Art Education*

Scholarly writings on the impact of electronic technologies on art education have explored the instructional applications of the Internet—including access (Grandgenett & Heise 1996; Hemmerla, 2001), significance (Koos & Smith-Shank, 1996; Prater, 2001), and implementation (Benzer, 2005; Bowler, 1997; Julian, 1997; Roland, 2007)—and art teachers' perceptions of the Internet (Heise, 1995). For example, in a quantitative study of art teachers' instructional use of the Internet within a DBAE paradigm, Park (2003) reported that when art teachers employ the Internet and multimedia as art instruction tools, they “enhance their teaching using huge amount[s] of digitized information including lesson ideas, art historical periods and styles, artists, [and] social and cultural contexts of art works” (p. 36). Similarly, a 1999 national survey of instructional strategies used by secondary art teachers in the U.S. reported that more than half the art teachers commonly used electronic technologies in designing course materials, researching resources on the Internet, and preparing lessons (Burton, 2001). In yet another survey of art teachers' use of technology in Illinois, Obiokor (2002) also observed that art teachers frequently use computers to collect resources for their instructional preparation. More recently, Roland's (2007) 2006 online survey of art teachers' professional and leisure uses of the Internet and other digital technologies confirmed art teachers' growing use of

the Internet in support of art instruction. Specifically, he reported that more than 75% of the art teachers surveyed participate actively in various types of online communities and use search engines regularly in preparing their classes.

However, as the amount and variety of literature on the instructional use of the Internet in art education suggests, many art teachers are more confident about using electronic technologies as a teaching tool than as an artistic medium. Indeed, both Burton's (2001) and Obiokor's (2002) large-scale quantitative surveys have shown that art teachers who feel proficient in using electronic technologies employ it mostly in preparing and gathering class materials rather than instructing and delivering the art curriculum. This practice, as Burton pointed out, may in part be a response to the difficulties of implementing electronic media in the art classroom. Indeed, based on his study of 177 secondary art teachers' instructional approaches across the U. S., Burton noted that art teachers, despite having access to electronic technologies and being confident in using them for lesson planning, may still struggle to master the electronic technologies "due to availability of hardware, software, and training" (p. 143). Similarly, Delacruz (2004) observed that owing to problems of time constraint and poor technology infrastructure, using emerging electronic technologies in the classroom continues to challenge art teachers' ability to maintain professional competencies. Accordingly, the Internet's easy and friendly learning interface provides resources for teaching and learning art, but mastering and teaching with advanced electronic technologies (e.g., video cameras, computer games, and digital image and video editing software programs) definitely requires that art teachers receive more technical support and professional training.

### *Electronic Technologies as a Medium in Art Education*

The use of computers as an art medium signaled a significant shift in the application of technology in art education. Initially, the dominant medium was the paint programs that allowed students to create computer graphics (Ettinger, 1988; Freedman, 1997; Roland, 1990). Such programs were desirable for art instruction and production because they were easy to learn and operate, made experimentation with visual effects easier than did other traditional art media, and allowed students to create professional artworks without much talent or skill (Roland, 1990).

However, current computer-based technology in the digital environment not only helps amateurs make art with ease, but the various forms of computer-based media text created through computer technology (i.e., computer graphics, hypermedia, animation, and video games) have great potential for developing students' skills of visual expression and communication. Thus, the complexity embedded in today's technological society seemingly responds to the art curriculum for the twentieth-first century as predicted by Madeja (1993) over a decade ago. That is, observing the effects of electronic technology growth on art education, Madeja argued that a new educational paradigm must emerge if students are to develop the abilities needed for the twentieth-first century:

At the K–12 level, the curriculum would include major units of study that engage the student in creating images with various output devices, i.e., print techniques that include documenting the electronic image, video pieces which include electronically developed imagery, two and three-dimensional animation techniques which would be documented on film or video, plotted imagery which uses electronic imaging as a base, or 3D images in virtual space. (p. 12)

Madeja's insight aptly predicts the growing multimodal characteristic of current art and technology integrated curricula and the need to prepare students with the abilities to reflect upon their experience of image creation in the context of their technological learning environment. However, when equipping students with such abilities, art teachers today face many more complications in engaging with various emerging electronic media than teachers using the earlier paint programs. To provide a clearer understanding of the impact of these electronic technologies on art education, the remainder of this section reviews the research on the implementation in art teaching and learning of electronic media such as video cameras, digital cameras, and computers. It also examines computer-based media text generated from computer-based technology, including computer graphics, computer hypertext, digital games, and virtual environments.

As Niesyto, Buckingham, and Fisherkeller (2003) observed, "auditory and audiovisual media increasingly offer young people opportunities to communicate their ideas and feelings using nonverbal and nonprint forms" (pp. 461–462). Hence, video cameras have become a popular medium for teaching adolescents how to express their opinions through their interests. For example, in conducting their video projects in public school and community-based settings, respectively, Berg and Turner (1993) and Lovett (2006) viewed video production as an opportunity for young people to make meaning of their lives through the lens of video camera. More recently, Taylor (2007) analyzed and interpreted the messages and meanings in music videos in the art classroom in the context of youth culture, while Nadaner (2008) used video art as an emerging art form to teach the perception of movement to university level students.

Even the possibilities of photography, long a popular medium for artistic production in art education, have been expanded by the invention of the digital camera and the resulting representations of digital photography. Consequently, the making of computer graphics in art education has recently moved beyond paint programs to engage the digital camera with advanced graphic editing software programs like Adobe Photoshop, which contain powerful functions for creating, manipulating, representing, and distributing both still and moving images. Photoshop, for example, is not only used at the elementary level to examine composition and representation in professional photographic artworks (Hunter-Doniger, 2005) but is a popular image-editing software program for broadly exploring self-identity through digital photography across K–12 art education (Barney, 2006; Herne, 2005; Riner, 2005; Wang, 2002). Likewise, when investigating social issues through image reconstruction, Chung's (2005) students used Photoshop as a means to explore the hidden messages embedded in cigarette advertisements. These applications exemplify Emme and Kirova's (2005) observation that "more recent developments in the digital recording, manipulation, and distribution of photographs have introduced new intensity into discussions surrounding photographic images as either realities or representations" (p. 145). Thus, recent applications of image-editing software programs in art education have moved from the simple process of making digital imagery to emphasizing the exploration of students' self-understanding and the examination of their lived experience in relation to social development.

Besides the computer graphic images applied in art teaching and learning, art education also frequently employs Internet-based computer hypertext, a form of electronic text that contains nonlinear links to other electronic text. For example, various



hypertext linking programs have been implemented at the elementary and high school levels to create interactive computer webs based on students' interests (Church, 2005; Taylor, 2000). Studies have also shown that teaching the construction of hypertext webs helps student critically reflect on their art learning experience with both traditional and electronic media (Taylor & Carpenter, 2005) and the research involved in their interdisciplinary research projects boosts their analytical thinking skills (Taylor, 2006a). For instance, while exploring the notion of hypertext and the potential of the Internet, Colman's (2004) high school students created their own Internet art and then published their artworks on the Internet. Thus, as these examples suggest, integrating the notion of hypertext in art curricula fosters student awareness of how changing electronic technologies may impact their ways of thinking, learning, and living.

Another emerging media text used in art education is the computer-based simulated virtual environment, here defined as the application in art education of technologies like virtual reality and digital games. As regards the former, Sakatani (2005) and his middle school students constructed an interactive virtual environment in an attempt to cultivate student authorship and ownership in their art and technology learning experience. Similarly, a German design project by Reimann, Winkler, Herczeg, and Höpe (2005) created a mixed virtual and physical learning space that allowed students to navigate computer programs and communicate creatively and aesthetically. More recently, digital games have received growing attention for their potential in art education (Keifer-Boyd, 2005; Liao, 2008; Parks, 2008), yet few studies have addressed how this medium can be applied in public school settings. Nevertheless, digital games have been successfully implemented in art education outside of the formal K-12 setting. For

example, Garber (2004a) used an interactive gaming environment to teach pre-service art teachers about the interrelation between the arts and communities; Keifer-Boyd (2005) observed teenagers' active use of the Flash animated program for designing computer games and animated stories in a community setting; and the game players of the digital game, *The Sims 2*, in Hsiao's (2007) study reported that their game-playing experience contributed to their construction of identity and articulation of reflective learning. Such applications in virtual environments suggest educational possibilities for ways of visual representation and communication.

Because such electronic media and media text are now being implemented in art education practices, most related writings addressed above are explanatory and focus on the values and promises associated with the engagement of electronic technologies in art education. That is, rather than simply addressing the mechanics of operating these electronic media, these projects aim for more comprehensive educational goals and try to demonstrate student ability to comprehend and analyze various forms of media text. For instance, Berg and Turner's (1993) video project inspired by the DBAE curriculum blended fine art and student interests, while Lovett (2006), Chung (2005), and Taylor (2007) all drew their inspiration from a visual culture-oriented art curriculum and shared the pedagogical principle that electronic media provide a lens through which students can explore and make meaning of their lives. As Krug (2002) observed, "electronic media create complex cultural conditions that have multidimensional and multidirectional social, cultural, economic, historical, and political forces and contexts" (p. 32). Thus, as the studies reviewed above demonstrate, electronic media can be both a powerful art form and a compelling method of communication in contemporary society. However, these

cases also indicate a significant need for the field of art education to develop art teachers' competencies in teaching ever-evolving electronic technologies and preparing students with the skills needed in today's image-saturated society.

Scholarly dissertations have also made intensive examination of K–12 art teachers' use of electronic technologies in the classroom. For example, Obiokor's (2002) quantitative study investigated how high school art teachers use technology as a teaching resource, while Morrison's (2003) study of 150 K–12 art teacher assessed their use of and concern with electronic media. In contrast, Park's (2003) study, rather than providing an overview of art teachers' general use of technology, put particular emphasis on 213 secondary art teachers' instructional use of the Internet to enhance a DBAE-oriented curriculum. Likewise, using qualitative methods, Cato (1997) analyzed how computer technology has influenced nine secondary art teachers' art instruction, while Wang (2000) conducted 12 qualitative case studies with K–12 art teachers to examine how they use computer technology in their teaching and what factors influence this usage.

A comparison of the intentions and results of these studies reveals two similarities: (a) they primarily discuss the effects of art teaching with a focus on the computer as an electronic device and (b) the term *use* refers to the utilization of electronic technologies primarily as an instructional tool. Thus, these scholarly investigations have contributed to art education by providing a precursory overview of how electronic technologies have been employed in art classroom instruction, but research has yet to examine how electronic technologies are taught as a medium in light of art teacher perspectives on what students should learn. As Delacruz (2004) observed, we do not know why (or why not) "art teachers are engaging with dialogical inquiry processes and

inventive multimedia applications in the innovative manner described in the art education literature" (p. 9) or whether the number of teachers using such techniques is significant. Overall, even though the scholarly studies surveyed above indicate that the field of art education is responding to and exploring the connections between the development of electronic technologies and art curricula, they have as yet not addressed teachers' conceptualizations about the potential of technology in the K–12 art classroom. Further research is needed regarding practicing art teachers' attitudes toward, beliefs about, and instructional practices designed to how to equip their students with the ability to use new electronic technologies.

### Visual Literacy and Art Education

As Raney (1999) observed, the concept of visual literacy highlights the status of the visual in a text-dominated world and suggests the expansive visual basis of contemporary culture. This section reviews the origins, identifications, applications, and implications of the concept of visual literacy for the field of art education by first providing a general overview of the concept, and then describing how this notion has been interpreted in art education.

#### *Identifying Visual Literacy and Its Significance*

The notion of being visually literate has historically been associated with an underlying hypothesis on the existence of a *visual language*. This notion of visual language, which has inspired and influenced scholarly conceptualizations of visual literacy, can be traced to philosopher Nelson Goodman's (1968) *Languages of Art*, which uses the metaphor of art as language and works of art as symbols in a symbolic system. In Goodman's view, the representations and expressions in works of art, just like those in

language, carry semantic meanings. As Goodman (1968) noted, “representation is a matter of denotation while expression is somehow a matter of possession” (p. 52). Accordingly, Goodman’s view of art as language has been employed in discussions of visual literacy as a means to describing the grammars of visual language (Bamford, 2001; Brill, Kim, & Branch, 2000; Feldman, 1976; Fransecky & Debes, 1972; Horton, 1982). Nevertheless, some in the scholarly community have contended that Goodman’s view of art as language oversimplifies the complexity of visual representation (Arrell, 1987; Boretz, 1970; Geahigan, 1992; Wolleim, 1970; Zucker, 1970). Indeed, Cassidy and Knowlton (1983) claimed that the visual language approach to the visual literacy metaphor is a misconception:

[T]he significance of iconic signs lies not in their similarities to the linguistic system but in their differences from the linguistic system. The connotation of the literacy metaphor is one of reduction, of reducing rich and varied sets of attributes to single attributes perceived as functionally equivalent, ignoring variation within a pictorial category as non-critical for communicating specific information. This “schematizing” approach is, of course, useful for many communication purposes. But it is the richness, complexity, and variation inherent in the visual-iconic sign system that makes it unique. (p. 87)

Likewise, in his discussion of the meaning of visual literacy in art education, Boughton (1986) suggested that “the visual and verbal are fundamentally different in the qualitative meanings it is possible to encode within each” (p. 131).

Nonetheless, even though Goodman’s view of art as language remains questionable from philosophical and fundamental perspectives, his theory has had a

significant impact on the development of the notion of visual literacy over time, especially for those who advocate the visual as a language to be read. The ideas of one such scholar, who conceives of the visual as “‘reading’ what we see” (Feldman, 1976, p. 195), has some points in common with Goodman’s theory but focus on understanding rather than basic decoding of a simple system:

The question is not whether we read images as if they were letters, or visual configurations as if they were words. What really matters is whether the perception of visual images can be regarded as critical understanding rather than programmed response. (p. 195)

Although this proposition of visual language is still debated in the academic community, it remains essential to discussing the notion of visual literacy in relation to art education. Despite including a discussion of Goodman’s theory and the related definitions of visual literacy, this current study does not favor the presumption of art as language. Nor is it concerned with debating definitions or questioning the concept of visual literacy. Rather, to steer the discussion on identifying notions of visual literacy, it draws on two scholarly categorizations of visual literacy to demonstrate how these competing definitions attest to the complexity of the term.

To date, discussion about the origins of the concept visual literacy remains diverse, and concepts of visual literacy have varied from one academic discipline to another. Because of the impact of changing developments in electronic technologies, current conceptions of visual literacy seem to be expanding, although compared with the theoretical discourse on linguistic literacy, the definitions and corresponding discussions of visual literacy have yet to be fully developed. Nonetheless, Boughton (1986) and

McDougall (2004), recognizing the extensive understanding of this notion across disciplines, have each developed categories with which to organize the realm of visual literacy.

First, in a discussion of the concept of visual literacy written primarily for art educators, Boughton (1986) proposed three conceptualizations of the notion: “Visual Literacy (Communication), Visual (Artistic) Literacy, and Visual (Aesthetic) Literacy” (p. 128). Boughton further observed that scholars who embrace a communicative conception of visual literacy—mostly those outside the field of art education—view it as “a kind of generalisable attribute” (p. 129) to be taught in schools across all disciplines. In Boughton’s view, communication-oriented visual literacy should seek to develop individual’s skills in communicating visually with others in a network of visual communication, whereas artistically and aesthetically oriented visual literacy should aim to develop the artistic understanding of creative production and interpretation of art works, and the aesthetic understanding of various visual forms, respectively.

More recently, McDougall (2004) identified three visual literacy mindsets: the “structural, sociocultural, and cognitive” (p. 26). Because a structural mindset considers how all “these various building blocks of the visual structure are used to communicate effectively” (p. 37), it focuses primarily on *how* images are made. In contrast, the sociocultural mindset examines “*why* images have been constructed in the ways they have” and “the ideological and contextual considerations that affect the image-making process” (p. 39). Finally, the cognitive mindset views visual literacy as a “mental function” (p. 45) and considers “the relationship between visual skills and cognitive/physiological processes” (p. 44).

A comparison of McDougall's structural explanation with Boughton's communicative and artistically oriented view show that these conceptions intersect: not only do they share a communicative intention, but both promote the need to understand a "grammar of images"—their formal visual elements and principles. McDougall's cognitive mindset also overlaps with Boughton's artistic and aesthetic views of visual literacy in that all three conceptions are associated with the abilities of visual thinking and visual perception. Thus, McDougall's and Boughton's conceptions of visual literacy serve as a useful framework for describing the origins, conception, and developments of visual literacy, as well as its significance.

In one of the earliest definitions of visual literacy, Debes (1969), an educational technology scholar, observed that

visual literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, and symbols, natural or man-made, that he encounters in his environments. (p. 27)

Debes' description suggests that visual literacy is a competency that humans develop by engaging their multiple sensory systems with images in their surroundings. Building on this orientation, Fransecky and Debes (1972) established guidelines for teaching visual literacy by defining a visually literate child as one that has "a basic understanding of the grammar of visual language and some realization that it parallels verbal language" (p. 7).



By visual language, these authors meant the “symbols, message carriers, [and] body language” (p. 7) delivered by television, films, and advertisements.

Whereas this conception of visual imagery as a language has seemingly been influenced by Goodman’s notion that art as language, for those visual literacy scholars who agree on the visual language point of view but work outside arts-relevant fields, the *visual* refers primarily to general visual forms like maps, advertising graphics, and road signs and not to works of art as Goodman implied. Nevertheless, describing visual literacy with a language metaphor provides an avenue for understanding images or works of art and suggests that interpreting visual images is as important as learning verbal language. Thus, in the three decades since the work of Debes and his colleague, mainstream discussion of visual literacy has assumed the existence of a visual language for learning images.

Scholars of visual literacy who have privileged the study of visual language grammars consider the composition and design of images to be the syntax of visual communication. For example, Dondis (1973), a public communication scholar, proposed that being visually literate requires mastery of visual elements<sup>7</sup> like texture, shape, scale, and dimension. In Dondis’s view, all visual experiences are expressed in and drawn from the basic graphic elements and the compositional source. In a more detailed explanation, Australian art educator Bamford (2003) observed that “being visually literate is a combination of syntax and semantics. Syntax is the form or building blocks of an image” (p. 3), while “semantics refers to the way images relate more broadly to issues in the world to gain meaning” (p. 4). According to Bamford, the syntax of images suggests that

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<sup>7</sup> Dondis (1973) referred to visual elements as “the raw materials of all levels of visual intelligence” (p. 15).

visual composition refers to how elements and principles are organized and created, while semantics, the study of signs, explores how the visual form is communicated and how meaning is constructed by the viewer.

This visual language approach to visual literacy corresponds to Boughton's communication-oriented view of visual literacy in which visual images are learnt so that the individual can develop visual communication skills along with verbal literacy skills. In a digitally mediated, technology rich contemporary society, this ability to communicate visually is more imperative, not only because people's lives are conditioned by the visual, but because electronic technologies accelerate the use of visual and multimedia communications in ways that necessitate attention to student skills in critical thinking and meaning making (Flood & Bamford, 2007; Freedman & Stuhr, 2004; Metros & Woolsey, 2006). As Bamford (2003) contended, "the proliferation of images means that visual literacy is now crucial for obtaining information, constructing knowledge and building successful educational outcomes" (p. 2). Thus, visual literacy involves more than simply viewing and creating images; it requires an awareness of how to interpret visual images and to assess them analytically and critically. That is, to effectively *read*, *write*, and *use* visual language, the individual must learn to choose, operate, and interpret various forms of electronic media so as to both understand and communicate meaning in a formed and informed manner.

Overall, as Bleed (2005) noted, "visuals created with new technologies are changing what it means to be literate" (p. 3). That is, in an era of abundant multimedia information, a visually literate individual must have the visual acuity and capability to critically distinguish the quality of information that melds written text, visual images, and

other sensory information. From this perspective, the significance of visual literacy is that it makes the individual not simply a passive consumer of images or artworks but an active producer and analyzer of new complex visual forms of communication.

*The Changing Notion of Visual Literacy in Relation to Art Education*

A large amounts of scholarly studies, both inside and outside art education, predominantly embrace a visual language approach to visual literacy, including use of the term *visual literacy*—a presumption of the visual as language—and the belief that visual communication is one of the skills needed in contemporary society. More than two decades ago, Boughton (1986) declared that, although Goodman’s concept of art as language inspired the discussion on how visual literacy should be conceived of in art education, its theoretical development has not been evident<sup>8</sup>. Indeed, the literature review conducted for this current study confirmed Boughton’s observation that despite a growing body of scholarly writings on the notion of visual literacy in the mid- to late twentieth century, such a focus seems not to have accumulated increasingly in recent art education literature. Rather, recent literature on visual literacy discourse seems not only to be growing across disciplines but is expanding relatively more quickly outside art education than inside.

However, on the one hand, the visual language approach to visual literacy probably generates more attention and discussion because changing social conditions influence the complexity of the notion and a technical image-saturated society confirms the necessity of visual communication. On the other hand, the fact that visual literacy discourse in art education seems less active that that in other disciplines most probably

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<sup>8</sup> Boughton (1986) observed that visual literacy is an emergent concern in both the scholarly writings and curriculum materials in art education.

results from art educators' different understandings and interpretations of the notion. That is, instead of affiliating with the mainstream discourse of a visual language approach,<sup>9</sup> including use of the expression *visual literacy*, these scholars simply engage with its underlying conception.

Thus, in art education the term *visual literacy* refers broadly to a set of skills related to both student comprehension of visual art and other images and student ability to express, interpret, and communicate visual messages conveyed through various visual forms. In particular, in the context of K–12 art education, this set of skills equates to the competencies that students should learn from art programs in the public school system if they are to meet the needs and challenges of society. Hence, as Bamford (2003) asserted, visual literacy “differs depending on context and purpose” (p. 4) and the understanding of visual literacy changes as the educational paradigms, learning contents, and teaching methods of art education curricula alter and different interpretations emerge of developing student visual literacy skills.

In sum, reluctance to engage in contemporary academic writings about the concept of visual literacy may be making art education appear less progressive than other fields in contemporary visual literacy discourse. Of course, in discussing student competencies, many art educators have accepted the mainstream visual language approach to visual literacy. However, importantly, it should be recognized that when considering how art should be taught and what students should learn, some art educators respond directly to the orientations by focusing on art curricula content without employing the specific terminology of visual literacy. Therefore, the following discussion

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<sup>9</sup> As discussed earlier, Goodman's *art as language* has been criticized for oversimplifying the complexity of visual images.

of visual literacy in relation to art education adopts a broad view of the notion and examines the influence of various art education paradigms, learning content focuses, and educational values and purposes used to justify equipping students with the skills needed in society over time.

In art education, the notion of visual literacy has been primarily influenced by Goodman's (1968) view of art as language, in which artworks are symbols and visual representation inhabits a symbol system. Accordingly, art educators that advocate Goodman's theory have proposed that art perception is similar to reading verbal language (Feldman, 1982; Perkins, 1980; Richardson, 1982). From this perspective, works of art can be interpreted through formal analysis of their visual elements and principles—including color, shape, balance, and contrast—which are considered the constituents of a symbol. This view holds that the search for the content and meaning of artworks occurs through the understanding of visual expressions and not simply the consideration of formal structures or visual grammars.

As one of the few art educators to initially employ the term *visual literacy* directly in the context of art education, Feldman (1976) noted that if art is a visual language, then it can be read by studying composition across the “history of art, iconology, art criticism, and aesthetics” (p. 199). Feldman further claimed that visual literacy is important because human “culture is increasingly represented and perceived in visual terms” (p. 200). At that time, elements and principles, conceptualized as visual components of art, were a gateway to accessing the meaning of artworks. Thus, being visually literate meant understanding the composition of art works and being proficient in compositional skills and principles in one's own artwork. As Wilson (1992) put it, “by learning to compose

designs based on these elements and principles, students would also learn to create and perceive harmony in art, in their surroundings” (p. 100). This conception of visual literacy is in line with Boughton’s (1986) artistically oriented visual literacy in that it emphasizes how art elements and principles are arranged in artworks and focuses on the study of art, including “fine art, applied art, folk art and popular art” (p. 135).

Boughton also noted that within art education the aesthetically oriented visual literacy movement was next to evolve after the artistic orientation. This shift from an artistic to an aesthetic view of visual literacy heralded a refocusing of art curricula beyond a preoccupation with the composition of artworks and a concentration on design principles to an emphasis on human response to sensuous visual forms and aesthetic theories. Two art educators were prominent in promoting aesthetically oriented art education, even though their conceptions of aesthetic literacy held different emphases. The first, Harry Broudy (1972), believing that students could develop their aesthetic capabilities through their encounters with aesthetic images<sup>10</sup> that provide a model for humanistic inquiry, proposed that the study of artworks should be the centre of the art curriculum. Thus, for Broudy, aesthetic literacy meant the ability to formally analyze and interpret works of art according to their structural and aesthetic features. The second, Vincent Lanier (1980), asserted that “aesthetic literacy would focus primary attention on how we respond to works of art or other aesthetically evocative stimuli, rather than on the character and quality of the objects themselves” (p. 20), meaning that students need to understand how their own aesthetic responses are being formed. Put simply, whereas Broudy focused on works of art as objects for analysis, Lanier focused on individuals and

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<sup>10</sup> As Broudy (1972) noted, aesthetic images may refer not only to artworks but to anything that a beholder can perceive or anything that has been perceived aesthetically.

their contexts, specifically on how students respond to art works and other visual forms. Although Broudy and Lanier focused on different views of aesthetic literacy, they shared the beliefs that aesthetics are embodied in human values and learning content should focus on the arts, objects, and experiences that can be perceived aesthetically.

In the 1980s and 1990s, even though works of art still constituted the dominant learning resources for developing students' visual competencies in art education discourse, the notion of aesthetically oriented visual literacy expanded the realm of aesthetic images from the study of artworks to consideration of the visual world in art education curricula. This notion of perceiving aesthetic and artistic experiences from outside the parameters of fine art was a new development in art teaching and learning content, one that focused first on culture or the environment in which students were interacting with various visual forms and then on visual culture as a condition of contemporary life to be studied in a particular way.

Subsequently, the cultural component embedded in diverse art forms like folk art and applied art influenced art education to expand the focus of art curricula to encompass a broad base of cultural knowledge and cultural experience. This movement to a culturally oriented visual literacy resulted from the social reconstruction and multicultural education movement, which was motivated by a shared interest in promoting educational programs and structures based on the notion of social justice (Delacruz, 1995, 1996). In such movements, discussions shifted from pronouncements about the value of studying great artworks to discussions about multiple value systems and, specifically, of studying how specific cultures work and interact with other cultures.

Promoting cultural knowledge in art curricula not only shifted the content focus away from skill-based formal analysis of visual composition in artwork interpretation but also promoted art education as a core subject in general education (Wilson, 1992). Thus, learning about artwork became significant as an avenue for studying cultural knowledge and human values. This logic in turn strengthened the purported value of art education in schools by illuminating the importance of artworks that supply the resources (i.e., aesthetic images) for aesthetic experience. Subsequently, the aesthetic experience of images remained vital, yet the learning focus on images expanded, shifting from exclusive to inclusive and rarefied to multicultural to include different art forms in relation to their cultural contexts. The resulting conceptualization of culturally oriented visual literacy attempted to broaden students' horizons to include the understanding of both multiple cultures and the cultural and historical contexts of artworks. Hence, developing students' culturally oriented visual literacy signifies a shift to a broader learning spectrum that calls for the study of not only art forms and particular aesthetic objects from various cultures but also students' cultural and social experiences.

In recent years, the mid- to late twentieth century preoccupation with aesthetic encounters with images has drawn criticism for its tendency to limit and abstract human experience:

Contemporary experience with the sophisticated visual culture we see every day, and the knowledge we construct through our many overlapping and associative visual experiences, tells us that the aesthetic exists in many forms and is as interested as it is sublime. (Freedman, 2003, p. 32)



In response to such criticism, a new art education paradigm oriented toward visual culture has emerged, one adapted from critical social theory, culture studies, and visual culture studies. Focused on “the objects, meanings, purposes, and functions of the visual arts students make and see everyday” (Freedman, p. 2), this new orientation assumes that learning content should embrace the issues and experiences in students’ everyday lives, including works of art, cultural artifacts, mass media, popular culture, and technology.

With this aim in mind, Duncum (2002) proposed that the early concept of visual literacy, with its assumption of art as language, could act as an antecedent in exploring visual culture-oriented art education. Specifically, he asserted that, while the term visual literacy “focuse[s] primarily on the image as a text, visual culture is concerned with the contexts of texts, the real, material conditions of image production, distribution and use” (p. 17). Thus, for advocates of this visual culture-orientation in art curricula, attention has recently shifted away from a sole preoccupation with works of art to a consideration of images and the contexts surrounding mass-produced images and visual environments. Within such a framework, works of fine art are no longer the dominant learning resource. Rather, visual culture-oriented art education takes into account various forms of images related to students’ daily experiences as a means through which individuals can understand their relationship to the world.

Nonetheless, even though the focus of recent learning content in art education has shifted from the art world to an expanded visual world, art educators hold different views on the ways students understand images. For instance, British art educator Raney (1999) defined visual literacy as learning how to create and understand images and objects while seeking a connection between the worlds of visual art and the visual. Such a viewpoint

emphasizes the comprehension of diverse forms of images themselves. In contrast, North American art educators that advocate a visual culture-oriented art curriculum believe that understanding images should extend to looking at images in their contexts as social phenomena (Darts, 2006; Duncum, 2004; Freedman, 2003; Tavin, 2003). Thus, this visual culture orientation attempts to develop student understanding of the content and context of images and other visual communication and experience and student ability to interpret, interact with, and respond to the visual culture surrounding their lives.

As noted above, social reconstruction and multicultural education movements have continually influenced the focus of art education since its inclusion of multiculturalism and cultural and social theories. Since then, many art educators, including proponents of a visual culture orientation, have paid increasing attention to the exploration in art education of social issues, social relationships, and social responsibility to promote democratic citizenship. As Freedman (2003) asserted, “an essential responsibility of education in the future will be to teach students about the power of imagery and the freedoms and responsibilities that come with that power” (p. 20).

At a time of rapidly changing electronic technologies and a growing global network, such exploration has become more vital in preparing students to communicate and interact with others in a technological rich society. Therefore, in the past few years, art educators have called for art to be learnt as a vehicle for examining the effects of political agency (Darts, 2004; Tavin, 2003), cultivating young people’s civic engagement in cyberspace (Delacruz, n.d.), questioning the power relations between individuals in the digital environment (jadogzinski, 2004), and encouraging youth involvement in participatory democracy (Blandy, 2004; Delacruz, 2005). Those advocating such inquiry

not only consider student ability to interpret and analyze content and the surrounding context of various forms of images but are even more concerned about student ability to question and analyze the underlying power relations embedded in the social systems that produce those images. This concern moves the educational purpose from one of fostering students' personal understanding and development to one that emphasizes advancing their social awareness as responsible global citizens. From this perspective, being visually literate means not only that students are inspired or informed by images, but also that they have the ability to question and communicate about social conditions and construct meanings and take action based on their examination of the relation between the images they experience and the lives they live. Whereas this emerging perspective of visual literacy embraces an educational goal of visual communication, it does not really associate it with an assumption of visual language. Rather, it seems to be responding to McDougall's (2004) sociocultural mindset of visual literacy in which learning is a form of social practice focused on examining *why* images are made.

In addition, when considering how students perceive images in the context of multimedia learning environments, art educators have noted the increasingly multiple modalities embedded in works of art and visual culture. Such multimodality draws attention to the social and the semiotic meanings that can be communicated and constructed from multiple perceptual modes (Kress, 2000a; McDougall, 2004). Indeed, Bolin and Blandy (2003) and Duncum (2004) observed that, far from simply experiencing visual forms of communication through their eyes alone, people responding to the characteristics inherent in a changing society perceive images through a wide range of multiple senses—verbal, visual, auditory, gestural, and spatial. In particular, Bolin and

Blandy described performance art, conceptual art, and installation art as “multi-faceted artistic expressions forms [sic] of visual art” (p. 257) to distinguish them from the general terms *visual art* or *visual culture*. They also observed that not all contemporary artworks employ visual representation exclusively: some also incorporate smells, sounds, and the tactile senses. Duncum also proposed a need for multiliteracy and multimodality in art education because “meaning is made through an interaction of music, the spoken voice, sound effects, language, and pictures” (p. 252). Such contentions focus on the increasing demands of engaging multiple perceptual systems in art education and call attention to the fact that developing student visual competencies is more than simply an encounter with the visual mode.

In sum, the conceptualization of visual literacy in art education has shifted the focus of learning content from artworks to visual culture, thereby expanding the scope of art learning and teaching from a preoccupation with decoding visual forms called works of art to an interest in critical analysis of the social structures that produce widely varied visual forms of expression in the world. The inclusion of these different focuses on visual forms in art curricula differentiate art education’s current perspective on visual literacy from that of other fields, and make the notion more complicated than just another form of language. In summary, instead of identifying the use of visual literacy in art education, this section has examined how different art educational paradigms influence the learning focus and result in different educational outcomes and student capabilities. It is also evident that visual literacy in art education is not a fixed concept but rather is constantly being modified for a variety of reasons, including diverse teaching and learning

environments, changing developments in curriculum theories and educational pedagogies, and the impacts of electronic technologies on society.

#### Expanding the Scope of Visual Literacy

To investigate beliefs about what students should learn given the expanded definition of literacy in contemporary society, the next section considers how intertextuality and the multimodal nature of communication embedded in the digital learning environment influence the contemporary notions of visual literacy.

#### *Intertextuality of Visual Images*

Mitchell (1994) described the postmodern era as a “pictorial turn” (p. 16) that indicates a revolution of “a postlinguistic, postsemiotic rediscovery of the picture as a complex interplay between visibility, apparatus, institutions, discourse, bodies, and figurality” (p. 16). This observation implies that visual representation, with its complex interrelationships, prevails over the conventional role of text as the predominant form of communication in postmodern society. Such growing attention to the visual is not only based on its inherent potential but also reflects the needs of a changing society. That is, rapidly developing electronic technologies have reinforced the predominance of visual communication in an information age. In such a digital environment, images are used expressively and exchanged frequently in a manner that echoes the picture-is-worth-a-thousand-words adage. Such usage indicates contemporary society’s growing interest in, and ease of access to, visual communication.

According to Bolter (1998), even though images and texts have historically been linked in print, images have traditionally been subordinated to verbal communication. With the new technologies, however, images play a significant role in the construction of

electronic texts on computer screens in the digital environment, which raises the question of whether there are “two literacies (verbal and visual), or ... only one?” (Bolter, p. 3). In Bolter’s view, digital hypertext and graphics coexist and interact, making and connecting meanings so that that visual literacy and textual literacy become one. Likewise, Kress (1997) observed that the increasing visual interaction with written text is a major feature of literacy in the electronic era. Indeed, the development of electronic technologies demonstrates that “melding text with image constructs new meaning” (Metros & Woolsey, 2006, p. 80) at a time when “texts are also becoming increasingly multimodal in their incorporation of images with written language” (Unsworth, 2001, p. 9). This interactivity of printed text and images leads to another concept, *intertextuality*, “the ways in which images reference one another, and how viewers interpret them in the light of other visual images or written texts” (Werner, 2004, p. 77).

Further discussion of the facets of literacy requires prior clarification of the concept of the intertextuality of visual images, a primary factor influencing the expanded notion of literacy. The term *intertextuality*, first introduced by French scholar Kristeva (1984), refers to how all signifying systems are blended and meanings are constructed from the interrelationship between present and previously encountered texts. Freedman (1994) described intertextuality as “foundationally about learning how to read and respond to a text based on other textual experiences” (p. 162). In these discourse *text* refers to any sort of communication. Even though intertextuality was initially associated with languages, the intertextuality of images is now commonly referred to in order to discuss how meaning is constructed through images and how images refer to other images. As a result, particularly given the impact of electronic technologies on art

education, the intertextual aspect of images has become vital. Visual experiences “are read onto and through one another, lending ever-accruing layers of meanings and of subjective responses to each encounter we might have with film, TV, advertising, artworks, buildings, or urban environments” (Rogoff, 1998, p. 14). Intertextuality not only enables exploration of the relationship between visual and textual literacy but has become part of how people experience the world. This latter is especially true for students, who must learn the skills needed to recognize and interpret complex series of interrelationships in their own lives.

Scholars in art education have discussed the intertextuality of images in various ways. For example, Freedman (1994) used the term *intergraphicality* to describe the intertextuality among images, asserting that viewers develop meaning through a cognitively interrelated network of images. Likewise, Walker (1996) proposed that intertextuality refers to “contextual relations outside the artworks,” particularly “social and cultural connections among artworks, such as popular culture, technology, religion, and family” (p. 83). Somewhat similarly, Taylor’s (2000) view of imagic intertextuality emphasizes learner interpretation of “the ways that works of art and artists are related across time, place, and conditions of humanity” (p. 379). For Taylor, the ability to make these interpretive claims depends on students recognizing the intertextuality of images and defining art based on their experiences learning about art and artists. In a more focused approach, Catalano (2005) discussed intertextuality between images and written texts in the context of reader engagement with picture books; that is, the correlations between the themes in fairy tales and the visual images that illustrate them. A synthesis of these scholars’ views on the intertextuality of images suggests that visual communication

draws connections within, among, and outside images. Yet, even though visual images have become a prominent resource for understanding the world, learning through the visual is not an isolated, reflexive process based on the image itself. Rather, meaning is made through an exploration of the intertextuality of the images as “meanings arise through the interaction of interpreter and text within the particularities and constraints of context” (Werner, 2004, p. 66).

In addition, even though various contemporary electronic media can be considered art forms, as multilayers of meaning increase in these dynamic multimedia forms, intertextuality becomes more complicated. As this present discussion of images derives from digitally immersed environments, its notion of text includes *dynamic images*, understood in the contemporary sense. That is, in contrast to the conventional view of text as “simply a passage of print or a slice of speech, or an image” (Lankshear, Gee, Knobel, & Searle, 1997, p. 45), it recognizes that “there is now a vast range of texts available to young readers in different combinations of modes and media so that text has come to include not only word-plus-images but moving images, with their associated sound tracks” (Bearne, 2005, p. 13). Indeed, referring particularly to screen-based texts, Bearne observed that digital representations, like animations and hypertexts, expand young people’s encounters with text and provide opportunities for them to engage multiple modalities in meaning construction and representation. Particularly, intertextuality of images in today’s multimodal digital environment signifies a form of communication that is configured and conveyed through visual imagery, sound, gesture, animation, and the written word. Therefore, the contemporary view of imagic intertextuality in art education must take into account how multiple modes of



communication and electronic media interact to represent and communicate ideas through both still and dynamic images and even through other forms of media text.

Because of technological developments, the ability to be able to communicate visually is not limited to vision, and the concept of text has also expanded to encompass a wide range of digital representations carried and constructed by electronic media. Thus, the development of learners' visual literacy skills must consider an expanded concept of literacy.

### *Expanded Notion of Literacy*

The concept of literacy is a fluid one that changes according to social conditions and society's expectation of what constitutes a literate individual (Lankshear, Snyder & Green, 2000; Leu et al., 2004). In general educational discourse, a literate individual can construct, communicate, and comprehend meanings through reading and writing. Yet the concept of literacy has also included learning with linguistic, visual, and aural perceptual systems. Not only did Dale (1946/1969) define literacy as "the ability to communicate through the three modes: reading and writing, speaking and listening, visualizing and observing—print, audio and visual literacy" (p. 92), Eisner (1991), writing from the standpoint of enhancing students' cognitive development, proposed that textual literacy must take visual literacy into account. Similarly, Flood and Lapp (1995) suggested expanding the definition of literacy to include visual and multimedia technologies. Such expansion moves beyond a single focus on linguistic proficiency to highlight multiple forms and purposes of communication.

### *From Literacy to Multiliteracies*

In a society that is immersed in and mediated by proliferating electronic technologies, literacy forms and practices are changing so rapidly that new and varying forms of literacy are still emerging (Daley, 2003; Evans, 2005; Kist, 2003; Lankshear & Knobel, 2003; Leu et al., 2004; Tyner, 1998). As one way to respond to such rapid technological development, the field of literacy education has adopted the term *literacies* instead of *literacy* to emphasize a plurality that reflects the multiple competences people may need in response to a changing society (Cope & Kalantzis, 2000b; Lankshear & Knobel, 2003; Unsworth, 2001). These ever-evolving forms of literacy associated with the growing development of electronic technologies include but are not limited to multiliteracies (Cope & Kalantzis, 2000a; Unsworth, 2005), new literacies (Kist, 2004; Lankshear & Knobel, 2003; Leu et al., 2004), multimodal literacy (Pahl & Rowsell, 2005), critical literacy (Cervetti, Pardales, & Damico, 2001; Goodman, 2005), information literacy (Zurkowski, 1974), digital literacy (Gilster, 1998), media literacy (Buckingham, 2003), and multimedia literacy (Hobbs, 2006; Lemke, 2006). To provide an overview of these emerging, expanded forms of literacy, the remainder of this discussion explores the connections among the various electronic media competencies and the notion of visual literacy in relation to electronic technologies.

Multiliteracies, a term coined in 1994 by the New London Group (Cope & Kalantzis, 2000a), are seen as being made up of multiple literacies like cultural literacy, critical literacy, and media literacy (Unsworth, 2001). Cope and Kalantzis selected the term multiliteracies because

it describes two important arguments we might have with the emerging cultural, institutional, and global order. The first argument engages with the multiplicity of communications channels and media; the second with the increasing salience of cultural and linguistic diversity. (p. 5)

In other words, because of its focus on language learning, the concept of multiliteracies encompasses the skills of multimodal communication required in a contemporary society, which, within a multiliteracy framework, are interrelated as a method of meaning construction:

To become effective participants in emerging multiliteracies, students need to understand how the resources of language, image, and digital rhetorics can be deployed independently and interactively to construct different kinds of meanings. This means developing knowledge about linguistic, visual, and digital meaning-making systems. (Unsworth, 2001, p. 8)

Hence, a multiliteracy approach to making meaning relies on an individual's ability to integrate different modes of representation to navigate and negotiate the connection between self and society.

#### *New Literacies*

The notion of new literacies is similar to multiliteracies. For example, Lankshear and Knobel (2003) interpreted new literacies as the sum of various types of competencies in response to "changes in technology, institutions, media, the economy, and the rapid movement toward global scale in manufacture, finance, communications and so on" (p. 16). On the other hand, Leu et al. (2004) conceptualized new literacies particularly in terms of "the skills, strategies, and dispositions" (p. 1572) required in experiencing the

Internet and information and communication technologies (ICTs). Nevertheless, these seemingly different interpretations of the concept new literacies share the view that the multiplicity of literacy is tied to the interactions of social, cultural, technological, and global concerns.

### *Multimodal Literacy*

Even though the concept of multiliteracies and that of new literacies each has its own rationale, both are as concerned with changing global development as they are with changing personal development. Likewise, both highlight the significance of the multimodal nature of communication in the current digital environment, which in general refers to the fact that meaning is made and communicated using a combination of multiple perceptual systems, including linguistic, visual, aural, and spatial modes. Whereas Pahl and Rowsell (2005) identified *multimodal literacy* as a separate form of literacy, other scholars view it as just one multiple literacy skill related to both multiliteracies or new literacies as they emerge in the face of changing electronic technologies (Bearne, 2005; Cope & Kalantzis, 2000a; Lankshear & Knobel, 2003; Kress, 2003; Leu et al., 2004).

Kress (2003) argued that communicative multimodality is as significant as the prominence of the visual mode of communication in the information age. For Kress, this concept of multimodality refers to an ability to construct meanings from social and semiotic perspectives using different modes of communication. Moreover, as Cope and Kalantzis (2000b) observed, meaning constructed through multimodality, rather than being simply a gathering of different representational modes, is intersected and integrated among multiple sign systems in a process whose core is “the inherent ‘multiness’ of

human expression and perception, or synaesthesia” (p. 211). This process has become particularly important for individuals living in an increasingly multimedia environment. Kress (2000a) also noted that when multimodality is used to communicate through electronic media, the meaning of the term *texts* is extended from written texts to include “text-like objects” (p. 184). For example, “multimedia production requires high levels of multi-modal competence based on knowledge of the operation of different modes, and highly developed design abilities to produce complex semiotic text” (Kress, p. 57).

Kress’ articulation of multimodal competence points to an emerging skill needed in the field of art education. That is, even though art education commonly employs electronic media in a process of artistic multimedia production that no longer requires cooperation by a group of people with distinct skills, young people need to possess the ability to communicate in a multimodal manner to make sense of their learning experience with art and technology. From this perspective, a multimodal approach to literacy is essential; young people must have opportunities to engage multimodally with electronic media based on the accompanying semiotic possibilities to communicate their thoughts individually and collectively.

### *Critical Literacy*

Another competence seen as necessary to various contemporary forms of literacy is critical literacy, defined here as the ability to analyze and critique social conditions in relation to the digital form of media text and to question and examine the hidden messages underlying various social practices. Because “the purpose of critical literacy has always been to empower us to take a critical stance toward our sources of information” (Lemke, 2006, p. 1), literacy scholars have advocated that literacy in the

information age must embrace a critical thinking component (Leu et al., 2004; Peters & Lankshear, 1996). Thus, the values of critical literacy are inherently aligned with certain electronic media-related literacy skills.

#### *Digital and Information Literacy*

To refer to such proficiency in communicating and responding to digital information formats in the electronic environment, Gilster (1998) used the term *digital literacy*, which, its advocates have claimed, moves beyond the technical applications of devices and software to emphasize social, cognitive, and psychological engagement in the digital environment (Gilster, 1998; Tapscott, 1998). Closely related to digital literacy is *information literacy*, an understanding and set of abilities that enable “individuals to recognize when information is needed” and provides them with “the capacity to identify, locate, evaluate, and use effectively the needed information” (Bundy, 2001, p. 1). Both digital and information literacy respond to the proliferation of and increased access to digital information, placing a primary emphasis on questioning and “recognizing message quality, authenticity and creditability” (Hobbs, 2006, p. 17).

#### *Media Literacy*

The definitions of media literacy, however, underpinned by diverse theoretical viewpoints, are probably as varied as those of visual literacy; therefore, this discussion focuses only on its relation to art education. In general, according to Buckingham (2003), media literacy can be defined as “the knowledge, skills and competencies that are required in order to use and interpret media” (p. 36). Thus, within Buckingham’s framework, the term *media* takes on a broader connotation of “visual and visual-audio representations” (p. 36) that includes digital images, Web pages, soundtracks, and films.

Many scholars also embrace the notion of media literacy as having a critical component (Buckingham, 2000; Frechette, 2005; Semali, 2000; Tyner, 1998), one that encompasses the study “of the social, economic, political, and cultural contexts of the mass media, including knowledge of how media corporations work and how the media affect society as well as individuals” (Schwarz, 2005, p. 12).

This concept of media literacy has recently been incorporated into art education discourse because of recognition of the importance of students’ digitally mediated experience. Specifically, interests in mass media and student interest in popular culture have exerted a significant influence on those advocating a visual culture-oriented art education, in which the primary learning resource draws from students’ daily encounters with many types of images and visual experience. Moreover, this notion of media literacy intersects with a particular perspective of visual literacy as it relates to electronic technologies. That is, developing student abilities in both visual and media literacies involves both media production and media analysis. As media educator Masterman (1985) asserted, “developing a conceptual understanding of the media will involve both critical reception of and active production through the media” (p. 24). Based on such an assumption, scholars in both media education and art education have addressed the relationship between creative and critical inquiries. For example, Griffin and Schwartz (1997) called for an emphasis on aesthetic visual production in media literacy education, Hobbs (2005) suggested that visual arts educators should engage intensive activities to analyze media along with creating artworks in the development of media literacy, and Chung (2005) viewed visual and media literacy as one desired student competence shared by a social reconstruction approach to art curriculum. As a result, media literacy is seen

as a construct compatible with visual literacy because both notions consider the power of digital imagery and the need for critical thinking skills in contemporary society.

The many aspects of an expanded definition of literacy suggest particular competencies needed in the rapidly changing twenty-first century. Even though these theories are specific responses to certain aspects of society's needs, they share a belief in the importance of two common competencies needed in the information age: multimodal communication and critical thinking skills. As the contemporary notion of visual literacy shares interest in these two commonalities with other expanded definitions of literacy, although one could argue that critical thinking component has long been embedded in discourse about art curricula. Nevertheless, the significance of the multimodal nature of communication has received growing attention from art educators (Bolin & Blandy, 2003; Duncum, 2004), and art education scholars have called for a critical stance in their propositions (Freedman, 2003; Tavin, 2003). Finally, even though many scholarly perspectives highlight the plurality and diversity of literacy, the notion of literacy as a prevailing concept is significantly concerned with the contemporary life:

Literacy in the information age, that which we experience, is not a collection of materials, nor tools, nor competencies, nor technical processes, nor even new affordances, but rather, a whole determined by our purpose at a given moment.

There is then a coevolution of individual, society, literacy, and technology, given coherence by the processes of construction. (Bruce, 2003b, pp. 336–337)

Bruce's observation underscores that the process of learning in contemporary society should be viewed as a unity rather than the piecing together of segments.

Moreover, because the knowledge and experience of today are traversing multiple expert



proficiencies, segregating different dimensions of literacy may either overemphasize or ignore some aspects of the skills needed in society. In light of the ongoing social changes brought about by changing electronic technologies and mass media, student development of visual literacy skills requires that attention be paid not only to the visual mode of communication but also to the fact that meaning is constructed through the intersections of communicative multimodality and interdisciplinary expertise. At the same time, Bruce's insight reminds all teachers and educators that the primary purpose of equipping learners with the abilities to meet society's need remains the same, even though conceptualizations about literacy may change over time and new forms of literacy may continuously emerge.

#### Summary

This literature review has been organized around three major subtopics: (a) the impact of electronic technologies as evidenced by the use of technologies as an instruction tool and art medium in art education; (b) the conceptualization and interpretation of visual literacy in art education based on different learning content focuses, and (c) the content that students should learn from art education today in light of imagic intertextuality and expanded definitions of literacy. As the literature review has illustrated, art teachers do not simply use electronic technologies as instructional tools or an art production medium. Rather, in art education, there is recognition that contemporary electronic media also deliver and carry their messages and have potential for the visual communication of ideas in the information age. Art educators and teachers must recognize that various constructions, uses, and alterations of computer-mediated imagery shape and inform new ways of seeing. Moreover, any contemporary notion of

visual literacy should take into account the complexity of images, embrace an expanded view across multiple forms of literacy, and bear in mind the continuous changes brought about by ever-evolving electronic technologies.

## CHAPTER 3: METHODOLOGY

The purpose of this qualitative study was to produce insights about three specific high school art teachers' conceptualizations of visual literacy as manifested by their involvement with electronic technologies in their classroom practices. This exploration of the unique characteristics of each teacher's conceptualizations and practices of visual literacy employed a qualitative research case study method. In addition to the three high school art teachers selected for study, the study participants included three respective groups of students who learnt the art projects taught by the teachers. These three teacher-student group pairs were selected from three different Mid-western public high schools at which the teachers were employed.

One guiding hypothesis of the study was that the three high school art teachers' engagement with electronic technologies and their conceptualizations of visual literacy are interrelated. Evidence for this hypothesis was gleaned from qualitative data collected mainly through observation and interview. These data are reported both as individual teacher case reports and in the form of a cross-case analysis.

This chapter outlines the process of planning and executing the study, including the research methods, recruitment, data collection, and data analysis. This description of the research design serves as a foundation for the study itself and provides readers with an overview of the study plan and corresponding process.

### Research Methods

Because the focus of this study was to examine the practicing art teachers' perspectives on visual literacy in relation to their engagement with electronic technologies, the investigation employed the qualitative research approach of a case

study. Not only is the case study approach commonly used for education studies of art teacher's teaching practice (Thurber, 2004), but it allows exploration of the conditions of specific locations, learners, and factors that shape practices as "lived dimensions that are indigenous to each teaching-learning event" (Freebody, 2003, p. 81). Therefore, to investigate "the particularity and complexity of [each] single case [and come] to understand its activity within important circumstances" (Stake, 1995, p. xi), this analysis views the three secondary art teachers as three unique instances of educational experience. Hence, the case study methodology serves as a framework in which to understand the phenomenon of the art teachers' technology adoption process in conjunction with their professional practice and knowledge formulation.

Additionally, in an attempt to deepen the contextual understanding of the phenomena under study, the research design adopted an ethnographic perspective that articulates the culture of each learning community and identifies the social relations and dynamics embedded in these teachers' beliefs and practices and their interplay with their situated school environments. As Freebody (2003) asserted, "ethnographic research, with its emphasis on context and 'thick description', has been seen as offering a range of procedures that give it applicability and flexibility in educational settings" (p. 76). Consequently, educational research in various areas, including art education, have implemented ethnographic methods of data collection and a case study approach to methodology (Barton & Hamilton, 1998; Bastos, 1998; Collins, 2002; Ellenbogen, 2002; Lai, 2002; Lawrence, 1996; Yasar, 2006). This current study adopted such an approach to explore the three art teachers' localized experience of teaching and learning with technology-relevant curricula and to reveal the uniqueness and significance of the cases

through contextual examination of the teachers' professional lived experience, beliefs, behaviors, and working conditions, together with their students' responses about what they have learned.

Besides exploring the social contexts of each case, the study focused on the uniqueness of individual subjectivity, which, it is worth noting, is embedded not only in the study participants but also in the researcher and the readers. Indeed, scholarly evidence has shown that researchers not only provide their personal perceptions but invite readers to map out their own interpretations of the study (Stake, 2006; Witz, 2006). Therefore, rather than providing a generalized overview of art teachers' understandings of visual literacy in relation to electronic technologies, this study sought to identify the individuals' in-depth experiences within their profession.

Overall, the three art teacher case studies aimed at contextualizing each teacher's conceptualization and practice of visual literacy in teaching art with technology within each unique school setting. Specifically, this case study method involved the ethnographic techniques of document collection, classroom observation, interviews with students, and a series of in-depth interviews with teachers to access the art teachers' insights and record them in the individual written case reports.

## Research Design

### *Participants*

The major study participants were three technologically competent art teachers—Liz Steele, Chris Taylor, and Sara Petersen (pseudonyms)—from three different secondary schools, whose respective students from selected art and technology integration courses also provided learning reflections about their teachers' pedagogical

beliefs. School administrators and faculty also contributed by examining the teaching and learning contexts of selected teacher participants. An overview of the contextual information for the three teachers and their schools are provided in Table 1 and Table 2, and both the schools and the teachers are described in more detail in the case reports.

### *Teacher Participants*

To find teacher participants who met the predetermined criteria, this study employed “snowball or chain sampling” (Patton, 1990, p. 176), which Patton described as a purposeful sampling strategy that seeks information-rich cases. Initially, identifying the teacher participants who proficiently engage electronic media in art classroom for this study was problematic because the majority of the secondary art teachers in the local community primarily teach art using traditional media. However, snowball sampling—in which one respondent links to other respondents, who in turn may identify further respondents (Patton)—allowed local experts familiar with the educational circuit to identify possible participants. Thus, because the study was carried out in a community in which there is a strong connection between a local university and the school districts, I was able to consult with professors and colleagues from the department of art education to identify suitable participants. The corresponding selection criteria were as follows: teacher participants had to (a) be teaching the subject of visual art to secondary level students, either in senior or junior high school; (b) be confidently and intensively incorporating electronic technology media in their art teaching; and (c) have at least 5 years teaching experience.

Table 1  
*School Context*

	Liz Steele	Chris Taylor	Sara Petersen
School	Kennedy High School	Lincoln High School	Washington Junior High School
	Grades: 9–12	Grades: 9–12	Grades: 6–8
Location	Mid-size city, Central Illinois	Rural, Northern Illinois	Urban fringe of a mid-size city, Central Illinois
Schedule	7 periods a day; 50 minutes for each period	5 periods a day; 90 minutes for each period	10 periods a day; 38 minutes for each period
Enrollment	1,485	186	645
Attendance rate	90.5	95.5	95.5
High school graduation rate	96.5	96.1	N/A
Low income	21.3% (District: 41.4%)	1.6% (District: 1.6%)	12.9% (District: 11.8%)
Student racial/ethnic background	Caucasian: 62.2%	Caucasian: 97.3%	Caucasian: 96.4%
	Black: 26.5%	Black: 0.0%	Black: 0.5%
	Hispanic: 2.3%	Hispanic: 1.1%	Hispanic: 1.6%
	Asian/Pacific Islander: 8.8%	Asian/Pacific Islander: 0.0%	Asian/Pacific Islander: 0.8%
	Native American: 0.3%	Native American: 0.0%	Native American: 0.0%
	Multiracial/ethnic: 0.0%	Multiracial/ethnic: 1.6%	Multiracial/ethnic: 0.8%

Source: 2006 Illinois School Report Card (available at <http://iirc.niu.edu/>).

Table 2  
*Teacher Demographics*

	Liz Steele	Chris Taylor	Sara Petersen	
Major	MA in Art Education	MA in Art Education	MA in Art Education	
Age/gender	Mid-30s/female	Early 30s/male	Late 20s/female	
Ethnicity	Caucasian	Caucasian	Caucasian	
Years of teaching experience	13	11	6	
Grade levels of the enrolled students for this study	K10–K12	K10–K12	K8	
Course selected for this study	Advanced Photography	Computer Graphics	Multimedia	Art (3rd hour)    Art (4th hour)
Number of students enrolled	16	16	20	25                  30
Projects taught in the selected course	Contact sheet print Photoshop: grid Photoshop: self-portrait Image and text 100 people community project Haiku Sepia tone Hand coloring Digital portfolio ABCs Polaroid transfer	Product package Mega car poster Gallery banner 3D Strata - Snowman - 3DCreature	Exercises in image and sound combination PSA video Video portrait	Image and sound combination Video documentary

*(table continues)*



Table 2 (continued)

	Liz Steele	Chris Taylor	Sara Petersen
Other teaching or non-teaching responsibilities during the term	Art Survey Photography I Study hall supervisor	Art I Painting Advanced Studio Introduction to the Arts SRT (Student resource time) supervisor for career/portfolio/ senior project School webmaster	Art (6 <sup>th</sup> grade), hands-on media Art (7 <sup>th</sup> grade), hands-on media Art club and video club sponsor Study hall supervisor

Applying Patton's snowball sampling strategy for participant selection first consisted of approaching colleagues and professors at a Midwestern university who are knowledgeable about art teachers in the local school districts and asking them to recommend potential participants. The three potential participants identified were then sent an email inviting them to participate in the study. Because only one of those three initial contacts showed interest in research participation, the search was broadened to include the school districts in more suburban areas. Again, snowball sampling on this larger pool of colleagues responsible for student teacher replacement identified other public school teachers who might be integrating art and electronic technologies in their teaching. This second sampling located four possible teacher participants, two of whom agreed to participate in both the pilot study and the continuing research. As it turned out, all three teachers selected for participation were diverse and unique in terms school location, student backgrounds, working conditions, and courses taught.

#### *Student Participants*

Despite this study's emphasis on high school teachers as the major participants, student reflections and responses to what they have learned from the three art teachers were also important for providing alternative insights into how the notion of visual literacy is manifested through teaching and learning art with technology. Specifically, these teachers taught various art courses over the term but only those art courses that contained technology-related components were selected for study. Moreover, because these art and technology integration courses might consist of more than one class session, there could be two groups of students taking the same course from one teacher or one teacher teaching two different art and technology integrated courses. Nevertheless, since

the study emphasized the teachers as cases, the students were still viewed as one group per teacher; especially as the dynamics of different learning groups were beyond the scope of the study.

As a result, the study identified three groups of students enrolled in the selected art and technology-integrated courses from the three teachers identified as potential student participants. Subsequently, within each group of student participants, approximately 10 student participants were selected for interview at the end of their learning process. Initially, such selection took into consideration teacher suggestions, and the decisions were made after the third class observation during which research consent forms were distributed. The selection criteria for the students to be interviewed were that (a) they be enrolled in the teacher participants' art and technology integrated courses, (b) they show interest in sharing and discussing their opinions and artworks with the researcher, and (c) while not necessarily showing obvious achievement in art, they show interest in learning about art with technology. Nevertheless, even though students were selected based on these designated criteria, the students that actually participated in the interviews were those whose time availability (without taking away from school time) was compatible with my own schedule. However, because the interviews were conducted with a very limited pool of students, the students engaged with their learning outcomes at varying levels of sophistication. Most particularly, this study could not measure the degree to which the students had learned from these selected courses and teachers, although their learning responses offered another arena in which to examine all three teachers' practices.

As Witz (2006) observed, the most natural way for a researcher to understand a participant's deeper thought is to foster "an ally relationship" (p. 249) with that participant. That is, to elicit the participant's deeper feelings (which reflect previous experiences), personal histories, and the way these factors have helped and developed their current being, both the researcher and the participants must value the significance of the research. Therefore, in this study, all participants, whether students or teachers, were fully informed of the research purpose, observation frequency, interview process, and the voluntary nature of their participation. In fact, this mutual liaison with the participants was crucial in the development of a professional researcher-participant relationship, and the investigation was greatly facilitated by the strong support and valuable assistance given by the participants, both teachers and students.

#### Data Collection

The entire data collection process took place over one semester or approximately four months. The time and dates of site visits were scheduled according to the teacher participants' convenience, the art curriculum schedule, and my own time availability. Within this time period, the three case studies of the three teacher participants were carried out in three different classroom settings, one for each teacher participant and his/her students, for up to four to six weeks each, depending on the length of the selected art projects. In addition to observations of the project-teaching sessions, the data-gathering activities included a series of in-depth interviews with the teacher participants and one semistructured, open-ended interview session with each focal student and an administrator or faculty member. In all, data were collected and analyzed from multiple sources, including my field and classroom observation notes, interview transcripts,

photographs of classroom activities, and copies of students' visual artifacts and journals and the teachers' teaching materials. In essence, the study employed three major methods of data collection—observation, interview, and document collection—whose execution is detailed in the following discussion.

### *Observations*

By paying attention to the teachers' lecture and teaching strategies, the students' learning responses, and teacher-student interactions and conversations in the classroom, the classroom observations provided contextual information on how the teachers' notion of visual literacy was manifested through daily teaching and learning. Specifically, the observation method used in the study was designed to eventually produce a descriptive narrative that reveals each case study's complexity. As Patton (1990) emphasized, "the purpose of observational data is to describe the setting that was observed, the activities that took place in that setting, the people who participated in those activities of those observed" (p. 202). Similarly, in the discussion of observation as a method of data gathering, Stake (1995) noted that the researcher "lets the occasion tell its story, the situation, the problems, resolution or irresolution of the problem" (p. 62). Thus, the research report includes several vignettes that focus on classroom happenings and describe how instructional strategies unfolded and how the teachers and students interacted with each other.

### *Observation Process*

During the spring 2007 semester, based on times that fit both my schedule and those of the teachers, I chose three separate classes for observation in which the students were to learn art and technology-integrated projects. To test the materials, during the fall

2006 semester, I conducted a month-long pilot study using Sara as the participant. Because, as mentioned earlier, this study focuses on the teachers, Chris's Computer Graphics and Multimedia were considered one class, as were Sara's two groups of eighth graders for the same curriculum. In addition, because Chris's and Sara's class sessions ran sequentially, I was able to observe them conveniently. The duration of the observations depended on the length and schedule of each teacher's art projects, but generally it involved two to three months of attending 16 to 37 class sessions for a total of approximately 100 hours of classroom observations with all three teacher participants. Figure 1 and Table 3 detail the data collection progress and the units of classroom observation. Observation field notes were composed on each day of classroom visits, meaning that 86 observation entries were constructed for the 86 days of observation.

During the classroom observation sessions, I initially neither participated in nor disturbed the class activities but sat at the rear of the classroom audiotaping the classroom conversation and taking field notes on what was occurring. As time went by, the students became familiar with my presence in the classroom, and the teachers encouraged me to have short conversations with the students as they worked on their projects. Toward the end of school year, the students quite often shared their artwork with me and asked for my feedback during the class period. Chris, most particularly, valued such interaction between me and his students because the students learnt to communicate on their work with an individual from outside the learning community.

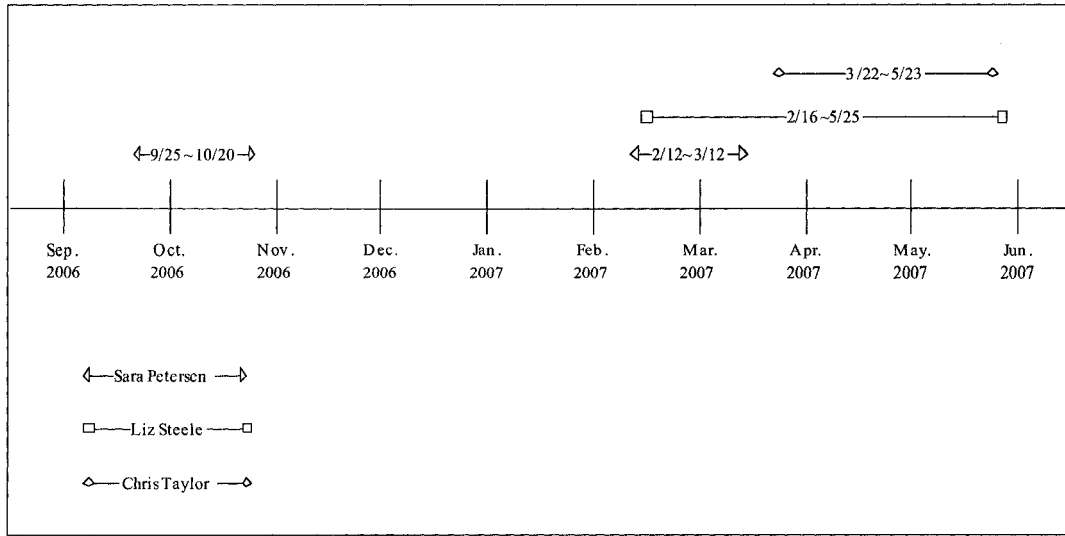


Figure 1. Data Collection Timeline.

Table 3  
Number of Observations

	Liz Steele	Chris Taylor	Sara Petersen
Periods of data collection/observation	2/16~5/25, 2007	3/22~5/23, 2007	9/25~10/20, 2006 2/12~03/12, 2007
Days of observation (total = 86)	37 days	16 days	33 days
Length of observation (total = 100 hours, 22 mins.)	50 mins. per class x 37 days = 30 hours, 50 mins.	180 mins. per class x 16 days = 48 hours	76 mins. per class x 33 days = 41 hours, 48 mins.

### *Interviews*

The interview sessions, conducted parallel to the classroom observations, consisted of a series of in-depth interviews with the teacher participants and semistructured interviews with the student participants. In describing in-depth interviews, whose purpose is to identify an individual's broader experiences and perspectives (Charmaz, 2002; Johnson, 2002), Johnson noted that the interview "aims to explore the contextual boundaries of that experience or perception, to uncover what is usually hidden from ordinary view or reflection or to penetrate to more reflective understandings about the nature of that experience" (p. 106). Thus, the in-depth interviews carried out in this study elicited evidence of the art teachers' deep involvement in their profession. That is, by examining the teachers' own contemplations on their beliefs and practices, this study sought to understand the teachers' conceptualizations of visual literacy in relation to electronic technology.

At the same time, qualitative interviews were conducted with selected students, which were valuable in providing a channel through which these adolescents could express their learning experiences in their own voices to produce a profile of their teachers' practice. Most particularly, the semistructured open-ended interview questions designed for the student participants encouraged them to reflect on what they had learned from their art teachers and the projects.

For transcription purposes, and with the interviewees' permission, all interview sessions were audiotaped, and all interviewees were later provided with transcribed copies of the interview content for their feedback. All interviewees were free not to respond to any question(s) they did not wish to answer.



### *Interview Process*

The individual interviews with the teachers were conducted during three interview sessions, each lasting 40–60 minutes, meaning a total interview time of approximately 420 minutes (7 hours). These three interview sessions took place at the beginning, at the midpoint, and after completion of the selected art projects.

In addition to the series of three in-depth interview sessions with the teachers, a 20-minute interview session was conducted individually with all participating (focal) student once they had finished their projects. As the three teachers each had about 10 such participating students, the total length of the interview sessions with the 30 focal students was approximately 600 minutes (10 hours). The students were interviewed during their available time in study hall or after school.

### *Interview Protocol Design*

The interview protocol design consisted of two semistructured open-ended interview protocols for the teacher participants and the student participants, respectively. These protocols served as a guideline for the direction of the interviews. Most important, after each interview tape had been listened to and transcribed, the interview questions and related discussion topics were redesigned and reformulated for the next session. During the interviews, teacher and student responses steered the interview direction and evoked new questions and interesting themes. Thus, the protocols were not strictly followed. For example, the fact that, according to the observation notes, the students described their technology learning experience by comparing electronic and conventional media gave evidence of their interest in traversing both old and new media. Hence, new interview questions were formulated around this situation. The resulting protocols for the teacher

and student interview are presented in Appendix A and B, respectively, and the following discussion articulates the rationale for protocol design.

*Protocol for teacher participants.* In the first interview, the teacher participants received a clear explanation of the research design and the research purpose. The remaining questions in this session asked about the teacher's career history, knowledge acquisition, and technology adoption process, including how and why each had become an art teacher, why each was interested in engaging electronic technologies in the classroom, and how each had learned technology. Thus, the first interview attempted to explore the teachers' professional experience in visual art and technology as it had developed over time.

The second interview, conducted at the ongoing projects' midpoint, looked closely at the teachers' own articulation of their beliefs about teaching art with technology within their particular learning context. Thus, these interviews focused on the teachers' inspection of the ongoing projects to describe their project purpose, expected outcomes, and expectations of their students. Hence, the art and technology-integrated projects served to enhance the richness of the interview data in that the teachers could express their abstract thoughts through the concrete curricula. Key points from the previous interviews were brought up for clarification or further exploration.

Finally, the third and last interviews were conducted after the art projects were completely finished, usually near the end of the semester or quarter. Because of the teachers' time availability and the numbers of intended interview questions, the third interviews appeared much longer than the second. In addition, whereas the second interview probed for the teachers' reflections on the projects taught, the final interview,

by focusing on the teachers' observations and contemplation on their given learning environments, aimed to capture their insights on what students should learn in order to develop the visual literacy needed in technological society. Specifically, this interview contained questions about the teachers' experiences of and attitudes toward implementing their chosen electronic media in their art classes, the challenges and opportunities of engaging technology in art, and the students' learning achievement and implication.

*Protocol for student participants.* Parallel with the classroom observations of the specific art projects, student participants were interviewed about their contextual understanding of how the art projects were unfolding and being directed by the teacher participants. These interviews, conducted after completion of the art projects, encouraged the students to share what they had learned by asking them to reflect on their interest in and expectations of the projects. They were also asked how their artworks were developing, how they were engaging media to convey their messages, and what art and technology meant to them. Interviewing the focal students in this manner provided a perspective on how the art teachers were implementing and engaging electronic technologies in their workplaces.

#### *Collection of Student Work and Teacher Materials*

In addition to the information from classroom observations and interviews, data were also collected by photographing and copying the students' visual productions and journals created from the art projects. Specifically, these documents served as resources for examining the connection between the teachers' lessons and the students' learning outcomes. Thus, images of the students' works were studied together with the observation notes to provide rich contextual information on the classroom events. Copies

of the learning materials used by the teachers during instruction for the projects (e.g., handouts and worksheets) were also collected as resources for understanding the teachers' knowledge as praxis.

### Data Analysis

Data analysis for this study—including interview notes, observational field notes, images of students' visual artifacts, and copies of student art journals and teacher teaching materials—consisted of a three-stage process of coding, case report creation, and cross-case analysis. The first stage, coding, required in-depth familiarity with the data so that key concepts and categories could be developed and then contextually coded to produce three individual write-ups of the teachers from each case study. Further analysis of these reports took the form of cross-case discussion, and a member check procedure during and after the writing process kept me constantly in touch with the teacher participants and allowed me to verify the accuracy of, elaborate on, and/or correct the manuscripts.

### *Coding*

This coding process enabled me to become fully immersed in the data by repeatedly reading the transcripts while listening to the corresponding audiotapes. Such intensive listening paid particular attention to emerging concepts and expressions together with conversational elements like tone of voice, gestures, and pauses. This approach, which seeks for the unity where elements merge, is designed to develop in the researcher's mind a whole sense of each teacher participant. Data could then be managed and analyzed using a qualitative research software program, QSR NVivo 7, which allows the coding and searching of large amounts of textual data. Hence, this first coding step

facilitated the grouping of key ideas and the organizing of relationships among the various concepts emerging from the data. Most specifically, careful scrutiny of the data enabled identification of significant ideas and contexts, which could then be assembled into separate categories representing “a phenomenon, ... a problem, an issue, an event, or a happening that is defined as being significant to respondents” (Strauss & Corbin, 1998, p. 124). For example, the analysis generated possible categories from the art teachers’ lived experiences, sources of inspiration, knowledge and behaviors, and student responses.

It should be noted, however, that in this study the processes of data coding and data analysis occurred almost simultaneously. Thus, once transcribed, the data were coded in a manner that facilitated categorical development and assisted systematic development of the connections among categories. The resulting categories were then used to reflect on the study’s direction and determine the design of the follow-up interview questions.

### *Case Reports*

The contextual coding information constituted the basis for the research findings report. Each case study was organized around emerging themes and issues to produce a coherent understanding of the case from the three dimensions of the teacher, classroom, and students. Moreover, each case report contains richly descriptive vignettes of classroom activities that illustrate both teaching strategies and teacher-student interactions. To support the research findings, the write-ups include direct quotations from the interview transcripts for both teachers and focal students, as well as teacher-student conversations during class activities.

### *Cross-Case Analysis*

In addition to the case reports, a cross-case analysis enables a researcher to “enhance generalizability” and “deepen understanding and explanation” across multiple cases (Miles & Huberman, 1994, p. 173). Thus, the cross-case discussion provided in Chapter 5 emphasizes the common themes that emerged among the three cases and reexamines the predefined categories developed during coding across these three cases to identify similarities and differences through feature comparison. Hence, besides presenting three unique case studies, the cross-case analysis offers a macroscopic view of how the three cases are interrelated.

### Summary

This chapter has provided an overview of the study plan and execution. Specifically, the investigation embraced ethnographic case study to examine three technologically competent art teachers’ perspectives and practice of visual literacy in relation to teaching art with technology. The research data analyzed were taken from multiple sources, including researcher field notes, interview transcripts, entries from classroom observations, and photographs and copies of the students’ visual artifacts and the teachers’ instructional materials. Data analysis consisted of a three-stage process of coding, case report creation, and cross-case analysis that facilitated the study goal of depicting the uniqueness of the three case studies and capturing the complexity of the social context in which the cases were situated. By providing rich descriptions of the three dedicated teachers, the three cases also represent extensive researcher engagement with both the participants and the data.

## CHAPTER 4: CASE REPORT

This chapter presents a case study report that profiles three secondary art teachers' uses of technology in the classroom, together with descriptions of three students' corresponding learning experiences. The three individual case reports—Liz Steele, Chris Taylor, and Sara Petersen, respectively—describe these teachers' insights into teaching beliefs and practices, vignettes of classroom scenes, students' responses and activities along with general descriptions of the classroom settings and technology-related curricula materials. The report for each case aims to provide insights into these teachers' notions of visual literacy, how technology utilization impacts these notions, and how technology related lessons are delivered in each unique case.

To protect the anonymity of participants, the names used in this study, including teachers, schools, and students, are pseudonyms. For ease of reference, the name of the interviewee, the interview number (in the interview sequence), and the page number of the interview transcript are inserted at the end of each verbatim passage. For example, the notation (Liz 1, p. 6) refers to a passage excerpted from page six of the transcript of the first interview with Liz. Occasionally, if a student participant was only interviewed once, the notation shows no interview number; for example, (Ethan, p. 2) refers to a passage excerpted from page two of Ethan's interview transcript.

### Case One: Liz

#### *Prelude*

Located in a university town with a population of approximately 75,000 in the Midwest U. S., Kennedy High School is hidden in a residential area right next to a middle school and a lush park. As a comprehensive high school, Kennedy has a strong history of

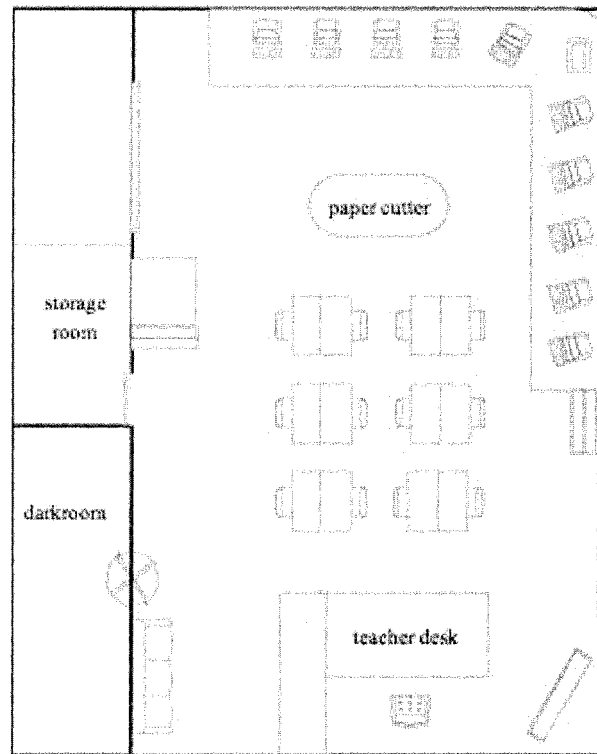
active academic programs and athletic teams. With an enrollment of 1,485 students from diverse ethnic backgrounds, it is also the larger of the two public high schools in the town.

In this district, students receive visual arts instruction from art specialist teachers from K1 to K6, after which (in K7 and K8) art becomes an elected course at the middle school level. At Kennedy High School, there are two full-time and one part-time art teachers teaching 15 visual arts courses over the year. Liz Steele, the teacher participant in this study, teaches Graphic Design, Photography I, and Advanced Photography, while another art teacher teaches primarily Painting and Drawing. Because of my interest in the electronic technologies, the current study at Kennedy took place in Liz's advanced photography class, where the students learn a combination of hands-on and digital applications of photography.

The art room is on the ground floor at the end of a narrow darkish hallway, which, during breaks between classes is thronged with students busy getting books from their lockers, walking and chatting with friends, and rushing to their next classes. Liz, the art teacher who I have met once but emailed several times, was standing at the entrance to her classroom. About five-feet five inches tall, with short spiked hair she greeted students in a melodious voice as they walked into the room. As I approached, she gave me a warm smile, saying, "Hi, how are you? So you are going to start your research today. Let me know if you need anything." While not a chatty person, she was very sincere and made me feel that I had her full support for the research in her classroom. I smiled and thanked her for her help.



The large classroom contained a small darkroom, a storage room, clusters of student desks in the middle of the room, and 10 Macintosh computers located in the northeast corner (see Figure 2). The teacher's desk and a cabinet were on the south side (right side) of the room near the entrance. I sat on a black couch on the left of the room, which offered the best vantage point for observing the entire class, although I was surprised when a student came out of a revolving door to my left. This door turned out to be the entrance to the darkroom, and the metal revolving door served to block out all the light.



*Figure 2.* The Layout of Liz's Classroom.

The wall was colorful, decorated with various movie and photography posters, as was the cabinet for storing cameras and films, on which were posted pictures and

magnets of artists and artworks. The east wall held a whiteboard on which Liz had made up a calendar of project schedules and due dates for each class. Above this, an adjustable screen for the LCD projector was installed in the ceiling. Both the classroom and the storage room were neat and organized, the latter filled with drying racks and drawers in which students could keep their works and art supplies.

The prerequisites for this class were two semester-long courses—Art Survey I and Photography I. Therefore, students who enrolled in this advanced photography class were sophomores through seniors with an interest in art. Not only did the students know Liz from the prerequisites, but they had prior knowledge of photographic development techniques learned in her Photography I. Comparing the latter class with Advanced Photography, Liz explained that

Photo I is the class where the main emphasis is on technique. Because you're learning the basics of photography, and photography is a very technical thing. With Advanced Photo, what I really try to do is to get [students] to think about some of the creative applications of photography. What makes a photograph? Even, first of all, do you have to use a camera to make a photograph? What kind of things can you do to alter a print, to make it more expressive, to bring in meaning? (Liz 1, p. 7)

In other words, Photography I is a technique-oriented class, whereas Advanced Photography assumes photographic techniques to be grounded knowledge on which to elaborate the implementation of photography. Therefore, “with Advanced Photo, we really get into thinking about self-expression, using photography as a medium for exploring ideas, for communicating ideas, even just the idea of playing with the art and playing with the medium of photography” (Liz 1, p. 7).

Over the semester, the students have to accomplish 11 projects that encourage them to “think outside the box” (Liz 1, p. 3) about their existing notions of photography.

The Photoshop grid and portrait projects are aimed at practicing the techniques of digital photographic manipulation and then creating a self-portrait image by modifying several photographs into one. The contact sheet print, image and text, sepia tone, hand-coloring, and Polaroid transfer projects explore hands-on photographic manipulation skills and inventive implementation of the medium, while the 100 people and Haiku projects encourage students to use photography as a tool to communicate with another culture and people in the local community. Presented in a digital slide format, the final portfolio project represents a culmination that asks students to portray who they are through the integration of their works of conventional and digital photography. Because the number of computers is limited, students work on multiple projects at a time during the 50-minute classes (from 13:30 to 14:20, Monday through Friday), with two groups alternating between computer and hands-on applications.

### *The Teacher*

#### *Becoming a Teacher*

Liz had never had any doubt that she wanted to study visual art in college, but, even though she had not yet decided on her concentration, she never considered art education. Rather, she pursued her enthusiasm for art at a Midwestern university. However, during her freshman year, she discovered that she did not want simply to work in one single art medium: “something about doing a wide variety of things really appealed to me” (Liz 1, p. 1). Initially, she considered Graphic Design to be her major but gave up this idea because working autonomously with computers did not involve interaction with people. Therefore, during the freshman seminar presentation about each major, she noted that art education “would be a good option” (Liz 1, p. 1):

[Being an art teacher is] stable; you've got steady income, [it] meets the criteria that I want from art, and I also had the notion that I'd have lots of free time to pursue my own art career. So it seemed like a really good match for me. And then, I started with art education classes and found that it was a very naturally fit for me. (Liz 1, p. 1)

Nevertheless, in deciding her academic path, Liz pondered the relation between her interest and career. Finally, in her sophomore year, she chose art education as her major with a concentration in photography, not simply because she believed that an art teacher can be a part-time artist with stable income, but also because she was in fact consciously measuring how art education might fit with her interest in working with multiple media and interacting with people. Later, she enjoyed the art education courses and early field teaching experiences and found that "teaching came easily; working in front of people was okay" (Liz 1, p. 1).

Liz's student teaching experience in her senior year was a milestone that made her commit seriously to the path of teaching. This experience confirmed her ability to deliver art knowledge to and share art experience with her students through instructional strategies:

My first cooperating teacher was an excellent fit, like her style was really a match for my style, even though I hadn't really developed much of a style. I could tell that we just really clicked. And so I was able to model from her very well and found that the way she was doing things worked really well with the way I kind of thought things should be delivered. And having just that environment, where I could really expand on some of my beliefs, but then, having the training, and seeing through her guidance, how to try things that really helped. (Liz 1, p. 2)

[The] student teaching really gave me the confidence that I needed, and I felt like I was good at it, so that's really rewarding to be able to do something that you feel like you can do well. And I felt I had a lot of information that I could share and a lot of enthusiasm for art that could carry over into my students. It was exciting for me to see other people getting excited about art. So it was really rewarding. (Liz 1, p. 2)

Liz was particularly inspired by her mentor teacher during student teaching, who encouraged her to experiment with new ideas, provided a liberal learning environment, and offered support and guidance. Learning *how to try things* from this mentor teacher resonated with Liz's interest of working with various art media and enabled her to envision how this interest could be demonstrated in the classroom. In addition, receiving positive feedback from students made Liz feel good about herself professionally, because of the opportunity to transform her role from that of artist to that of art teacher. Student teaching also confirmed her expectation that as an art educator, she could meet her goal of working with various media and interacting with people, the decisive factors in choosing her major. This experience has therefore become significant in Liz's life as the point at which her intuitive awareness of herself came into sync with her decision to become an art teacher. Interacting with people became a bridge to sharing her enthusiasm for art with others. Indeed, Liz's deeper motivation for teaching was drawn from the spark of human interaction, which made her devote herself to teaching art as a career.

#### *Human Interaction*

Human interaction enabled Liz to learn something new and cultivate relationships using what she identified as part of her personality: "I really thrive on that kind of human contact: having meaningful relationships, versus just, maybe like business relationships" (Liz 1, p. 1). In fact, the quality of human contact is crucial to her ways of learning and teaching and has motivated her vitality. Accordingly, she has benefited from living in a college town, being a mentor teacher for art education student teachers and by taking courses at the university almost every year. Liz is aware that "doing something, like ... taking a class and having that interaction is a more effective way of learning than just

buying a book and trying to read up on something” (Liz 1, p. 5). In recent years, she has also taken night courses on East Asian Culture, as well as Gender and Women’s Studies. Learning through the interaction with others in these university classes has been a form of continual professional development, in that being again in the position of learner has enabled her to envision how the learning content and context can be applied to her own teaching:

I think it’s really important to be a student when you’re a teacher because it helps you keep that kind of contacts, to have the same pressures of deadlines and expectations. And it helps to have a really crappy teacher every once in a while, because you’re like, “Oh, this is awful. Oh, man! I do some of those same things. I should try to do that differently.” But I think when you’re involved in learning, it helps you to become a better teacher because you understand the process. You don’t get too far removed from what it means to be a student, and thinking about some of the expectations that I give to my [students], I want to be able to model some of those, and plus, it’s stimulating. It keeps me interested. I try to do things that are applicable to my job. So, for instance, this semester I took the East Asia class and then developed lessons from that, that I can implement [in my classes]. Or even when I was taking a gender and women’s study class, thinking about the way that applies to my teaching, maybe not coming up with a lesson for that, but thinking about my interactions with students, and how, as a teacher, I am treating the students in my class. (Liz 1, p. 4)

While interacting with others in her university courses, Liz has consciously traversed between the roles of student and teacher and intentionally deliberated on how one human connection might affect another. In this case, she thought of her students while being a student herself, believing this was a means *to become a better teacher*. She was aware of the strong tie in the teacher-student relationship of learning and teaching and consciously thought of ways to improve her teaching. Being able to maintain meaningful relationships with her students has played an important part in Liz’s 13-year teaching experience.

“Ms. Steele is cool” is the impression reported from many of her students at Kennedy High School. Liz’s classes heavily emphasize individual attention, and she

strives for contact with each student as much as possible on a daily basis. She also likes to maintain long-term relationship with her students and is motivated by feedback from current students and news from students that have graduated. Most students who have an interest in art have enrolled in Liz's art classes more than once. Thus, Liz develops continuing relationships with these students, not only on a semester-long basis but over their high school years. Sharing their life stories with her, students view Liz as a friend but still accord her the authority of a teacher. Frequently, current and former enrolled students stop by Liz's classroom to chat with her, saying, for example, "Ms. Steele, can I show you a fun video on YouTube?" or "Ms. Steele, look at this new t-shirt I just bought yesterday." Liz listens to them, asks about their recent life, or smilingly reminds them to get their work done. Liz made the following remarks about her relationship with students:

It's something that has developed more, in just the sense that I feel more confident, more comfortable in what I'm doing. But also, the nature of the relationship is that it really does build a relationship between me and the student; it really builds over time. So some of the students in this class—I've had, maybe, three or four other classes with them—so they know me really well. I know them, and we can relate on lots of different levels. (Liz 2, p. 2)

Nor is the teacher-student rapport in Liz's teaching practice simply the outcome of student learning alone. The students' trust in their teacher has become an underlying motivator for their own learning and also sustains Liz's confidence in her teaching. This mutual rapport built over time obviously facilitates the quality of learning; especially as maintaining relationships with her students has become intuitive in Liz's teaching practice:

I don't feel like I do anything, like I don't consciously make an effort to do this everyday. I think that, for me, it's just about enjoying [students'] company. I like them; they like me. It's a mutual relationship where I try to really respect them and then hope that they give that back to me in return. I talk to them like I value them, like they're adults, in most cases. But I try to engage with them in a way

that's authentic and not full of pretenses or objectives. And I guess I do make an effort to try to have contact with every student every day, and that's one goal; it's that I always like to try to circulate around their room as much [as possible]. I don't sit at my desk very often and just grade papers or whatever. I want to make sure that I have some communication with every student on each day, whether it's standing at the door and greeting them as they come in, or saying goodbye to them when they leave, or just in trying to get to every computer and ask how I can help. (Liz 2, p. 1)

This passage reveals Liz's deepening involvement in cultivating relationships with her students through the ordinary classroom routine, in which the details of the teacher-students interaction are internalized in the teaching praxis. This involvement has developed over Liz's teaching career, becoming part of her intuition in treating students with her unique style. Part of Liz's style is to treat teenaged students like young adults: she refers to this attitude as "authentic," in the sense of "not pretending, or be[ing] condescending. Try[ing] to communicate with [students] on a level that's like how I would want to be treated and talked to" (Liz 2, p. 1).

Liz continually refines her ways of teaching and consciously challenges the boundaries of student learning. Her vitality in learning and teaching derives from acts of human interaction because she feels constantly motivated to learn something new. Liz also identifies herself as a visual learner who increases her knowledge mostly by taking courses from the university and watching TV programs like NOVA and FRONTLINE on PBS (the Public Broadcasting Service). Being able to visualize the application of new experiences to her teaching excites her; her eyes light up while reflecting on such thoughts: "[Learning] comes from the innate desire in me. I like to learn. I like to learn about new things. It stimulates me, and it keeps me excited about the new experiences" (Liz 1, p. 5). Characterized as an *innate desire*, this enthusiasm for learning is one of



Liz's core strengths—a strength that keeps her teaching and that extends to her belief that teaching involves “the element of exposure” (Liz 1, p. 3).

### *Beliefs*

Because of time constraints, Liz devotes much her professional time to students rather than the study of teaching philosophies. Aware of emerging art education theories and willing to acknowledge and apply some components of new approaches in her teaching, she does not think of herself as subscribing to any particular pedagogies. Therefore, her beliefs about art teaching are minimally affected by recent theoretical trends; rather, she made clear that she wanted her students to realize how art can be applied in their lives. Most relevant to her is her objective to instill in students a desire for learning. She also wants her students to have new experiences, which she believes are imperative to providing students a certain exposure to how people have looked at the world and how they can approach varied tasks:

So, I think, my main goals are to create relevance to students' lives, give a pretty broad exposure to a wide variety of art media, time periods, and just really try to give my students—in the short time that I have with them—as much information as possible. So that if they want to study art later, or just have an interest in it, they feel like they have some connection or know somewhere they can start. (Liz 1, p. 3)

Overall, Liz has a vision that art may somehow “spark” students in the long term. To her, exposure to varied art media and their learning experiences serve as the resources for students to draw connections with their current and future life experiences. To ensure that students can achieve her teaching goal, Liz works hard to ensure that students can access the best equipment and materials. For example, she applied for a grant to cover the high expenses of the Polaroid transfer project and insisted of having Macintosh computers in

her classroom because she believes that students must be exposed to computerized artistic tools that are standard in the design industry.

In Liz's teaching, exposure manifests through various art projects, including a Haiku project inspired by her East Asian studies class. To learn a new art form from another culture, the students were assigned to compose a Haiku, a type of Japanese poem, to accompany their photographic work, a project whose purpose Liz explains as follows:

I try not to get too bogged down in technique. I know some teachers are very interested in just making sure the students know the right way to do things. But for me, it's more about the experience of doing that; it's more like, making some connections, opening up new possibilities. That, to me, is really exciting. (Liz 1, p. 5)

With the Haiku project, for instance, I was amazed at some of the Haikus that these kids drew, and they've never done it before. They may never ever do it again, but, for some of these students, it was a really momentous occasion for them, where they considered this whole new form that they'd never even thought about before, and now, they had some exposure. It's probably going to come up again at some point in their life, like "I understand Haiku or I'd see the scene and compose a little Haiku in my head about it." That's cool to have that connection. And then, of course, thinking about some of the customs that go with that—some partial understanding of another culture—is really great. And maybe that sparks somebody's interest in them. Later, [maybe they'll] go to Japan because they've had this little bit of exposure. (Liz 1, pp. 5–6)

Seeing the students thrilled about their new experiences and taking pride in their work motivates Liz; she emphasizes student involvement more than their proficiency in techniques. Thus, even though the Haiku project was partly designed as a competition between Liz's students and the students from a creative writing class, Liz appeared more excited to me than her students as interesting ideas emerged. She reveals her excitement through her voice, body movement, and energy, which in turn influences her students to work hard to keep up a similar level of motivation. Liz believes and hopes that her

students will develop their confidence through the process of art-making and then apply this sense of confidence to other life situations.

Liz's understanding of art sustains her belief that students' life experiences can be enhanced and inspired by broad exposure to art. Despite observing that people cannot always envision how art can be applied to their everyday lives, she believes that the skills learned from academic subjects—such as speaking, writing, and calculating—can be concretely implemented in the future. Thus, she sees the role of art as somehow functional, and encourages her students to view art as having the same weight as other subjects by showing them how it may be applicable to their lives:

I would say that one of my overriding goals is just to help people understand that art doesn't have to be just like sitting down and drawing a picture. It can be just about a way of seeing, [of] viewing the world, or even just developing an appreciation for what it takes to create a work of art. (Liz 1, p. 7)

Even though art can be about seeing the world from an artistic viewpoint, Liz's belief in providing students with broad exposure fits well with her philosophy. To give art learning life relevance, Liz wants her students to learn skills they can implement in their lives:

Ultimately, I want students to walk away from my classes, not necessarily with techniques that they'll use, because the chances, realistically, [of] these kids having access to a darkroom later on in their life is very slim to none. Most people aren't going to do more with photography once they leave my class. But I think that the art is so good at doing. It's just really about problem solving, about creative approaches to things, and thinking things through and trying to apply [it] to anything, where you think about what your intention is and how can you use the tools at hand to express those ideas. (Liz 1, pp. 7–8)

And so I hope that the students are developing some critical thinking skills, and problem solving skills through this [experience of learning art]. And, like I said, just a general appreciation for thinking artistically, and what that might mean to them, and how to approach things from different vantage points and such. (Liz 1, p. 8)

As these two passages show, Liz is very aware that art experience can serve as a means for the general student population to develop life skills such as problem solving and creative thinking. In Liz's view, these life skills can be used to solve both visual and life problems. As she put it, "[art's] just really about problem solving," by which she meant solving the visual problems assigned by the teacher or revealed in the process of creation. For example, in designing her projects, Liz sets up clear objectives "so that students know these are the things that the teacher is going to be looking for in my project and how can I meet those expectations? In what ways can I go above and beyond those expectations?" (Liz 1, p. 3). By thinking of the above questions when making their artworks, students are considering how to convey the artist's intent through the process of visual arrangement and decision making. This visual problem solving skill is one that Liz expects students to develop in her class and then apply to life problems in future, thereby transforming the thought processes from their visual learning experience to their life experience. Because students' approached to solving a visual problem in the art class may inspire their attitudes or strategies for solving life problems, Liz believes that it is far more essential for her students to learn *visual thinking* (i.e., the attitude or solution to facing the visual problem) than the *ways* of art making (i.e., the techniques).

In sum, Liz's desire for learning fuels her deepening involvement in cultivating relationship with her students. At the same time, her belief in the value of new learning experiences has expanded to her view that teaching should provide students with broad exposure to the art experience. Finally, her idea of exposure continues to unfold in her view of technology as an alternative artistic practice that fulfills similar aims.

### *View on Art and Technology*

To explain Liz's view on learning art in relation to electronic media, it is first necessary to articulate her observations on the changing society and the skills it requires. Particularly, Liz's attitude toward teaching art using technology fits in with her belief in broad exposure to new artistic experiences: "It would be doing the students a great disservice if we didn't have them using the computer, using technology, to create their art, just because they need to have that experience, because it's a real life experience" (Liz 2, p. 8). When Liz mentions using technology as a "real life experience," she is aware that many of her students already embrace technology in their everyday lives. Nevertheless, she does not think of technology as something that they already know much more about than does the teacher; rather, she believes in teaching them to "[see] how technology can do better for them; what it can do differently for an assignment; what ... the limitations of technology [are] (Liz 2, p. 8). Thus, Liz believes she is teaching her students to develop a consciousness or way of thinking about technology rather than merely using technology for specific purposes. Her concern with this awareness drives from two observations she has made about today's society: the proliferation of information and the pervasiveness of visual imagery.

First, Liz contends that the information overload in today's society requires the skill to question information sources. As she observed, people today cannot trust one single source for needed information: "Now, you just get bombarded with information, and part of what you have to do is sift through it and try to figure out what the real story is; what are the essential facts" (Liz 3, p. 2). Second, Liz identifies herself as heavily reliant on visual imagery as her source of information; as she pointed out, society is more

visually situated, meaning that learning how to read commonplace images such as an advertisement is as important as how to read a piece of text. For example, Liz believes that the viewers must learn to question why advertisement designers choose particular colors and “what does this font do that another font might not do?” (Liz 3, p. 2).

Liz’s notion of developing awareness about the nature of technology is “to question the authenticity of information” (Liz 3, p. 1), with *information* generally defined as the input received from various media sources, including computer screens, television, and magazines:

So having the ability to deconstruct not necessarily exclusive images but information and to look at what it means, to think about some of the intentions behind it, to question some of the sources and things like that, I think, becomes a really good life skill in this technology age, where we’re just inundated with images and information. (Liz 3, p. 2)

For this reason, Liz teaches Photoshop creation in her Advanced Photography class, because it is the standard program for image modification and proliferation in the field, and because she believes that students need exposure to “the experience of [Photoshop] and understanding how it works” (Liz 3, p. 2). At the same time, Liz views the computer and its programs as an art-making tool just as the camera is the tool for photography. Wanting her students to have an exposure to various art media, Liz invites them to think which medium works best to convey their intentions and how. While introducing Photoshop, she tells students to “think of it just as a paint brush on the canvas” (Liz 2, p. 8), because the process of art-making is similar: “you’d begin by having an idea; you maybe sketch it out; you’d have some kind of a plan, and you’d use the paints, and all that to make it look the way you wanted it to be” (Liz 2, p. 8). Liz believes that if the students consider the best visual solution to relay their intentions when working with

Photoshop, they can develop a better consciousness of what Photoshop can do for their artwork, and at the same time realize how the digitally manipulated images they see daily may impact their own lives. In other words, Liz believes that through the Photoshop working experience, students can develop a critical view by thinking about the hidden intentions of what they see.

Liz also feels that various art learning experiences help students to learn decision making. She recognizes that through exposure to learning experiences in both digital and conventional photography, students may discover their interests and then decide whether they prefer making art at the computer or in the darkroom:

I like to expose people to lots of different things and let them decide through experience if it's for them or not. If they say, "I don't like Photoshop," after having worked with Photoshop, then that's a fair statement. But if they say, "I don't like Photoshop," and they've never really tried Photoshop, then it's not a good experience. (Liz 2, p. 9)

Liz encourages her students to try new experience in a safe environment. As they do so, her energetic voice and gestures convince them that trying new things is fun, but at the same time, she "give[s] the students the option of doing it on the computer, or doing it by hand, or maybe a combination of both" (Liz 2, p. 10).

With the development of skills in photography in mind, Liz's students are also encouraged to consider their darkroom knowledge while learning the Photoshop program. Liz would say, "Well, here's how you sepia tone in Photoshop" (Liz 2, p. 9) or "we've worked [with solarization] in a darkroom with the chemicals and the lights, and here's how you do it in Photoshop" (Liz 2, p. 9). Using prior photographic knowledge to learn Photoshop's filters, Liz's students also show interest in discussing the pros and cons of hands-on and digital photograph manipulation skills with which Liz is attempting to raise

their awareness of the of art-making process, along with the restraints and potentiality of technology. This attempt manifests in a series of self-portrait projects in which Liz expects students not to simply play around randomly with Photoshop but to be aware of their decisions about the use of filters. In their first Photoshop grid project, students try out graphic effects by altering their snapshots to give “ them the outlet to get some of that playing out of the way” (Liz 3, p. 5). In the second part of the project—the digital portrait—Liz asks students to think seriously about how the Photoshop effects represent their intentions, saying “think about the message that they can convey with the use of imagery; think about what certain things you can do to have an impact on your audience in terms of symbols, in terms of colors” (Liz 3, p. 2). It is typical of such projects that they are designed sequentially. For example, the self-portrait project begins with a small task as preparation for a second bigger project, which allows the students to expand their prior knowledge by applying it to the second major task. Liz therefore instructs her students to mess around during the first project and then make conscious decisions during the second.

Confirming my observations, Liz noted that in making their digital photography, the students in her Advanced Photography class have developed a better artistic sensitivity than have the students who have no experience with conventional photographic development:

I think it would be pretty fair to say that students in my advanced photography class have a [fuller] experience with Photoshop, because they have perhaps a better understanding of visual imagery and how they can change if something is too dark or too light. And so when they change those things, I'd like to think that they're thinking about why they're doing it versus just playing around with the things. When I've done Photoshop with other more beginning level classes, [student work] all look[s] pretty standard. [Students] play with the same filters, they pull faces, and do the same effects. It's more about distorting the image as



much as possible from its original versus maybe more subtly changing something about it. (Liz 3, pp. 4–5)

These remarks derive mostly from the class critiques, from seeing that her students have become more conscious about how the visual composition corresponds with the artistic intents in their artworks.

Liz is also open to the students' choices of media, but she observed that some students enjoy working in the darkroom more than with the computer:

For some students, they're like, "Oh, [Photoshop] is magnificent. It's so easy." But more often [students] keep going back to the darkroom. There's something about that process. I think a lot of people really like the hands-on, like watching the image turn the color, and you feel more connected to it. (Liz 2, p. 9)

Even though working with Photoshop seems to allow instant visual responses without much time and space constraints, Liz's comment also suggests that the students value the physical connectedness of using the manual development process involved in making their own photographs and prints.

### *The Classroom*

This section provides three classroom vignettes that illustrate Liz's praxis: (a) her routine practice in assisting two groups of students, (b) her involvement in accessing a student's work, and (c) her dialogues with the students during a project critique.

#### *Classroom Vignette: Photoshop Grid Project*

The bell rings. Several students gather around Liz's desk while she checks student attendance at her Macintosh computer; they want to look at their tentative grades and talk to Liz: "Ms. Steele, can I work in the darkroom today?" "Can I do something for extra credit?" "Ms. Steele, can I reshoot my pictures?" Liz nods her head, asking students to return to their seats. She gets up from her chair and raises her voice to get everyone's

attention: "Hello, everybody. Today we have Group 1 working in the darkroom and Group 2 working on the computers." "We are going to work on a Photoshop grid project," she continues, "as a preparation for your Photoshop portrait project." She then returns to her desk and projects her computer screen onto the white screen.

As she explains the project to the students, she passes out handouts and then sets up the Photoshop program, saying, "You need to divide your digital snapshot into a 4 x 5 grid and use various filters in Photoshop to manipulate your image differently in each column." She asks student to watch the screen and pay attention to her step-by-step demonstration. The students laugh loudly when the picture is exaggerated by the Photoshop filter effects: "Try different filters as much as you can, and use the paper grid sheet to record your manipulations." While demonstrating, Liz explains the task further: "Experiment with different image adjustments and tools such as saturation, contrast, extract, paintbrush, and smudge tools."

Talking to each other softly, the students are amazed by how much Photoshop can do to an image; "Wow, it's cool," one student exclaims excitedly. After allowing the students some time to talk and think, Liz turns the light on and makes eye contact with students to make sure they understand her: "Okay, remember to use time wisely to explore and record your manipulations so that you can use this knowledge for your next Photoshop portrait project." She raises her voice and continues, "Look at your handout if you forget how to make a grid or how to mess around with Photoshop. And group two you are working in the darkroom today."

Due to the limited number of computers, the students are divided into two groups of nine each that take turns working on the Photoshop grid or developing films. All the

students appear self-directed, knowing what they are supposed to do that day and seemingly familiar with the pattern of working on multiple projects at one time. They either grab their rolls of film and disappear into the darkroom or approach the computer desks and log in their IDs. “Last call for developing, whoo-who!” Liz stands at the metal revolving door and simulates the sound of a train horn to get the group two members into the darkroom. Then she follows them in, checking the equipment and refreshing students’ memory of film development. Ten minutes later, she reenters the main room, walks quickly to the computer stations, and helps students in group one. To accommodate different student’s needs, she moves around frequently between the darkroom and the computer station to check each student’s progress.

I remain in the darkroom for a while to watch students developing their film. Because the indistinct red light is the only light source, the atmosphere is relaxing, with the sounds of radio music and running water, and eight students chatting to each other while masterfully carrying out the film developing procedure, a skill learnt from the Photography I class. They seem self-motivated and productive, asking each other for feedback. Then, individually, they go back into the main classroom with their prints on a tray, letting Liz check the color of their work. Following Ethan, a senior, out of the darkroom, I see Liz busying back and forth between the students’ computer desks. “Ms. Steele, can you check if this is too dark?” asks Ethan. Liz raises her head from a computer screen and looks at Ethan’s work, saying, “It looks good. Nice job!”

Some students seem to have trouble figuring out Photoshop’s filter selections; they may have the effects they want in mind but do not know which filter creates that result. One tall student, Peter, asks, “Ms. Steele, how do I pull my face?” Liz answers

Peter slowly and calmly: “Well, you have two options here...Try it!” Liz demonstrates and explains Peter’s choices to make the effects he wants. “Ms. Steele, how do you make the grid?” asks Helen. Laura, who is sitting next to Helen, takes the initiative and answers the question before Liz responds by telling Helen to look at her handout. She then demonstrates the procedure for Helen on her computer screen. Liz comes to Helen five minutes later, saying “Sorry, I made you wait.” Helen tells Liz that Laura helped her to resolve her question, at which Liz looks pleased: “I like that you are helping each other; great job, girls.” Liz moves on to another student, Samuel, to explain the notion of Photoshop. She gets down on her knees, making eye contact with Samuel while talking to him. “When it adds text, it adds another layer. The layer flows above your background,” she explains and demonstrates it. “That’s cool!” exclaims Samuel excitedly.

Five minutes before the bell rings, Liz asks students at the computer station to save their work and asks those in the darkroom to dry their equipment. She reminds them of the project due dates and compliments them on their hard work. The students leave the room when the bell rings, and Liz checks their electronic files, making sure their work has been properly saved and stored.

*Classroom Vignette: Claire’s Project*

It is a day in May, a busy month full of excitement about the prom and graduation for high school students and of deadline stress for teachers. As on any typical day, Liz refills her water bottle during the five-minute recess and then rushes back to her classroom to check the supplies and equipment needed for her next class. When the bell rings, she greets and talks to the students at the entrance as usual. When the class begins, two girls are still talking to each other about the dresses they want to wear at the prom.

Smiling at them, Liz gets their attention and announces several project due dates. Then she allows students to work on their own projects individually because each is making different progress. Claire, a senior student, approaches Liz with a shoebox in her hand, asking if she could take a look at her finished alphabet project. She attracts Liz's attention immediately as most of the students are still drafting their ideas for this project.

This photographic alphabet project was announced at the beginning of the semester but the deadline is in May, close to semester end. Using digital or film cameras, the students are to take 26 aesthetic photographs of different objects that can be identified as the 26 letters of the alphabet. Claire has not only developed her photographs but has made each photograph into a puzzle block that can be put together from A to Z. Laying Claire's work on the carpet in alphabetical order, Liz and Claire work together to piece the 26 photographs into one piece of work. Liz, in a kneeling position, concentrates on Claire's work and then sits on the carpet saying nothing, just looking at each photograph carefully. Other students gradually gather to see Claire's work, impressed at how stunning the project has turned out to be: "Wow! It's beautiful." "Claire, where did you take these photos?" "Claire, the letter 'O' was a clever idea; I would never think of that."

Claire tells Liz and the class that she took this series of photographs in Disney World Florida where she went for a spring break vacation with her family. "My mom and dad and my sister, they helped me a lot," admits Claire. Liz seems to enjoy Claire's work; she sits back or leans forward, trying to look at the work from different angles. "Ms. Steele, when is this project due?" asks one student. Still looking at the photographs, Liz responds briefly, "May 22." She is totally absorbed; both the students and I witness how

thrilled she is at seeing a student who has done outstanding work beyond her expectations.

The students have worked long enough with Liz that they know her thoughts about Claire's project even though she barely says a word. Laura, the sophomore student, later reflected on Liz's reaction to Claire's project:

Ms. Steele is very encouraging. So if you have an idea, she gets really excited about it and helps you. Another girl, Claire, in the class, she made her alphabet project like a puzzle, and you can just tell how excited Ms. Steele was that we were thinking outside the box. That's something Ms. Steele is always personal [about]. I think that's nice because it forces you to be creative and not just do what's expected. You have to go beyond that, and that's what I like about her class. (Laura, p. 4)

As Laura has pointed out, Liz's excitement was for Claire's creative presentation, which in turn stimulated more students to submit their work during the next couple days.

#### *Classroom Vignette: Portrait Project Critique*

This vignette first presents Liz's thoughts about the self-portrait project and then provides a classroom scene of the project critique. The digital self-portrait project in Advanced Photography asks students to portray a part of who they are using the Photoshop program to manipulate at least three of their own photographs. The self-portrait idea is one of Liz's preferred inclusions in her curriculum; she believes that self-portraiture is a channel to understanding how her students conceptualize themselves:

Self-portraits are really fascinating to me because there's always some kind of filter there. Because if I were to tell someone else, something about you, I could tell them without worrying too much about what you would think about that statement. But if I tell someone something about me, I'm inherently thinking, "Well, what do I want them to know about me?" So, with the self-portrait, it's ostensibly really honest and open, but in many ways, there's this barrier; there's this veil. So I'm always really interested in high school self-portraits. (Liz 3, pp. 2-3)

As this passage shows, Liz's interest in the self-portrait lies in the *messages behind the veil*. During the classes for this project, she frequently reminds her students that they must be conscious of their choice of image selection and manipulation, as well as their use of symbols and the principles of design: "[The self-portrait project] is an exercise in getting [the students] to think about the codes that go into their visual experiences" (Liz 3, p. 3). She therefore requires them to write a self-evaluation of their work that describes how the images were composed to represent themselves. Some students describe themselves in contrast to their friends and family, while others are more intimate—Liz sees this self-evaluation as a private dialogue between each student and herself, one in which some students may share personal reflection and some may become more aware of their artistic intents.

Following an individual student self-evaluation activity comes a class critique, which Liz describes as follows:

[It's] similar to many of the critiques, where I just open it up to student comments, and they can talk about "What do you think the artist is trying to convey?" And then we give the student the opportunity to respond to those comments. It's really interesting, in those types of critique situations, not only for me as a person who's assessing it, like "How clearly did your classmates see your idea?" or "You've written down what you're trying to do; did that come out in the critique?" But also it's really good for them—especially if something doesn't work and people see something really different—to understand why that might have been interpreted differently. (Liz 3, pp. 3–4)

The follow-up critique expands the conversation from a dialogue between each individual student and Liz to a dialogue among the class as a group; therefore, it serves to encourage the students to think about how viewers' responses reflect their artistic intents.

On this May day, the students gather in front of the white screen, relaxing in their chairs as Liz projects each student's work from her computer to the screen. The first piece is Carrie's.

"Okay, Carrie, tell us about your photo (see Figure 3)," says Liz, raising her voice and looking at Carrie.

"I just wanted to show how to handle words as another image layer to make it look like a statement," answers Carrie.

"Okay, with that info what can we say to Carrie about her project?" asks Liz.

"Good job! Carrie," several students shout simultaneously.

"Thanks, guys," Carrie waves her hand at the class cheerfully. Other students laugh at Carrie's reaction.

"I like the purple she used; it's pretty. You could see the purple background behind her face, and I think it blended well with the image," says Claire.

Trying to guide the conversation, Liz elaborates, "We can also talk about some of the Photoshop qualities here. Like we can talk about some of the, 'Oh I like the way you did the blah blah blah. So your use of the blah blah blah is really fantastic.'"

Jason raises his hand: "I like how her face kind of looks like..., it got the sketch of words look to it. I think that has a lot of messages with the look."

"One of the things I really respond to is just I like how [the image] looks like [it] is on notebook paper. I think that is really fun," adds Liz. "Other comments for Carrie?"

No one responds so Liz moves the discussion on to another student. "Guess who is going to be next? Okay, Vicki, tell us about your images that you have put together for your self portrait."



“Well, the pair of glasses that you can see here is the focal point that symbolized I like reading. Reading made me feel peaceful. I wanted to show another side of me in this picture by using the glasses,” explains Vicki softly (see Figure 4).

“Okay, what can we offer Vicki? asks Liz.

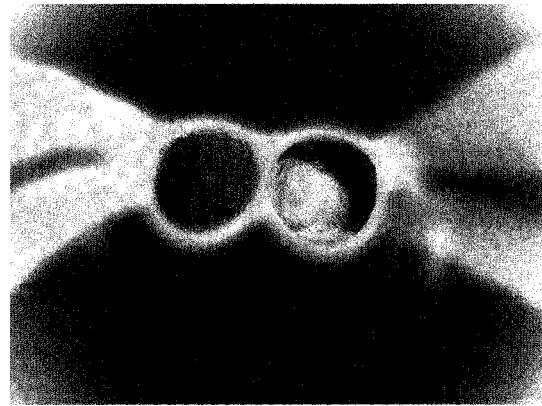
“Her color choice of the orangeish part really contrasts with the white background. The orange color really stands out,” answers Jessie.

Liz looks around at the students, “Okay, what more?” “Okay,” she adds, “so you are seeing it through the perspective of the sky. Vicki, I had a hard time I guess, initially, seeing that those were books. I was unsure as to why or what I was seeing in the left hand thing; did you intend to make it to be kind of ambiguous?”

“Yes, everything does have a really soft edge in my picture here. So looking at these edges, I had thought it’s kind of faded and blurred and that might help [the edges] integrate more into the designs instead of feeling like they are on top of [my image in the picture],” responds Vicki.



*Figure 3. Carrie's Artwork.*



*Figure 4. Vicki's Artwork.*

“Other comments?” No students respond so Liz continues, “Okay, let’s look at Danielle’s. Danielle, tell us about what your portrait says about you.”

“I really love nature and my family. The stuffed animal was a gift from my brother for my birthday; I miss him a lot. ...I don’t know what to say,” answers Danielle, shrugging her shoulders (see Figure 5).



*Figure 5.* Danielle’s Artwork.

“And what can we tell Danielle about her picture?” asks Liz.

“I really like how she made the stuffed animal yellow; it really stands out from the whole picture. I would say that even though there is something on top of the bear; it still looks like the bear came out and caught my attention,” responds Julie.

“Her picture is pretty, like her eyes are stunning,” adds Kim.

“The eyes are really powerful,” comments Liz.

“The dull background is cool; it really contrasts with the person in the colorful foreground,” says Claire, nodding to Danielle.

“I like how she added color to her lips. It feels subtle, but it makes the picture just like a little more mysterious,” adds Julie.

Liz looks around, making sure she has all the students' attention; "Yes," she adds, "I agree. [The lips] tie in with the whole picture. That is interesting to play [with] a really cool color, like even the grey is not warm but rather cool, and then the cool blue there. It becomes important, and then we see that echoed in her lips. Certainly, it's an interesting image. It has multilayered meanings, like you have to think about what the significance is of her use of the numeric equations there. What are the significances of the butterflies and the teddy bear? What is this other stuff going on? It really has nice dimensionality to it."

As the students concentrate visibly on Danielle's work, Liz continues: "All right, Julie, let us have a pick at yours."

"Well, this picture is in a sanctuary. It is, I guess, special to me because I was there all the time, and I spent all my summers there since I was eight. So I walked around there a lot; it's my sacred place. In addition, I like to do cartwheels because it is fun. Maybe I am just weird, but my mood was really affected by the weather, so I tried to play around the colors with the sky. And I found the sky background is interesting; it looks either like snow or stardust or something. Well, I thought it is kind of cool," explained Julie (see Figure 6).

"I like the collage kind of texture of this picture," Samuel remarks excitedly.

"Okay, so has the collage added quality to it?" asks Liz.

Several students answer, "Yes, yes."

"To me the sky just looks so dramatic, obviously the place and architecture is aged, so having that colorful sky is really kind of mystical. Nice contrast," adds Liz. She then breaks the silence that ensues, saying: "All right, Peter, show us your photo."

“All right, this is a picture of me playing golf and then the master in the distance. It is like my dream playing with the master; that is a picture of Tiger Woods. This is the picture of my house in the right corner, which really shows how I grew up, and I just have to have my own picture in there,” says Peter (see Figure 7).

“Sweet,” says Liz, as the students laugh in the background. “What can we offer for Peter?”

“Looks like he is ready to hit the golf ball at Tiger Woods,” says Jason. The students laugh again.

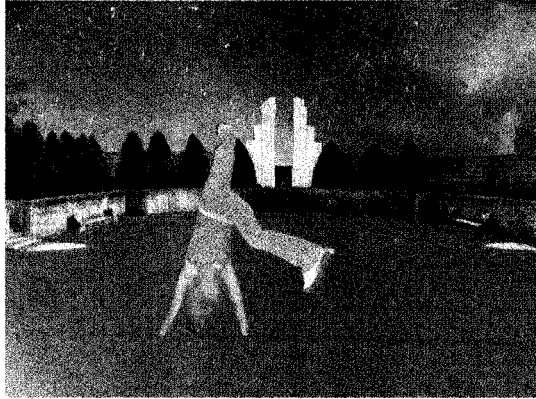
“Yeah, that looks like a competition, [does] it not?” asks Kim.

“I think you should have made the house smaller or have the house hidden with some trees. It’s kind of odd to have it in the foreground, kind of [coming] out of nowhere,” suggests Ethan.

“Yeah, the house took out a huge spot and [is] distractive,” adds Jessie.

“Can I make a suggestion?” Samuel asks. “You can cut out some part of the background trees and then paste the house there, and then paste the tree back on the top of the house. It makes the house look like it’s hidden in the forest.”

“So I really enjoyed the story that you have told about your experiences with the golf course, and then not knowing much about golf myself, what you said about how the position of two figures becomes significant,” adds Liz. “Okay, Samuel, tell us about your photo.”



*Figure 6. Julie's Artwork.*



*Figure 7. Peter's Artwork.*  
(Peter's work has been modified after the critique)

Samuel looks around and says, "Well, it's my self-portrait."

"Okay, great!" responds Liz. The students laugh again.

"The picture looks like I am fooling myself. And then I have a negative in the right corner with pictures of my friends, and my friends are important to my life. In the background, I have the white curves because I like doing water-bikes. I thought it was really cool to have curves and stuff like that. The bird, at first I did not have the bird transparent, but then when I flattened it up or something happened, so I was not able to go back, and I made the bird transparent accidentally. And then I tried smoothing up the edges and copied and pasted the bird there upon my shoulder, I think I could have it like a transition," Samuel explains.

"Great!" Liz remarks. "I think it is really interesting that Samuel chose to have something in black and white, because if I remember it correctly, this was a colored photo, or no?"

"Yes, it was a colored photo," affirmed Samuel.

“So, unless you get into Photoshop, you really would not play with colors. And Samuel is taking out some colors, removing and keeping a very interesting arrangement. So I just thought in comparison to the other pictures, that was a unique approach,” adds Liz.

“Yes, it looks like a cutout of something,” Jason remarks.

“Other comments?” asks Liz, looking at the clock. “Hey! We will continue the rest of these in class tomorrow. Good job, guys, very insightful comments.” The critique finishes when the bell rings.

Together, these three vignettes illustrate Liz’s ordinary class interaction with her students, which reveals her caring character in helping students individually, her earnest excitement at witnessing student achievement, and her guidance in encouraging students to express their opinions. To demonstrate another avenue through which Liz practices her teaching, the next section presents student responses that reflect her contemplations on what students should be learning.

### *The Students*

To provide an example on how Liz’s students respond to what they have learned and their impressions of Liz, this discussion elaborates the students’ learning contexts together with their responses. After a close initial examination of two students’ reflections in their specific learning contexts, this section then weaves in my observations about other students’ learning outcomes to provide an overview of what it appears that they have learned in Liz’s Advanced Photography class.

### *Individual Student Responses*

*Ethan.* Ethan, a senior, is so tall as to make him look like a college student. After taking Graphic Design with Liz in his junior year, he enrolled in Photography I and Advanced Photography in his senior year. On the weekends, he particularly likes to drive his car around and take interesting pictures to share with Liz. A responsible student, he always turns his assignments in on time and is self-motivated in finishing his work. His reflections primarily reveal what he has learned from the darkroom experience and give his view on the relationship between art and technology.

Because he enjoys working in the darkroom, Ethan spends a fair amount of time there both during class time and after school. Afterwards, he asks Liz' to comment on his pictures. Since students in this class already have photographic manipulation experiences both on the computer and in darkroom, I asked Ethan whether he considers the digital process much easier than the conventional one:

Oh! For something like that, I personally say that the darkroom is something you don't want to miss out on. I love it; I love working in that. It's always a good idea to know where the art form has started from originally, and then to go in and work with these photos with your own hands, it really gives you a better sense of the life—how far it has come, and it can give you a clue on what else you can do with this. (Ethan, p. 8)

There are plenty of times where me and my group would get our cameras set up and okay, okay we feel good about this. We go and develop and like, crap! It's too dark, the crap and there is so much light, and maybe we have a leak in a box or something like that, but it's just things like that really makes me appreciate the photos more. Because when you go into Photoshop and you print something out, and you may even working on it for a long time and you still really enjoy it; it's still your work. But personally I feel better like I am really humble when I get a picture that I have developed and I worked on the timing, I mixed the chemicals for it and everything and then it comes out and then it just looks great, and just that always seems more rewarding to me. (Ethan, p. 8)

Ethan values the hands-on element in his darkroom experience, associating the physicality of making with the development of his confidence and his certainty about photograph production.

Ethan also reflected on his view of working with the computer for digital photographs versus working in a conventional darkroom to develop photographs:

I can see the pros and cons of both digital and darkroom. I love working in the darkroom because there you have the raw elements themselves. You have the actual negatives; you have the photo printer. Actually just the other day me and Heather, another girl, we were just goofing around with pictures, and I took one of the pieces of photo paper, dipped a sponge brush into developer, and just kind of drew a picture on it, exposed it to light, and stuck it back into the developer and it looked like a solarized picture. But really you would consider it like a radiograph, and I never did that before. And it was just cool to know that I did that by myself, just experiment in different things rather than somebody telling me okay, well, now that you've downloaded the picture, you go ahead and click on this, the filter, and then you can get this effect. (Ethan, p. 3)

Ethan's satisfaction, fulfillment, and deepening involvement are clear from his description of the development process. He has gained confidence by solving his visual problems with his hands and by experimenting with the film developing techniques with his peer. Both he and his group members comment on each other's work in a casual but constructive way in the darkroom. They like to work as a group but are still able to work individually. Ethan's appreciation has expanded to his perception of Photoshop, even though he enjoys the darkroom more than the computer:

I think when you actually work in the darkroom, you really appreciate the things that Photoshop can do. Like I said before, if you make a mistake in the darkroom, you kind of go, Oh, crap, and you get to start it over again, whereas with Photoshop you're like Oh! Wait! And you just click and it's fixed, and you get a better idea of what looks good with a picture and you learn firsthand about darkness and shading, the shadows, and how much light you want on something, and the different intensity and everything, and what you can do with just light and shadow. With Photoshop, you can take those basic things that you've learned and expand on in it more, and just always you keep trying to improve yourself with



Photoshop. I think it would always be a good thing for people to get darkroom experience before they work on Photoshop. (Ethan, p. 7)

Having working knowledge with both Photoshop and the darkroom, Ethan can apply his substantial darkroom experience to the other experiences working with digital photographic software. Moreover, as the above passage shows, Ethan has not simply been *trying* the Photoshop filters; he has become more aware of his decision making by considering how the effects accompanying the filters connect to his knowledge of photography (see Figure 8).

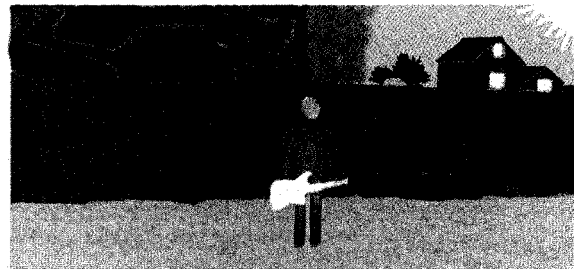


Figure 8. Nathan's Artworks of Photoshop Grid (left) and Self Portrait (right).

Amazed at how Ethan's view on Photoshop was strongly attached to his experience of film developing, I asked him whether this learning process was *about* technologies or *through* technologies:

I think a little bit of both. I've learned more about art through technology, and I've learned more about technology through art by taking Ms. Steele's classes. If it wasn't for this art class, I'd have no idea how to use Photoshop, iMovie, or PowerPoint. Because Ms. Steele said, "Hey! I want you to have at least a three minute slideshow, and we're going to add music to it; go ahead and do it." So she gives you these basic ideas, and then you go through it and work on it. While you're working on it, you try to find more things and add something to make it

look better, and because you're trying to make it more artistic, you're finding out more about the programs. So in a sense, you're finding out more about the technology too. (Ethan, p. 5)

In Ethan's view, finding ways to make his work artistically turn out to be a motivation for exploring computer programs. To illustrate this point, he provided another example comparing non-art and art student-made digital slides:

Well, whenever you see students doing PowerPoint, they are usually like the same things just done by different people or just seem a little boring. But then what we do with art, where we have the different tasks, and we try to make it interesting and to have it stand out. Like I said before, learning about art through technology, we try to get the different contrast and make the color stand out but still have it easy to read. We want people to be entertained and be like, "Oh! Wow, that's cool; I wish I would have done that." Yeah, there's always a big difference. (Ethan, p. 7)

As this comment suggests, Ethan views the artistic element in technology as the "big difference" that makes him stand out from other students who have not had many art lessons.

Continuing on the topic of having specialized knowledge resulting from his class with Liz, Ethan excitedly shared with me that he just got accepted into an IT (information technology) fellowship at a technology program in Indiana:

I don't even know how many people send out the applications for this fellowship, but [the fellowship committee] were impressed with my application because of all the different technologies and arts things that I have learned. Since they were impressed with that, they asked me more about it to see if I really knew. And I said, "Oh! Yeah, I've done this; I have done that. I know how to do that; I can make a movie on that thing right now if you want." They were impressed with that. I've found all the experiences that I've gained from this class really helped me to stand out among the other applicants. (Ethan, p. 6)

Even though he was appreciative, giving all the credit to Liz and telling me how much he has learned from Liz's courses, Ethan's pride also revealed his confidence in how art and technology can merge together in his post-secondary study. Not only does Ethan believe

that the computer programs he has learned set him apart from his fellow applicants, he also realizes that his sensitivity for art is his strength.

In addition, Ethan's interest and sensitivity to art provide him with an alternative outlook on technology, in that he recognizes that he has learned art and technology simultaneously. For example, his experience with the photograph development process has facilitated his learning of Photoshop because he has been able to apply the knowledge of such elements as color variation and intensity, learned in the darkroom, to the making of digital photography.

*Kim.* Kim, a sophomore student with long blond hair, likes art and so does drawing and scrapbooking during her leisure time. However, photography is her favorite art form. She identifies it as an interesting art form that can make other people see what she has seen. Because she enjoys developing her film and prints in a darkroom, she has found a friend who lets her work in a personal darkroom when she has no access to the school's facilities. Kim always carries her digital camera with her and uses film and digital cameras regularly and interchangeably in her daily life. Her grandmother finds it interesting that Kim still uses a film camera, while most teenagers are using digital cameras exclusively.

Kim's views on how her Photoshop portrait project represents her family values and how photography has taught her to be herself reveal what she has learnt from her photographic experiences. Having seen Kim carrying a digital camera around several times, I was interested in her enthusiasm for taking photographs and asked whether she preferred working in the darkroom or with a computer:

I really like doing my own prints in the darkroom, because it's something that I made myself, and it just makes [it] really pretty. I think digital images aren't

really beautiful pictures. I think that the black and white, and the prints that you make, it's just more appealing. (Kim, p. 1)

Kim looks at the photographs taken from a film camera as pieces of art but those taken with a digital camera as snapshots that record her life stories. She is aware of the varied usages of her cameras on different occasions; she uses her digital camera for taking photographs of family members and events but the film camera for shooting scenery, for which she pays attention to artistic angles.

Although Kim likes working on her prints in the darkroom, her favorite project has been the Photoshop portrait, which asks students to represent who they are by combining and manipulating at least three of their photographs into one. Kim portrayed herself from the aspect of her family values, combining seven pictures of her family members into one piece. During my classroom visit, Kim excitedly showed me her work on the computer screen, telling me stories of each person in her picture. As she explored the various filter functions, she was thrilled by how much Photoshop can do for digital images. She described this project during the interview:

The project we did in Photoshop, that wasn't just manipulating the images, but when we put the multiple images together, I thought that was really neat. I did one with my family, my dad, my sister, my step-sister, my step mom, my niece... They are not really one big family, but to me they are my family, and I thought that it's a really interesting aspect of photography that you can make anything pretty much what you want. I thought it was interesting. (Kim, p. 5)

Kim's description reveals that she is tightly bound to her family. I therefore also asked Kim whether this "interesting aspect of photography" was tied to her attachment to her family:

Yeah. I think that what I did of that project was perfect for the assignment, just because that's how my family is. It's like they're kind of spread out, there's bits and pieces everywhere, but to me it's all one thing. (Kim, p. 5)

Kim chose to depict herself through her bond with the family. The project invoked her interest in digital photography because she was excited about how to use her skill in photographic manipulation to reunite her family in a digital picture. She even thought of purchasing the Photoshop program someday, so that she could work on her huge collection of digital photographs on her home computer.

During our conversation, Kim revealed great enthusiasm for photography, saying that she has learned to be herself and see things from different angles:

[The] powerful aspect of photography is that you can express who you are or what you think through the pictures. You don't really have to tell someone but you can show them who you are and that's really interesting. (Kim, p. 8)

I kind of just learned how to see things differently. I think perspective is something that the class taught me because it goes beyond just taking the picture or whatever but kind of looking at the world or looking at a person in your own way, not just what everyone else sees. (Kim, p. 6)

By "see things differently," Kim may mean both seeing things through the lens of a camera and having a different view of things happening in her life. In fact, her understanding of *seeing* has encouraged her to cultivate the uniqueness of her personality:

I think things just don't have to be what other people make them. They can be what you make them; they can be what you like or what you want them to be. Look at things the other way, and I think that it's something that you always want to remember... I learned to be your own person. I think that's very important, being yourself; not being pressured into something or just what other people think you should be. If other people don't like who you are, okay, fine. I think it's a really important thing. (Kim, p. 6)

Kim's concern with the novelty of her photographs has expanded to her awareness of the need to have her own character and not succumb to peer pressure. Based on her reflections on making artistic photographs, she has learned to be confident about herself and the decisions she makes.

Therefore, in Kim's case, an art lesson has become a life lesson, as Kim reported that the integration of art and technology has served as a means to fulfill her need for family connectedness. Kim expresses her love for her family by working on Photoshop with her own photographs. In addition, Liz's encouragement of seeing things from varied angles has made Kim realize the importance of having her own unique personality and accepting the differences in others. Thus, she has learned more than simply the skills and knowledge of photography; in fact, her competence in photography has provided the groundwork for exploring the attitudes, values, and strengths needed to face life.

#### *General Student Responses*

The remaining discussion elaborates on the nature of student perspectives about their experiences in Liz's class by presenting a few more student comments. Specifically, this discussion focuses on students' impressions of Liz, their interest in hands-on experience, and their attitudes toward approaching life issues. These three aspects provide the insights into how and what the students have experienced in Liz's class.

*Student perspectives on their teacher.* Since the same students had already taken more than one semester of classes with Liz, they were familiar with both Liz's teaching style and each other's characteristics, a long-term relationship that has influenced the learning atmosphere. As Kim described it, "we have interesting people in the class, people who aren't just what everyone expects them to be" (Kim 1, p. 6). Likewise, Claire identified the supportive friendship among her peers:

The kids in art are really welcoming. It's really diverse; like some people are athletes, some people are in band, and they are really interesting. And [art class is] a cool place because we all have something in common, and we all enjoy art and we all like to make new friends. You won't have this in your English class.  
(Claire 1, p. 4)

This familiarity with peers, which has resulted in a constructive and friendly learning environment, has also affected this group's learning outcomes. More than peer influence, the students identified Liz's personality as a major component that enriches class quality and pushes student potentiality:

[Liz] is fine; she is exciting; she is loud; she is vibrant; she is not standing in front of us showing us all the time. She's more hands-on. She wants to involve and interest the students, really make them want to do things and be involved. (Kim, p. 5)

She has a really unique personality, and she is really her own person that she can inspire her students to be that way. She is not like other teachers. She pushes you; she really cares about her students and she wants her students to be interested in art. (Kim, p. 6)

She is a very lovable person although she is a very, very good teacher. She is a very good person. You can talk to her about anything regardless if it has to do with the class or not. She is very outgoing and very happy. (Laura, p. 6)

She really pushes you. I am a straight A student but I have a B in this class. It upsets me. But then I felt she was really grading on whether we've thought outside the box, and that helped me; it pushes me further to do much better on every project. So I like how she pushes her students. (Laura, p. 5)

To me, it's a fun class. Ms. Steele makes it more exciting, like you're not just sitting in class or writing a paper, but at the same time she challenges you to do different things. So I like it that way. (Jessie, p. 1)

I think that Ms. Steele does a really good job of not being too friendly. She does a really good job of keeping the space between a teacher and a friend; she is like a friend, but she still has the authority over us, and we don't want to disappoint her, and we don't like to do something to upset her. (Claire, p. 4)

These student comments indicate that the teacher's style and personality influence their learning. They have not only learned from Liz's knowledge and her personality, but also from her enthusiasm about art and consideration for students. These students have been motivated by what they characterize as Liz's down-to-earth, upbeat character, and her striving to foster a learning environment of mutual respect.

This sense of trust that has developed in Liz's relationship with her teenage students serves to encourage students to exhibit their potential. That is, because of this trusting relationship, students are more willing to work hard and perform their best. Ethan specifically defined Liz's character, the way that trust is built in his relationship with her, and its importance:

Ms. Steele is really acceptant to all different personalities and everything. So, even if she thinks that the kids are troublemakers, she will still try to talk to them and help them out, whereas other teachers were just kind of, "Oh! I don't even want to waste my time." (Ethan, p. 2)

I think this is really important for students, because it's a small thing, but it really makes you feel like you can trust that person. And you really believe that she really thinks what the best is for you, and she really help you out. So then when she [says], "Hey! That's a bad idea, you should try this instead," it means more than when someone [tells] you, "No! Don't do this or don't do that; you have to do this." It's just kind of you are hearing the same thing over and over again, and it doesn't always carry the same weight. (Ethan, p. 2)

As a teenage student who wants respect from adults, Ethan sees Liz's uniqueness as her sincere, caring relationship with her students.

In addition, describing what they have learned from Liz, Jessie and Ethan compared Liz's teaching style with their encounters with other teachers:

Ms. Steele makes the class fun and that could be about the subject. But I've had other photo teachers; they were just not, I mean, they didn't put out the class the same way as she does. She is different and her class is different. She just makes it fun and she's herself, so she brings that to the classroom. (Jessie, p. 1)

Ms. Steele, she is not like other teachers. She would walk around the classroom and talk to the different students about stuff, and she would make jokes with us. It seems like more personal than anything. And then we mess up, she could tell us that we messed up, but still keep us from feeling bad about it. I had a math teacher one time, she tried to be on my personal level but I just felt awkward. Whenever we did something wrong, she would just be like, "Oh! No, that's not how you do it; do this; do that." Well, with Ms. Steele, we would try something; we would learn [it was a] mistake, and she would be like, "Well, okay, that didn't work; try this instead." She doesn't say you have to do this or that; she leaves us plenty of



room to experiment with things, and if we want her help, she'll be there for us.  
(Ethan, p. 2)

Both Jessie and Ethan's responses show that the teacher's personality and teaching style play a major role in their learning experiences, especially given that these students have developed a critical view on different teachers' teaching methods. Liz's sincerity in treating her students with mutual respect seems highly valued by her students: knowing that their teacher truly cares about them motivates them to impress her.

*Student perspectives on art-making media.* Liz wants her students to discover their interests after experiencing both digital and conventional photographic processes. One discovery about this student group is that they seemingly enjoy working in the darkroom more than on the computers. Therefore, even though these students exhibit competence and interest in creating their digital photographs with the Photoshop program, they value the hands-on, conventional darkroom development process as a rewarding experience. Below, some students compared their experiences learning digital photographic manipulation with film developing and printing:

Computer manipulation is like almost anyone can do it. You just have to learn how to do it, but not everyone has access to chemicals or equipment in a darkroom. I think it's more rewarding working my pictures in the darkroom, and it's your own work. But for computer, you can't connect to that; it's a computer.  
(Vicki, p. 5)

When I am at home, I am always on the computer. It's kind of cool to do something not on the computer; like actually, you put your hands on something. So it feels like you are really doing it, instead of letting the computer do it for you. (Claire, p. 2)

There is a fine line between taking a picture with your camera and creating one with the computer. I think it's a lot more artistic to do it yourself than to have you use a machine. Digital is faster, but it's more rewarding to work in the darkroom, because it's just something that you did yourself. You didn't have to take it somewhere to develop it for you; it's something you did yourself. I think that's more rewarding, and I think there is a lot more. There are so many settings on the

cameras. I mean we can decide how fast you want the shutter to go and how clear the picture is, things like that, things that you could decide yourself, I think that's kind of neat. (Laura, p. 3)

As these comments show, Vicki noted that accessibility to the darkroom is a unique experience compared to the proliferation of computers; Claire viewed the darkroom experience as a displacement from her high computer usage at home; while Laura believed that photographs developed in the darkroom are more artistic. All three of these students stressed that the physical bond offered by the conventional developing process between the artworks and the tactile experience provides them a sense of control and reward.

*Student perspectives on art as a means for problem solving.* The students interviewed commonly referred to working on their projects as a process of problem solving, which here meant solving a visual representation problem. In other words, students had to create their photographic work by integrating their artistic intent with the art medium, thinking about how their messages could be conveyed through their work. Encouraged by Liz, such negotiation stimulated the students to think visually. Some students indicated that this experience of solving the visual problems may inspire them to see their life problems from different perspectives.

I don't know if I visually look at a chair in different ways, but I think about as I am growing up and looking at my life situations. I definitely could see backside or different ways of that. So I am not just straight minded; I am more open to all the different things that happened to me. (Claire, p. 4)

I just think about things differently because I think with the photography you have to look and imagine; you have to see it from so many different ways and try to interpret it in different ways. I started looking at it like a math problem, more than one way, and I just get caught up in thinking about it. (Laura, p. 4)

I would definitely have to say that I've learned a lot about patience and am willing to try new things. I've gone through a couple of roles of film on different

projects and just got frustrated about it. I just have to tell myself, “Okay, well, it didn’t work; I’ll try something else.” And then you learn to look at things from different angles. (Ethan, p. 8)

In the above passages, Claire reflected that she may become more open minded in undertaking her life tasks; Laura reported being inspired to resolve a math problem from different a orientation; and Ethan referred to applying the attitude learned from solving his earlier visual problem to another assignment. For these students, their experiences of visual problem solving may affect their attitudes toward other interests of issues in their lives. That is, they may look for alternative solutions to or view a task from different perspectives as they did in the process of art-making. In fact, it may be that their learning has moved beyond the boundary of visual art: they have learned a positive attitude toward facing their lives.

These students attribute their learning achievement to Liz’s caring personality; a few of them reported that they view Liz’s class as an outlet for their academic pressure and enjoy her companionship as mentor. For instance, Ethan reported that he has developed an artistic approach to of learning technology, while Kim has found digital photography to be a solution to reconnecting her family bonds.

### *Epilogue*

During my interviews with Liz, she often indicated that she seldom thought of the rationale underlying what she was doing. She identified herself as preferring to spend time with her students rather than elaborating her teaching philosophy. However, although Liz did not consider herself reflective, she seemed conscious of her teaching method, clearly structuring her curriculum and constantly refining her teaching praxis. Her inner desire to provide meaningful learning experiences for her students has become

a thread running through her belief in and act of teaching. Liz believes that in the long run, exposing students to diverse art experiences may help them spark connections with their daily lives. Accordingly, viewing electronic media as a paintbrush or camera, Liz considers technology a medium for making art. As a teacher, she acknowledges that she is teaching her students how to develop a *consciousness* about using technology instead of merely teaching them how to use it. For example, in having students learn the techniques of both hands-on and digital photograph manipulations, Liz encourages her students to discuss both the social potential and the limitations of technology.

The responses from the students in Liz's advanced photography class indicate that their darkroom experience has enhanced their understanding about working with digital imaging software. The students particularly expressed fulfillment in working with photographic development processes, asserting that their experiences with conventional photographic manipulation has been more rewarding than that with digital manipulation. They also recognize that they have been motivated by Liz's enthusiasm, and they appreciate her caring nature as a teacher. Some students also acknowledged that they apply the working attitude and thought process learned in Liz's class to resolving their other life situations.

When I shared the students' interview transcripts with Liz, she showed great interest in reading the student responses. She was pleased to learn from some of the student reflections that they were applying what they have learned from her classes to other decision making. She appeared gratified that, as she hoped, her students can transform their art learning experience into their life experience: "This is something I

always want [students] to think about, but I couldn't see how it turned out in my classes”  
(Field notes, p. 33).

## Case Two: Chris

### *Prelude*

With only 186 students, Lincoln High School is located in a rural town in Midwestern U.S., whose common industries are construction and agriculture. Its population, which numbers less than 1,000, consists mostly of Caucasians. Because Lincoln is the only high school in this district, its students all come from the surrounding communities in the county.

The current superintendent, Ms. Bennett, explained its focus on technology in terms of the school vision:

We think it's important that when our students walk out of here, whether being in a job or in a college class, they can sit down at a computer and function with no problems. We have both Windows and Mac because we think it's essential that students know how to get around on both platforms, because you don't know what you're going to walk into when you leave here. (Bennett, p. 1)

As a result, the school has a reputation for integrating technology into the curricula, “the previous superintendent, Mr. Sullivan, who was a tremendous force in making [the faculty] realized the importance of technology and using technology as a tool in education; not that it's something separated, but that it's integrated within the courses” (Bennett, p. 1). Students are exposed to technology in various subjects by, for example, learning video editing and photo manipulation programs in art and keyboarding classes, creating a blog in history class, and/or making a video from a student-acted play in literature class. In interviews, students reported that the workload at Lincoln High School is heavier than that at other high schools in the region, but they also reported receiving

more individual attention from the faculty than do students at larger high schools. In addition, students at Lincoln are generally well-behaved, engaged in learning, and “really good kids” (Bennett, p. 6).

All the courses at Lincoln High School are organized into A and B days made up of 90-minute classes that students attend every other day. Given the study purpose, my classroom observation was about to take place in Chris’s Computer Graphics and Multimedia classes, both scheduled on B days from 11:30 to 3:00 with a half hour lunch break at 12:30. This school schedule coincided perfectly with my own and provided enough time to commute and avoid daily long-distance driving.

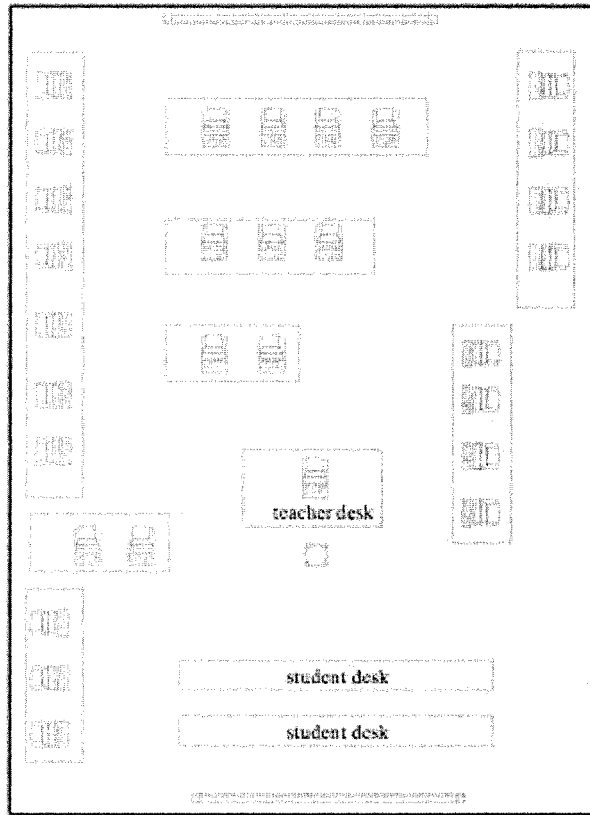
As a one-man visual arts department, Chris has designed and teaches all art courses at Lincoln as part of a four-year visual art curriculum structure consisting of eight courses that can be classified by either hands-on or electronic media. The prerequisites for the Computer Graphics class are Art I and Design I, although no courses are required prior to taking the Multimedia course, which originally belonged to computer education rather than art. In the Computer Graphics, students learn to mediate between their ideas and a hypothesized client’s needs for product design. They use Photoshop and Strata 3D to create several projects, including a packet, an online gallery banner, a commercial poster, and a 3D animated creature. In Multimedia, they also use a camcorder and video editing software programs for self-expression and communication, as well as iMovie to cooperatively create PSA videos and Final Cut Express to create their own self-portrait music videos.

Entering the school at five-minute recess, I signed in at reception. Rather surprisingly, as an Asian woman walking around a small high school at which most

students are white, I received few stares. Instead, students were respectful and showed good manners, greeting me politely as a school visitor. Chris—tall, thin, and bespectacled—greeted me at the door to his second-floor classroom where he awaited my arrival. This art classroom, he told me, is used mainly for art studio classes, while the third-floor computer lab is used for computer graphics and multimedia classes.

While Chris was preparing materials for the next computer graphics class, I surveyed the art room, which was not large but was full of art supplies. It was obvious that Chris is very well organized: student work was neatly stored on a wooden shelf, paints and clean paint brushes were neatly placed in small buckets next to the sink, and cables and wires in the room for the electronic equipment were tidily organized. The walls were covered with poster examples of art elements and principles, and on the north wall hung a large unfinished panel, a collaborative mural created by five students in the Advanced Painting class portraying community history and highlights.

Following Chris to the computer lab on the next floor, which was twice as big as the art room, I was impressed with the facilities. The lab contained several large windows that invited good natural lighting, comfortable office desks and chairs, and equipment such as white screens, scanners, and printers (see Figure 9). It also held about 30 Apple Macintosh computers, more than the class enrollment. In addition, as the teacher, Chris had access to one laptop and two desktop computers, one for the art room and another for this computer lab. Seeing my astounded look, Chris told me this was just one of several computer labs in the school.



*Figure 9.* The Layout of Chris’s Computer Lab.

*The Teacher*

Chris identifies himself as “not an articulate person”; he prefers expressing his thoughts in writing rather than speech and feels more comfortable in informal conversation than in recorded interviews. Nevertheless, during our formal interviews, he was thoughtful in answering my questions, sometimes pausing to think carefully about how to answer my questions or rethinking the questions at home and then answering them by email. I was amazed by his serious deliberation in both assisting with my study and reflecting upon his teaching practice.



### *Inspiration*

“I think I derived most of my inspiration from a lot of teachers” (Chris 1, p. 5), he pointed out, attributing his proficiency in teaching art with technology to the other teachers who had appeared on his journey of being an art teacher. He specifically identified three influential art teachers in this pursuit and recognizes that he has become a better teacher by learning from his colleagues and the supportive school environment.

Chris has had a great interest in visual art since he was young and, until his high school years, he seriously pondered his art teacher’s advice of pursuing art as a career. After graduating from high school, he studied art at a local community college where he witnessed the art teacher making artwork and teaching art to his students simultaneously. This possibility inspired Chris to consider art education as a major; most particularly, because he admired this teacher’s laid back teaching style, but also because he acknowledged that he might not enjoy being exclusively an artist:

I just did not see myself showing in galleries and doing that whole business of being an artist. It just seemed like that [art education] will be a little bit more stable and a chance to do artwork and teach too. It does seem like a better option. (Chris 1, p. 2)

He therefore transferred in his sophomore year to an art education program at a larger Midwestern university, where he met Marilyn, his role model as an art teacher.

Marilyn was a graduate teaching assistant who served as Chris’s mentor teacher in his early field teaching practicum. Run by the department of art education, this early field practicum, a community art program, offers art classes from pre-K to high school levels for local students from surrounding communities, and at the same time providing pre-service art teachers an avenue through which to acquire teaching experiences and skills.

Here, Chris learned from Marilyn's constructive feedback and her ability to design a sophisticated curriculum:

[Marilyn] brought everything together: art history, art making, and critique. She had great advice and was a great TA. She observed [myself and another student teacher] as we interacted with students; she always had very meaningful things to say that were helpful, and I could use them the next time and feel like I was improving. I could tell she had been a high school teacher prior to [being a TA]. (Chris 1, p. 4)

Marilyn's mentorship developed Chris's confidence and skills in teaching art and confirmed his desire to be an art teacher.

Up to that moment, Chris's art learning and teaching experience had only dealt with conventional art media, but he encountered technology in art education in his first year of teaching high school. Initially teaching for two years as one of four art teachers in a large Southeastern high school, over 10 years ago, he began using technology in his own instruction by scanning pictures to make transparencies for overhead projection of his ceramics class materials. He then decided to move back to his small hometown in Midwestern and began teaching at Lincoln High School. In his first year of teaching at Lincoln, Chris's use of technology as an art media was sparked by former superintendent Sullivan's encouragement, which began at Chris's job interview with a question about teaching a Photoshop class. Chris promised to do so even though he did not know much about computer graphic programs. As an advocate of implementing technology in the public school, Mr. Sullivan encouraged Chris to try new software programs and supported him with equipment. For example, he put a Macintosh computer, scanner, and printer in the art room on Chris's first day of teaching: "He would bring boxes of software and say, 'Look, this is a 3D modeling program; you might be interested in trying out. Hang on to that for a while'" (Chris 1, p. 9).

Chris is not resistant to learning computer programs; in fact, he had never thought about resistance to learning technology until I asked him. He had learned some entry level Photoshop lessons from his sister, a former graphic designer who now teaches high school art. Since then, he has continued to learn more about technology by searching online resources, reading manuals, and tinkering with the programs. However, he has found that he learns programs more efficiently by teaching them to his students, from whom he also learns:

I [feel] that I [have] learned more about the programs through teaching. It is because things would come up, and this trick or that trick, and [the students] would share that with me. So I have learned more. I learned at much faster rate than I would just [sitting] in front of it myself. That happens with any program really. (Chris 1, p. 10)

Excited about learning from his students, Chris did not find learning new programs difficult; actually, he reported that it was fun for him to gain new knowledge. Moreover, his learning from students further influenced his teaching strategy in that he has tried to promote a mutual learning environment. For instance, Chris encourages students to work in a “buddy system” (Chris 2, p. 4) in which they share their discoveries about the software programs and techniques, and help each other with questions.

Chris’s knowledge about teaching art with technology has developed primarily over his time teaching at Lincoln High School, whose technology-rich environment and supportive administration have contributed to the growth of Chris’s technological competence. Although the workload at Lincoln is much heavier than at his previous school, Chris reported enjoying the current situation: “I found the right fit. I think I found the school primarily fit for me” (Chris 1, p. 8). In addition,

[the] students here are great to work with and just the support from the administration, [he former superintendent] Mr. Sullivan and [the current

superintendent] Ms. Bennett. Mr. Sullivan is the one who gave me the computers and has always encouraged me to use technology in the class. I have always been able to do whatever projects I wanted here, and I have never had to worry about supplies or anything like that, computers, projector or laptop...The parents are great. When you call home, you get support. Then the other reason is my colleagues and everybody on the staff. And when you carry your own department here, that helps too. (Chris 1, p. 8)

In this passage, Chris identifies five components of his finding “the right fit” with the school: students, administration, colleagues, parents, and being in charge of the department. For example, Chris noted that the parents here care about education, while the students “are generally good-natured students, very honest students, and it is easy to work with because they are very engaged to learn and they are cooperative” (Chris 1, p. 7). The support from administration has also encouraged Chris to liberally implement his ideas of teaching art with technology. Both the former and current superintendents, Mr. Sullivan and Ms. Bennett, have strived to incorporate technology with teaching and learning at Lincoln. To support this technical goal, the school has purchased a collection of stock images, including still images and videos footage, as student resources, as well as various computer programs needed for educational uses. Recently, they purchased a new costly 3D animation and modeling program only for Chris’s computer graphics class and provided Chris with a grant for implementing video conferencing. Additionally, Chris believes that he has more control having his own department, in which he can freely design the entire school art curriculum. In interactions with his art teacher friends and by attending conferences, Chris also seeks outside resources and ideas to make up for the limitations of being alone. As he mentioned, “it’s common to do collaborative projects here and it’s inspiring” (Chris 1, p. 6). That is, a technologically oriented partnership with his school colleagues has inspired him to view his curricula from a

broader perspective. As a result, he enjoys working with both the IT staff and teachers of other subjects, claiming that he has learned to become a better teacher by observing how and what others teach.

The five factors of engaged students, encouraging administration, knowledgeable colleagues, supportive parents, and being in charge of the department have led Chris from knowing little about technology to becoming a technologically competent art teacher, a development also attributable to his willingness to try new software programs. He has also demonstrated sensitivity to the issues of ownership and copyright, trying to raise awareness by making sure that students use legitimate resources in their artworks and cite online materials properly. He encourages his students to view copyright not only from the perspective of legal issues but also in relation to issue of intellectual property.

In addition to being an art teacher, Chris is the Web master for the school Web site and has taught technology professional development workshops for his colleagues. He also manages an online school art gallery and an art class blog on which he posts students artworks and communicates with students and parents online. Being a humble person, Chris continues to attribute his accomplishments in teaching art with technology to his colleagues. Nevertheless, in my observation, his achievement stems not only from his colleagues' inspiration but also from his strict self-discipline in assessing his own teaching performance. That is, his working attitude of perfectionism pushes him to do his best and never allows him to be satisfied with his teaching praxis. Rather, he continually modifies and implements into his teaching new ideas taken from his colleagues, constantly refining his teaching strategies and seeking ways to improve his practice.

These high professional self-expectations have become an inner force that urges him to maintain the quality of his art teaching.

*Chris's Beliefs and Their Influence*

Given this introduction to how Chris became such a technologically competent art teacher, this discussion now turns to Chris's deliberations on what it means to be a visually literate person in the given circumstance of learning art with technology. According to Chris, he constantly refines his teaching beliefs to fit with the school's vision and the students' need. These ideas of visual literacy, of possessing the ability of visual expression and problem solving, as well as what students need to learn to achieve it, have been primarily influenced by two elements: Lincoln High School's portfolio system and Chris's observations of students' prior knowledge in art and technology.

Chris's vision about teaching art is characterized by a career orientation that ties learning to the preparation of students for job procurement and college admission. However, as Chris observed, this orientation goes beyond a simple emphasis on being college bound:

It's about what do you want to do with your life? And yes, if you need college to help you get there, that is fine. But it's okay if you don't. It is not a strong college aspect compared to other high schools. It is not as pushed here...[although] I think 80% [of the students] do go to college. (Chris 2, p. 8)

As part of this emphasis on career choices, the school attempts to teach life skills along with the academic subjects. Lincoln students all work under a unique portfolio system that connects student performance through their four high school years (see APPENDIX C). Specifically, the students are required to document evidence of their strengths and achievements in four school-wide facets—written communication, oral communication, service learning, and application of technology—and to present six content-specific

samples selected from seven areas: visual or performing arts; mathematics or science; and physical/kinesthetic, vocational, problem-solving, collaborative, and leadership skills. For instance, in multimedia class, creating public service announcement (PSA) videos in groups would constitute collaborative learning, while in computer graphics class, making a D.A.R.E. (Drug Abuse Resistance Education) poster for the local police department would be considered servicing learning. To supervise student accomplishments, teachers sign the Portfolio Content Check List included in students' agenda books as part of the review process. Students then present their portfolios during the senior presentation as one of the graduation requirements.

Commenting on the portfolio system, Chris said, "I am a big fan of the portfolios. I think that is part of the reasons why I like being [at the school]" (Chris 2, p. 9). Initially, Chris was not sure whether this portfolio system affected his teaching because he had been following this system without thinking for several years. However, after contemplation, he agreed that, albeit unconsciously, he used the portfolio system as a learning motivator and encouraged students to experience the life skills listed for the portfolios through art. This admission corresponded with my classroom observation that Chris urges his students to accomplish portfolio requirements through his art classes. For example, when the multimedia class held a videoconference with a filmmaker from New York City, Chris helped the students with the interview questions and strategies, asserting it to be an opportunity to practice and document their oral communication skills. Therefore, although he brought the portfolio system into his art classes partly to fulfill the school requirement, Chris had career considerations in mind, unwittingly showing his students how art can be related to their needed life skills.

Another factor that has influenced Chris's beliefs is his observation about the change in student prior knowledge in their varied learning settings. Specifically, he noticed that whereas students once came into high school having neither art nor technology learning experiences, now they bring in strong technological skills but cannot present their ideas clearly:

I see freshmen coming in with flash drives now, and they already have learned Photoshop or Dreamweaver... This one guy, he knew everything about the program; all the incidents; all the shortcuts. He was sitting there, being able to do stuff without even touching the mouse. But his product, just the color was rolled all over the place and it was not unified. The idea was not clear there. (Chris 2, p. 13)

Students are bombarded with all the visual stuff today, and a lot of [the visual stuff is] not well designed. Students put something together with Photoshop, and they are not really sure if they like it. They want the title to stand out, but they put such a busy image behind it. (Chris 2, p. 10)

Chris also pointed out that whereas over half the students attended no formal visual art classes during their elementary and/or middle school studies, they may have enrolled in a technology course or have known something about technology prior to entering high school. Because awareness of this circumstance is increasingly prevalent in the community, Chris believes that developing students' artistic sensitivity in their learning with and about technology has become key to making the conveyed messages visually compelling and in such a way that they clearly stand out from mass information. This lack of formal art learning experience in incoming technically capable students makes Chris feel a duty to bring the beauty of art into students' lives.

In sum, taking the context of his students lives into consideration, Chris's teaching practices are driven by his consideration of both the school's career-oriented portfolio system and the students' lack of former art experience. These two factors have



established Chris's stance that art develops strength for career preparation and the potential for self-expression, which is also tied to his views on visual expression and problem solving.

Based on his beliefs about teaching art with technology, Chris defines a visually literate person as one able to use art as a means for self-expression and problem solving. That is, to ensure that in any given situation, students can visually express themselves in an interesting manner, Chris has attempted to provide students with exposure to art experiences and allowed them to develop their personal voices.

*Visual expression.* As the majority of the students have had little art in school before entering Lincoln high school, Chris feels that "my role is here to expose students to all these art stuff as much as I can" (Chris 1, p. 12). Thus, providing art experiences through exposure means that students discover their self-identities and develop a sense of appreciation. For example, Chris favors portrait projects for students to try and "figure out who and where they are right now and be able to express that visually" (Chris 1, p. 13). Through the process of visual expression, Chris hopes students will explore their own adolescent minds in an open-ended way, thereby sparking an appreciation for art on a daily basis:

Some [students] might go into art for a career but most of them might not, but they might become a community member that is on some sort of a board that makes a decision about having a mural on their community or doing this or that. So, in some way, I think it will impact their lives whether they go into art or not. (Chris 2, p. 1)

A similar purpose underlies his teaching of various graphic and video editing programs:

It's about the experience or maybe on appreciation of those things that [students] run into as to what goes into all they see; especially when they anime those creatures, and they get it to just do a few seconds with the movement. It took the

whole night to render, and it took hours to make. They can maybe appreciate the process of making a movie. (Chris 1, p. 12)

As these two examples show, Chris considers visual expression a life skill in that the impact of art is embedded in and connected with students' lives. That is, as regards decisions about community murals or digital images, the practice of visual expression helps students develop conscious reflection about the images they consume, view, and make.

*Problem solving.* Whereas he considers visual expression a life skill, Chris views problem solving more as a career skill because "no matter what field you go into, you run into a problem" (Chris 2, p. 6). As he explained,

from a career point of view, if you are pitching an idea to a client, you got to be flexible and present more than one idea because of your competition. You list all your ideas, no matter how crazy they are. List them all out, and then go back and look at them or combine them; you can get more after that. A lot of projects actually as I think about it, I will say, "What are your first 10 ideas? We are not using those. Now let us start listing more ideas. We are going to look through those ideas." Or "When you pick an animal, what are common animals that might be picked for this [3D creature] project? You could do a common animal, that is fine, but I want you to start thinking about something that will not be done normally." (Chris 2, pp. 6–7)

In Chris's view, problem solving refers to the problems that occur in *any* career field; it is not exclusive to visual problems evoked in the process of making art. Yet the art experience helps students to foster the deliberation of unique solutions for the problems they face. In other words, the visual thinking process may apply extensively:

Whether it is visual art or something else, just the whole process of coming up with several ideas before choosing one idea; just being able to go over that thought process and knowing there is not just one possible way of doing something. (Chris 2, p. 7)

Indeed, practicing this process through art might develop students' confidence in brainstorming ideas and making decisions, which Chris identified as "originality or personal voice" (Chris 2, p. 6):

I try not to use creativity as a term. Creativity is just so vague, I think, as a term, it is overused, but people understand original. Original means different, and I do talk about it in computer graphics and design [classes]. They have to come up with so many sketches before choosing one idea that they are going to go with. We develop our ideas as we go along, and sometimes they improve or become more unique as they go along. (Chris 2, p. 6)

In Chris's view, *solving the problem* is not the initial intention in approaching the skill of problem solving. Rather, he emphasizes students' ability to develop more than one unique idea: his teaching aim is the thought process for resolving the problem. Specifically, Chris argued that having this ability distinguishes students from competitors in their careers.

Chris's notion of visual literacy comprises two major components: visual expression and problem solving, which Chris approaches from the perspectives of life and career skills, respectively. That is, the aim of visual expression is to develop students' sensitivity in viewing their everyday visual experiences, while problem solving is intended to nurture students' development of originality as a career competence. These two indicators thread through Chris's aesthetic concern for presenting art through technology: "It is important not only to have a clear idea but also to be visually interesting" (Chris 2, p. 13). In other words, according to Chris's teaching beliefs, the quality of visual representation is imperative in learning with technology. Therefore, developing students' basic understanding of art knowledge and software program techniques is not the ultimate goal of his teaching, but rather the basis for learning to be a visually literate person. With these beliefs and Chris's aesthetic concerns in mind, the

next section outlines some of Chris's specific teaching strategies as evidence of how he develops students' primary skills in learning with technology.

### *Practice*

According to Chris, computer classes are more popular than the conventional art media classes because students feel they cannot draw or paint but know how to play with computers. However, as he pointed out, the computer is a medium for art making, so hands-on art experience may help student comprehension in learning with technology. Therefore, he encourages students to take hands-on art classes, such as drawing, ceramics, and painting before taking the computer-related classes. He believes that in art learning, having a solid art studio background and knowledge of art elements and design principles, is fundamental to proficiency. Thus, in Chris's computer graphics and multimedia classes, the teaching of techniques makes up a portion of the curriculum; most particularly, learning with students, exercises using the tools, and development of assessment rubrics.

As already mentioned, Chris became proficient in a variety of software programs while teaching; that is, he has learned *with* students in a school atmosphere that makes him feel comfortable doing so. Therefore, when introducing a new software program, Chris first practices until he knows enough to teach it and then admits to his students that he does not have a full understanding of the program tools and must learn along with them. Welcoming student input, Chris then names the techniques after the students who discover it, such as "the Ellie effect" or "the Damien method," and then uses these invented terms in his teaching. According to Chris, "the students seem receptive to this strategy and [are] eager to show me new things" (Chris's email, p. 16). Responding to the

students' enthusiasm, Chris shares his appreciation with them by thanking them for their help in increasing his knowledge and understanding of the programs.

Based on my observations, within this all-learn-together learning environment, the students seem less anxious about figuring out the software programs. In fact, they become visibly attached to the filters and effects revealed by their peers and themselves and are willing to try out these tools and take the initiative in exploring the programs. At the same time, Chris uses both the invented and actual names of the program elements interchangeably and is excited when the students contribute something he did not yet know.

Chris's second strategy is "tool exercises" in which the students work with the same goal of practicing the program tools before making their assigned project. For instance, the students practice making a snowman to learn the features of the Strata 3D modeling program, and reconstruct the voiceover and footage of a commercial ad to become familiar with the iMovie video editing program. As Chris pointed out, "a lot of times we are all doing the exact same thing; there is no creativity in that. It is a way for me to be able to tackle some common problems" (Chris 2, p. 1). Chris also demonstrates the how-to procedure of these tool exercises on the projected screen and walks around the room to make sure everyone is making the same rate of progress.

Even though, as Chris mentioned above, he believes that there is no creativity in these tool exercises, they do enable him to discuss with students the basic art elements and principles. Therefore, he can refresh the students' knowledge about what they have learned from perquisites, such as color harmony, unity, and balance, at the same time as they practice their newly learned techniques. Once the students are comfortable with the

software program tools, they can concentrate more on thinking how the tools can represent their ideas: “We do exercises to get some basics, to learn about the tools, and then the students use these tools to express their project ideas” (Chris 2, p. 1).

Nevertheless, he admits that

some people are scared to jump into the actual projects. It does take more time though to do tool exercises; this way you might end up with few final projects, but then they are higher quality than if you were to just jump into the material and learn as you go. (Chris 2, p. 1)

Thus, Chris’s strategy of learning sequentially helps the students to reduce their fear of the unknown programs and to develop the techniques needed to make their projects. For example, Chris recognizes that, structurally, the tool exercise for the Strata 3D modeling program is technically driven but that “familiarity [with the tools, techniques, and vocabulary] will serve as a foundation for our 3D animation unit yet to come” (Chris’s teaching materials, p. 20). As detailed in a later section, Chris’s student responses indicate that his students seem to be responding to this strategy well because they feel that Chris makes the programs easy to learn.

For Chris, knowledge of art is taught through the implementation of the program tools, which students use to express their artist intents. This learning process has contributed to his belief that the student digital work must relay unique messages in a visually pleasing manner, which is tied to the third strategy, the development of rubrics for how Chris will assess student work.

First, when introducing the projects, Chris discusses and usually provides handouts on the assessment criteria. However, his handouts, besides giving project guidelines, also articulate the learning objectives using the two categories of concept goal

and technical goal. That is, Chris explains what he wants the students to learn and encourages them to discuss how to meet these learning objectives:

There have been times when we are working on something [and] I say, 'Well, how should this be graded? What should I look for in that project? Let us come up with a rubric together.' And they know that we look for the neatness of the work, and is this idea expressed the best way it can be. (Chris 3, p 4)

Since these students have been learning from Chris for a while, they know his expectations for the projects. During my observations of the rubric discussions, the students put forward ideas like message clarity and visual composition and uniqueness, the concepts frequently deliberated by Chris in his instruction. Thus, these discussions serve as a facilitator that connects students' knowledge with their new project experiences. That is, they are involved in the making of the rubrics for their projects and feel as though they are contributing to the assessment process. Hence, even though they do not totally invent the rubric contents, the students feel a sense of ownership, which makes them reflect seriously upon their projects during the self-evaluation and critiques. In addition, since Chris views technology as a medium for art making, the structure of each teacher-student developed rubric in his technology-mediated classes resembles those in his conventional art studio classes. According to my observations, the assessment criteria usually fall into the norms of originality, craftsmanship, communication, and subject knowledge, through which Chris looks for the clarity and novelty of visual expression.

In sum, to invoke student awareness about the quality of visual representation, Chris has developed his own unique teaching strategies. Specifically, he has created a mutually respectful and interactive learning environment, broken down complicated components into sequential learning experiences, and increased the students' involvement

in developing the assessment criteria. Moreover, Chris teaches art as representation through technology but teaches mastery of the software program tools by building on the students' knowledge of art.

### *The Classroom*

To demonstrate the importance of the teacher in learning with technology, the vignette below illustrates the teaching-learning events, including the student reactions and interactions, in a multimedia class session from which Chris was absent because of illness.

#### *Classroom Vignette: A Day without Mr. Taylor in the Multimedia Classroom*

One Thursday in May, Chris is out sick, so he has sent me two emails in the early morning in the hope I could save myself the drive. However, having left my apartment without checking my email, I arrive to find a substitute teacher in the classroom. Nevertheless, Chris has written a long list of notes for the substitute, expecting students to take the initiative to work on their ongoing projects, although he has also expressed concern that the students might experience some frustration because he is not in class to help them.

The bell rings for the multimedia class, and Eric, a student with curly hair, enters the room asking, "Where is Mr. Taylor?" The substitute teacher, Ms. Johnson, a retired teacher from this school, answers, "Mr. Taylor is sick today; he won't be here." "You are kidding, right? Ms. Johnson. Mr. Taylor is never sick," Eric replies in surprise. "Where is Mr. Taylor?" another student asks as she walks in. Ms. Johnson smiles and firmly answers, "I am not kidding. Mr. Taylor is not here today; I am subbing for him!" Several other students express surprise, claiming that Chris never calls in sick.



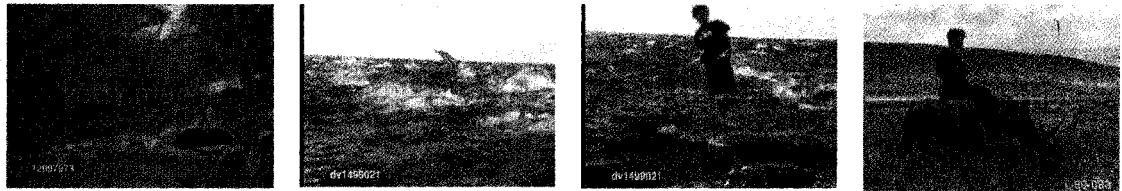
Ms. Johnson then asks the students to continue working on their portrait music video projects and to help each other when they have questions. This music video project is new, only introduced to the students three class sessions ago. To complete it, the students are to use the Final Cut Express video editing program to create a two-minute long video that represents who they are as individuals. For a video resource, students can film their own video footage or use stock footage purchased by the school. Prior to this project, students have already created cooperative PSA videos using the iMovie program; however, some students find it a difficult challenge to leave their comfort zone with iMovie and shift into the Final Cut Express.

Therefore, while some student import their filmed video clips into the computers, others practice the Final Cut Express program, such as deleting the footage's background and combining two video clips into one. Without Chris, the classroom dynamics have changed. Instead of concentrating on their own work, students are chatty, asking for help from each other. At times, students raise their hands for help but realize that Chris is not there. Lillian then puts down her hand and talks to herself: "I'm silly; I forgot Mr. Taylor is not here." She looks around and asks, "Anyone know how to insert a jumping cat into another background scene?" However, her neighbors, struggling or busy with their own problems, cannot help her. Lillian just stares frustratedly at her computer screen.

Lillian is just one of the students showing frustration. Brian, an athlete, who excitedly told me a couple of days ago about realizing that one TV commercial had been manipulated using the same stock footage as was available here in the school, is concentratedly working on his computer but suddenly pounds the desk with his fists. Clenching his fists tight, he says not a word but looks disappointed. After a pause, he

looks around the room, yelling, “Where’s Mr. Taylor? I don’t want to do this anymore.” Everyone is shocked by this unexpected outburst, but the class remains silent, the students’ faces reflecting their understanding of his frustration. Brian then gives up working on the Final Cut Express and returns to polishing his PSA project in iMovie.

Steve, a junior, is the only student to do filming this day. Casual, a regular wearer of baggy khaki pants, he is taking courses in both Computer Graphics and Multimedia this semester. His rapid grasp and implementation of ideas and the creative application in his artworks have already impressed Chris. For example, his music video used action footage in conjunction with different animals in their habitats. Moreover, while other students are working on becoming familiar with the Final Cut Express program, he has already made one video clip showing him jumping out of the ocean with dolphins. His plan of the day is to make another clip about him chasing a squirrel (see Figure 10). To do so, Steve asks Jeff to film him while he acts out in front of the white screen located at the back of the classroom. Knowing the effects he wants, Steve checks the camcorder footage and asks Jeff to film it again because he is dissatisfied with his performance. Initially, Steve is a little too shy to act out in the class, because he realizes that he is being watched by some students who are either frustrated with the program or waiting for the program to render footage. As a result, Steve is receiving more attention than on the days when Chris is present.



*Figure 10.* Footage of Steve’s Video.

Lillian, one of the watchers, asks if Steve can help her. "Okay, but can you wait for five minutes?" Steve replies, finishing up his acting and ready to import his footage. Steve plugs the camcorder into the computer and then goes to help Lillian while his footage is importing. In making the dolphin video clip, Steve has become familiar with how to take the subject out of the scene and place it on top of another background scene in Final Cut Express. He demonstrates this technique to Lillian using her footage, and Lillian is excited that her problem is solved. "Thank you so much, Steve," she says appreciatively. Steve then rushes back to his seat to check his work onscreen. Lillian's excitement attracts more students, especially girls, to ask Steve for help and it does not take long for other students to realize that Steve is the one to fulfill their desperate need for a teacher. Although helping peers is a work ethic that Chris promotes in the class, Steve is overwhelmed by the many requests and also eager to get his own work done. He takes a deep breath and moans, "Where's Mr. Taylor?"

Because of the attention Steve received on this particular day, I asked him during our interview how he had learned such a difficult program as Final Cut Express. By "messing around and just figuring everything out" (Steve, p. 7), he replied; "The cool thing about computers is you can try stuff out and if you don't like it, you just hit the undo button" (Steve, p. 11). Thus, Steve had adopted an experimental approach to resolving the program complexity, a playful attitude of learning-by-trying that he also used when helping classmates: "I had a small idea of what to do, so I just figured it out more when helping [Lillian]" (Steve, p. 8). He elaborated further:

That's why I think anyone would figure this stuff out, because that's what I just did. You just play around with the program to make it work. But I think people are afraid that if they press a wrong button like computers can explode or

something, so you really just have to try stuff out and play around with the different functions. (Steve, p. 8)

With the courage to *try stuff*, Steve demonstrated his confidence in learning new programs with ease, claiming that the difficulty lies in the attitudes toward learning not in the program itself.

The above vignette of students' reaction on a day that Chris was absent from the multimedia classroom reveals the significance of the teacher in a technology-mediated learning environment. As the vignette indicates, some students plainly expressed their dependence on Chris's help and their unease at not being to resolve their learning difficulty instantly. They therefore came to realize how much they rely on the supportive learning atmosphere that Chris has developed. Chris's absence especially uncovered the trusting teacher-student relationship between Chris and his students.

### *The Students*

This next section reports the selected student responses to the questions about what they have learned from Chris's computer graphics and multimedia classes. After detailing individual students' stories, the discussion presents an overview from the perspective of two different directions that a teacher's teaching style and the learning environment can take.

#### *Individual Student Responses*

*Ray.* Ray, a tow-headed senior student in the computer graphics class, is composed and quiet to the point that he often seems to be in deep contemplation. Holding his chin with his left hand, he would stare at his work on the computer screen for a while, take the pencil from behind his ear to sketch some patterns on paper, and then look up at the screen again to fix his work. Interested in design and computer application, Ray took

the class because he thought that “computer graphics would be a great way to learn more about designing” (Ray, p. 1).

Before entering Lincoln High School, Ray had had no formal art learning experience in school, but during his four high school years, he has taken five art courses from Chris, including Introduction to the Arts, Ceramics, Painting, Multimedia, and Computer Graphics. Acknowledging that Chris had sparked his interest in art, Ray admitted that he did not think he could draw and paint until taking the first art class with Chris. Since then, he has come to really enjoy art: “I realized that anybody can draw, and that I could draw, so it really opened my eyes. I really enjoyed doing it, and I didn’t realize that I would enjoy doing it” (Ray, p. 1). He also explained his enjoyment:

I think the way that Mr. Taylor presented it really got me into art, and art itself is really enjoyable for me. And I like the way that art communicates, like instead of just saying something blatantly. Art, it just says in a different way and in abstract way. I really enjoy that part of it. (Ray, p. 1)

Fundamentally, Ray recognizes that, for him, visual communication is more intriguing than verbal communication. That is, the implicit character of art appeals to him because “my art defines who I am” (Ray, p. 5). For Ray, art is also about relaxation: he likes to make art at home in his leisure time and decorate his bedroom with his artworks and favorite pictures. After school or on weekends, he also likes to be in Chris’ art room to paint, walking in and asking Chris if he can stay. He then takes out his unfinished piece and quietly works on it in a corner.

Thus, for Ray, art helps him represent himself as a person, but is not a consideration of his goal of studying computer engineering in a reputable engineering college at a Midwestern university: “Art is more of my way of showing myself than a job” (Ray, p. 4). He was therefore clear about the role of art in his life, seeing it as a tool

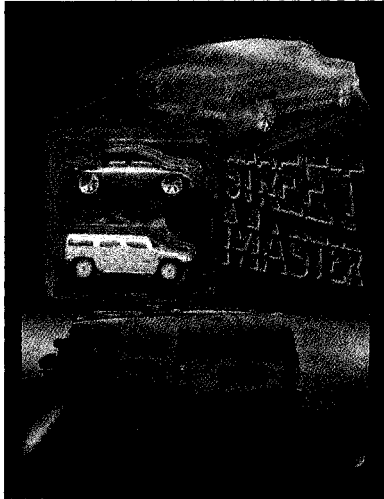
of self-expression and communication. This viewpoint is borne out by his thoughts on the projects learned in the computer graphics class.

Ray is particularly interested in product design because to look at design is to communicate ideas. Thus, he is aware that “a lot of our ads used nowadays have some forms of art in [them] actually” (Ray, p. 4) and that people need to question what messages are conveyed in today’s commercials:

I think art is important and that it’s something that’s overlooked a lot. A lot of people see a product, and they don’t really think of like how it’s designed. They just think, “Oh, I like that product,” but they never know how they came to the conclusion that they liked it, when that could have been how the logo was designed. Or what kind of music was chosen on an ad in TV. Or anything like that. (Ray, p. 6)

This passage shows Ray’s sensibility to the images he perceives. He is conscious of the imagery associated with commercial intent and aware of how consumer desire is revealed through product design.

Reflecting on his thoughts at seeing a product, Chris said, “When I see something, actually I think of how could I do that? How would I have made that or what would I have changed in that product?” (Ray, p. 6). Applying this idea to the making of the product package project, Ray enjoyed taking out the existing packaging and redesigning a new one. For this assignment, students must pick up an item from a dollar store and redesign the package. Ray chose a toy car as his product and manipulated a photograph of the real car to give a sense of speed to his package design (see Figure 11). Looking at the existing design stimulated Ray to think how he could better deliver the product’s messages.



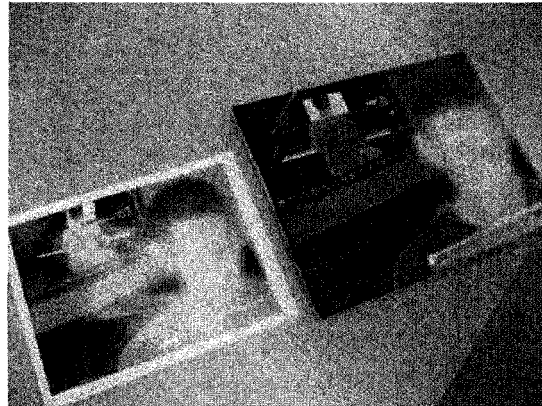
*Figure 11.* Ray's Artwork of Package Design.

Ray initially learned Photoshop in his freshman year with Chris and took six months to familiarize himself with the program. Although he is now proficient in the application, he considers Photoshop a useful but difficult program to learn. Although he has no preference for making art with conventional or electronic media, he is now pretty confident that he can sketch, paint, or work on the computer. In fact, for Ray, Photoshop is "more of a tool for painting or drawing" (Ray, p. 2):

One thing I really enjoy is making a Photoshop image. If I have an idea in my head, and I want to paint it or draw it, I'll just, I'll go and make something in Photoshop really quickly, and it doesn't take that long. Then I end up painting it or drawing that, and it's really nice to know how to use Photoshop. I am doing a painting right now where I printed out a Photoshop image that I made from a combination of images, but I am painting it now. It's easier to paint the textures if you have something to work on. (Ray, pp. 2-3)

Using Photoshop to sketch out the idea for the painting was something Chris encourages his students to try in his painting class, and it is apparent that Ray has adopted and enjoyed this technique. His proficiency in Photoshop in turn supports his skill at visual composition in painting. For example, he showed me his Photoshop sketch and the

ongoing acrylic painting, a realistic portrait of himself, describing how he arranged his ideas in the Photoshop program and envisioned how his painting might turn out by looking at the Photoshop manipulated image (see Figure 12). “I think Photoshop is like my way of sketching,” he explained; “Yeah, it’s almost quicker to use Photoshop for me now than to just sketch something; it’s really weird” (Ray, p. 3).



*Figure 12.* Ray’s Photoshop Sketch (left) and Acrylic Painting (right).

Ray also identified 3D modeling as the most complicated and difficult project in the computer graphics class. This final class project asks students to build on their Photoshop knowledge by designing a 3D invented creature using the animation program, Strata. Ray’s 3D creature resembled a raccoon resting on a tree branch (see Figure 13). To complete the project, he dedicated a fair amount of time to playing around with Strata just as he had done to learn Photoshop, pinpointing the difficulties that might arise from the uneasiness of shifting 2D concepts to 3D imagery and from the familiar Photoshop to another new program. According to Ray, “[the Strata is] challenging and it’s new, but I think I would be able to get used to it” (Ray, p. 8). He also reflected on his learning process:



At first I didn't really enjoy being pushed out of the comfort zone, but I think I ended up enjoying it. Once I saw the finished result, I kept pushing myself. And also, like I was, I was thinking of doing the details and then just saw what it would come up with in the end. That's what I really tried to focus on. I just tried to do the details, even though I didn't know what was really going to happen because I've never really done it before. But in the end, once all those details come together, it makes a great project. (Ray, p. 8)

Sometimes I come to a point where I don't even know where I am going with the project, so I just sit down and I'm like, "Oh, I need to start completely over." So sometimes I just start completely over or go back a couple of steps because I don't know where I was going with that path. A lot of times I just don't know. I just get like a mental block, and I don't know where to go. Then I kind of find my inspiration from just looking at where I am in my project, so that I can know where to go from there. (Ray, p. 8)

On the Strata vision project, one time I was focusing so much on the details. But when I looked at it from a different view, it was completely flat. I realized that I wasn't looking at it as a whole thing, and I should have been focusing more on that part of it. But then once I fixed that project or that part of it; it was okay. So I felt good about it. (Ray, p. 9)



*Figure 13.* Ray's Artwork of 3D Modeling.

Ray's conscientiousness reverberated through this introspective analysis of his own thought processes. He welcomed the challenging task that Chris had assigned and transformed it into an inner force that pushed him to do his best. Unlike some students who expressed their anxiety at dealing with the new program, Ray stayed calm in

figuring out Strata, only asking Chris to comment on his artwork not teach him the techniques. Apparently, Ray paid meticulous attention to details when executing his work, he was conscious about his decision making, thinking of how to represent his ideas with his 3D creature. He would stay in the lab after school and keep polishing his work right up until the day the project was due. Ray's thorough attitude also reverberated in his reflections on what he has learned in relation to his life experience. In particular, making the small scale 3D model has given him a sense of appreciation for the animated film industry:

I think one of the biggest things that I am going to take away from the computer graphics [class] is the experience of working on 3D modeling, because I didn't have any exposure to it before I took this class. I didn't realize how hard it is to work in that three dimensional world, and I think I am going to take that away with me, knowing how hard it is and what people need to go through to make the films, the movies that we see today. And I'll have more respect for that. (Ray, p. 2)

In sum, Ray enjoys visual art, recognizing visual communication as his way of expressing himself. His understanding of the Photoshop program has moved beyond knowing its mere techniques to use of the application as a communicative expression of his interest in product design and a sketch tool to explicate his ideas for painting. Nevertheless, Ray's competence in graphic design took a long time to develop (four years of high school years) and has been growing along with his interests in other art media. In fact, this development has fostered his sensibility in questioning the images he views on a daily basis. Subsequently, Ray's persistence has carried over into his learning in the 3D modeling project, while his reflection on communicating ideas is indicated in the quality of his work. In Ray's case, he has not only developed a critical eye for viewing images but also a respectful application of the work ethic of image producers. Expanding his

learning experience to recognize the hard, diligent work in the art and electronic media industries, Ray continues to carry his gratification with art into his life.

*Ashlee.* Ashlee, also in Chris's computer graphics class, has straight long brown hair, beautiful eyes, and smiles sweetly under her fashionable glasses. A very polite sophomore, she always greeted me warmly, showing me her artworks, sharing her excitement about the projects, and asking for my opinion. She did not believe herself to be good at drawing but expressed great interest in working with the computer. On her home computer, she had an outdated version of Photoshop, with which she "fooled around ... a little, but I've never actually known what I was doing" (Ashlee, p. 2). Having played video games intensively while in middle school, Ashlee has decided to be an animation and game designer and considers this computer graphics class a preparation for her career path: "I want to be a pro at this; this is what I want to do for the rest of my life, making video games. I'm going to be awesome at this when I get into the college" (Ashlee, p. 5).

Because of her career goal, Ashlee was initially more excited about learning the 3D multimedia and animation program Strata than about the Photoshop program. However, after experiencing frustration working with Strata, she decided to slightly change her career interest from game designer to graphic designer. I asked her what she has gained from both her enthusiasm for learning and her frustration, as well as her recognition of Chris's help in overcoming such frustration.

Ashlee told me that she enjoyed the poster making and product package design projects most, asserting that she has come to master Photoshop because of Chris's computer graphics class (see Figure 14). Specifically, this class has helped her consider

the reality of her dream of being a game designer. She has realized the numerous details that must be taken into account if a piece of digital artwork is to be successful, details that she never thought of before while reading a magazine or watching an animated movie.

Reflecting on what she has learned, she pointed to the following:

I learned Photoshop; I learned Strata 3D; I learned different composition, like centering objects on a page to make [them] look appealing to people. I learned a lot. I didn't know that so many things went into making something look good. (Ashlee, p. 2)

I learned not be afraid to try your crazy ideas and don't worry if people will like it or not. You should try to go along with your ideas even if you don't think they're maybe good at first, because once you start working with it, then you're going to start thinking of other ideas that you can put along with that and then everything just starts to come together, and it all turns into something great. (Ashlee, p. 4)

I definitely, I learned a lot about computer in general and the different applications that go along with the computer. Also, now that I'm taking this class, maybe a couple of weeks ago I was flipping through a magazine and I saw an ad that I knew exactly what they did to make the effect. So I took it up to Mr. Taylor, and I was like, 'Mr. Taylor, they used the glass effect to make this ad.' He was like, 'you're right.' So I pay attention more to a lot of that stuff, and I can tell the different things that they used and how they did it. So it's kind of cool. (Ashlee, p. 4)

Taking this class has obviously shifted Ashlee's standpoint on technology from the end user to the designer: she has gradually discovered the effort required to compose her favorite digital world. Ashlee's reflections also reveal her realization that her enthusiasm for working with the computer could not survive without the development of thinking and the sensitivity of viewing.

Throughout the semester, Ashlee also realized that she might change her career plans due to the unexpected frustration of switching programs and learning concepts. Specifically, she felt uneasy being pushed out of her comfort zone from 2D design to a novel 3D world, probably because of the difficulty in constructing the 3D structure and

the unfriendly, complicated program interface. She tried hard to learn Strata as she had learned Photoshop, telling herself, "I'm not good at it now, but maybe after I work with it for a couple of more classes, I will like it more" (Ashlee, p. 6). Nevertheless, despite keeping a positive learning attitude, she still experienced frustration with the 3D modeling project:

I think because we started out with Photoshop, and it's more about copying and pasting and all that, but Strata is more like you have to make shapes and then you have to make the shapes go into the other shapes. Then you have to make the shapes straight; you have to make it look like they all fit together nicely like it's supposed to. I am not very good at it. I can't even make a good jellyfish, so it's definitely really challenging. (Ashlee, p. 5)

When I first took this class, I didn't want to do Photoshop; let's just work with Strata 3D for the whole semester. Now that I've been working with Photoshop all the time, we are starting Strata and I'm like, "give me back the Photoshop, I don't want to do Strata any more." I think it has to do with maybe some people are better at doing all those shapes and making everything fit together than just working with Photoshop and putting in effects. (Ashlee, p. 5)

Thus, Ashlee was able to identify her learning block by articulating the difference between two programs: Photoshop has become the basic knowledge for Ashlee to learn Strata, as well as the comparative source of her frustration.

Besides the mechanical problems, Ashlee was also bothered by having to understand the mechanics of three-dimensional rendering, a new concept for her. Therefore, she had a hard time transforming a 2D jellyfish image into a 3D structure on the 3D program, even though she had learned perspective drawings in Chris's design class. To work with the 3D creature, she needed to envision the object as a whole from varying perspectives and thus decided to develop her interest in being a graphic designer rather than a 3D game designer because "Strata 3D isn't working so well right now" (Ashlee, p. 1).

As a result, Ashlee found that her fulfillment from her 2D graphic design projects was greater than that from her 3D work. That is, her frustration with the 3D modeling project derived from the program's difficulty and the disappointment in building up her career path. However, at the end of the semester, her 3D creature turned out much better than she expected, so she was satisfied and happy, although she ascribed her success to Chris's help. Specifically, she acknowledged that her inspiration, motivation, and tenacity working with technology might have been stimulated by Chris's encouragement:

He definitely encourages us a lot, like some of the ideas that I had for some of my Photoshop stuff and even the Strata 3D stuff, I would think that I probably wouldn't do that unless Mr. Taylor told me, "Okay, come on, be more creative; think outside the box. Do something that's a little bit different." So I try to think more creatively. (Ashlee, p. 9)

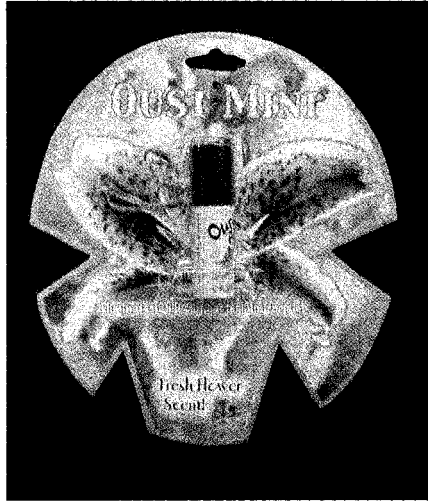
Chris's verbal encouragement sustained the teacher-student trust in his relationship with his students, which helped the students overcome their frustration with technology. As Ashlee observed, Chris comforted his students, including herself, when they were struggling with the assignments. She also noted that she felt better when receiving his help and support:

Most of the time if I got frustrated, at first I'll get angry and then I will raise my hand and start yelling, "Mr. Taylor." And then Mr. Taylor will be like, "this is what you're doing wrong." Then I would realize that I was wrong at that time, then I'd correct it, and then I'll get happy again. So it's just, basically, I would just ask for help, and Mr. Taylor would help me. (Ashlee, p. 7)

Mr. Taylor always has different ideas, and he'll always help you even if you're like, "Mr. Taylor, I don't want to do this; this is stupid, I don't want to do this." He'll still be like, "well, here are a couple of ideas and you could do this, and we can do that." So he is always very helpful for us; it's much better than if someone teaches his students, saying, "I don't know. Why don't you look it up?" Because you can't really look up something on Photoshop, you kind of have to work with it. (Ashlee, p. 9)

Ashlee's elaboration emphasizes how Chris has facilitated her learning process by offering constructive suggestions and sharing instructional knowledge. She was willing to take Chris's advice and try things out because she trusted that her teacher was there to walk her through her struggle. She also indicated that without Chris's help, she might have quit or given up on her projects. Therefore, she appreciated Chris's teaching style, his giving the students challenging tasks but following them up with support. As a result, Ashlee enjoyed the challenge: "When you're challenged, I think that's when you're at your best; you tell yourself that I'm going to try to make this as best as I can, so then you try to do it better and do more" (Ashlee, p. 9).

Ashlee's learning frustration also derived from her disappointment about the gap between her passionate career goal and its complicated requirements. In the end, her project turned out to be outstanding because her inner strength made her continually refine her 3D jellyfish (see Figure 15). Ashlee's case indicates that the resolution of a student's learning anxiety with technology is connected to teacher-student trust. That is, Ashlee trusted Chris's instructional advice to continue working on her project, and Chris was confident in helping Ashlee overcome her learning difficulty through his attitude and knowledge.



*Figure 14. Ashlee's Artwork of Package Design.*



*Figure 15. Ashlee's Artwork of Package Design.*

*Damien.* Among the students observed in the computer graphics class, Damien was probably the most confident, quickly grasping Strata and creating his 3D model with ease. He described himself as being “interested in art and ... pretty good at computer” (Damien, p. 1). Having had vast exposure to electronic devices and computer programs both at home and school, Damien is characteristic of the generation growing up with computers. Learning technology is neither new nor difficult for him. Rather, for Damien,



working with computers is fun, and the best part of the 3D modeling project was “making it and seeing the final result” (Damien, p. 1). When describing how he had learned with technology, Damien exhibited little excitement; instead, he was calm and convinced that he had technology under his control. Sensitive to digitally manipulated images, he had once had a discussion with his classmate about a giant rabbit picture from a search of Google Images. “It’s not real,” he had claimed. “I can see the ears have been manipulated. The color intensity is not right. Do you want me to show you how to do this on Photoshop?” (Observation notes, p. 8).

Damien’s 3D creature was a fire dragon, elaborated from an ink sketch made while watching TV at home (see Figure 16 and 17). He had begun his dragon by making the head on the Strata program, making sure that its 3D proportion spanned correctly on the screen. Once the 3D model’s structure was accurately arranged, he then continued to work on the details of the figure and texture. Unlike other students who struggled with the 3D modeling program, Damien understood it well and received praise for his work from his peers and teacher. Wondering about Damien’s understanding of transforming his 2D dragon sketch into a 3D model, I asked him how he had worked through the transition:

What I do is, I just picture the model in my head, and I try to turn it around what it will look like in real life; how all the shadows would form and everything. So I just turn it around and put that on a computer. I don’t plan ahead of what I am going to do. I just do it off the top of my head and make sure it all goes well with each other. (Damien, p. 7)

This passage echoes Damien’s contemplation on organizing the 3D structure. When asked from where this contemplation derived, he responded, “It’s little bit of intuition,

but I think it's from all the other art classes I have taken. Mr. Taylor has really taught me a lot" (Damien, p. 7). He elaborated further:

I really had some experiences with the 3D stuff. In the [art and drawing] classes, we had to draw... and [Mr. Taylor] taught us how to make everything 3D like spheres, and then [the projects] got more complex and everything. And to do that you have to really look at what you are doing and know that on one side it's the same as the other. So that's pretty much probably what helps me. (Damien, p. 8)

Thus, Damien attributed his comprehension of 3D modeling to what Chris had taught him in other art classes. Because of his previous drawing experience with 3D structures, Damien claimed, he could envision the required 3D visual composition to make his project successful.



*Figure 16.* Damien's 3D Creature.



*Figure 17.* Damien's Sketch.

Although Damien was still a sophomore, he took most of the art classes offered at Lincoln. He had been taking two art classes per semester and so far had finished Introduction to the Arts, Art I, Design, Drawing, and Ceramics, and was currently enrolled in Painting and Computer Graphics. Perspective drawing was also taught in various projects in the classes of Art I and Design, which benefited Damien's 3D modeling. He also pointed out that drawing itself did not actually help too much in his learning of computer graphics, but the notions of idea construction and visual

arrangement learned in earlier art classes facilitated his making of the 3D dragon creature.

In Damien's case, his previous art classes gave him the knowledge base to support his learning of technology. His confidence in operating the technical program derives from his comfort working with the computer, whereas his perception in modeling the 3D structure was evoked from his prior learning experiences with other art media.

*Madison.* "Overall, I am comfortable with the computer," responded Madison when asked about her impression of the multimedia class in which the students make a video montage, a PSA video, and video portrait projects. "This class was more fun than challenging for me, I think" (Madison, p. 2). Madison, a senior, intended to study business in college; however, multimedia was her third art courses with Chris after Introduction to the Arts and Art I. Madison took this class after seeing earlier students' work displayed in the hallway because she thought it seemed interesting. Having video editing experience from her other classes, she considered Chris's multimedia more in-depth in terms of content and techniques, so she really enjoyed it: "Once I finished my project, and I just think it really looks cool, and it's entertaining more than anything" (Madison, p. 1). Reflecting on what she has learned, Madison admitted:

I never really thought I could be creative. I never thought I could be able to draw well. But then I got into multimedia and it's like, oh, I don't necessarily have to be good with a pencil, but I still can be artistic and creative. So [the multimedia class] really showed me how I can express myself. I never thought I can do that, really. (Madison, p. 6)

That is, she has been pleased to discover that the hands-on art form is not the only avenue to being *artistic*, and she recognizes that video production can be an art form for self-expression. Specifically, her notion of being artistic in making video is to be unique and

interesting enough to entertain the viewers. She considers creativity to be imperative: “I really push myself to be creative in this class more than anything else” (Madison, p. 4). Madison also associates her rationale of creativity with the learning environment at Lincoln, a technology-rich school in which students are encouraged to peer-assist in learning technology. Being creative in video production meant entertaining the audience and helping them to think what makes a successful video:

I guess, if someone’s going to see my work, I want them to be entertained. So I think my creativity helps other people, which is why they [think] it’s good because everyone knows we are so technology-based, everyone is expected to know iMovie and know all of these technology things. “iMovie” is a common term here. So that’s why it’s great here, because your creativity is brought out to help teaching everyone. So that it’s not so boring and so drawn out; it’s more like entertaining. (Madison, p. 7)

Madison’s learning motivation therefore derives from the technology-oriented school environment, a school vision to assist learning with and through state-of-the-art technology.

As a result of this vision, the students see technology as a necessary skill in building up their career opportunities. Since integration with technology is encouraged in every subject in this school, the students here have a great opportunity to review each other’s videos created for various course assignments, including History, English Literature, and Sociology. Madison valued this learning atmosphere in which the students had high expectations about learning with and about technology. The peer-assistance system has further stimulated her and made her think that the uniqueness of her work could help generate new ideas for other students:

Personally, I try to be more creative and be different, not to use the usual templates in my project, so that other people can learn something from my video. Because they’re going to pay attention, and they will be like, “Oh, that’s cool.” They are not going to be like, “Oh, my God, another boring presentation.” The

whole atmosphere here is like that. I know a ton of people in our class really liked the PSA project; I thought [the student-made PSA videos] were really entertaining and stuck out to us. With a whole atmosphere like that, it's a lot more beneficial to our creativity and our learning experience because all of us are expected to teach someone else something. (Madison, p. 7)

Madison's words reflect her strong belief that the audience reaction to her videos and her artistic intent in conveying her messages is bound up with her idea of how she can entertain her audience. To her, the intention to entertain is the motivation to make her work stand out from that of others. To reach this goal, she pushes herself to search for new ideas and think creatively.

#### *General Student Responses*

The feedback from the individual students discussed above is echoed in further comments from other students about what they have learned in Chris' classes. These responses may be divided into two categories: impressions of the teacher and observations about the learning environment.

*Impressions of the teacher.* The students' general view of Chris was as a good teacher who encourages students to do their best and offers instructional help whenever needed. Although Chris teaches sophisticated computer graphic and video editing programs in his art and technology classes, his students reported that learning these programs is not complicated because of Chris's instructional strategies. Whereas Steve and Ashlee pointed out that Chris always begins with small components to get his students familiar with the program technique so that they imperceptibly develop their ability to operate the applications, Lindsey noted that Chris helped her draw technical connections among different programs:

I like Mr. Taylor; the way he teaches. He doesn't really, he always just gives you hints; he never tells you what to do, like exactly with your stuff. He will just say a

little subtle comment about things, and it always brings you to a better understanding without you even really realizing you learn all that. He started out very easy with little exercises and stuff. So it was actually really easy to learn [all the programs] because we just did small exercises and built up the bigger projects. (Steve, p. 1)

Mr. Taylor just gave us tons and tons of different things to do. He gave us assignments and all the practice. So basically you became good at it without even really realizing it because he gave you all these lessons. So after assignment after assignment, you started getting good at it without even realizing that you're good at [the programs]. (Ashlee, p. 6)

[Mr. Taylor] has taught us some of the programs before; he showed us how some of the programs have the same tools and how they have a lot of similarities. I think he has made it really easy to learn and adapt the different programs. (Lindsey, p. 2)

Steve's and Ashlee's observations about Chris's teaching strategies show their awareness that their learning accomplishments have built up through a series of sequential learning. Revealing little panic at handling the complexity of the computer programs, they acknowledged that their technical knowledge about using the programs developed gradually over time in a step-by-step process.

Not only does Chris break down the large complex learning components into small units of instruction, he also helps his students to bridge their ideas with the chosen medium and tools. As Steve put it, "Mr. Taylor pretty much helped me with that [first video segment of the video portrait project]. I knew what [video effects] I wanted, and he was showing me how to do everything" (Steve, p. 8). Madison expressed a similar thought:

Mr. Taylor knows everything, and so you can tell him your idea like, "Oh, I really wanted to do this, what do you suggest?" and he might tweak it a little bit so that way you can really do it on the computer. I have [the] ideas of what I really want to make the effects happen, and he is great with the answers and questions for that...He broadens our horizons the ways he shows us the technical stuff: "Okay, this is how you enter the transition; this is how you do this and that." So I think it

is just something about Mr. Taylor and the way he teaches that really brings up the best creativity in your work (Madison, pp. 4–5).

Obviously, these students have developed a relationship of trust with Chris, knowing that they can freely express their ideas and that Chris is there to ease some of their technological anxiety. As Madison emphasized, Chris has demonstrated confidence in his knowledge working with electronic media: “When I have questions, I would just talk to Mr. Taylor, and he would help me out and explain it all. He is really good at explaining things and just making time for us; he is always available” (Madison, p. 2).

Moreover, because of this trusting relationship, students are willing to take up the challenges laid down by Chris, who commonly encourages students to think outside the box. When reflecting on what they have learned from their teacher, several students remarked that Chris really pushed his students to try their best but still respected their opinions. Madison and Steve also indicated that Chris’s pushing made them devote more time to polishing their work:

He really pushes you, and he is always reminding [us], “Oh, you have three days; oh, you have two days.” So he kind of not only rushes you but encourages you to get moving. But at the same time he is like, “Oh, well, try this I think this would be really cool even if it is time consuming,” because he’ll help you on your way through it. So just his whole attitude, his whole way of teaching us, I love it because it really helps [in] furnishing my creativity (Madison, pp. 8–9)

He always pushes you in everything, like if you will say you finished with something, he will always come over and give you something else to do. Not directly, but he will say, “You could probably do a little bit more to this.” So I guess what I learned from him is never [to] think you are done when you are done; there’s always extra stuff you can do. But the thing is you can never push it too far, because you can always overdo an assignment. (Steve, p. 9)

These two reflections indicate that teacher knowledge, teaching competence, encouragement and support have stimulated the students’ persistence in refining their assignments. Although video production and graphic design can be strenuous and time

consuming, the students have developed the ability to use their strengths in working with electronic media.

Nevertheless, as Steve pointed out, there is a fine line between exaggerating and understating, a borderline that Chris purposely addresses by allowing his students to give their judgments. As Ian remarked, "You don't have to take [Mr. Taylor's] advice fully; it's just some insights" (Ian, p. 5). Lindsey used her project experience to illustrate her negotiations with Chris:

I thought [the product package project] turned out really nicely. I think the only thing was Mr. Taylor and I had a little bit of a disagreement on that, because he wanted more effects on my lettering, but then my artistic side was saying, "No, I think if I do anything else, it's going to look too flashy; it's not going to look right; it doesn't go with the design that I want." But I think at the same time, he understood where I was coming from when I said I don't want to do anything else to it. He was like, "No, you are right; this doesn't really go well with that; you can leave it." So then he's been really understanding about that; that was really good. (Lindsey, p. 6)

Obviously, Lindsey appreciated both Chris's suggestions for her project and his respect for her ideas. Chris's supportive attitude came in conjunction with his professional knowledge and teaching skills, which made his students comfortable working with the programs and confident in expressing their ideas.

*The Learning Environment.* The computer-enabled environment at Lincoln was another significant factor influencing the students' learning outcomes. Like Madison, who in an earlier discussion had expressed awareness of how the school environment has affected her learning, Ian also reported awareness of being "in an environment where we can put all our efforts into computer, and we will try our best to make it [the assignments] look good, so we keep trying that up" (Ian, p. 10). Lindsay concurred, saying,

I think the atmosphere here at school is very computer friendly. I think the ratio here is one computer to one student. So I think when going to school here you



work with computers. It does not matter what classes you take, you've got to be in contact with computers at some point of time. But I don't think the atmosphere is too much, I think it is more like if you are interested in art and computer stuff, you can start from the freshmen year to learn some types of art, computer graphics, and the animations. (Lindsey, p. 3)

As is apparent, the students are aware that computer knowledge is the common groundwork underling the school's focus on technological integration. Even though attending in a small high school with only 184 students, the students acknowledge having more opportunities to learn technology and receiving more individual attention than in some larger schools. Indeed, technology serves a career-oriented function at Lincoln high School, where the administrative staff and teachers convey to their students that learning technology provides the skills that are imperative in society and career development. It is evident that Chris's students have been affected by this school vision, which they believe that what they have learned with technology will make them stand out in the job market or on their college applications. For example, Madison who wanted to study business, Joy who intended to study journalism, Lindsey who hoped to study advertisement, and Ellie who wanted to study visual art were all convinced that their hard work would promise them a great future. As Lindsey put it, "I think all the stuff I've learned with Photoshop, PowerPoint, [and] iMovie will help when I do any future presentations" (Lindsey, p. 4).

With this career orientation in mind, the students also exhibited an expansive understanding of their own creative and social development and their relationship to technology:

Learning from Mr. Taylor definitely made my creativity grow. I think in today's world, originality is huge; that will help you in [your] career when you are pitching a new idea to your boss, so that's something you definitely learn with the art classes here. And I think visual stuff also helps when you are doing something for someone, rather than just spitting out words at them. You can show them a

visual presentation of what you are thinking and they can get more of the idea. That [originality] will definitely help in a career, anything. (Ellie, p. 6)

I may not necessarily learn about personal growth [in Mr. Taylor's classes], but I think in a way of problem solving, definitely. Because with the way our world is going, technology is just growing and growing; it'll be more and more involved with different technological aspects as in computers or photography stuff and with the new programs coming up. I think the knowledge I have with the older programs that I've learned here, it definitely helps me to pick up on the new tools in the future. (Lindsey, p. 4)

In the older generation of computers, it was a lot harder to do everything—coding was much longer and [more] difficult. But with all the inventions, today's computer was a lot easier for us, and because we pretty much grew up with computers, that technology is so common, like iPods, video games, or anything. (Ian, p. 10)

The school environment and atmosphere have influenced students' views about the relationships between society, careers, and technology. It is also worth noting that Ellie, Lindsey, and Ian's reflections all indicate that they have paid conscious attention to their learning settings, such as environment and career, along with their learning content. This awareness may function as a learning motivation because they are sensitive to changing developments in society.

Although the students in Chris's classes had been informed by the school faculty that technology is essential in their future, being situated in a computer-enabled school environment also made them experience the technology-related competition and cooperation among their peers, which generated a bottom-up understanding of the significance of working with computers. For instance, Lindsey referred to the teamwork in executing her project:

Mr. Taylor makes his class different because he teaches about creativity and tries to help us learn about what [it means to be] visually pleasing as well as the computer techniques. We had some pretty interesting projects that you have to work with the people in your group and you had to say, "Okay, you're good at iMovie, you're good at the directing, and you're really outgoing, so let's make

you the actor.” And we all just worked together and came up with some really creative stuff. (Lindsey, p. 7)

As this comment shows, in developing an understanding of the relationship between society and technology, this school has become a small scale society, helping the students foster the skills that accompany their learning with and about technology, including cooperation and negotiation. What the students have learned is not limited to art or technology; in fact, they have learned how to develop the needed competence to face interpersonal and social challenges.

In sum, the students’ technology and learning outcomes are varied and affected by many factors, including the school environment, the teacher, their peers, and course content. According to Ray, electronic media are his tool for self-expression and communication, while Ashlee indicated how her trusting relationship with Chris resolved her learning anxiety. Likewise, Damien reported that his earlier art learning experience facilitated his understanding of 3D modeling, while Madison recognized that the learning environment has become a motivator for her to do her best. Other student responses also indicated that Chris’s supportive attitude and rich instructional knowledge have helped them learn art through the complicated computer programs with ease.

### *Epilogue*

Chris runs an after-school open studio for students, stays late at school to put student work in the display case and commonly skips his lunch to prepare his classes. Not a talkative person, he helps people, including me, through his actions. For example, he would often ask me whether I had gained enough information for my research, offering help and showing me his teaching resources and his students’ work. He constantly wrote me emails reflecting upon his teaching praxis of that day. He would suggest that I avoid

the long commute on the days on which either field trips or early dismissal was scheduled and then would update me on the classroom happenings by email.

Chris's case reveals how a well-equipped technological learning environment with administrative support can inspire and enhance technological competence in an art teacher. Of course, Chris's own initiative in enriching students' art learning experiences affects his contemplation of and practice in teaching art with technology, but a supportive teaching environment sustains his strength in developing the richness of his curricula. In his learning art with technology courses, Chris argued, the art component makes students' work stand out from the prevalent digital productions. He encourages his students to clearly represent and communicate their ideas in a visually interesting way. Moreover, the process of visual thinking derived from this learning experience provides his students the ability to develop their own skills needed in their future professions. Chris's notion of being visually literate takes into account the necessity of life skills in the hope that students may transform their visual learning experience into the development of strengths in both their lives and careers.

Student responses also indicate that these students have been motivated and influenced by the technology-rich learning environment; they consider their peer audience's reaction when making their videos, and they acknowledge that Chris's teaching style makes learning with advanced graphic and video editing programs much easier. At the same time, many students reflected on their prior art studio experience as enhancing their understanding of 3D modeling and recognized Photoshop as a sketch tool for envisioning the effects that may emerge in a conventional painting. As result, they have become more aware of images encountered in their daily basis. Overall, the students

have embraced the technology-focused environment in the school and enjoy learning art with technology in Chris's classes.

### Case Three: Sara

#### *Prelude*

Located 10 miles away from a Midwestern U.S. university town, Washington Junior High School is located in a rural residential community with a population of approximately 6,000 residents. The enrollment comprises 645, mostly Caucasian, students in the sixth to eighth grade. Because the school requires a quarter-long visual art course from K6 to K8, Sara Petersen, the art specialist and only member of the art department, teaches four quarters a year, two classes for each grade level each quarter, with approximately 25–30 students per class.

Initially, I knew Sara as a fellow doctoral student who shared similar research interests in art education. A sincere friend, as well as a dedicated teacher, she is a cheerful person with an energetic voice. Enthusiastic about her curricula and interested in her students' idea and art making, Sara constantly reflects on their reactions to her teaching. She also devotes a tremendous amount of time to her job during her leisure hours, commenting on students' videos at home and sharing her students' work with friends.

My interest in including Sara in the study lay in her work with electronic media in her eighth-grade curriculum, in which the students make collaborative, issue-based video documentaries. These two eighth graders' classes, scheduled daily during the third and fourth hours, are made up of 38-minute periods, from 9:44 to 10:22 AM and 10:26 to 11:05 AM. My observation of four student groups from Sara's eighth grade classes with

similar curricula lasted through two quarters, one in fall 2006 and the second in spring 2007. Because the case study focuses on the teacher, this report does not attempt to assess the student learning outcomes or differentiate the dynamics of the four different student groups. Rather, it outlines what students have learned from Sara's class based on their reflections on their chosen topics and the making of their videos.

When I visited Sara's office, its decoration demonstrated her enthusiasm for teaching. The wall in front of the desk was covered with the photocopies of her students' work and thank-you cards, as well as a recent clipping from the *Journal of Art Education* of a quote by art educator David Darts (2006):

What I do as an art educator is not really any different than what other teachers do, which is to help my students to make sense of their experiences and themselves, to facilitate critical inquiry and creative problem solving, and to support the creation of meaningful interactions and interconnections between and within the world(s) around them. (p. 11)

The essence of this quote is reflected in Sara's video documentary project in which the video camera serves as an outlet for exploring issues of interest to the students and gives them a chance to "talk about things and share ideas that are really important to them" (Sara 1, p. 9). Therefore, Darts' words seems like the underlying guidance that steers Sara's caring teaching style and her careful listening to her students.

With 30 students in the room, Sara's classroom appeared too small, especially as it was full of art supplies and equipment. Attached to the classroom were two small extensions, her office in the front and a computer room at the back, which together contain a total of eight computers (see Figure 18). When Sara's eighth graders need to work on their video projects, her office becomes their workstation. Besides working in a

crowded space, Sara has received only limited technological equipment from the school, a situation that Mr. Smith, Sara's principal, acknowledged:

You can see that her space is really small, and it's totally inadequate in my opinion, but Sara does not want to let that [stop] her or [get in the way] of what she wants to do. I really appreciate her work ethic in that sense and [her] providing our students with a really good opportunity in the class. (Smith, p. 1)

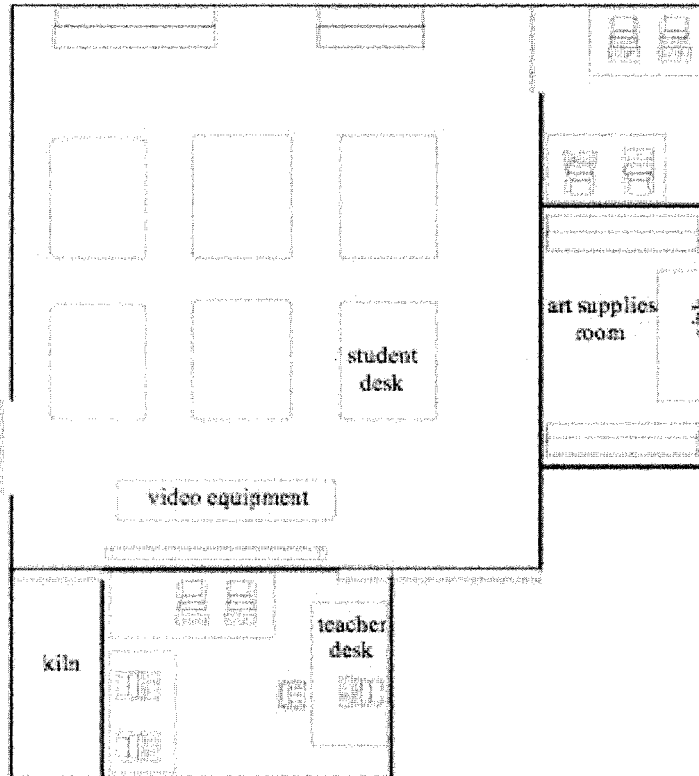


Figure 18. The Layout of Sara's Classroom.

Nevertheless, although the administrative staff appreciates Sara's endeavors, the school budget is too tight to support Sara's needs and goals. In fact, Sara only has two camcorders funded by school financial support and regularly borrows camcorders and tripods from the university or asks students to bring their camcorders from home. Even

though the learning environment may not be ideal for teaching with technology, Sara is appreciative and remains enthusiastic about bringing the video documentary project to her eighth graders: “I feel fortunate; we’ve got a projector now” (Sara 1, p. 7).

Sara’s curriculum involves an integrated audio-visual digital video documentary through which the students must learn to communicate their ideas visually. Having heard about this video project from their peers and siblings, the eighth graders were quite excited about it. The making of the documentary takes four to six weeks and then culminates with a film festival at which the students share their documentaries with their parents and community members. Prior to this project, Sara spends two weeks teaching some mini-projects designed to familiarize students with the basic techniques of sound and image combination. To make their collaborative videos, the students are grouped according to their topics of interest such as war, stunts, peer pressure, cutting, school privilege, animal abuse, and bullying:

[The students] need to pick a social issue or critical issue in their documentaries. They have three minutes to communicate about it, to introduce the issue, and to talk about different points of view, which is the hardest part. Usually, they only see one point of view. They also have to do research, talk to different people, and try to make sense of that information. So it’s like a research project, and then they have to communicate it visually. So they get to work on the Photoshop or just interviewing to find out what would be the best way to convey their messages. (Sara 1, p. 8)

Because the students hold particular viewpoints on the topics of interest, Sara believes that teaching them how to present different viewpoints through their video documentaries as the biggest challenge of this project. To encourage her students to see things differently, she uses video clips from professional documentaries to show how symbols and icons can represent people’s views, and how various points of view are addressed and expressed in successful films. In addition, because this project requires students to



conduct research about their chosen topics, they must work with their teammates and gather a wide body of information from the library, the Internet, community members, and family members. In addition to conducting research, each group must put forward written research proposals, plan interview questions, write journal reflections, film the footage they need, take turns using the computers to edit their videos, and prepare the final documentaries.

### *The Teacher*

#### *Interests in Art and Art Education*

Sara's interest in art initially developed in junior high school when art provided a voice with which to express herself confidently. As an eighth grader, Sara liked to remain in the art classroom, helping and talking to her art teachers. As a teenager uncertain about life and self, art was an outlet to express Sara's feelings. The art teachers who provided Sara a comfortable learning environment were a catalyst that positively impacted the development of her self-esteem. Because of her active participation in art—particularly in her role as the president of the art club in which students worked on community art projects—Sara received an art award at the end of her last year of junior high school. She recalled that receiving this award was so beyond her expectations that she has carried this memory into her own teaching. When the time came for Sara to choose what student levels to teach, she also readily decided on junior high school because of her own unforgettable learning experience: "I wanted to teach that age [group]" (Sara 3, p. 1), she asserted. In particular, Sara wanted her students to build up their confidence and make sense of their lives through art just as she had done at that age.

Compared with her positive memories and vivid experiences in junior high school, Sara's recollection of her high school life was minimally impressive. In her view, the high school environment was competitive and not as supportive as her junior high school. Frustrated, she questioned her artwork, feeling that her pieces were beautiful but lacked creativity. However, after some voluntary teaching experience with elementary school students, Sara was unsure whether she would enjoy teaching more as leisure or as a profession. She eventually gave up the idea of being an art teacher when looking into employment opportunities prior to applying to college. Rather, partly because her aunt was a graphic designer, Sara felt that majoring in graphic design held promise for a "real job"—she believed that graphic designers, unlike sculptors or painters, could make a living.

As a freshman at the School of Art and Design at a Midwestern university, Sara took several drawing classes that made her question the meaning of art. Despite many hours spent in skill-oriented, realistic drawing, she questioned the reason for and meaning behind her drawings. Her perception of this time-consuming but meaningless learning experience made Sara's first college year experience disappointing. At the end of her freshman year, while preparing her portfolio for the department of graphic design, she decided to change her major to art education: "I [had] this idea that graphic design would be sitting behind the computer, and I wanted to interact with people" (Sara 1, p. 2).

Sara enjoyed the art education courses in her sophomore and junior years and became especially inspired by one course that introduced her to contemporary artists and art in different cultures. This class provided her with her first exposure to art outside the scope of Western rarefied fine art, and the Japanese aesthetics she learned inspired her

current teaching of the Japanese tea ceremony to her sixth graders. In addition, amazed by the work of contemporary feminist artist, Barbara Kruger, Sara began incorporating messages about social and cultural issues into her artworks. Through such exposure in her major coursework, Sara realized art's possibilities beyond realism and rediscovered her confidence in art-making that she had lost after graduating from junior high school. As Sara reported, this exposure to a multiculturally oriented approach to art education and contemporary works of art later became the guide for her sixth- and seventh-grade curriculum development.

As a college senior, Sara student taught at Washington Junior High, where her mentor teacher's curriculum included video production and computer graphics with a focus on social and political issues. Both this focus and the use of a video camera as an art-making medium had been virtually unknown to her before she learned about them from this mentor. Impressed by the level of student engagement in making videos on issues they cared about, she also realized that dialoguing with students constantly was the key to effective learning outcomes in this project. Since then, Sara has been interested in exploring issue-based art curricula, valuing art as a means for students to communicate and make sense of their lives.

After graduating from college, Sara was offered a job at Washington Junior High School, where she had taught during student teaching. However, wishing to discover new ideas for art teaching, during her second year of teaching, she enrolled in a master's degree in art education at the nearby university where she earned her bachelor degree. Interested in how the visual culture phenomenon connects with students' interests and is

applicable to teaching, she enrolled in an art education course predicated on a visual culture approach with one of its leading scholarly proponents.

Inspired by this course, Sara experimented with an art project in her eighth grade curriculum that incorporated her students' popular culture. Specifically, she asked her eighth graders to discuss a reality TV program and make their own reality TV show based on their art learning experience. In this project, Sara's students explored and discussed how individuals consume popular culture imagery and how they are in turn affected by it. This experimental project made Sara rethink how the inclusion of the study of visual culture in art education could be merged with her pedagogical philosophy. She began thinking of the ideas of meaning construction as having different layers, a metaphor she had picked up from one of her readings in a university course about visual culture she had taken. Sara valued dialogue with students as a critical layer of meaning making. Even though she felt that there had been much classroom dialogue in the reality TV project, Sara believed that half her eighth grade students had not totally understood it what she was hoping for. Therefore, in search of a curriculum that eighth graders would find more relevant, in her fourth year of teaching, Sara changed the reality TV project to a cooperative student video documentary project.

As a teacher who continues to improve her teaching, Sara described the change of her eighth grade curriculum as follows:

[The reality TV curriculum does not serve] everybody. There were half of [the students in] my class didn't get it. You know, these kids can't think critically on their own, like some of them can't ask people questions. So I think...this isn't a good framework for everybody, because you are pushing the kids that can think to a higher level, you are pushing them really far, and you are leaving other kids behind. I was really upset about it. That's why I changed the reality TV curriculum into the video because video is... people are working in groups. By assigning groups, I can match up ability levels [with] people who are more hands-

on, people who are more in their heads, people who get excited about the topics, and put them all in groups and mix them up. So each person has a different strength, but they have to work together and they learn from each other. (Sara 3, pp. 6-7)

As her reflection shows, in her effort to refine her eighth grade curriculum to meet different student's need, she has realized that video production, an art form that requires teamwork, may serve her students best. Sara subsequently observed that the group effort in video production generates more dialogue among these students, dialogue that is important to developing their ability to communicate with each other. For over six year since, Sara has taught video as an art medium in her curriculum for her eighth graders.

She is currently a part-time doctoral student in art education at a university near her school district, taking courses at night and holding a full-time teaching position during the day. Recently, Sara has been developing her interest in the visual culture approach to art education, seeking a connection between her teaching practice and academic theories. During her third and fourth years of teaching, she continued attending courses taught by the same professor who had taught the visual culture course and took a week-long summer visual culture course at another Midwestern university in another state. Learning from these courses, Sara came to think about her impact as a teacher on the students, more conscious of the images she selected, and more concerned about the questions she asked her students.

More important, rather than merely adopting emerging art education theory into her practice, Sara engages eclectic approaches in teaching art to middle school students based on the belief that art should be taught in conjunction with students' life experiences. Her recent advocacy of the theoretical paradigm of visual culture art education has both developed from and been influenced by her broad exposure to diverse

art education theories over time. Consequently, Sara's interests in art and art education manifest through her three-year middle school art curriculum development for her sixth to eighth-grade students. Thus, Sara embraces multicultural oriented art education in her sixth-grade class and incorporates contemporary art and traditional art making into her seventh-grade art curriculum. Likewise, in implementing a visual culture approach to art education, Sara uses technology as a means of empowerment that encourages her eighth-grade students to express themselves and communicate with others. These different curriculum themes represent both Sara's versatility in teaching and her beliefs about what students should learn about art in different grade levels. Therefore, although this study investigates only Sara's art and technology engagement with her eighth graders, an overview of her three-year art curriculum and its underlying philosophy is important to understanding Sara's view on students' visual literacy development. To illustrate how Sara's value system and corresponding curriculum approach have unfolded through her teaching practice, the following discussion of Sara's teaching beliefs articulates her insights both into her eighth-grade video documentary curriculum and her overarching K6-K8 art curriculum plan.

### *Teaching Beliefs*

Sara's teaching beliefs are organized around and elaborated through two categories: her choice of art medium and the goal of learning communication skills.

*Medium.* Sara's personal learning experience in art and her exposure to various art education paradigms have reinforced her belief that the importance of art lies on its connection with student ability for self-exploration and communication. As Sara pointed out, "I think each grade level kind of shows different aspects of how I think art is

important” (Sara 1, p. 3). Sara also used her K6–K8 art curriculum to explain her thoughts about teaching art:

Like for the sixth graders, they do a thing called “quiet time.” It’s very much about the focus. That’s why we do the tea ceremony, getting them to appreciate their surroundings, using their senses, and working cooperatively. Try to work as a group, and understand what it means to produce something as a team. That’s one component of the sixth-grade curriculum. The seventh grade [curriculum] is very skill based, and we talked about a lot of art. We do critiques every week, so it’s about being able to use art vocabularies to communicate and talk about art. And with the eighth graders, we focused heavily on communicating ideas. [The students] thought about their feelings or experiences that happened to them. The eighth grade’s [video documentary] project is about empowering their voices [and] uncovering ways they live or things they do in their lives. Through art, you know, they know themselves better. (Sara 1, p.3)

Sara’s sixth-grade curriculum introduces Japanese aesthetics to inspire students’ awareness of the sense of being; she teaches ceramic to her sixth graders as a means for cultural appreciation and understanding. The seventh-grade curriculum exposes students to drawing and painting as they learn visual composition and art knowledge. The eighth-grade video documentary curriculum then encourages the students to make cooperative issue-based videos of their interests. As all students in Washington Junior High School are required to take Sara’s visual art courses, her three-year art curriculum is developed and executed sequentially. Thus, Sara attempts to provide her students an interconnected art learning experience, teaching them to engage traditional and electronic art media for the purpose of self-exploration and visual communication. Because this long-term learning process enables Sara’s students to develop a basic understanding about art during the sixth and seventh grades, Sara reported that her students have nurtured the skill to express themselves visually so that she can shift the curriculum emphasis from expression to communication in her eighth-grade video project. For Sara, the significance of art lies on its associations with various dimensions of lived experience. Therefore,

each grade level of her art curriculum focuses on developing learners' different abilities, including cultural appreciation, expression, and communication.

Accordingly, after exposure to ceramic, drawing, and painting during the sixth and seventh grades, Sara's eighth graders are introduced to the video camera as the core medium for their art learning. Sara believes that the video camera is the best learning motivator because it matches young adolescents' major interests:

The eighth graders were into [making videos], and they were excited about using video cameras. And even like recently, [even when] the kids wouldn't do their writings, they [would] talk in front of the camera. So it's a really quick way of getting information, and the kids feel comfortable with technology. (Sara 1, p. 8)

More specifically, she has chosen this medium for her eighth-grade curriculum because multimedia provide an interactive channel through which her students feel it is fun to learn and have access:

There's something about how active it is in multimedia. I think it's important for kids to have access. A kid told me, "I think it's cool that we learn how to do movies. I didn't know movies can be made at home. It's free. Now, I can go home and make movies." It's something they have access to in their lives. They all have digital cameras on their phones. (Sara 4, p. 13)

Nonetheless, even though the students have easy access to innovative technological equipment, Sara believes that it is imperative to teach them technological applications. Seeing a student's excitement over amateur movies motivates Sara to teach art with electronic media because she believes that students should possess the skills to operate and make use of the technological equipment. Sara also asserted that the development of students' analytical views on media consumption connects with their ability for media creation: "You have to understand how to use [technology] in order to be able to understand the digital images you see today" (Sara 1, p. 1).



Above all, Sara considers video production provides a collaborative learning experience for young people to learn social and communication skills:

The video, I think, it's more dynamic, because at the same time the students are doing their projects, they're participating in other people's. So I feel like it builds a community for the classroom; they are learning from each other's topics. (Sara 4, p. 7)

Sara's notion of community is built on the students' familiarity with each other's work as they give interviews and critique the output of other groups. That is, in promoting the interactive quality of video production in art class, Sara has attempted to develop students' ability to cooperate with and participate in others group projects. At the same time, she has aimed to enhance students' realization that the group effort of making multimedia productions also rests on the individual strengths of every student in using the video camera to express themselves in ways with which they feel comfortable:

I think any kid could talk to the [video] camera. It's really a direct way to get kids to speak out. Like Jacob and Sam; they were shy; they didn't want to talk in front of the camera, but they could do the voice-over, or they could use the camera to interview other people. So, by talking to the camera or being the interviewer, you learn how to speak to people; it's communication. (Sara 4, p. 6)

Sara's observation illustrates that the audio-visual mode of communication provides her eighth grade students more choices of self-expression. Affirming that it is a challenging medium but one worth teaching, Sara also believes that the video camera is an "age-appropriate art medium" (Sara 4, p. 6) for eighth graders who want to be heard and recognized to voice their opinions. Indeed, according to Sara, the video camera as an art medium provides an avenue through which young people can learn about the skill of communication, an educational purpose that is described in more depth in the following section.

*Communication.* For Sara, teaching art means teaching young people how to express themselves and communicate with others. Therefore, whereas Sara's eighth-grade curriculum moves from hands-on art experience to engaging technology as a tool for visual communication, her K6 and K7 art curricula place greater emphasis on studio art making and multicultural art appreciation. In addition, because art is not a mandatory subject in high school, Sara views the eighth grade as possibly the last chance for some students to gain exposure to visual art. Accordingly, student communication skills take precedence in Sara's teaching of her eighth graders, because she considers it an essential lifelong skill that students should acquire through visual art:

In the school, we talk about peace education, or we're trying to make the world a better place; those are idealistic things, but just learning how people communicate can be a fundamental skill for everyone. I think learning how people communicate is important. If I'm talking with you about something and you disagree with me, it's not in my best interest to just tell you my side. I'm going to have to figure out where you're coming from in order to convince you, or I'm going to have to listen to you so I can understand your side. (Sara 4, p. 3)

Sara's deliberation stems from her observation that young adolescents may be proficient in expressing their opinions verbally but lacks the skill of listening to others. Sara believes that the investigations for a documentary can help young adolescents learn the significance of communication skills as they actually learn through their experiences interacting with and listening to their peers. Her fundamental goal for this video project is to teach her eighth graders to acknowledge that people hold different points of view and to appreciate these varying viewpoints:

[The students didn't] have to change their beliefs or opinions in their videos, but they had to listen [to others]. The more successful videos were the ones where they listened better and tried to represent what somebody else had to say. If they can acknowledge that people see things differently, then they're acknowledging that there's more than one way to see things. I think that's an important lesson in our lives. (Sara 4, p. 4)

As part of communication skills, this acknowledgement that people see things differently plays a significant role in Sara's teaching beliefs and practice, in which she views herself as a facilitator: "It's my responsibility to get [students] to see the other sides of opinion" (Sara 2, p. 13). Most particularly, Sara's insights into communicating through the video camera involve the ultimate purpose of developing students' sense of recognition for social competence. Thus, through a small learning community in the school setting, Sara is attempting to employ a collaborative learning opportunity in conjunction with video production so her students can simulate the experience of social interaction.

To achieve her goal, Sara devotes great effort to teaching and learning side by side with her students. In her classroom, she emphasizes the learning process more than the end result because she wants the students to document their learning curve and peer interaction. Therefore, she often introduces diverse video resources to broaden students' understanding, including critiques of both professional and student-made documentaries. She also encourages her students to reflect on their interview techniques and conversations by keeping an interview journal, asking them frequently, "What did you find out from this interviewee?" (Sara 4, p. 4). To make sure they investigate their topics from various angles, Sara watches student-made footage daily, reviewing student journals, offering suggestions, and talking to them individually or collectively.

Because Sara believes that communicative competence can be developed through the making of collaborative audio-visual artwork, the clarity and organization of the message is her primary criterion in assessing student video productions. However, time constraints and limited technological support also influence Sara's consideration of her eighth graders' communication skills: "Obviously, students are not going to compose

images that are visually pleasing because of our given [learning environment], but the priority for their videos is to communicate their ideas and be able to see different points of view” (Sara 2, p. 8).

Yet in clarifying her thoughts, she declared that she does not privilege communication for or exclude aesthetic considerations from her eighth grade art class. In fact, she aims to encourage her students to seek a balance in presenting and communicating their video contents. She exemplified her different learning focuses using her seventh- and eighth-grade curricula:

[In] seventh grade, we talk so much about skills, mostly art techniques, but the content is embedded as a part of artwork... When these kids go to eighth grade, they are supposed to use the techniques expressly because they have learned the basic art knowledge in sixth and seventh grades. The content is the major thing we talk about in eighth grade [art class], but the techniques are embedded in it. These kids care about their issues, but I think there are technical things that we do, talking about sequences and timing, fonts and colors, and organization of videos. [The content and techniques] have to go together in the students’ work. (Sara 4, p. 7)

As this observation shows, Sara’s views on developing student communication skills through art are sustained by their prior knowledge of art techniques and appreciation developed during the lower grade levels. For Sara, bringing the discussion of art vocabularies and knowledge into her eighth-grade video project is a reinforcement to ensure students’ understanding and improve the quality of the video productions. Because of this familiarity with her eighth graders’ prior knowledge about art, Sara can emphasize the cultivation of their communication skill as her primary learning objective.

Sara’s eighth-grade video documentary project must also be understood from the larger perspective of her three-year middle school art curriculum plan because her

advocacy of teaching art with electronic technologies is supported by the value she places on artistic expression skills:

I see the visual element as still important in today's technological society. When these kids leave my art classes, hopefully, they might be thinking about organization or technical aspects about things they see, thinking about how to make things stand out, emphasis, or contrast. (Sara 4, p. 8)

Thus, Sara's views on communicative skills emphasize both verbal interaction and visual presentation. Therefore, Sara encourages students to implement other art forms in their videos, including the drawing and animation taught them in earlier courses:

I don't want to take art out of my video class. [It] is one thing to be able to use video cameras, but there are some aesthetic students like to draw or work with the clay, and I don't want to take that away from them. (Sara 1, p.10)

Accordingly, although she embraces technology with art, the hands-on experience still plays a vital role in Sara's teaching with electronic media. She takes student preferences in art into account and uses these visual resources, including still photographs, moving images, and illustration, as the groundwork for her teaching of communication skills through video documentary production.

Overall, because of her beliefs about teaching art to her eighth graders, Sara strives to develop their communication skills, build their confidence, and expand their understanding of others. The following reflection illustrates what she believes her students should learn from this project:

I want the kids to feel like they have a voice. I want the kids to learn how to communicate in a kind of...more sophisticated way. I think it is important to push kids beyond their comfort limit sometimes. This project does that because they have to work with the equipment; they have to listen to their interviewees' opinions, they have to work together; they have to make decision about their films, they have to edit footage and music. (Sara 1, pp. 9-10)

As her comment illustrates, the project focus moves away from technical proficiency to the communication skills and respect for others that students learn in the process of making videos; that is, success in this project lies in both individual endeavor and the group members' teamwork. In addition, Sara's expectations of student learning outcome are complex: they involve multiple and interwoven levels of achievement. To more fully examine this complexity, the next section explains Sara's notion of visual literacy as it relates to her expectations of what her eighth grade students should learn.

### *Notion of Visual Literacy*

In this section, Sara's insights into visual literacy are illuminated through a description of her eighth grade video documentary project. In a broad sense, this discussion outlines Sara's deliberations on how and what eighth grade students should learn through her fusion of art and technology. When I asked for her opinion on what it means for students to be visually literate in the information age, Sara appeared sensitive to the term *visually literate* and denied any assumption that the students had previously been "visually illiterate" (Sara 4, p. 19):

I don't think it's a yes or no question: Are you visually literate or no? These kids at home, they know computers; they use search engines; they use digital cameras. They have experience with technology; they're not just starting from zero. Everybody has something already, and as a teacher, I build something more onto it. (Sara 4, p. 19)

As a teacher, Sara is also concerned about students' background knowledge so that she can adjust her teaching to enrich her students' abilities. Thus, for her, visual literacy development is situated in each student's individual learning context. That is, visual literacy is neither a yes-or-no nor a more-or-less measure of student achievement; rather,

it involves a process of developing students' rich learning experiences over time. Sara also considers visual literacy to be a meaning-making process:

I think visual literacy is something that's in flux all the time; it's not an end point. It's something that is constantly evolving, depending on who we interpret things with, how we're situated to do things, and how we tackle meaning on things we have experienced. There are all those layers. It's not just something that you have; it's how you use it to make meanings. (Sara 4, p. 15)

Sara's view on the process of visual literacy development includes three learning steps: doing, understanding, and making sense. More precisely, as she embraces experiential learning, Sara believes that learning by doing is the most efficient way for her students to approach technology.

Rather than being something people possess, for Sara visual literacy means that students can understand their visual learning experience at different levels and then make sense of that understanding to create multiple "layers of meaning" (Sara 3, p. 6) in their lives. Putting this idea into classroom practice, Sara wants her eighth grade students to question and reflect upon their learning experience:

I'm hoping that my class raises questions that make them start to think differently, not only in my classroom but everywhere. If they can start thinking differently in any given situation, then they are going to be able to teach themselves to become more visually literate, because they're going to be able to ask themselves questions and figure out the solutions. Same thing with the interviewing techniques; some kids practiced their [interview] questions over and over before going out to ask people. They know which interviews are the good ones, and why. Some kids said, "Oh, we didn't get any good information." They know, they know how their questions affected the answers, like, "I asked this question this way, and I got more information that way." (Sara 4, p. 18)

Sara has observed how some of her students, through such practical learning experiences, have developed greater awareness of the interrelation between questioning strategy and response received. For Sara, the sensitivity of inquiry leads students to re/construct meanings that make sense to them. This is also why Sara does not consider visual literacy

an absolute competence; rather, it is comprised of various degrees of understanding in young people's mind.

One common term that emerged regularly in our conversation about Sara's perspective on visual literacy was the concept *layers of meaning*, in which the word "meaning" is understood to have two denotations: the intertwined existing messages embedded in the images that people perceive everyday, and the significant messages that people create through their personal encounters with images. For Sara, this twofold intent is interconnected because understanding the layers within images helps students make sense of their own layers of meaning. Indeed, Sara's speculation about her students' use of search engines exemplifies her view of layering:

I think visual literacy in technology is being able to understand the layers. When kids are searching the Internet, are they able to access what they want to see? A lot of kids are searching on Google; they see these pictures that are obviously adapted on Photoshop, but do they have the ability to know that's been manipulated in Photoshop? Or do they ask questions about what they see? Do they think about how things are arranged? (Sara 1, p. 1)

Here, the layers of meaning within the images circulate through inquiry into the image's authenticity. According to Sara, young people are capable of searching information on the Internet, but the distinction is whether they have developed the critical lens to question what they see. Thus, she believes that her accountability as a teacher lies in developing students' thinking skills to deconstruct and then reconstruct layers of meaning. Consequently, wanting her students to question the images they experience in their lives, Sara's class always involves a huge amount of discussion on how images are manipulated and represented and can be interpreted from various perspectives. Viewing herself as a facilitator in these discussions, she feels responsibility to stimulate and enhance students' thinking processes.



In sum, Sara's view about visual literacy development for her eighth graders rests on her notion that it is a continuing process. That is, through the making of their visual productions, these eighth grade students can question images they make and perceive and thus construct multiple layers of personal meaning: "I'm hoping, in my class, [that the students] are going to be more sophisticated in a way that they can use those movie-making or interview techniques to communicate with others" (Sara 4, p. 16). In this case, the layers of meanings may develop through such tools as the use of the equipment and the action of interview. Although Sara believes that her eighth grade students may not all have similar video-making experience again in the future, the ways they collaborate, interact, and communicate with their peers develop layers of meaning that can be carried through into their lives. Sara believes that images associated with today's technology are much more complicated than in earlier epochs; she also considers that visual literacy should not be simplified as an instant indicator of student abilities. Rather, it should be seen as a holistic learning process in which student background and learning contexts must be taken into account.

### *The Classroom*

The two classroom vignettes provided in this section throw light on how Sara's eighth grade video project and underlying beliefs unfold in the classroom. The first scenario presents a segment of the classroom interaction between Sara and her eighth grade students, while the second describes the project critique at the end of the quarter.

#### *Classroom Vignette: Classroom Routines*

On one day of the classroom observations, Sara arrives at school as usual at around 7:30 AM and then sits in her office reviewing her lesson plan and student work

until the first hour begins at 8:20 AM. Except for a 30-minute lunch break, these 50 minutes are usually the only time she sits down. During the rest of the day, she walks around, teaching, importing video footage, talking to students, and fixing computers until 5:00 PM. Throughout the day, Sara seemingly dedicates a great deal of energy to her students, assisting them no matter whether it be class or break time. She spends a fair amount of time with her eighth graders, helping them brainstorm ideas and interview questions, preparing equipment, importing student footage, and writing comments constantly for each group.

The third hour class begins at 9:44 AM. Sara goes first to the sign-up sheet to make sure each group is taking turns using the computers and video cameras and then reviews some interview techniques and questions. However, instead of listening to Sara's announcement, the students, particularly the boys, wait impatiently, eager to work on their projects. After commenting briefly on each group's ongoing video, Sara then dismisses the students to work with their teammates independently. As the students work individually, Sara becomes busier as students all over the classroom wait patiently or impatiently to talk to her.

Student voices ring out from all directions: "Ms. P., the Internet is not working!" "Ms. P., I can't find our interview footage," and "Ms. P., the computer shut down again." The students seem involved, eager to resolve their problems and continue their work. Their questions address issues of equipment operation, idea formulation, and topic presentation, and they all want Sara's individual help. Sara resolves one student's technical problem while talking to another. Some students who do not get a chance to talk to Sara return to their seats to write their daily project reflection. Knowing there is not

enough time to talk to all the students during the 38-minute class period, Sara apologizes to them and asks them to come during the study hall session or after school when she can offer more individual attention. Even facing this tense classroom atmosphere, Sara keeps a smile on her face, maintaining rapport with her students.

Sara's students appear excited about working on their topics but frustrated when the equipment does not work properly. Because some young adolescents need immediate attention, they are upset at not receiving Sara's instant help. One of these is Jamie, who is working with Morgan on the topic of teen suicide for their video documentary project. Although these two joke around, they show enthusiasm about making their video. Among the bustling that pervades the noisy classroom, Jamie suddenly shouts from the small computer room at the rear, "Ms. P., the computer is freezing again." Visibly frustrated, he yells "I quit" in an angry, deliberate tone. His temper scares some of the students as they reported to me later that they know Jamie pays little attention to other subjects but is serious about this video project. Sara approaches Jamie immediately, fixing his computer and trying to soothe his anxiety. He seems to know that this is the fastest way to get Sara's attention. Seeing his problem resolved, Jamie smiles and continues to work on the music selection for his video.

Sara has little time to talk to Jamie because some other students are also waiting for her assistance. Seeing Sara finish helping Jamie, Nicole, holding out a note, asks, "Ms. P., can you find this song for us?" Sara nods as she exits the computer room. She carries post-it notes with her, writing down students' needs that she has been unable to resolve during the class, such as importing John's footage and finding Nicole's music; these are her tasks for tonight. Not wanting her students to be disappointed, she works at

home, approximately four days a week, to ensure that the students will receive what they need the next day.

Despite having 30 students in this class, Sara seems to manage the classroom well and keep everyone productive. She glances around the room regularly, making sure she is in control. Looking around the room again, Sara sees George and Sam chatting, holding their pencils but not writing their project proposal as they were assigned to do for the day. “George and Sam, are you guys working on your proposal?” she asks, approaching them. “This is boring; we know what we want to do, but we don’t know what to write,” replies George, handing his blank paper to Sara. Sara, knowing that both George and Sam are talkative but not interested in writing, asks, “So tell me what you want to do? What do you have in your video?” Both George and Sam are eager to talk; they talk almost at once, explaining their filming plan for their topic, school privilege.

Sara comes up with the idea of letting them to do a video proposal instead of the written one, saying, “Do you guys want to talk in front of the camera explaining your plan? But you need to be specific, telling us who you will be interviewing or what kind of footage you are going to film.” “Yes! Let’s do that,” exclaims Sam excitedly. With Sara’s permission, George and Sam take a video camera and tripod and start recording the visual-audio description of their plan in a corner. They keep joking around as they record, George talking while Sam takes charge of the recording. However, Sam has to rerecord several times because George is not satisfied with his performance. Therefore, George goes back to his desk to grab pencil and paper, realizing that having some written notes in hand would help him speak more fluently in front of the camera.

The bell rings; class is over. The students grab their books and rush to leave the room. During the four-minute recess, Sara continues working with some students who want a last chance to talk to her. Then the bell rings again for the fourth hour class, so Sara returns to the front of the classroom as another class begins.

*Classroom Vignette: Project Critique*

The video documentary project critique took place during the fourth hour class on the day following the film festival; Sara wanted the students to share their thoughts on their peer's work while their memories were still fresh. With over 20 student-made videos shown, the festival provided the students in both of Sara's eighth grade video classes the opportunity to watch each other's videos and share their achievements with their parents and community members.

"Just in time to give your praise," Sara raises her voice to start the class. "Your parents and I were talking about how great you are that you dealt with complex topics so well. We were talking about how impressive your video is," Sara notes excitedly. Seeing that her cheerful opening seemed to be grabbing the students' attention, she continues, "Here is what I need to see." She pauses and then enunciates clearly, "First of all, I am collecting your critique sheets from you and your parents. These are worth 10 points per piece. I know that not everybody was able to make it to the film festival, [so] make sure you take the sheet home with a DVD, so that you can watch your video with your parents." As Sara is speaking, some students are handing out the critique sheets, while others raise their hands to request a copy of their movie.

Adding one more reminder, Sara announces, "And the other thing as I was going through all of your folders, I really like the way that a lot of you did journals; a lot of you

kept your research information. I was amazed how much research each team put into it; you have done a lot work, more than what we saw in the videos. So get your folder organized if you have not done it; I am going to go over it one more time.” Three male students are visibly impatient, one swiveling in his chair while the other two start chatting.

“What are we doing today?” Tim asks, bending his head over his desk.

Pausing for a moment, Sara replies, “So here is what we are going to speculate on. Because some of you in here are writers, and some of you are talkers, so we are going to discuss some of your videos. Pick one or two videos that really grabbed your attention. Get some ideas on paper right now, and then we will talk about each video for five minutes. I want you to be specific. Talk about what made the video successful or what can be improved.” While talking, Sara walks around the room to hand out pencils to the students.

The students start writing quietly; Sara’s footsteps ring out clearly as she circles the room. Raising her head up from peering down at a student’s desk, she declares, “Be specific; I want you to write in sentences.” Meanwhile, some students seem to be speculating on what to write, while others are writing effortlessly.

Sara breaks the silence after 10 minutes, saying, “Let’s start with Adam and Kyle’s video.” Asking the students to stop writing, Sara then looks at Adam: “Adam, can you remind us what your video is about?”

Adam, a stocky boy, gives his teammate, Kyle, a nudge wanting Kyle to speak for their work. Kyle nudges him back, so Adam decides to speak up: “It’s about the training

of the basketball and gymnastics teams in our school, “Adam explains. “I’m a gymnast, and I wanted people to see how much effort we have put in to be gymnasts.”

“Any comment for this group?” asks Sara.

Patrick raises his hand, saying, “I felt it’s more interesting to watch the basketball part instead of the gymnastics.”

“Okay, so is there something about the way that they filmed it made the basketball more exciting than the gymnastics?” Sara follows up on Patrick’s response, prodding the students to think more deeply.

A girl’s voice from the back of the room pipes up, “ [Adam and Kyle] used different [angle shots], and the music made it more exciting.” It is Katie, who adds, “I meant the basketball part.”

Trying to summarize Katie’s idea, Sara prompts, “So the way that they used music for the basketball made it better, whereas they did not have music with gymnastics?” Several students, including Katie, nod their heads.

“Tim, do you know what we are talking about?” Sara focuses on Tim, who keeps chatting with his classmate even though he is sitting right in front of where Sara is standing.

“What?” Tim answers smilingly looking at Sara, who smiles back as she responds deliberately, “Gymnastics and basketball?”

“Right. Well, it was pretty cool how they throw the ball, swooshing to the net. You know, they are like the people in the movies doing those tricks, and that was pretty cool.” Tim does not feel embarrassed at being picked on, instead he answers Sara’s question right away.

Sara then asks for suggestions for this group, and Becky responds, "I felt it would have been better if they edited out a little bit more on the gymnastics; they repeated the action a lot."

"The repetition was meant to show the hard work of being a gymnast," explains Adam, defending his work.

Commenting on Adam's video, Sara summarizes the comments: "Okay, we have talked about where you are filming from. For the gymnastics, the interview on Adam in the beginning was nice; it gave us an introduction to this sport. Then we were watching him practice over and over; it tells us that you really have to practice hard in gymnastics. But as a video, it would have improved if they had some different shots, like some close-ups."

"Who wants to talk about their video? Any volunteers?" Sara asks, wanting to move on to the next group.

"Talk about ours," offers Morgan, jumping up and down in his chair. Jamie, Morgan's teammate, hearing him volunteer, stares Morgan down. Jamie punches his desk but smiles, seeming more shy than angry about sharing their video.

"All right, Morgan and Jamie, tell us about your video?" says Sara.

"It's about teen suicide," Morgan replies. "Jamie and I interviewed Mr. Jones [the science teacher], and we used pictures showing there're lots fun things to do." Morgan giggles as he explains the video; several boys laugh with him because they hardly ever see Morgan describing something serious. "The message is 'do not commit suicide'," Morgan concludes loudly (see Figure 19).



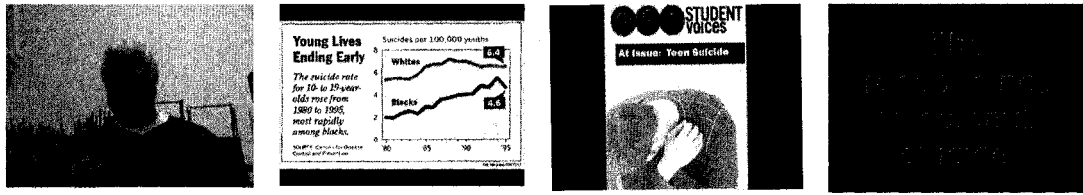


Figure 19. Footage of Jamie and Morgan's Video.

"Did you guys remember what Mr. Jones was saying in that video?" prompts Sara.

Looking up from her notes, Josie, a tall girl with glasses responds, "Mr. Jones said, 'think twice before you hurt yourself because you hurt your family and friends too.'"

"Excellent, very good," Sara looks again at Morgan, asking, "Morgan, tell us what you have learned from making this video?"

Taking a deep breath, Morgan notes, "I was surprised that there are quite a lot of teenagers thinking about committing suicide. I learned not to commit suicide, and I learned..." Morgan pauses and looks at Jamie, chuckling, "By doing this project, I feel I'm a better friend and more supportive with Jamie."

"In terms of what works well for their video, I think Jamie and Morgan's music choice was outstanding," Sara continues; "To make sure the songs you guys picked are appropriate to be played in the film festival, I started reading these songs' lyrics. Jamie and Morgan picked a song that went well with their topic. You know, their video is about teen suicide." As Sara gives her compliment, Morgan and Jamie are visibly nervous and titter. They do not seem to know how to react to the teacher's public praise, as they revealed me later that was a moment they have not commonly experienced.

“Let me review some of the lyrics,” Sara reads from her note, “Blank stares from broken men. /So withered from the poisons they can’t remember when. /There were once honest reasons..../Pretending I’m still here. /Justify what I’ve become, sanctify what I’ve become...” Putting down her note and looking at the class, Sara comments, “When you hear the lyrics, this idea of pretending that you are here but people ignore you, or justify[ing] yourself but people are not satisfied. Wow! Good work, guys!” Sara praises Jamie and Morgan again.

“Blank stares from broken men,” Sara repeats the lyrics, asking, “Who can describe it, like having a blank stare?”

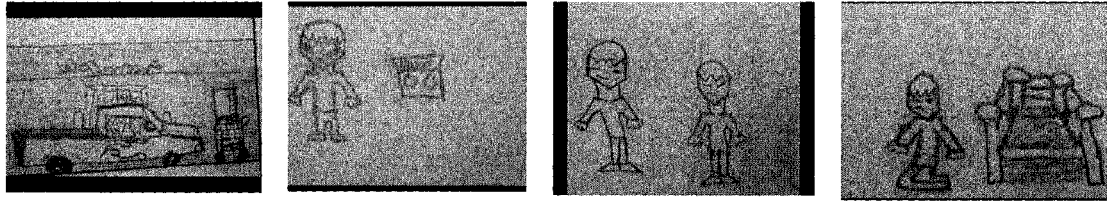
“Like you are looking through nothing,” Dave answers immediately.

“Yah, you are looking through nothing. I don’t know if you have had this kind of experience before: you are looking at somebody, walking somewhere, talking to someone, but you are not paying attention to where you are or who you talk to. It is a metaphor,” Sara explains as though touched by the message.

“You guys did a good job. You picked a song with lyrics that really spoke to your movie,” she says proudly to Jamie and Morgan.

Looking around the room, Sara sees Marvin sitting in the corner, quietly doodling on his notebook. “Marvin, let us talk about your video a bit. You know the country song, and you illustrated it? Tell us why did you choose drawing to make your video?”

Marvin looks up at Sara, his glasses seeming too big for his tiny face. He continues to doodle while answering in a soft voice, “I like to draw, and I wanted to work by myself. I don’t want to do issues for my video; I just want to use my drawings (see Figure 20).”



*Figure 20.* Footage of Marvin's Video.

"I really liked Marvin's video; I felt like I was watching a music video. His drawings went well with the music," says Erin, a short-haired girl wearing a football jersey.

"Yeah, my parents said they liked it very much," adds Sophie.

"Thanks," answers Marvin softly, looking up again.

"That is Rodney Atkins' song, Watching You. Marvin, your drawings were beautiful, and you did a good job matching the illustration and the rhythm of the music," says Sara and continues illustrating her comment; "Look at Marvin's video; you don't have to use a video camera to make a good movie. You can use your own artwork, clay, or photos; we talked about this in the beginning of this quarter."

Looking at her watch, Sara acknowledges that she can only discuss one more video before recess: "Are there other videos you would like to talk about?" she asks.

Four girls are whispering at one of the rear desks; Mia raises her hand, wanting to share what they were discussing: "I don't like Lauren's video," she complains. "It's not true that she said stepparents are better!"

Walking around the room to get the students' attention, Sara asks, "Who remembers that video? It's Lauren, Amber, and Billy's video from the third hour. Did everybody see it the same way as Mia?"

"No," some boys answered collectively but softly.

“Anyone get the message of this video?” adds Sara, pushing her question further.

“It’s about drug use effects,” answers Sophie.

“This video is about Lauren’s friend, about this girl’s memory of her father and the impact of drug use for her whole family,” says Sara, trying to explain Lauren’s video. Seeing a girl raise her hand, Sara prompts, “Go ahead, Jane, talk about the impact.”

Jane reads from her notes. “It’s a sad story; it made me think how drug use can affect more than one person. But I felt their interview was too long” she adds, shrugging her shoulders. “It’s hard to follow.”

“Yes, maybe they could have edited that down a little bit more. What was Lauren telling you in her video? What did you hear in that interview?” asks Sara.

No one answers Sara’s question; they either look at Sara or stare down at their desks. Sara breaks the silence, saying aloud, “It was [Lauren’s] friend’s dad who was a drug dealer, and he got shot when this friend was a baby.” Pausing a moment, Sara continues, “In the interview section of that video, you heard Lauren say, ‘What if that was my parents; what if my parents died when I was a 2-year-old?’ Think of if we were in her shoes. She had all this kind of stuff about her dad totally ditched them. And now she had a stepparent in her life; she was saying that this stepparent cares about her more than her real father, and she is so lucky to have him.” She paused again to gage the students’ reaction: they are listening quietly, so Sara finishes up by saying, “I think that was her general statement. Maybe what she said about the stepparents-are-better was a little extreme because it is not always true for everybody.”

Jumping into the conversation, Katie, one of the girls in Mia’s group, says, “Then [Lauren] should be more careful about the statement she made in the video.”

“Yes, I felt angry to hear she said that stepparents are better for you,” echoed Susan firmly. Mia and Katie nod their heads as Susan speaks.

Sara, sensing the girls’ resistance to Lauren’s video, tries to explain it further: “This video was more about a personal story, and [Lauren] spoke more from feelings than thinking.” The class retreats into silence, the girls staring at Sara. “See, Lauren’s video would be a good example. It really shows how important it is to present clear messages in the film. An unclear statement can affect how your audience views your video.” Several girls nod in agreement.

Using a more excited tone, Sara suggests, “Let’s talk about some good things about this video.”

“I thought it was pretty cool in the end to have the soft music and her family photos fading in and out. It’s a powerful way to show the influence of using drugs,” responds Hayden, a tall boy who wears braces.

“Very good observation,” comments Sara. The bell rings, so the students pack up their books and rush to leave the room.

### *The Students*

Since Sara’s video documentary project relies heavily on the students’ collaboration and their learning outcomes vary according to their chosen topics, I approach student response from a topic-driven angle, one that addresses student reflections on their learning experience together with their video content and video-making process. Thus, the report presents three different groups’ stories.

### *Justin and Keith*

Justin and Keith, both tall and thin, are good friends who hang out regularly outside of the school. Because of time availability, my interview with Justin was longer than that with Keith. Therefore, this report draws mainly from Justin's reflections. Justin and Keith made their video about the war on terror, primarily using a collection of still photographs from 9/11 and American soldiers in Iraq in conjunction with interviews of their classmates on the U.S.-led war on Iraq (see Figure 21). Part of the reason that they decided to work on this topic was Keith's personal connection; when they made the video, Keith's sister was in Iraq, so Keith had had a fair amount of exposure to this topic from his family. Reflecting on his choice of topic, Keith explained that he had chosen it

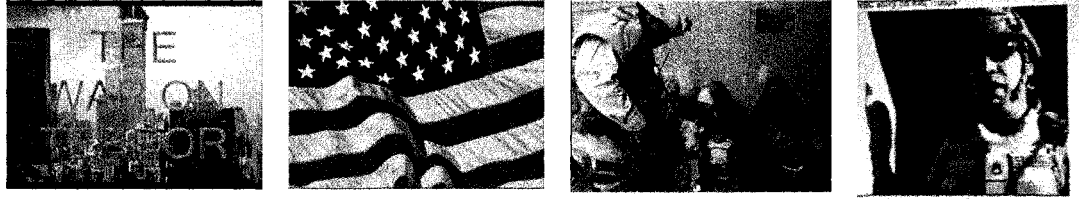
because it's a strong topic, and we both had really strong opinions about it, and we were relatively informed compared to a lot of the kids in the school. So we had the chance to give a lot of people the information. (Keith, p. 2)

Keith felt the obligation to raise awareness in the school by informing young people about the war on terror. Compared to Keith's rationale, Justin's reason was stronger and involved his moral values:

[Keith and I] heard a lot of negative stuff about the war on terror, and we were kind of bothered by that. Parents don't talk to their kids about it because it's kind of a complex subject. The news doesn't talk about it because it's such a controversial subject. I find it is wrong that [the media] don't show it because it's a very important topic for Americans, and I feel it's kind of a shame that we have stories about celebrities on the front pages of the important newspapers and the side note about the soldiers who died in Iraq. (Justin, p. 4)

Justin's frustration at the media motivated him to produce a video on a topic about which he is seriously concerned. Feeling that the issue of the war on terror should be openly discussed, he saw his video as something that could encourage the students in the school to open up a discussion. In executing their project, Keith and Justin were equally

involved: “We really like [this project] just because we are able to send the message out” (Justin, p. 2). By message, Justin reported that as citizens in a democratic society, young people in the United States should pay attention to the U.S.-led war in Iraq and consider how the war may affect people’s lives and the country.



*Figure 21.* Footage of Keith and Justin’s Video.

In fact, for Justin, constructing the message was the most difficult challenge in making this video. Even though he held a particular point of view on this topic, he tried as much as possible for an unbiased portrayal of the information: “We didn’t want it to turn into a patriotic video, and we didn’t want it to be propaganda for Bush” (Justin, p. 3). Thus, Justin seemed conscious about how the viewers might react to their video, and with this idea in mind, he sought solutions to delivering the message as neutrally as possible:

Because if we make it [the video] like propaganda, people would see it as propaganda and they would think this isn’t real. But we actually ended up with putting two pictures of President Bush; there were positive and negative images of him. We didn’t want people to think that we are making this video just to support him; we wanted them to know that this was about the war and supporting our country and not forgetting what we have here [in the United States]. (Justin, p. 4)

According to my own observations, compared with their peer’s work, Justin and Keith’s video emphatically addressed both the pros and cons of their chosen topic. In addition to using still images to signify the two stands of ant-war and pro-war, they also presented interview footage of their classmates’ opinions along with news footage from American soldiers in Iraq. It seems to me that Justin’s conscious portrayal of two points of view

was partly inspired by Sara's encouragement, as well as his sensitivity to a topic he cared about.

Referring to their video subject as a "strong and serious topic" (Justin, p. 1) that has impact on people, Justin showed care not only about the viewers' reaction but also its consequences:

In terms of a serious topic, if you don't do it right, you put up something really wrong, and if you don't show the correct views, then you end up with having people either upset or confused. Because it's something serious that shouldn't be joked about, and if you mess up and show it wrong, then you are giving people a false view of [a serious topic]. (Justin, p. 5)

Justin felt a responsibility not to misrepresent any information in their video. That is, not only was his attitude toward this project serious, but, knowing that an audience of 100 people might attend the film festival, he worked even harder with Keith to accomplish their work. As a result, the week before the festival, Justin and Keith stayed late continuously after school, during which time Justin did most of the video editing and Keith took care of the topic research.

As Justin pondered, "It was worth [it] to put in all those efforts because the video turned out well" (Justin, p. 7). He felt that making this video documentary was rewarding even if they had to undergo some frustration like failing to extract the news footage and accidental deletion of the interview footage by another group. Both Justin and Keith valued this learning experience, with Justin seeing art as an avenue for idea expression and Keith feeling he had gained more awareness of life issues by sharing his peer's work:

I think the real part of art is how we express ourselves. We chose a strong topic that really had some meaning to us, and art was the way here to express our opinions. The way we flowed music, words, and pictures really made everything work together for our movie. (Justin, p. 4)



It's interesting to watch so many different movies in the film festival. I think seeing and knowing all the movies about different issues, now I am more aware of the things around me instead of being sort of oblivious to what's going on. (Keith, p. 3)

In sum, Justin and Keith's issue-based video production was inspired by their personal interests. However, having chosen the war on terror as a topic, Justin did not try to take a particular stand (even though he had one); rather, he was aware of its political sensitivity and attempted to present the pros and cons in the video. For Justin, art provided an outlet to articulate his viewpoint on a topic with which he felt strongly connected. To demonstrate his ability to visually express his opinion, he incorporated the components of still images and video footage into his video.

#### *Lucy*

Lucy, Anna, and Kelly's video project, entitled "Cutting," discussed the cutting risk among teenagers. However, because Anna's and Kelly's time availability conflicted with my interview schedule, this section of student reflections is developed only from my interview with Lucy. "The message in our video is that cutting isn't probably the best choice for your problems, and we want to get people to stop cutting themselves" (Lucy, p. 1), explained Lucy, a well-spoken girl who conducted the interviews and did the voice-over for her group.

Their video began with Lucy's voice reading a poem by an anonymous student who had cut herself (Figure 22). Along with the narrative, illustrations of cutting were flowed in against soft background music. The video also contained several interview video clips from students who had experience with cutting. To protect their interviewees' privacy, Lucy and her teammates used a fair number of editing techniques to manipulate

the footage so that the audience would not recognize them. Describing the intent of using interviews in the video, Lucy said,

Yeah, in our video, we got pictures and sound and stuff, but sometimes people don't know exactly what cutting looks like. So we showed interviews that just had the voices, then even if you don't know what cutting looks like, but you can hear what [people who have cut themselves] think and how they feel. (Lucy, p. 4)

Thus, Lucy was conscious of her interchangeable use of images and sound and avoided showing terrifying images of cutting. Rather, she approached the video representation from an emotional standpoint by sharing the interviewees' stories and feeling.

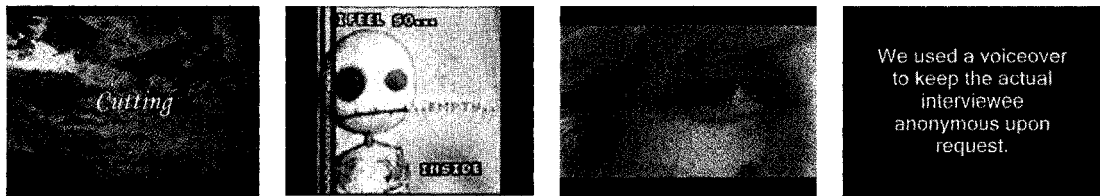


Figure 22. Footage of Lucy's Video.

Lucy seemed to have developed a personal interest in her working topic.

Producing the issue-based video made her deliberate on why people cut themselves and how she can help them:

I thought, well, an issue that might be a kind of boring but then I got into it. I really started thinking about all this cutting stuff and what makes people do it, what drives them to do it, and it just makes me think. (Lucy, p. 3)

Lucy's speculation reflects her engagement with the chosen topic for her group's video documentary project. Initially, Lucy chose this topic to show that some students in the school had cut themselves; however, as the project went along, she became more concerned about her friends who had cutting experience and sympathized with their situation. She modified the message as her thoughts on the topic shifted; that is, she

aimed to prevent people from cutting themselves, as well as encouraging people to understand this problem of cutting:

A lot people don't know much about cutting, especially the parents; they don't know sometimes their kids are cutting themselves. By watching this video, I think [parents] can try to help their kids and [make] them alert. (Lucy, p. 4)

As her comment suggests, Lucy would like parents to take action to help their children after watching her video. Apparently, Lucy's consideration of the audience reaction derived from her investigation of the topic and influenced the finished video.

Lucy had learned how to make a video as a seventh grader in Sara's after-school video club. Having had this prior experience, she therefore appeared more concerned about the cinematography of their video, applying various framing angles while operating the video camera and editing techniques while combining images and sound. Reflecting on her favorite part of this project, she said, "I actually really like it because it has to do with photography and filming, and that's what I want to do when I get older. So I think it's really interesting and fun" (Lucy, p. 1). Lucy viewed this video learning experience as a touchstone for her future career, an interest developed after she joined Sara's video club.

Lucy thought that piecing all the components together into a video was the most challenging part of this project:

Probably, putting it all together [is the most difficult task], because you have different resources for your topic, like pictures, music, research data, and interviews and so on, but you don't exactly know what the order should be and how you are going to put [it] together. (3)

This reflection resonates with Sara's teaching goal that the students must learn to visually communicate their ideas in this project. For Lucy, the message was clear but the challenge lay in how to get it across using the visual and audio elements. To deal with

this difficulty, Lucy and her group had intensive group meetings before and during the editing process. They brainstormed and shared ideas, narrowing down the footage needed and pondering ways to grab the audience's attention. Trial and error seemed the only way of determining how to compose the video.

Frequently, they watched their video and then rearranged or edited out footage. Sometimes, they looked up information on the Internet or asked advice from their friends with cutting experience. In fact, the first version of Lucy and her teammates' finished video was six minutes long, which exceeded Sara's five-minute limit. Feeling no need to shorten their video, they asked Sara whether they could keep it that long. Sara allowed them to keep the first long version but encouraged them to edit and save another more condensed version. The girls then listened to their interview segments over and over, and ended up with a new version of less than five minutes. Lucy acknowledged that editing out the unnecessary pauses and words from the interviews was one way to retain the video's overall organization but make it much shorter and more refined. The girls presented the shorter version during the film festival.

In short, Lucy's video on the topic of cutting encouraged her to express her sense of caring. Specifically, Lucy and her team attempted to raise parents' awareness that young people may cut themselves and to stop people from hurting themselves. As Lucy pointed out, the challenge of this project was the audio-visual presentation, how to convey the message by assembling all the components, such as images, sound, and research information. Working collaboratively with her teammates, Lucy overcame this challenge by going back and forth between the process of editing and reviewing the gathered information on their topic of cutting.

### *Kevin and Todd*

Kevin and Todd made their video on the topic of stunts because they liked to watch them on TV and even do them sometimes. Therefore, given the freedom to choose their own topic, they expressed great interest in this project, and both felt that making this video was a chance to alter people's negative impressions of stunts. Kevin, a sturdy boy with strong opinions about his classmates' topics, likes to express his thoughts honestly even knowing that other students would disagree with him. His classmates interviewed him on several topics because they knew his opinions might provide a different viewpoint for their films. His partner, Todd, is much quieter than Kevin and a little shy but always does his work neatly.

Before making their video on stunts, Kevin and Todd had a discussion with Sara to figure out the direction of their video. Initially, they simply wanted to show some stunt footage "because it's fun" (Kevin, p. 1). However, Sara convinced them to portray at least two viewpoints on how people think about stunts, encouraging them to shift the direction from entertaining to informative. They accepted Sara's idea because they felt that an informative video might be more persuasive and change the public's negative view of stunts. Explaining what their video was about, Kevin said, "My video is about stunts, and why people perform them, and how people think they're funny or stupid or don't care" (Kevin, p. 1). Todd added,

We had a point of view, and we kind of did both [positive and negative views]. A lot of people think that stunts are just stupid, but we're trying to prove that they are also funny, and that it's okay to do them sometimes. (Todd, p. 2)

As they described their video to me at the end of the quarter, instead of saying that "stunts are fun" (observation notes, p. 40) as they had in the early stage of the project,

Kevin and Todd emphasized the multiple perspectives they had garnered on stunts. They still retained their original viewpoint but had become more accepting of others' contrasting opinions.

Kevin and Todd's video had a fast rhythm and contained a rapid flow of still images of stunts performed to hard beat music. To produce some impressive shots, they had edited a collection of stunt footage from TV programs into their video. They had also included several interview clips showing their classmates' various opinions about stunts. Both enjoyed their finished work and watched it repeatedly: Kevin found it a pleasure that was hard to describe in words, while Todd was proud of his editing accomplishments.

In addition to being friends at school, Kevin and Todd developed a productive working partnership during the project. Assessing his teamwork with Todd, Kevin said, "Todd was the one who actually edited the stuff; I was sitting next to him all the time and giving him ideas. I brought movies from home, interviewed people, found music, and wrote journals" (Kevin, p. 4). Kevin also noted that he knew how to work with the editing program but liked throwing out ideas verbally rather than working hands-on on the computer. Todd asserted that he was more capable at working on the computer than interacting with people. He was glad to be in charge of editing. Like Lucy, Todd reflected that "figuring out where to put everything is difficult" (Todd, p. 2). Yet Todd actually enjoyed the challenge because he considered editing to be "a mind game like piecing puzzles" (Todd, p. 3). Kevin's verbal suggestions helped Todd think about the different ways of putting their video together, and their dissimilar personalities complemented

each other's needs and facilitated their exploration of the selected topic and the achievement of their project.

Besides both having to learn how to make their own video, Kevin also developed an understanding of the project's overarching goal: the definition of an issue. However, he was careful in using the term "issue" to describe their video, saying, "We didn't really do our video on an issue. We just did it on a topic. Like the abortion and the cutting stuff, that's an issue; we just did it on a topic" (Kevin, p. 5). Kevin also showed interest in comprehending other groups' work, as revealed by his active participation in regular class discussion on other groups' projects. Further distinguishing between topic and issue, Kevin explained,

Well, an issue would be a problem or a conflict, the controversial, whereas a topic is just like stunts. People usually don't comment about it and don't have [very] different points of view. It's [a topic that is] not really that controversial. (Kevin, p. 5)

Well, in the topic, you need a lot of footage, so you have to get the footage and put it together. You have to like doing editing on the computer. Whereas in the issue, you have to pay more attention to more people's points of views to get a general idea of what people think; you have to do more research for an issue. (Kevin, p. 6)

Kevin's view about this differentiation between topic and issue derived both from his video working experience and his observations about the work of his classmates. As his observation clearly shows, he considers his work driven by a topic and not an issue that involves more debate.

Although Kevin and Todd's video attempted to show different viewpoints on stunts, Kevin thought their topic not sensitive enough to be called an issue. At the same time, he was interviewed by several groups on so-called "controversial issues," including cutting, abortion, and drug use. On these, Kevin had strong opinions and was interested in

seeing how his interview clips were portrayed in those videos. He reported being impressed by how those issues were represented and became more open to listening and understanding other people's opinions.

Kevin and Todd enjoyed making their video about stunts because they could decide on their favorite interest. They worked cooperatively, each contributing unique strengths to the project. In this way, they came to recognize that different video portrayals might have different effects on viewers' perceptions of their topic. As a result, they took Sara's suggestion and presented positive and negative opinions on stunts rather than just showing their enthusiasm for them. Kevin, particularly, seemed observant, paying great attention to what was happening in the classroom. Indeed, his insight into the distinction between topic and issue derived from his observation of other students' working progress on the video project.

Overall, the students appeared to have been very involved in investigating their chosen topics. Although not overly concerned with technical issues, their reflections mostly addressed their deliberations on and representations of their video content. In addition, they demonstrated their individual strengths in working collaboratively, distributing the workload but still working simultaneously. Although their learning environment was not ideal for video production, they managed to take turns on the equipment and devote extra time to finish their projects. As they reflected upon this learning experience, the students felt it was unforgettable even though it involved great effort.

One similarity among these three groups of eighth grade students is they produced their videos by circling around their messages and considering their audience's reaction.



For example, Justin and Keith, focusing on the war on terror, asserted that it was an important issue about which young people in the United States should care. Likewise, Lucy attempted to send out a message that cutting is not an appropriate means of problem solving, so parents should be aware of this issue among teenagers. In contrast, Kevin and Todd wanted to change adults' and teenagers' negative impressions about stunts, so, keeping their targeted audiences in mind, they pondered methods and directions to convey their messages.

Most noticeably, this video learning experience extended from mere self-expression to communication in that the students began with their personal interest in particular topics and then aimed to communicate with others. These students had faith that their videos might inspire people to change their minds in some way, believing they could contribute to positive changes in their community. This faith became part of their learning motivation, and the film festival provided an avenue through which to broadcast their messages.

### *Epilogue*

Teaching art to middle school students means a lot to Sara because she developed her own confidence and interest in art at that age. Viewing this age range as a crucial period in life, she teaches the video documentary project to her eighth graders in order to cultivate their communication skills. Her primary pedagogical goal is to teach these students to appreciate other people's points of view, which she considers a vital life lesson for young adolescents. Even with a student-to-teacher ration of 30:1 and limited technological equipment and support, Sara insists on implementing this curriculum in her classroom. In doing so, she exhibits the determination to overcome obstacles to the

students' learning experience. Above all, Sara views this project as a channel through which the students can communicate with others on the topics of their interests and help create a mutual learning community in which the students must work together collaboratively.

In Sara's view, the notion of visual literacy is a process of meaning making, and not a distinct competence that can be substantiated. Specifically, she claimed that students create interconnected, multiple layers of meaning through and with their situated learning contexts. In the case reported here, Sara's students developed the skill to communicate their ideas visually through their exploration of unique topics in their video documentaries. That is, by understanding how images function in situated contexts, they developed the knowledge to implement the images needed to relay their messages. For Sara, being visually literate means being able to understand and make sense of the layers of meaning in the images perceived and in one's own personal experiences.

Sara's students, in turn, were highly engaged in this video project and enjoyed the freedom of working on their chosen topics while still working cooperatively with peers. The contents of the students' video productions were varied and included social issues, popular culture, and personal reflections. Several students reported the integration of all the audio-visual segments as the major challenge that demonstrated their strengths and endurance in teamwork, topic research, and editing. Although the minimally equipped learning environment caused some students technological frustration, in the end, they valued this learning experience because they developed a personal bond with their topics.

When executing their projects, the students were also concerned with audience reaction to their videos—the impact of their work on the viewers—and noted that both

the quality and the persuasiveness of the videos improved once various viewpoints were incorporated into the projects. In particular, these young people took the initiative to listen and understand other people's viewpoints, especially for counter opinions. For instance, Justin and Keith portrayed the pros and cons of the U.S.-led war in Iraq because they felt the need to present an equitable documentary. Likewise, in the stunt video, Kevin and Todd included opinions contrary to theirs as a way to shift the genre of their video from entertaining to informative. As Sara pointed out, this video documentary project pushes the students to listen to others and, from their own introspection, develop an understanding that people view things differently.

## CHAPTER 5: CROSS-CASE DISCUSSION

It is important to point out that new ways of thinking and framing my research questions have evolved over time during the development of this study. When the research began, I was motivated to explore teachers' practical perspective about the visual literacy notion, to review the rich scholarly literature on visual literacy discourse, and to address my concern about the impacts of changing development of electronic technologies in art education. At that time, it seemed important to investigate the initial research question of how art teachers engage the notion of visual literacy in their teaching practice with electronic technologies in order to understand how practicing teachers equip their students with visual literacy skills in the information age. However, once my fieldwork began, early findings raised a second question about the nature of the role of this visual literacy concept in these teachers' teachings and curricula. Thus, as this study unfolded, the research task changed from and became more significant than the original study intention. Hence, to present findings that both tie with and go beyond my research questions, this chapter describes the analysis and results framed in terms of my two research questions and design, but Chapter 6 presents the new additional themes and findings that unexpectedly emerged from my analysis and that now seem most relevant to the study contribution. Importantly, the discussion in this chapter provides the groundwork in which leads to the study conclusion itself.

This chapter examines both commonalities and differences of three art teacher cases through a cross-case analysis organized around five categories: (a) becoming technologically competent teachers, (b) teacher competencies in teaching visual literacy in the information age, (c) teachers' sociocultural orientation to visual literacy, (d) the

intersections of visual arts and technology education, and (e) concerns about teacher professional development. The first to the fifth categories, respectively, then discuss four commonalities identified through my analysis: these teachers' motivations to learn new technologies and their processes of becoming a technologically competent art teacher, their shared competencies in teaching visual literacy as it pertains to electronic technologies, their views reflecting a sociocultural orientation to visual literacy education, and their beliefs about the interdependence of old and new media in learning about art. This discussion also includes student responses related to these findings and issues. Finally, the last category addresses my concerns about teacher professional development that emerged during my field observations and subsequent analyses. Following these five categories of cross-case discussion is a summary of findings that draws from this subsequent analysis.

Prior to the discussion, I should explain a change to one of the original research questions based on my field observations of the disengagement between scholarly writings and theories about and teachers' actual practices related to the notion of visual literacy. The original question asked what it means, from these three teachers' perspectives, to be a visually literate person in the information age. In my attempt to answer this question, I discerned an important gap between theoretical writing found in academic publications and these teachers' practical discourse about the notion of visual literacy. That is, although these teachers reported continually hearing the term *visual literacy*, they themselves seldom use it. Liz considered it to be an academic term that she would not specifically engage in her teaching practice, Chris found the term vague and broad, and Sara thought that the term implied a misconception that students are visually

illiterate prior to entering her class. These teachers use the term *visual literacy* to mean the assembly of skills and practice related to what students should learn in their art and technology-integrated curricula, but importantly, they derive their conceptions about visual literacy from their own practical experience and not from scholarly texts.

Therefore, to gain a better understanding of these teachers' insights about how their notion of visual literacy is manifested through their teaching practice in art and technology integration, this particular question was reworded for my fieldwork and analysis, with *what does it mean to be a visually literate person* being replaced by *what should students learn?* This latter phrase, while still indicating a set of dispositions and skills, better reflects the nature of these teachers' thinking and is more akin to the kind of language these teachers used to describe their work. During my conversations with the teacher participants, I used the two phrases interchangeably.

In the discussion here, the connotation of visual literacy follows these teachers' interpretation, although I still use this term in the study and with these teachers, even though they themselves did not use it in their discussions with me about their conceptions of teaching. Such usage results from my intent to show the changing understandings of the visual literacy notion and to connect my initial interpretation of the notion with my latter discovery about these teachers' understanding of this construct.

### Becoming Technologically Competent Teachers

Because all three teachers each had to both adopt and learn new digital media and adapt these new technologies to their school environment, this section addresses two primary aspects of this experience: (a) the teachers' inspiration and motivation to learn technology, and (b) their adaptation to the school environment in terms of teaching art

with technology. It describes the three art teachers' speculations about why they have integrated technology into their practice, their sources of inspiration to become technologically competent, and how each teacher's school and community setting influences their process of technology adoption and implementation. Overall, these teachers' motivations to learn to use new media, as well as their desire to integrate new technologies into their praxis, is interwoven with and derives from multiple sources. These include their own personal learning experiences, their insights into the correlation between students' lives and living in a technological society, their concern with the potential of technology for pedagogy, and their determination to accommodate their school culture to meet their own teaching beliefs. The following discussion further examines these sources.

#### *Inspiration of and Motivation to Learning Technology*

Personal learning experience particularly—in various settings and with different people—has influenced these teachers' interest and ability to engage technology in the art classroom. For example, Liz's early encounter with technology drew mainly on her own desire to learn new things, and her observation about the importance of technological influences in society. In contrast, Chris was inspired and motivated by a school superintendent who envisioned building a technology-enabled school, while Sara was introduced to video camera as an art medium by her mentor teacher during student teaching. Although Chris and Sara's initial technology learning experience was passive compared to Liz's, they all took an active role in their follow-up learning, with Chris striving to introduce art through technology and Sara seeking to implement electronic media as a visual communication tool.

One commonality among these teachers is their limited access to formal technology training courses, even though Chris did receive specific advanced technological support from his administration. Likewise, these three teachers each learned how to use new equipment and media devices along with a variety of new software programs by studying online resources, by trial and error self-practice, and by familiarizing themselves with the applications through experimentation and implementation in the classroom. As Sara put it,

Was I an expert at computers? No, I learned from my job. I didn't know anything about video before. I learned by doing. Some questions I still can't answer. The fact that my Mac computer is still not hooked up to my printer [illustrates this fact]. (Sara 4, p. 33)

Apparently, teaching new electronic technologies constitutes a form of experiential learning in which the teachers can develop their own comfort levels with unfamiliar teaching materials. In other words, through the experience of teaching, these teachers seemingly have both mastered essential operations with the electronic media and have become competent in delivering technological learning content to their students.

In addition, these teachers' similarly reported high degrees of professional concern for students as learners. This student-driven motivation, which appears to be second nature to these teachers, has developed over time from each teacher's internalized experience of judging how students can benefit from learning about and through new technologies. Such internalization is similar to Kohl's (1984) notion of "teaching sensibility" (p. 57), that is, teacher consciousness of ways to enhance student learning, which is manifested through their teaching practice. Liz and Chris, who have more than 10 years of teaching experience, have engaged technology pedagogies without thinking about it as technology education *per se*, as Liz explained, "For me, technology with



teaching is almost a daily thing” (Liz, 2, p. 10). While Sara’s own profound art experience in her middle school year reminds her constantly to provide a similar experience to her students. Apparently, none of these three teachers had a definitive reason for engaging technology other than simply considering it “right for [their] students” (Sara 2, p. 13).

These teachers have integrated technology into their teaching practice for reasons that are diverse but certainly intertwined with their accumulated beliefs about teaching and learning. Specifically, their motivation to use and adopt technology-based learning stemmed from their observations about the impact of technology in a changing society and capabilities of emerging technologies to learning. For example, all three teachers based their insights about the skills that students must develop on their observations about the development of electronic and information technologies in contemporary life:

I think, in our society today, there’s so much information out there, and we have access to tons and tons of things. But the fact that anybody can put information out there requires us to think a little more critically about the source of that information. (Liz 2, p. 14)

[Students] are bombarded with all this visual stuff on the Internet and a lot of [things] are not well designed...Students need to know how to use technology as a medium to express themselves and be able to identify the quality and messages of images. (Chris 2, p. 12)

In my video class, we talked about the impacts of technology...By doing this video project, my kids are going to have a better understanding of what is possible in terms of manipulating audio and video. So kids should know sometimes what we believe and what we see aren’t the same. (Sara 1, pp.1–2)

Because of their concern with how to equip their students with the abilities needed in a media saturated society, these teachers were self-motivated to learn new and often complex technological applications and to integrate them into their art classrooms. In particular, they appeared concerned with student awareness of the changing ways of

making and viewing digital images and the influence of emerging electronic technologies. This focus had seemingly developed from their practical teaching experience and concerns about their students' needs.

*Adaptation to School Environment in Teaching Art with Technology*

In terms of technological support from the school administration, Liz and Sara shared similar isolation in their teaching. Because Liz's school district had decided on a PC-based technological environment, all the technical support and training workshops were PC oriented. As Liz pointed out, "I had to put up a fight for Mac in my district" (Liz 2, p. 15) in order to expose her students to the Macintosh system as an artistic tool that meets industry standards. This insistence on having Macintosh computers in Liz's classroom made maintenance and training necessarily self-contained. Of the two major personal computer operating systems, Microsoft Windows and Mac OS X, the art teachers in this study tend to favor the latter to provide quality teaching with image and video editing software programs. However, as Microsoft Windows is still the dominant system worldwide, these teachers' nonmainstream Mac preference leads to more issues of school budget, training, maintenance, and computer system compatibility, problems that these art teachers would rather not worry about in their teaching. Yet the reality for art teachers like Liz who insist on using the Macintosh system is that they cannot avoid the technical issues surrounding the teaching itself. Thus, over time, Liz has become technologically knowledgeable in software programs and hardware maintenance because her teaching environment is remote and self-sustaining, explaining that "I've just had to learn to be computer savvy so that I can try to fix things myself" (Liz 1, p. 23).

Likewise, Sara's school appreciated her hard work teaching digital video production, but could not provide her with substantial equipment or technology support. In fact, the school had recently purchased some new laptops, but "science teachers have the priority [of use] because [the laptops] came from their grant" (Sara 2, p. 20). To solve the problem of equipment shortage in teaching her video class, Sara asked students to bring their own video cameras to school, used her personal electronic equipment, and borrowed laptops and video cameras from a nearby university.

Apparently, both Liz's need for a nonmainstream computer system for teaching art with technology has been seen as unimportant and Sara's demand for technological equipment are being ignored by the administrators at their schools, which makes the challenges of utilizing technology in their classrooms particularly difficult. Specifically, these challenges go beyond professional knowledge to include negotiation with school administrators and the acquisition of technical expertise in both software and hardware. Liz's and Sara's extraordinary means of meeting these challenges may be evidence of the serious lack of workplace support for art teachers more generally, especially those who, like Liz and Sara, are capable and willing to engage new technologies.

In contrast to Liz and Sara's teaching isolation, Chris's art and technology integration has received much support in a school-wide, technology-enriched learning environment. In Lincoln High School, which has fewer than 200 students, the vision of technology integration into every school subject fans out from the school administration to teachers and students. Over the years, the superintendents and principals of Lincoln have strived to financially maintain the most up-to-date technology-learning environment; the teachers inspire each other to integrate technology into their subjects;

the students are aware of the teachers' extra efforts to provide learning with technology and recognize this learning environment as unique. Because of this school-wide commitment to technology, the faculty members are well supported in their accomplishment of the school's vision for technology.

Lincoln's commitment to learning with technology seemingly responds to some scholars' shared view of ecological system as a metaphor for learning technology in a social institution (Bruce, 2008; Narid & O'Day, 1999; Zhao and Frank, 2003), in which the key to successful technology implementations is the interrelated cooperation between all roles in the setting. Specifically, Lincoln's case shows that a supportive learning environment (ecosystem) can sustain the network and relationships between its learners and teachers (species) and elicit the best teaching qualities in a well-equipped classroom (habitat). Not surprisingly, the members of this learning community in Lincoln, including teachers and students, reveal active engagement with technology in response to the cohesion of a well-functioning learning environment.

As regards facilities, Chris's school has separate computer labs for Microsoft Windows and Mac OS X operating systems, with a full selection of educational software. In addition, the school continually purchases copyrighted stock images and videos, which provide rich learning resources for Chris's classes. As a result, even though Chris is as overworked as Liz and Sara in his technology engagement, he seems much more fulfilled in his alliance with colleagues to carry out the school-wide technology commitment. In fact, Chris shares some of the technology support staff's work because they are also burdened with multiple tasks that include substitute teaching and technology maintenance.

Obviously, such work revealed among these three teachers is common for dedicated teachers, but the difference lies in its consequences; whereas fulfillment from working conditions motivates teacher dedication, frustration with it diminishes teacher vitality. In Chris's case, he was able to focus on teaching without the concerns faced by Liz and Sara about school budget and technical support. As a result, despite being overworked, Chris expressed to me much less frustration with his professional life than do the other two teachers.

In sum, derived from their observations about the impact of technology in a rapidly changing society, these teachers' beliefs about student needs seem to support their strengths in bringing their students the best qualities of teaching and learning. Because becoming a technologically competent art teacher has been far from an effortless path, all three teachers exhibit the persistence needed to learn new technologies and adapt them to their given school environment. For example, Liz reported feeling isolated by having to teach with a Mac operating system in her PC-based district, while Sara has had to borrow equipment from her university. Chris, understanding only too well the time-consuming process of learning technology alone, has developed technology workshops for his colleagues. Although not initially technology experts, all three teachers have devoted a fair amount of personal time to their technology learning and adoption processes despite being generally busy in other aspects of their work. All three teachers have demonstrated determination in overcoming obstacles to technology learning processes and integration into their constrained environments, a strength elicited by both their personal characteristics and their dedication to their students and professions.

## Teacher Competencies of Teaching Visual Literacy in the Information Age

This section, which attempts to articulate some of the teaching qualities shared among all three teachers, identifies the components that contribute to their successful achievements in teaching art with technology to develop their students' visual literacy skills. However, this discussion does not intend to provide an exemplary teaching model or generalized guidelines for developing visual literacy skills in the information age. Rather, it serves to increase understanding of three technologically competent teachers' abilities to engage visual arts and electronic technologies and examines how these teachers' beliefs about teaching art with technology are revealed through their instructional strategies and practices.

As Leu et al. (2004) observed, as emerging technologies invoke new literacies, the role of teacher, although changing, remains significant because teachers must be capable of coordinating learners' learning experience within the rich digital environment in which they reside. Based on this observation, Leu and his colleagues suggested that teachers must be "(a) aware of emerging technologies for information and communication, (b) capable of identifying the most important new literacies that each requires, and (c) proficient in knowing how to support their development in the classroom" (Leu et al, 2004, p. 1599). According to my observation and analysis, these professional capabilities were manifest in the teachers that participated in this study. For example, all pay attention to the emerging technology of students' interests and work with their students to develop their technological knowledge, although Sara is more aware of developing students' varying forms of literacy skills in her teaching, while Chris is knowledgeable about solving students' technological problems. Building on Leu and

his colleagues' teacher requirements in teaching technology in the information age, I identified three teaching qualities shared among these three teachers in guiding the following discussion. Specifically, all three teachers are able to facilitate students' creative and critical inquiry, all can identify specific visual literacy skills for their student groups, and all are proficient in teaching technology effectively.

### *Facilitating Creative and Critical Inquiries*

The three teachers in my study are not only aware of the emerging development of electronic technologies but they also provide crucial insights in response to this development. In particular, they attempt to develop students' critical awareness about the digital images they consume and make their students more aware of the importance of the art-making experience in the information age. According to Dewey's (1938) observation, knowledge is derived from the processes of continuous inquiry into experience. All three teachers stated that they value experiential learning, believing that students learn best by reflecting on their experiences. They seemingly reflect Dewey's view, attempting to provide their students with broad exposure to art media and encouraging them to express their understanding to and relationship with the world.

These teachers have observed that while making art with electronic media and revealing the visual effects of their work onscreen, the students experience more instant reactions that are less constrained by time and space. As Sara observed, "the video camera is a fast way to get a tons of information. Kids can see their footage right away from the view screen; they can reshoot again immediately if they don't like it" (Sara 2, p. 3). As electronic media expand the potential for students to experience the immediate trial and error of technological effects, these teachers are able to focus on the students'

ability to inquire into their learning processes. For example, Liz allows her students time to experiment with digital visual effect filters in Photoshop but asks them to justify the decisions they make and ask questions about the quality of the resulting digital images. She believes that her “[students] have to think about the rationalization behind all of the steps that they do” (Liz 1, p. 4) and will “learn to be more aware of what you can do with Photoshop” (Liz 1, p. 4). Therefore, she asks “how that might impact them on a daily basis, like looking at something they’d come across on the Internet” (Liz 1, p. 14). All these teachers are interested in asking their students questions that lead students into a critical analysis of and reflection about the images they are consuming and producing, such as the following: “Is it possible that this image you picked wasn’t a real image, but rather something that was crafted, and assimilated? (Liz 2, p. 14)”; “Can you identify which images are manipulated and which are not? How it is done? What is altered? Can you look critically at something?” (Chris 2, p. 13); “Do you ask questions about what you see? Do you think about how things are arranged?” (Sara 1, p.1). In asking these questions, these teachers are emphasizing an analytical aspect of reflection, in addition to an expressive aspect, while promoting the construction of student knowledge and skills directly through fingertip exploration and experimentation with electronic media in relation to their lived experience.

In addition, all three teachers connect art making with technology as a means of developing students’ critical lenses for media consumption. In our conversations, they consistently pointed out that being able to question the authenticity of digital images requires an understanding of how images are manipulated. For example, Sara claimed that “to be able to understand what you see, you have to understand how digital images



are made” (Sara 1, p.1). Likewise, Chris asserted that “students need to gain better understanding of how easy it is to manipulate [digital] images” (Chris 2, p. 12), while Liz explained her belief “that having students exposed to digital image making process helps them to question the authenticity of things, like information or images” (Liz 2, p. 14). More important, these teachers believe that student ability to question, reflect, analyze, and assess media text, such as Web pages, magazines, and video clips, develops from their practice of creative media production. This teaching emphasis on the *process* of digital art making, which reflects Dewey’s (1934) assertion that art lies in the nature of its practice, derives from these teachers’ studio backgrounds and commitment to studio practice in their art programs. For these teachers, digital media is an art-making medium that differs little from traditional art media in that this art experience serves as an avenue through which their students can articulate ideas, feel about the world, communicate with others, and express issues that matter.

#### *Identifying Situated Visual Literacy Skills*

My observations across these three cases suggest that in teaching art with technology, all three teachers are seemingly well-informed about the unique student learning backgrounds, histories, and environments in their schools, and they attempt to teach specific skills for their distinctive student groups.

In Liz’s case, the students in the class that I observed form a group of art enthusiasts who have taken two to three visual arts classes with her, and they are mostly identified within the school as “arty students.” Compared with the students from the other two cases, some of Liz’s students seem to have a better realization about their own personal attachment to art. This view may stem from their artistic development over time

through traditional hands-on art activities in Liz's prior art courses. In fact, as described in the chapter of case reports, some of Liz's students appear more interested in making art with conventional art media than with electronic media, and they point to the physical pleasure that working with electronic media may not provide. For Liz, "the computer is another artistic tool for creating art" (Liz 1, p. 25). Therefore, she wants this "arty" group of students to develop an awareness of technology's potentials and limitations and to contemplate the correlation between choice of medium and artistic intent:

Having the ability to look at what [digital images] mean, to think about some of the intentions behind them, and to question some of the sources, I think, becomes a really good life skill in this technology age, where we're just inundated with images and information. (Liz 2, p. 3)

It's important to understand how to use technology, and what applications work best for your intention. But there are times when a hands-on art lesson is going to be necessary. I think a lot of people really like the hands-on; you feel more connected to it. (Liz 2, p. 14)

Liz's allegiance to making art through traditional art media may be responsible for her students' interests in hands-on artistic expression; that is, she tries to convey to her students the notion that electronic media are only one of many artistic tools. Additionally, because this group of students had been previously (and periodically) exposed to visual arts education with more traditional studio media, their awareness of technology uses that Liz aims to foster builds on their prior knowledge of working with traditional art media.

The students with the least formal school art learning experience are those in Chris's multimedia class. There is no prerequisite for Chris's multimedia class, which also draws the highest enrollment of all Chris's courses. Being aware of his multimedia class's popularity with a student population having limited formal art learning backgrounds, Chris has identified a substantial number of incoming students as

technically capable of working with electronic media but lacking the artistic ability to present clear ideas visually. Thus, in this class, one part of Chris's teaching objective is to use technology to spark students' interest in art and help them learn about art through technology. As Chris observed, "When everyone is being able to do something with Photoshop or easily making a blog today, the one who has the artistic sensibility will make his work stand out more" (Chris 2, p. 15). In Chris's case, although technology plays a major component in his class, what he strives for is to cultivate his students' artistic sensibility through their interests in new media, which he considers an imperative ability in the technology-saturated world.

Of these three teachers, Sara is the only one who teaches a mandatory art course, in which the youngest (eighth graders) and largest (25–30 students per class) group of students receives the shortest period of art instruction (on the quarter system). Therefore, her priority in the eighth-grade art curriculum for these students who have been learning art from her since the sixth grade is that they develop communication skills. Sara believes that teaching communication skills through video production is "age appropriate" (Sara 4, p. 9) for her eighth-grade students because

for these [eighth graders], it's a kind of rough age, where they are old enough to talk maturely about things [that] are going [on] in their lives, but they also are not old enough to ... change ideas or realize people's points of view. This video project is not just about me or what I think, it's about recognizing all other viewpoints out there, trying to broaden the scope of what we see. (Sara 1, p. 10)

Sara's curriculum decisions and design draw from her experience with young adolescents and aim to cultivate students' self-esteem, self-understanding, and social skills through art. As revealed several times during our conversations, Sara wants her eighth graders "to understand different points of view" (Sara 1, p. 11; Sara 2, p. 8; Sara 4, p. 1) through the

process of making videos. She also explained, “I want them to at least try and consider what other people see” (Sara 4, pp.1-2). In particular, her goal of communication skill development, both verbal and visual, focuses on her eighth graders’ abilities to recognize, understand, and appreciate the diverse opinions that people possess. Believing that this ability can be taught through art, Sara considers it an important skill for her students to acquire before leaving junior high school.

Overall, even though these three teachers do not actively employ the type of discourse about visual literacy found in the academic literature, the types of abilities and attitudes they are concerned about may actually contribute directly or indirectly to student development of visual literacy as it is posited in the scholarly literature. Moreover, these teachers’ objectives have significant connections with and implications for those scholars and policy makers concerned with the development of visual literacy in a technology-saturated society. Liz’s case serves as a reminder to teachers not to get lost in the advocacy of learning through technology and keep in mind that students need to develop the ability to judge the value and function of technology. Likewise, Chris’s case reminds that school administrators and educators must pay attention to the pros and cons of the increasing emphasis on technology education and the decreasing learning opportunities for traditional art education in the school system. Finally, Sara’s case illustrates the potential and power of visual communication in developing the skills needed in a technological society.

#### *Teaching Technology Effectively*

Based on my observations, even though each teacher in my study exhibited a unique personality and teaching style, their teaching practices reveal a use of three similar

instructional strategies that contribute to the quality and effectiveness of teaching art with technology. First, all three teachers embrace a sequential learning process and conduct small technique-oriented projects prior to the more content-involved major projects. They break their large projects into small components so that learners can sequentially develop their working knowledge. For example, Liz uses a grid project that allows students to experiment with the Photoshop filters and techniques before moving on to the digital photography self-portrait. To familiarize students with each new software program, Chris usually spends one class session (90 minutes) working on technique exercises, such as making a 3D snowman and manipulating a commercial video: “Through the electronic media, I like to teach the tools first, get some basics, and then I go on with the project itself and encourage [the students] to express their ideas through these tools” (Chris 1, p. 18). Likewise, Sara uses short film clips from popular movies in which students can practice their editing skills of visual and audio combination and manipulation.

With regards to these teachers’ beliefs about the value of these mini-projects, Chris pointed out that these exercises provided to students mechanical practice with new software programs, while Liz and Sara considered them a learning transition in which students could learn what electronic media could do for them. All three seemingly view the technical learning process as preparatory groundwork for students to articulate and communicate their artist intents. Once these teachers move on to their major content-focused projects, they only revisit technological skills briefly in discussing the sophistication of students’ visual productions.

Second, as students’ visual productions turn from a traditional art material format to a digital format, these teachers also change their ways of presenting student work. For

instance, Liz organizes a student digital portfolio show at a commercial theater; Chris displays students' computer graphics through an online art gallery and showcases students' video productions through a videoconference with a professional filmmaker, and Sara holds a film festival of student documentaries in the local community. Thus, instead of using conventional artwork exhibitions, these teachers engage settings with real time interaction in which students can gain immediate feedback from their audience. In doing so, they encourage students to practice dialogic skills and learn to communicate their thoughts, abilities that Goodman (2005) argued have been ignored by the school system. Through their overt extra efforts to provide opportunities for students to showcase and discuss their digital media productions, the teachers create an environment that simulates for students the experience and pleasure of watching their own video productions as professionally made films.

Third, all three teachers seem to emphasize a writing component in their art and technology integrated projects, both to boost students' ability in composition and to assess their learning results. All three teachers require student written self-evaluations at the end of each project, asking students to reflect on their achievements. Chris and Sara's video projects, specifically, involve more extensive writing on project organization, including proposal planning, script writing, and storyboarding, and Sara asks her students to keep daily journals about their project progress and peer collaboration.

In sum, other than utilizing slightly differing strategies for presenting final student works in unusual settings, all three teachers are alike in applying a sequential learning process and engaging student thought processes and reflection in writing. The choice of specific digital media does not apparently much affect their teaching styles. However,

their instructional strategies in teaching with technology do influence their students' learning outcomes in that the students reported that their teachers made the software programs and equipment easy to learn, encouraged them to share their work with a large audience, and made them realize the correlation between verbal and visual communication.

### Sociocultural Orientation to Visual Literacy

The teachers in this study apparently approach their students' visual literacy development from a sociocultural perspective in their teaching art with technology. They encourage their students to examine contextual social and cultural messages embedded in images, to investigate sociocultural issues within students' lived experience, and to tie their learning experience with their personal development and career preparation. Here, a sociocultural orientation to visual literacy refers to these teachers' beliefs about what students should learn through a form of social practice that prepares them to connect themselves with the world and be responsible citizens. To explain this orientation, the following discussion first articulates these three teachers' identification of sociocultural issues in relation to a social reconstructionist approach to art education and then presents their insights on developing students' life skills through learning art with technology.

#### *Teacher Identification of Sociocultural Issues*

These teachers' notions of visual literacy in relation to electronic technologies seemingly emphasize student understanding of the social and cultural aspects of images. Based on my observations, these teachers attempt to develop student skills in understanding, interpreting, and analyzing both the contents and the surrounding contexts of images, and try to bring in students' popular, school, and community cultural

experiences to help them understand and construct the meanings of the images they encounter. Thus, each teachers' teaching activities reflect various degrees of social and cultural considerations; in particular, engaging with the social issues that interest students, encouraging students to develop awareness of sociocultural problems in their lives and to explore the cultural and social domains of their identity, and using electronic media as an artistic tool for making social statements.

For example, Liz wants her students go into their local communities and use digital cameras to portray stories about their community members, whereas Chris incorporates service learning into his computer graphics class, asking students to pitch their ideas to simulated clients, the local fire, and police departments to publicize public safety. Likewise, Liz and Chris conduct a digital photography and a video project, respectively, to explore identity through the making of self-portraits:

I'm always really interested in high school self-portraits. I think it's a great way to see what's going on in [high school students'] brains, like what's their concepts of themselves...So, [the project of digital self-portrait] forces them to think about their values, cultures, and things they care about. It's not only about self-expression; they learn to be aware of the connotations of images. It is an exercise in getting them to think about the codes and symbols that go into their visual experiences. (Liz 2, p. 5)

We do a lot of projects where [students] are exploring themselves about where they are right now and their identities. We have done a music video self-portrait project [in which] they've learned to express themselves visually [and] make conscious decisions on their choices of music, images, and particular aspects of themselves. (Chris 1, p. 13)

In addition, Chris and Sara employ a Public Service Announcement (PSA) video and video documentary projects, respectively, that encourage students to actively investigate social or community issues that concern them. Chris' students investigate issues such as teen pregnancy, teen drunk driving, teen suicide, pet adoption, and the growing numbers



of landfills in their community, whereas Sara's eighth graders research topics like racism and bullying in school, teen suicide, animal abuse, cutting, and war on terror. The results of these explorations are then broadcast through a school Web site, videoconference, or film festival. Chris and Sara reported that they believe that the interactive feature of electronic media provides students a rapid channel through which to communicate with others on the issues that interest and concern them. All three teachers also indicated that making art through electronic media is a powerful means to address the social and cultural issues that are relevant to students' lives.

As a result, as confirmed by my observations of their classroom activities and my interviews with them, in their art teaching practices, these teachers, like many art education scholars (Chapman, 1978; Delacruz, 1995, 2005; Efland, Freedman, & Stuhr, 1996; Feldman, 1970; May, 1994; Lanier, 1969), believe that addressing sociocultural issues is important to nurturing socially responsible citizens. Hence, in their engagement with art and technology, these teachers embrace a thematic approach to contemporary sociocultural issues, which is a fundamental aspect of embracing a curriculum conception aligned with social reconstruction. Such an approach to art education, which draws from critical social theory, aims at "developing critical conscious among children and youth so that they will become aware of the kinds of ills the society had and become motivated to learn how to alleviate them" (Eisner, 1985, pp. 75-76), and embraces a belief that "art education can make a difference in student understanding of and action in the world and that difference can enrich and improve social life" (Freedman, 2000, p. 314).

I also observed that these teachers' identifications of sociocultural issues in their teachings were not so much about questioning the underlying power relations embedded

in such issues as suggested in the academic literature. These teachers' curricular implementations have much to do with generating interests in social concerns but little with the practice of critical pedagogy<sup>11</sup>, which aims to help students "understand their personal stake in struggling for a future in which social justice and political integrity become the defining principles of their lives" (Giroux, 1996, p. 21). That is to say that, other than creating productions that consider issues of equitable social justice, these teachers do not engage students in directly confrontational or challenging issues. Nor do they appear to be involving students in a systematic analysis of the underlying considerations of social inequities as suggested in the scholarly writings.

Yet, even though in their pedagogical practice these teachers seemingly have not directly engaged social issues critically, my observations did indicate that their teaching practice has shifted away from simply developing student ability for personal artistic expression in service of self-fulfillment to take an analytical stance that provokes student attention to and awareness of the sociocultural issues they find interesting. By incorporating sociocultural issues into their teaching, these teachers seemingly encourage their students to explore their own strengths and identity, acknowledge the social and cultural connotations embedded in images, examine the complexity of sociocultural issues in their daily existence, question the power of images regarding the proliferation and pervasiveness of digital images, and take actions to broadcast their statements on the sociocultural issues with which they are concerned. Moreover, even though when teaching art with technology, these teachers' engagement of sociocultural issues is not as

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<sup>11</sup> This focus conforms to the belief of many advocates of a social reconstructionist approach to art education that art can be an educational force that develops students' participatory citizenship (Darts, 2004) and awareness of social justice (Garber, 2004b), encourages dialogues about social equality (Delacruz, 1995, 1996), and promotes "democratic public spheres and ethical imperatives" (Tavin, 2003, p. 210).

socially active as scholarly writings suggest it should be, their conceptualization of visual literacy still appears to embrace a sociocultural stand that strives to develop students' personal and social responsibility through their visual learning experience.

*Teacher View on Developing Students' Life Skills*

All three teachers aim to connect with students' lives in their belief that art helps students foster the skills needed to face and manage contemporary life problems. Teaching art with technology reinforces this aim because these teachers are aware of the influences of emerging electronic technology on students' daily lives. For these teachers, developing students' visual literacy skills seemingly equates with cultivating a unified experience of life practices; that is, technology and art learning makes sense when it is connected to learners' public and personal lived experience. As a result, these teachers' articulation of what students should learn does not focus merely on the content and context of imagery but also on how students' encounters with images as a unified learning experience can spark connections with their lives. Rather than distinguishing and categorizing students' literacy skills according to communicative modes (e.g., visual or aural modes) or ability types (e.g., computer or media analysis skills), as is the case in some scholarly discourse about visual literacy, these teachers view the needed competencies holistically as integrated lifelong skills. As Liz explained, "I want to make the projects, the learning, relevant to the students' lives so that they can see some sort of connections" (Liz 1, p. 4), a sentiment with which Chris and Sara agreed:

I don't want to just teach the tools and programs; it's very dry. I want [my students] to be able to make connections with their lives through learning technology from art; to develop a sense of appreciation to art and their lives. (Chris 1, p. 18)

I'm hoping that my class raises questions that make my students start to think differently, not only in my classroom but everywhere. If they can start thinking differently everywhere, then they are going to be able to ask questions about their lives. (Sara 4, p. 28)

In addition, both Liz and Chris privilege visual thinking in student cognitive development and focus their teaching on developing student skills of problem solving, decision making, and creative thinking. Specifically, Liz encourages her students to transform their visual thinking abilities from resolving what Arnheim (1980) called the "perceptual problems" (p. 492) revealed in their art making to solving problems in their lives. As Liz put it, "Hopefully when [my students] get out of my classroom, when they do something in their lives, they are able to connect with their art experience, or to the attitude or process they learned from art" (Liz 2, p. 4). Liz also pays attention to developing students' decision-making skills, manifested through class critiques that focus on the students' articulation of artist intent. Likewise, in my interviews, Chris asserted that the problem-solving skill is not privileged to art but rather art's significance is the visual thinking process evoked from solving perceptual problems, which may inspire student abilities in the creative thinking and decision making that he considers to be imperative competencies for any career preparation. As Chris explained,

I told my students if you have a problem in a business and you need a solution to it. You may try to come up several original ideas and possibilities to solve that problem. Just like what we do in the art class. I think taking students through this process of visual thinking helps them. (Chris 2, p. 7)

Sara, like Liz and Chris, embraces problem solving and decision making but approaches these skills from the perspective of young people's need to develop communication skills. For Sara, when a project has a communicative purpose, the students are excited

and motivated to think more deeply about their work, seek for solutions, and make decisions.

In short, these teachers' notions of visual literacy are not limited to the understanding of images: many of their teaching practices engage a thematic approach to sociocultural issues and embrace learning resources "from a variety of disciplines from both within and beyond the visual arts" (Delacruz & Dunn, 1996, p. 77). Above all, they consider their students' personal and career development a holistic experience to meet the needs of a technology-rich society, emphasizing the development of student ability to, for example, make conscious decisions, solve problems in their lives, and communicate with others.

#### Intersection of Visual Arts and Technology

The teachers and students in this study revealed their insights into, preferences for, and values related to the partnership between art and technology in teaching and learning. In their art and technology-integrated teaching and learning experience, all three teachers value the experience of working with conventional art media in teaching art with electronic media, and many of their students have developed a growing understanding about art and/or technology. The following discussion begins with the teachers' thoughts on art media and then moves into students' reflections about conceptualizations of art in relation to technology.

#### *Interdependence of Conventional and Electronic Media in Learning Art*

Even though these teachers engage electronic technology in their art teaching in innovative ways, each also continues to value the aesthetic experience they have gained from conventional hands-on art media, not only out of allegiance to their traditional

studio art background but also because of their belief in the inseparable relationship between conventional art values and the integration of art and technology. As Liz asserted,

Anybody can do Photoshop, but it is hard to do it well. Anybody can make a Web page, but it's hard to make one that looks good and easy to navigate. [Students] need to develop a general appreciation for thinking artistically. (Liz 2, p. 8)

In a similar vein Chris pointed out that he is “always reinforcing and reminding [students of] the art elements and design principles in Computer Graphics” (Chris 2, p. 7), while in Sara’s class, she and the students “talk about clear presentation, and they know techniques are important; they know their content has to be visually interesting” (Sara 4, p. 7).

These teachers incorporate traditional art knowledge, sources, and techniques prior to and within their teaching with technology because they believe that the development of artistic sensitivity is vital to working with electronic media. For example, in Liz’s case, although she has taught art through conventional and electronic media concurrently, she apparently does not want to impose her own art values and preferences on her students. So she lets them make their own judgments about and comparisons between these two art-making experiences. Because Liz believes that hands-on art experience can enhance students’ learning art with electronic media, she teaches photography using both the Photoshop program and a traditional film-developing process simultaneously. In our conversation, Liz noted that the traditional hands-on darkroom experience helps students better understand Photoshop concepts and techniques. Likewise, Chris explained that he encourages students to take art foundation classes prior to taking computer-based art classes because the craftsmanship required in digital

production can develop from the art knowledge learned with traditional art media. Sara also pointed out that her eighth-grade video documentary curriculum must be examined in the context of her three-year curriculum plan in which her students' exposure to her multicultural and hands-on art curricula in their prior two years contribute to their understanding of visual communication and representation in their final year with her.

Believing that hands-on art experience should not be taken out of learning with technology, Liz gives her students the option of making art with a mix of conventional and digital media, while Sara invites students to animate their hands-on drawings into digital videos. Neither Liz nor Sara believes that technology can serve all students. They observe that the option of conventional or digital media allows students greater enjoyment of the physicality of making art and encourage them to decide which media to use in fulfillment of their artist intents. Although Sara's priority in teaching her eighth graders is to develop their communication skills with digital media, she believes that the quality of visual presentation embedded in her eighth graders' video productions is developed during their studio art learning experience in the sixth and seventh grades.

Overall, these teachers carry over their expertise in studio art to enhance students' learning with technology and to address their concern for individual learning differences. They seek a balance in their teaching between conventional and electronic art media, delivering a message to students that traditional art knowledge and hands-on experience serve as a foundation for learning art with technology. Chris, particularly, observed that in the information age, even amateurs can produce electronic media text with ease and speed, but development of artistic sensitivity is the key to helping individual work stand out from amateur mass productions.

### *Interrelationship in Learning Art and Technology*

Student responses to my inquiries indicate that two major constituents of my research focus—visual arts and technology—cannot be addressed separately. In fact, the students I interviewed commented that in their learning experience in these art classes, one enhances the other. For example, Ethan in Liz’s class and Damien in Chris’s class noted that they have learned technology through art, whereas Ray and Madison in Chris’s and Justin and Lucy in Sara’s classes expressed that they have learned art through technology.

Reporting what he and his classmates have learned about technology through art, Ethan pointed out that his photograph developing experience in the darkroom helped him better understand the rationale of the Photoshop software program, while Damien recognized that his rich hands-on art learning experience in 2D drawing and 3D sculpture assisted him to better picture the structure of his 3D digital production. These two students with a studio art learning background exhibited confidence and had less difficulty learning complicated software programs and producing sophisticated artwork than some of their peers. These students did not simply experiment with technology; they rationalized every move during their digital art-making process and developed new working knowledge by connecting each move to their prior knowledge. In Damien’s words, “[before I create my 3D creature on the computer screen], I just do it off the top of my head and make sure every part all goes well with each other” (p. 9). Likewise, Ethan explained that

if you make a mistake in the darkroom, ...you have to start it over again, whereas with Photoshop,...you just click and it’s fixed, and you get a better idea of what looks good with a picture, and you learn firsthand about darkness and shading, the



shadows, and how much light you want on something, and the different intensity and everything, and what you can do with just light and shadow. (Ethan, p. 7)

With regard to students' reflection about learning art through technology, Ray, in making a sketch with Photoshop for his acrylic painting, reported that he found this image editing program enhanced his understanding of both visual composition and material texture. On the other hand, Madison extended her definition of art because working with technology had changed her notion of creativity: "I got into multimedia and it's like, oh, I don't necessarily have to be good with a pencil, but I still can be artistic and creative" (p. 6), and "I really push myself to be creative in [the multimedia] class more than anything else, trying to come up some original, interesting ideas. So that other people can learn something from my video" (p. 5). Likewise, Justin and Lucy reported that they came to see video production as an art form that conveys its message through aesthetic strategies. As Justin put it, "Of course, video is an art form. You really have to think how to put things together to express your ideas and make your messages stand out" (p. 4). Lucy agreed: "I think our video is powerful and beautiful and Ms Petersen said that too... This is because I really think about the angles when I filmed people, or how words can fit with pictures [in our video]" (p. 4). As these examples show, these students built their own views about art by exploring the potential of technology. Consequently, their interest in art was sparked, expanded, or altered, and they discovered, through their encounter with technology. Many of them reported that art contains various meanings, as Madison put it, "art is not just about painting and drawing" (p. 3).

These student comments indicate that they value the partnership between art and technology; for example, as Ethan asserted, "I think when you actually work in the darkroom, you really appreciate the things that Photoshop can do" (p. 7), and as Ray

reported, "I can sketch by hands, but Photoshop is just a quicker tool for me to make sketches for my [acrylic] paintings" (p. 4). As this evidence shows, an integrated art curriculum helps students comprehend art and/or technology at a desired level. It also suggests that learning art with conventional media should not be devalued just because art education is eager to embrace electronic technology. Rather, the students' commentaries about their learning illustrates that learning with technology has the potential to enhance student understanding of the diversity and accessibility of art.

#### Concerns about Teacher Professional Development

As continuously changing electronic technologies demand new literacy skills, one challenging question for both theorists and practitioners is how to "keep up with new ideas about how to teach with these [everchanging] technologies" (Leu et al., 2004, p. 1600). This question, pinpointed by Leu and his colleagues, caught my attention, particularly as the results of my fieldwork on these art teachers' continuous professional development in teaching with art and technology underscored its significance. Observing that these teachers' self-initiated learning of new technologies has also influenced their professional development in various ways, I therefore recently added this concern to the other research questions that frame this study and present my findings in the following discussion.

As discussed in the beginning of this chapter, these teachers took few staff training courses in technology. Yet, these teachers' professional development still occurs even in the absence of formal training opportunities in technology in their workplaces. In many instances, their inspiration to engage and integrate new technologies into their art teaching were related to their interests in non-technology related issues or contents. In

fact, their learning inspiration might not be directly connected to the art and technology fields; most often, they use available and accessible resources to spark the connections with their teaching practice. For example, Liz's broad exposure to up-to-date, informative TV programs and university-level courses (East Asian Cultural Studies and Women and Gender Studies) has motivated her to integrate content about different art forms from East Asian culture and the topic of global community formation into her classroom. Likewise, Sara's university-level filmmaking course during her fifth year of teaching video curricula inspired her to incorporate more film production components into her class, including storyboarding and framing angles. Chris, not having the convenience of a nearby institution of higher education, has traveled to conferences for idea gathering and shared thoughts on technology integration with colleagues from other subject areas in his school.

When self-teaching was their primary means of learning the latest software program or techniques with digital equipment, these teachers sought to develop innovative ideas about content that were applicable to and could enrich their art curricula. Importantly, their need to continue learning moved beyond mere technique-oriented learning to opportunities for content-rich technological application in their professional work. In Chris's case, particularly, the technological knowledge gleaned from his self-study enabled him to teach professional development technology workshops to his colleagues. In Chris's school, he holds a leadership position in designing staff-friendly technology workshops and in conducting a funded project that explores the implementation of videoconferencing in art teaching.

In short, these teachers' method of self-education and professional development in adopting and learning technology has led to a preference for the content applications used in their professional practice. Their taking the initiative in learning technology has contributed to significantly their ongoing professional development, in which they open-mindedly learn from students and resources in their environments. Using such means, these teachers manage to keep up with ideas of how to teach within the contexts of ever-evolving technological changes, mostly by learning from their students, who often have some latest technological knowledge, technology applications, and software programs. Accordingly, these teachers incorporate their updated knowledge into their beliefs about what students should learn about art with technology; they also and provide guidance, feedback, and learning opportunities to their students in a trusting learning environment in which the teachers function as co-learners with their students in the classroom.

#### Discussion and Summary of Findings

The cross-case analysis, which integrates the selected findings from the three case studies of teachers and students using new technologies, has provided useful general insights into the nature of teaching art with technology. These insights are expanded in this subsection, which summarizes the study results in terms of my two research questions. As this investigation sought to understand the participant teachers' notions of visual literacy and how such notions are manifested in their teaching, the major research findings are discussed below under two headings: (a) these teachers' shared views about visual literacy, and (b) these teachers' insights about visual literacy development in the context of teaching and learning.

## *Shared Views on Visual Literacy*

### *Teachers' Personal Practical Knowledge*

The stories evoked from all three participant teachers give evidence that their beliefs, values, and practice are influenced by their personal practical knowledge, which in turn results from their own reflections on their personal and practical experience (Clandinin, 1985). As Clandinin observed, teachers' "personal practical knowledge is knowledge [that] is imbued with all the experiences that make up a person's being" (p. 362). These teachers seemingly engage in a process of "teaching-as-inquiry" (Clandinin & Connelly, 1995, p. 29) in which they constantly refine their own philosophy and practice by reflecting on their acts of teaching. Their beliefs about what students should learn are determined by what they perceive as the students' need to connect with the world and to function in contemporary society. Accordingly, these teachers' teaching practice shuns a traditional emphasis on understanding works of art in favor of a focus on developing life skills—including problem solving, decision making, and critical thinking—in order to prepare students as productive and responsible members of society.

These teachers' deliberations about student life skill development seemingly embrace what has been identified in academic discourse as higher order thinking skills that move beyond simply receiving given information to employ learning processes like exploration, interpretation, organization, rationalization, and representation (Ennis, 1987; Resnick, 1987; Torff, 2003). This focus echoes Lewis and Smith's (1993) suggestion that higher order thinking skills should "include problem solving, critical thinking, creative thinking, and decision making" (p. 136) and favors a learning transformation from general knowledge to sophisticated meaning construction. Accordingly, working with

multimedia, these art teachers attempt to stimulate students to process their thoughts using various modes of communication interchangeably, and to prepare them with the ability to translate and link their ideas and actions. This ability to connect ideas and actions corresponds to Efland's (1995) argument that "emphasis [on how the student applies knowledge] needs to shift from the ability to recall knowledge to transfer, where the student demonstrates advanced understanding by applying the knowledge in new situations" (p. 152). As Sheldon and DeNardo (2005) pointed out, "this freedom [of application and learning in higher order thinking skills] culminates in the learner's independence when the individual is equipped with processes that facilitate continued learning outside of the classroom" (p. 41). Hence, specifically, these three teachers demonstrate an attempt to develop in their students' independent and sophisticated higher order thinking skills that can be implemented in other aspects of the students' lives.

As conveyed in Chris's and Liz's comments, they hope to not only continue to boost higher order thinking skills in learning art with technology but to also help their students draw linkages between this set of skills and the complexity of contemporary living the electronic age. As Chris put it, "what students learn about the skill of problem solving in art is not much different than in math or language arts; the importance is to transfer it to their lives" (Chris 3, p. 6). Likewise, Liz reported thinking about "multiple intelligence" because

some students may respond to math better than art, but some may learn well from the arts. I think it's important for schools to keep the arts program and offer various opportunities for students to learn skills like making decisions or thinking critically... These are important life skills to have. (Liz 1, p. 15)

Importantly, these teachers, although not specifically opposed to engagement with academic theories about visual literacy found in the scholarly literature, appear

uninterested in the academic discourse *per se*. They are aware of the theoretical trends in scholarly art education publications or pronouncements, but do not affiliate themselves with the academic language found in the visual literacy discourse. Thus, these teachers' understanding of what students should learn (or "visual literacy" in the sense of academic discourse) is built instead around their own personal practical knowledge and experience about what students need, and on their understanding of the learning environments.

### *Sociocultural Approach to Visual Literacy*

Despite their lack of interests in the academic literature surrounding the concept of visual literacy, the three art teachers' conceptualizations of visual literacy in relation to electronic technologies seemingly embrace a sociocultural perspective in terms of both ways of seeing images and learning objectives. That is, all three state their belief that learners must develop the abilities to inquire analytically into how images are made and presented and to embrace sociocultural issues within the contexts of their lived experiences. As discussed earlier in this chapter, when teaching art with technology, these teachers identify, address, and engage in dialogues with their students about issues in society and encourage their students to convey ideas about these issues of their concerns. Yet, these teachers these teachers engage in little analysis and critique of the power relations embedded in such issues. In fact, these teachers reported that even though they embrace a critical component in developing students' competencies to meet the needs of contemporary society, in their minds, the notion of *critical* seemingly implies analysis of the forms of media text or artworks, whereas the concept of *critical* in visual culture or social reconstruction theory refers to the analysis of power relations in the social system that produces those forms (media text).

It is also worthy noting that I classify these teachers' thoughts on visual literacy development as a sociocultural approach, even though they did not explicitly reveal active engagement with critical pedagogy theory as promoted in scholarly discourses about sociocultural approaches to literacy education and art education (Darts, 2006; Delacruz, 2005; Duncum, 1997; Freedman, 1994; Goodman, 2005; Kenway & Nixon, 1999; Muffoletto, 1994; Tavin, 2003). I do so because these teachers are seemingly directing their visual literacy pedagogy toward fostering learners' *engagement* and participation in a democratic society, which is similar to the approach advocated by literacy educator Gee's (1998) claim that a sociocultural approach to literacy education moves "away from focusing on individuals and their 'private' minds and towards interaction and social practice" (Introduction, ¶ 1). In the same vein, Lankshear and his colleagues (2000) observed that "from the sociocultural perspective..., learning is about becoming proficient participants in social practices" (p. 42). Thus, these teachers' practice of visual literacy pedagogy first prepares learners to express themselves and communicate with others visually, and then encourage them to use this ability to participate in and develop awareness about sociocultural issues that are important to them. In turn, with regard to students' visual literacy development in the information age, the different levels of engagement in critical analysis in art education theories versus these teachers' practices suggests the need for further inquiry into teacher knowledge about and ability to teach critical pedagogy, along with further inquiry about the preparation necessary to making such teaching happen.

With regards to proficiency in art elements and principles, considered a vital skill in the scholarly discourse about images as a visual language (Bamford, 2001; Brill, Kim,



& Branch, 2000, Stankiewicz, 2004), these teachers paid less attention to this aspect of visual literacy. Rather, they viewed preliminary design-oriented exercises as a means to learn about art, not an end goal of learning. In other words, instead of assessing the students' acquisition of knowledge about art elements and principles, they emphasized their student abilities to make connections between the images they produce and analyze and their own lived experience, and to use this visual learning experience as preparation for personal development and/or the career preparation needed in society. Overall, the three teachers seemed most interested in the implications of image production and analysis embodied in the connectedness to students' meaningful lived experience.

#### *Integrated View of Visual Literacy*

These teachers' statements and teaching behaviors indicate that they not only support teaching with multiple communicative modes as a means to enrich the quality of new media production and analysis, but also recognize the interdisciplinary connections embedded in multimodal learning opportunities. Because of this recognition, these teachers seemingly adopt a holistic model to developing students' visual literacy competencies in relation to their art learning with technology. That is, while their teaching incorporates various forms of abilities—art making, writing, conversation, media analysis, and technological techniques—when articulating their thoughts to me, they bore in mind the plurality of literacy and reported their desire to provide to their students an integral whole learning experience. These teachers' perspective on what students should learn in art and technology integrated curricula is not limited to the visual component; they teach multiple skills depending on what they think is appropriate for their students in their particular learning environment.

Especially in Sara's case, she realizes that learning art through electronic multimedia simulate students' multimodal experiences in the real world, where several modes of communication function synchronously for meaning construction. As Sara observed,

some of the kids really think about the lyrics of their song [used in the videos], like Jamie and Morgan, the teen suicide group. If you read those words, they really went well with message of their video... They really thought about those lyrics and music, what do they mean, and how can we use them with images. I think that's an important skill, because [students] are not only dealing with the visual stuff when communicating ideas through their videos. They have to work with sound, images, and text. (Sara 4, p. 12)

As shown by the further evidence provided in the case report chapter, these teachers' chosen multimedia technologies involve the integration of images, sound, text, time, animation, and movement. Apparently, these teachers are pragmatically engaging the emerging scholarly notion of multiliteracies (Cope & Kalantzis, 2000a; Kress, 2000b; Luke, 2000; Unsworth, 2005) and paying attention to the growing and changing multimodal nature of visual communication in learning art with electronic technologies, but without referencing the actual scholarship itself.

Because of their integrated and practical-oriented approach, none of the three teachers expressed any interest in dissecting the various forms of literacy or giving ascendancy to any particular type of skill. Significantly, recognizing that, as Bruce (1998) asserted, "the relations between humans and technology are both sensory and contextual" (p. 272), these teachers strive to develop their students' multimodal sensitivity together with various learning resources across subjects as a unified visual experience in the context of their situated learning environment. Technology, in these teachers' praxis,

serves as a medium to enable their students to voice their concerns about the self, community, and society.

*Visual Literacy Development in the Context of Teaching and Learning*

*Administrative Support and Operative Technology Infrastructure*

To provide contextual understanding, as I investigated the art teachers' conceptualization and practice of visual literacy, it was necessary to examine the technological learning settings in these teachers' individual schools. The cases in this study provide contrasting examples of how a well-supported technological school environment can strongly influence the quality of learning and visual productions, as well as teacher motivation and satisfaction. For instance, Chris's case illustrates that the effectiveness of technology implementation in the classroom lies in the development of an ecological framework in which informed administrators sustain the networks of technical support and professional development so that teachers can fully engage technology in their teaching. In contrast, Liz's and Sara's cases demonstrate that teachers, even when not given the administrative support they need, are resourceful and persistent in overcoming the obstacles to exposing students to the technology-related learning experience they consider necessary in contemporary society.

Contrary to Prensky's (2005) criticism that teachers are resistant to change and the integration of new technologies, the teachers in this study demonstrated great strength in learning about and teaching with technology in order to meet their pedagogical beliefs, even when working conditions were technologically inadequate. However, even though these teachers were motivated to bring technology into their art classroom, my findings point to two significant problems they faced in doing so. First, in two of my three cases,

visual art is seemingly the last subject considered for the allotment of electronic equipment and resources under the school financial budget. Second, an art teachers' insistence on working with a nonmainstream computer operation system (in Liz's case, a Mac OS X versus the district's Microsoft Windows-based environment) leads to further issues of technical maintenance and computer system compatibility for teachers, as well as added negotiations with school administrators. This finding supports scholarly evidence that in spite of the fact that art teachers are frequently provided few resources and limited support, early adopters are resourceful and resilient in their attempts to engage electronic technologies (Delacruz, 2004). If the profession of art education eagerly encourages practicing art teachers to adopt the ever-evolving electronic technologies in the classroom, we must consider ways that schools may better provide art teachers with stronger technology infrastructures.

The results also reinforce three additional scholarly findings. First, in their professional development, art teachers are less reliant on school district offered technology courses than on self-study and learning from colleagues and/or students (Delacruz, 2004; Phelps & Maddison, 2008). Second, all three teachers' acquisition of technological knowledge represents a learning pattern that shifts away from face-to-face instruction to self-directed exploration and collaborative learning. They are less interested in exclusively technique-oriented technological approaches or courses than applicable, exemplary learning models that can be modified in their local learning settings (Delacruz, 2004; Wood, 2004). Finally, my study findings support an imperative need for "a healthy human infrastructure and a functional and convenient technical infrastructure" (Zhao,

Pugh, Sheldon, & Byers, 2002, p. 512) in the learning community if technological integration is to occur in education.

My findings strengthen the argument that art teacher training programs (including those for both preservice and in-service teachers) must reconsider the design and quality of post-service technology education in response to teachers' need for efficient and practical professional development courses (Delacruz, 2004). Significantly, to make sure the quality of the technology education programs meets teachers' needs, technologically competent teachers may potentially serve as leaders in their schools' technology staff training program (Delacruz, 2004; Dunn, 1996). As evidenced in this study, Chris serves as Webmaster of Lincoln High School's Web site and technology workshop developer and instructor for his colleagues. His leadership in equipping his colleagues with the ability to teach technology across subjects ensures that they learn technological knowledge from a practical standpoint. Importantly, Chris encourages teachers to consider the aesthetic quality and impact of their technology-embedded presentations and delivery of the knowledge they learn.

#### *Old-Fashioned Art Values in Teaching New Technologies*

Findings of this study also show that both the teachers and students value the interconnection between old and new art media in learning art with technology. Indeed, based on their allegiance to a studio-based art background and experience, these teachers each identified an ability that supports such a view. First, Liz expressed the belief that students' conscious decisions about their media choices develop from working with both conventional and electronic media. Second, Chris posited that learning foundational art knowledge is imperative to their development of both aesthetic quality and craftsmanship

in digital productions. Finally, Sara put forward the view that hands-on art experience contributes to the development of sensitivity to the use of visual representation in electronic visual communication. These identifications suggest that practicing art teachers carry over their values about and experience with conventional art media into their teaching of the newer media, and that they use this value system as a means to sustain students' learning with technology.

Likewise, student responses to my inquiries suggest that hands-on art learning experiences with traditional media enhanced their understanding of the rationale, production, and representation of digital images. Working with both old and new media made them appreciate the power of electronic technologies, and working with electronic multimedia broadened their perspectives on and definitions of art. Particularly, some of Liz's students seemingly attempted to separate their educational and recreational uses of technology, reporting that they enjoy the physicality of working with conventional media and recognize the hands-on element of art as a unique experience in an age of electronic media proliferation.

These students similarly reported a seamless learning of art and technology, which echoes Bolter and Grusin's (2000) argument that "new visual media achieve their cultural significance precisely by paying homage to, rivaling, and refashioning such earlier media as perspective painting, photography, film, and television" (back cover). Manovich (2001), similarly, identified new media-appropriate techniques from an examination of the history of visual culture and older media. The association between conventional and electronic art media found in this study represents an interdependent partnership in which old media contribute to the enhancement of new media and new

media reshape the meaning of old ones. This identification reminds art teacher educators that, in encouraging teacher to adopt technology in their art teaching, they should still value practicing art teachers' professional knowledge of conventional art media. Learning new media by engaging the knowledge of and experience with traditional art media may also facilitate learning by reducing teachers' anxiety and resistance to learning new technologies.

*Consonance between Teaching Beliefs and Learning Outcomes*

The findings also provide evidence that students' learning results are both affected by and respond to their teachers' context-specific views about what students should learn. That is, these teachers each indicated that students' experience with and ability for image production and analysis only make sense when they are connected to lived experience. Alternately, the students I interviewed reported that their learning experience in these technology-enrich art rooms stimulated them to envision how they might carry the skills learned into their social lives as a whole. The student reflections on what they have learned made little reference to their visual productions and image analysis, but rather emphasized what technology and/or art now means to them, and how this meaning is connected with their personal and public lives. This line of thinking responds to all three teachers' shared goal that students in the information age need to develop a form of visual literacy that equips them with the competencies to manage the tasks in their lives and in society.

Findings also reveal that these teachers' sociocultural view of visual literacy manifests in their students' learning outcomes. That is, many of their students apparently develop an analytical thinking component by engaging technology in various degrees as a

medium for resolving perceptual problems and drawing inferences about life issues. For example, Ethan, Damien, and Madison all reported that technology both represents their identity and gives them confidence. Ashlee and Lucy expressed their enthusiasm for technology by exploring and refining possible career paths that included a technology focus. Some students also develop the abilities, for example, to question the authenticity of images (Damien), to evaluate the limitations of technology (Laura), and to take a constructive stance in portraying their concerns (Justin and Keith).

The findings also show the importance of the teacher-student relationship in teaching and learning art with technology. For instance, some students reported that they had learned from their teachers' knowledge and character, indicating their awareness of the teacher's attitude toward, observations about, and dedication to the engagement of art and technology as revealed during their teaching. The trusting teacher-student relationship, in this study, appears vital to developing and facilitating student visual literacy skills in relation to electronic technologies. Indeed, comments by Chris's students, Brian and Lillian, and Sara's student, Jaime, presented in the case reports, reveal that students learn technology more efficiently with their reliable teachers' presence and help. Likewise, Liz's students Claire, Laura, and Ethan appear to have been motivated to produce high quality digital artworks because of the mutual respect in the learning environment that Liz created. Thus, the evidence from this study suggests that these teachers' insights into visual literacy pedagogy and their related teaching practices significantly impact students' views about technology in society, and their trusting relationship with students contributes to the development of student abilities to express themselves and communicate visually.



## CHAPTER 6: CONCLUSION

Having attempted to answer the primary research questions in Chapter 4 and 5, I now use this concluding chapter to describe the findings and queries that go beyond my two research questions, but that are significant to the study purpose. First, although the study's initial aim was to investigate how well a group of technologically competent secondary art teachers conceptualize and understand the notion of visual literacy in relation to electronic technologies, the analysis revealed another surprising finding. That is, these teachers neither use the term *visual literacy* in their conversation with students, colleagues, and myself nor apply the visual literacy concept in framing their curricula and executing their teaching practice. Initially, this surprising discovery led me to wonder whether these teachers conform somewhat to McDougall's (2007) assertion that the practicing teachers in her study possessed no full understanding of the notion of visual literacy but rather viewed it as a trendy curriculum theory. However, closer examination of the data revealed that, in contrast to McDougall's finding, these three teachers have accomplished the goals that visual literacy theorists would expect but without employing the academic language of visual literacy.

In fact, these teachers are achieving more than the scholars' expectations in regards to the desired set of visual literacy skills. That is, these teachers interpret visual literacy as a collective term that describes what students should learn in contemporary society, meaning that they go beyond developing students' visual competencies to embrace a holistic teaching and learning experience that incorporates themes like student voices, a trusting relationship with students, community, career development, lifelong skills, connections with lives, contexts of particular teaching praxis, and richness of

teacher knowledge. For me, these emergent and unexpected themes seem more important in response to my original inquiry of how the notion of visual literacy is manifested through art teachers' teaching with electronic technologies to prepare students with the skills needed in the information age. Hence, I came to believe that the academic discourse on visual literacy as it appears in scholarly texts may be missing some essential insights about the nature of learning.

In the following discussion I distance myself from the scholarly literature on visual literacy reviewed earlier in this dissertation to draw a significant alternative conclusion derived from findings in my fieldwork with these three teachers and their students. To justify this alternative, this concluding chapter first discusses the significant findings and questions that go beyond the study's original research questions, then summarizes the overall findings, and finally outlines their implications for the fields of literacy education and art education. The chapter concludes with recommendations for further research.

#### Discussion of Findings

Based on the research data gathered in my observations and interviews with art teachers and their students, I began to consider whether the focus on visual/literacy skills and technology in teaching and learning is the most pertinent question in the information age. More specifically, as this investigation of three art teachers' conceptualizations of and practice related to visual literacy in relation to electronic technologies unfolded, new themes emerged beyond the findings about desired student skills, visual competencies, and prerequisite teacher attitudes and knowledge. New aspects—the changing dynamics of the roles of teachers and students in the age of global communication, the need for

trusting human interactions in contemporary classrooms, and a regard for the totality of the learning experience—proved to be as significant findings as those findings discussed in the previous chapter.

One very important observation is that each individual teacher's role in teaching his or her technology-oriented curricula has changed from that of instructor to facilitator. That is, rather than being the sole sources of formal instruction about the techniques of software program operations or digital devices, the teachers are facilitators, shifting their aims to provide additional learning resources and constructive feedback that stimulates student awareness of their technological usage. At the same time, these teachers' teaching style is seemingly moving away from one of knowledge delivery to one of two-way collaborative knowledge construction and simulation between the teacher and students.

Moreover, even though the teachers have apparently remained in authority as classroom leaders, the authority of learning also has been redistributed from the teacher to the students. In other words, these teachers were co-learners in the classroom in many instances, sometimes even building upon student knowledge and expertise. As Liz and Sara observed, young people who know more about technology than their teachers may possess more authority over certain types of technological knowledge. Likewise, Chris recognized that updates to his technological knowledge stem primarily from his former and current students. In addition, all three teachers reported having adopted new technologies more easily and rapidly by teaching them to their students. Sara also mentioned that she came to operate technological equipment confidently by learning along with her students. Chris specifically pointed out that the longer he taught, the more he learned from his students' discoveries of software program techniques and from their

emerging questions as they learned the programs. These three teachers are keenly aware of the changing dynamics of teacher-student relationships in the classroom while teaching with electronic technologies, and are willing to make necessary adaptations. As a result, they also cultivate a mutually trusting shared learning environment for their students and are open to learning from their students.

Each of these teachers also exhibited and reported a remarkably high level of professional dedication to their students, and their students appeared well aware of their teacher's extraordinary level of involvement and regard. Specifically, these teachers have gained their students' trust over time by devoting large amounts of time and attention to them, learning along with them in the classroom, offering a supportive learning environment, and encouraging them to perform their best. As a result, a highly developed level of teacher-student trust and mutual respect has emerged in these settings, and appears to have both contributed to the quality of the students' personal and educational development and influenced student views about art and technology in positive ways.

This study reinforces the significance of the teacher role in the information age of rapidly changing electronic technologies (Delacruz, 2004; Freedman & Stuhr, 2004; Leu et al., 2004). That is, development of student knowledge is facilitated through a teacher's effective teaching strategies and characteristic styles, and trustful teacher-student social interactions enhance the quality of learning with electronic technologies. Although recognition of the connectedness between learning with electronic technologies and the factors of human and environment influences in learning is not new, this study reinforces the importance of this interconnection and provides evidence showing that the role of the

teacher and the situated learning environment have become even more crucial in the twenty-first century.

For these teachers, developing students' competencies in digital imagery creation, analysis, and consumption is apparently a holistic, not separate and quantifiable, task. Thus, their statements about and practices related to developing student awareness of technology use seemingly do not identify whether this ability is associated with visual, media, or technical understanding. They consider how this learning experience may tie with student understanding of the world, pondering "what students can do and how they can extract meaning from their own experiences" (Bruce, 2008, p. 5). Hence, these teachers believe that student knowledge transformation and construction of media analysis are revealed through a correlation between creative and critical inquiry. Yet they do not describe this learning process as visual literacy or media literacy, which is the common usage in academic discourse when discussing similar learning activities.

It also became apparent that the use of the term visual literacy may be dismissed in that these three teachers did not recognize its usefulness in the practical teaching arena. Rather, these teachers strive to instruct students with situationally specific skills, knowledge, and practice related to their social and cultural experience, viewing the visual literacy concept as simply fashionable academic terminology for what students should learn with or about images. These teachers are particularly uninterested in using the term visual literacy independent of its teaching and learning context. As Chris put it, "If there is a thing called visual literacy, it's not just that skill you have; it's how you apply it to make meaning out of it, to use as a tool to make some connections between you and the world" (Chris 2, p. 17). Liz and Sara described their own usages in similar fashion:

I don't use the term [visual literacy] or think about the term; it probably is another way to talk about what students need to learn today. I am not interested in breaking ideas about students should learn this or that. The business of learning is a connected process that threads through students' prior knowledge, learning place, teacher's ways of teaching, and more. (Liz 2, p. 27)

I think we can't assume that it's an instant thing like, "Well, the kids come into my class, and they have no visual literacy, and by attending one of my classes, they're going to have visually literate." Visual literacy is something that's in flux all the time; it's not an end point. It's something that is constantly evolving, depending on who we interpret things with and how we're situated to do the specific projects, and how we make meanings and develop our understanding to another new level. (Sara 4, p. 24)

For these teachers, the process of learning through encounters with visual images and technology is a unified practice that is not limited to the creation and analysis of visual messages but is strongly connected to and with students' lived experience. These teachers also highlight the significance of situated learning, taking the contexts of their students' lives and community into consideration in designing learning content.

Although these teachers seemingly make little use of the academic language about visual literacy, they engage similar concepts and principles underlying its theoretical discourse. That is, all three of these teachers appear to use art making with electronic media to enhance students' competencies of problem solving and critical thinking to engage them in the process of reflecting on how they make artistic and life decisions, to facilitate their experiences of image consumption, and to encourage their abilities to communicate their own ideas visually:

I think that they can learn to make decisions [from this advanced photography class]. If they're making art again or doing something else later, I hope they can think about what's going to be the best tool for conveying [their] intention. (Liz 1, p. 1)

In terms of 3D modeling, it is a whole area I want students to have a little bit of exposure to. I think it is important to bring it in rather than just teaching with Photoshop...I know that very few students will go into game design, animation,

or even architecture, but the experience may help [all of them] to develop the appreciation of those things that they run into as to what goes into all they have seen, especially when they animate those creatures and they get to just do a few seconds with the movement. It took all night to render, and it took hours to make. They maybe appreciate that more when they later watch TV or a movie. (Chris 2, p. 12)

With [video] editing it's about choices. It's not just choices of "Oh, I want to show this." I think they have to really be thinking a little bit more, or maybe subconscious choices, and I want them to be provoking. I don't want them to go by or just think that art is about drawing or painting something. It's also about communicating your ideas to other people. (Sara 4, p. 11)

These examples show that these teachers' comments may respond to a broad interpretation of the academic discourse on visual literacy, which suggests a set of visual competencies for understanding, constructing, interpreting, and communicating visual messages while attempting to advance learners' abilities such as problem solving, decision making, and critical thinking (Debes, 1968; Spalter & van Dam, 2008; Wileman, 1993). But without engaging the term visual literacy, these teachers attempt to reach this goal through a student-centered, situated learning approach.

Importantly, it should be stressed that even though scholars and teachers share a similar goal in desiring to prepare learners with the skills needed in contemporary society, there is a difference in their processes to reach this goal. That is, these three teachers see students' visual literacy skills as coming with and within wholeness of learning, whereas the discourse of some visual literacy scholars argues for predetermined visual literacy agenda with specific skill sets and guidelines that must first be followed or evaluated. This observation raises a question about the nature of the visual literacy construct: should visual literacy be conceptualized as a means of learning or an end goal in the information age? This question can also be expanded beyond the visual component to ask whether the notion of literacy should be a means or an end of learning. In an age of

ever-evolving electronic technologies, literacy has become a popular term in academic discourse to identify new skills to be learned. However, terms like *visual literacy*, *media literacy*, or *digital literacy* seemed to make little sense to the teachers in this study, even though these terms are proliferating among the scholarly community under the assumption that such literacy skills are socially necessary.

More specifically, in a culture of standardization and accountability, the American educational system is dominated by a national discourse on how to improve learning with standardized criteria. Students are evaluated through nationally standardized assessments for their purported mastery of systematically predetermined sets of skills and abilities, and teachers are told to instruct these predetermined intended learning outcomes to prepare students for life. Hence, in American culture, having these assorted articulated literacy skills is seemingly assumed to prepare the individual for a bright future. However, by attaining this end, we, as both teachers and learners, may neglect the process of learning and forget that learning is more than simply a set of procedures leading to a particular end result. The danger is that, when literacy (visual literacy or any other) is seen as a convenient expression or assembled term to describe concrete skill sets, standardized learning criteria, and prescribed expectations, the experience of learning is drawn out of its human context and disconnected from both the self and the world.

In *Experience and Education*, Dewey (1938) criticized the confusion between means and ends in education by which educators and teachers may overemphasize the predetermined ends of learning achievements and ignore the significance of the learning experience itself. He therefore proposed that *means* of learning should be considered



parts of *ends*, with learning being both about preparing for the future and engaging in the present life. Dewey's view seemingly manifests in these three teachers' praxis: they care about how the current learning practice may engage students fully at the moment they learn, and how this experience may inspire them later after they leave school.

Accordingly, both Liz and Chris expressed hope that their students might apply their experience and process of learning later to workplace or life problems, while Sara claimed that what her students "are going to take away from this class is not their videos; it's the process of making the videos, like interviewing and working with people" (Sara 2, p. 7). As Dewey (1938) argued, "preparation for a more or less remote future is opposed to making the most of the opportunities of the present life" (p. 256). Hence, these teachers seemingly do not use the visual literacy construct as a predetermined end to frame students' learning outcome but rather that view the presence of learning (means) as part of the ends.

If these teachers can connect their students with the moment of learning and transform it into preparation for life without applying the construct of visual literacy, scholars and educators may consider the strength of engaging a holistic and contextualized learning model across subjects in the public school system. That is, the learning that occurs in these teachers' engagement with new media is not a collection of competencies or possessions that can be prescribed for another teacher; rather it is "a coevolution of individual, society, literacy, and technology, given coherence by the processes of construction" (Bruce, 2003b, p. 337).

In addition, even though the scholarly discourse on holistic learning has a considerable history (Doll, 1993; Krishnamurti, 1953; Palmer, 1983), few literacy

scholars support this view of literacy education in promoting the wholeness of the learning experience (Bruce, 2003b; 2008; Bruce & Bishop, 2008; Lankshear et al, 2000). Indeed, even visual literacy discourse pays little attention to a holistic approach to visual literacy development. Instead of calling attention to a need to embrace a holistic view of the visual literacy notion in academic discourse, I question the continuing value of emphasizing the “visual” in visual literacy discourse in the information age because a contextual, holistic learning experience is not limited to visual experience, and learning through multimedia involves more than just the visual mode (Cope & Kalantzis, 2000b; Bolin & Blandy, 2003; Duncum, 2004; Kress, 2003).

More specifically, the significance of the multimodal nature of communication in the current digital learning and living environment is challenging the system of literacy categorization that developed from the separation of various sign systems and skill types. That is, when meaning is made and communicated cohesively through a combination of multiple perceptual systems—including linguistic, visual, aural, and spatial modes, what do we as educators gain or lose if we discard the use of the term visual literacy? Is the concept of visual literacy still equivalent in the context of contemporary society? Here, I do not intend to answer these questions but hopefully to generate further debate about the usefulness of the visual literacy notion in the information age.

#### *Overall Summary*

Because visual literacy is recognized as a vital skill in the twenty-first century (Jones-Kavalier & Flannigan, 2006; Lemke, 2003; Sellen, 2002), this study has explored three secondary-level visual art teachers’ perspectives about visual literacy and their related educational practices of integrating electronic technologies into their art curricula.

As part of its case study methodology, the study used ethnographic data collection techniques to provide rich descriptions of how the selected art teachers adopted and implemented electronic technologies in their given learning environments, and how such implementations related to their own conceptualization and understanding of visual literacy. A cross-case analysis of the findings then offered an intersected analytical comparison among the three cases.

Being broad in scope, the notion of visual literacy in this study implies an individual's set of abilities and practices related to communicating, thinking, learning, and constructing meaning visually as an imperative possession in the information age. As I carried this broad understanding of visual literacy onto my field sites, attempting to find out how these art teachers interpret the notion of visual literacy, I eventually realized that these teachers' insights into visual literacy differ from the early understanding I gained from my literature review of scholarly discourse on the topic. In fact, as it unfolded, my investigation revealed that these three teachers do not use the academic language of visual literacy found in scholarly texts but rather connect to concepts underlying such discourse in their teaching practice. That is, these teachers teach the practices related to, and the concepts and skills of, what they think students should learn in art and technology-integrated curricula in order to equip them with the abilities to be productive and responsible members of the technological society.

As a result, these teachers share with visual literacy scholars a similar goal of preparing learners with the skills that correspond to society's needs, but these teachers try to achieve this goal without engaging the visual literacy terminology in their teaching. For these teachers, then, what students should learn in art and technology-integrated

curricula (so-called *visual literacy skills* in scholarly discourse) is a context-situated and content-specified experience that depends on the particular interconnections among the teacher, learners, learning setting, and larger cultural context.

These findings, within the framework of the original research questions, show that these teachers' understanding of visual literacy takes into account the larger contexts of teaching and learning to embrace a sociocultural and holistic approach. That is, to prepare students with the skills that enhance and advance their personal and career development, these teachers draw from their own personal practical knowledge about students, society, and education, as well as from their concern about the correlation between their students and technological developments in contemporary society. The findings also reveal that these teachers' are interested in facilitating student ability to question the limitations of technology, apply art knowledge to understand the rationale underlying digital work, recognize the role of technology and art in life, and integrate multiple literacy skills and communicative modes in media production and analysis. Above all, they encourage student development of higher order thinking skills in connecting art and lived experience and promote student use of technology as a force for expressing social concerns.

With regard to the concept of visual literacy in the context of teaching and learning, my findings suggest that learning in the information age takes into account both the content and context of the images and the learners' backgrounds and communities. In addition, according to the teacher reports, the experience of making art is vital to understanding how technology functions and how the interactivity of multimedia provides learners an opportunity to simultaneously communicate with viewers. Likewise, these teachers' learning preference of adopting technology through self-study, co-learning

with their students, and meaningful content applications based on their assessment of students' interests and backgrounds suggests that staff professional development may shift from technically oriented workshops to more content-oriented modules that clearly exemplify and implement specific technological applications. Finally, my findings about the students' perceptions about their learning in these three teachers' classrooms confirm their teachers' beliefs that conventional and electronic art media are equally valuable in art learning today, and that technology is a vehicle for connecting the individual and society.

These findings, which go beyond the research questions but are still tied to the research purpose, indicate that the factors of teacher dedication; trusting teacher-student relationships; situationally specific learning and connection with student lived experience; and holistic learning experience are also significant to learning with technology in the information age. It also questions the value of conceptualizing visual literacy as having predetermined learning results; and it points to the confusion of means and ends in discourse about student learning with, through, and about new technologies.

#### Implications of the Study

The findings of this study have important implications, not only for the areas of literacy education and art education, but for educational theory and practices more broadly. First, at a time when scholars in both literacy education and art education are continually inquiring into the definitions and meanings of literacy in relation to electronic technology development (Bruce, 1997; Leu et al., 2004; Stankiewicz, 1997, 2003, 2004), this study has provided practicing teachers' perspectives of and practices related to visual literacy development in their own contexts and voices. This empirical evidence of these

teachers' situated viewpoints about visual literacy highlights the complexity of visual literacy discourse and reinforces the equal significance of visual learning content and context. Likewise, the evidence for these teachers' disengagement with theoretical discourse and their development of practical discourse about visual literacy may generate a debate about the value of visual literacy scholarly discourse in the information age, open a wider discussion on the disconnection between theory and practice, and encourage scholarly research on the factors that influence this disconnection.

Second, in response to the growing concerns that school curricula must pay equal attention to developing students' linguistic and visual communication skills (Bearne, 2005; Flood & Bamford, 2007; Goodman, 2005; Giffin & Schwartz, 1997), the significance of this study lies in its authentic classroom scenarios, which illustrate how art teachers foster students' visual competencies and more through teaching with electronic technologies in their situated learning communities. In addition, the fact that visual art teachers in this study seem not to align with predetermined notions of visual literacy as learning the grammars of images may generate further discussion and debate for those advocates who approach visual literacy with this understanding. Thus, this finding provides an alternative direction for scholars to rethink the usefulness of applying the term visual literacy in framing learning practice and designing school subject curricula.

Third, this study provides evidence for the changing landscapes in forms of literacy skills and modes of communication in the information age. In particular, it confirms a recent shift in literacy education discourse to an emphasis on the growing multimodal learning experience among learners in a technological society. Specifically,

the study offers empirical insights that support teachers' awareness and implementation of these new educational emphases, which opens further avenues for examining and questioning the possibilities and challenges of the theories and practices emerging from changing electronic technology development.

Fourth, because art education heralds the need for and significance of engagement with technology in the teaching art (Delacruz, 2004; Flood & Bamford, 2007; Freedman, 1997, 2003; Freedman & Stuhr, 2004; Gregory, 1996; Garber, 2004a; Keifer-Boyd, 1997), this study contributes by providing practicing art teachers' perspectives about teaching in a manner that engages and equips students in a technological society, and by offering an alternative pedagogical perspective for examining the relationship between visual arts and technology. Specifically, it suggests the need for a holistic learning model that connects students' lived experience with the world they live in, and what actions teachers can incorporate in their praxis to facilitate such learning. In particular, the selected teachers' sociocultural orientation on visual literacy contributes to the discourse on visual literacy in art teacher education by providing guidance for curriculum development and instructional strategies.

Lastly, this study contributes to the areas of teacher thinking and teacher knowledge for art teacher education by highlighting the art teachers' inspiration, working conditions, challenges, and potentials in teaching art with electronic media. At the same time, in order to help school administrators and art teacher educators rethink the quality of teacher education courses with technology, the findings also enhance understanding of the changing nature of teachers' professional knowledge development and the role of art teachers in facing the demands of integrating technology with art.

## Recommendations for Further Research

One important avenue for future research is to explore individual experience with technology beyond the use of artistic tools in art and technology integration. In this study, technology is used primarily as a medium for art making and as a means for personal and career development. However, because ever-evolving electronic technologies continually impact young people's lives, especially in the areas of education and recreation, further research might emphasize the implementation of technology in art education to help learners understand how technology influences their world and everyday lives. In particular, "technological changes invoke issues such as empowerment, equality, access, speed, efficiency, liberation, and the development of a global community in support of a pro-technology agenda" (Bruce, 1998, p. 269). Such issues can be explored through art education by examining how the global network shapes social relations around the world and how technology contributes to the learning development of civically engaged citizens. Exploring these growing technological issues would encourage learners to make meaning not only with their private but with their public lives. As Delacruz (in press) asserts, connecting art education and technology in a digital media-saturated society must aim to develop learners' public engagement and participatory citizenship.

Accordingly, further research might investigate art teachers' ability to engage art and technology in the framework of students' globally networked lives. In particular, follow-up research might examine why these three technologically competent art teachers engage few of these new technology-related issues in their practice, how they might apply their professional knowledge to issues other than media production and analysis,



and how they might engage critical questioning and critique of such issues when teaching art with technology.

Second, art education scholars suggest that teaching art with technology should engage social responsibilities and incorporate emerging technological issues such as online collaboration and networking, cyber identity, innovative art forms, virtual communities, and virtual reality through art (Colman, 2005; Delacruz, in press; Keifer-Boyd, 2005; Roland, 2007, Stokrocki, 2007). Therefore, further research potential lies in the investigation of how these emerging and significant issues are and can be implemented in authentic classroom settings and what teacher knowledge and human and technology infrastructures are necessary for their implementation.

Third, further research should investigate students' diverse ethnic backgrounds in relation to their technology-relevant learning outcomes. For example, in this study, even though Liz's school has the most ethnically diverse student population, only one Asian and one African American student were enrolled in her advanced photography class. In the other two cases also, the majority of the students enrolled in the art classes were Caucasian. This homogeneity of student background implies the need for further research into learning with art and technology by culturally diverse groups. Given that studies on multiliteracies propose that linguistic and cultural diversities have significant impacts on public and private lives in technological society (Cope & Kalantzis, 2000a; Lankshear & Knobel, 2003), further research might emphasize how learners' cultural and linguistic differences are expressed by and elaborated on through the audio and/or visual communicative modes in their learning communities.

Finally, as this current study of art teachers' practice focused primarily on a limited pool of teacher and student participants, follow-up research might expand the focus by examining students' process of learning art with new media in conjunction with their implementation of multimodality. Such studies might also use a mixed method of qualitative and quantitative research to investigate students' visual artifacts periodically and explore the extent to which students engage their learning at varying levels of understanding.

In addition, because the findings identify an influential correlation between art teachers' technology implementation and administrative and technical support from the learning community, further study might use an ecological perspective to investigate the complexity of learning art with technology in formal and informal learning settings. Such an approach would examine institutions like schools and community centers that promote learning art with technology as an ecological system, seeking for the linkages among administrator, teacher, and student technological participation. Thus, a future study might combine administration of a survey to a large pool of participants with a small number of semistructured interviews to identify how the system of human infrastructure functions in the institutions' learning environment.

#### Personal Reflection

This search for the meaning of the notion of visual literacy has inspired me to become a better teacher and shown me both the potential of art education and the strengths of what art teachers can do in the information age. During this research journey within a U.S. framework, my non-American cultural background has been both a limitation and a strength. On the one hand, an investigator's cultural background and

professional knowledge affects, to a certain degree, how a study is conducted and the data interpreted and understood. On the other hand, an outsider orientation provides a framework that is less embedded in a particular educational and cultural viewpoint, such as that of the United States.

I also feel fortunate that these three dedicated teachers participated in my study, not only because we share a similar passion for teaching art with electronic media, but because their insights have contributed greatly to the study's significance. As MacDonald (1995) asserted, to put students in contact with the reality of social development, a curriculum should be "reality-centered" (p. 32). These three teacher participants have looked through learner lenses in order to prepare their students with the skills that correspond to society's needs. Indeed, I have witnessed all three teachers' flexibility and strength in accommodating their individual learning environments to meet their teaching beliefs and equip their students with the competencies needed in a technological society. Thus, even though the school system and student dynamics in the United States differ from those in my home country, the art teachers' demands of and enthusiasm about teaching appear similar. As a result, I greatly respect my participants for the fact that their commitment to teaching art with technology moves beyond work responsibility to the social responsibility of being a teacher in the society.

Significantly, even though this study identified the three primary participants as technologically competent teachers, their knowledge construction, concept formulation, and technology adoption have unfolded and developed in the contexts of their everyday public school learning environments. Thus, they represent many teachers in the field who are resourceful, reflective, and capable of implementing new media in teaching art. Most

importantly, this study has helped to reinforce my faith in teaching art with technology both as a teacher and researcher, because even though the challenges of engaging technology in public school art curricula remain, its potentials sustain teachers' dedication to their students and their profession.

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APPENDIX A

Table A1

*Teacher Interview Protocol Design*

Question	Potential follow-up questions	Research interest
Interview I		
How and why did you become an art teacher?	How many years of teaching experience do you have? What kinds of teaching experience have you had? What does teaching art mean to you? How has the practice of your teaching philosophy developed over your lifetime?	Teacher philosophy of art teaching. Source of art teaching philosophy.
How did you learn technology?	What motivates you to learn about technology? What kinds of technology-related workshop have you taken? How do you enhance your professional knowledge?	Process of teacher technology adoption. Teacher learning motivation on technology.
How did you begin integrating art and electronic technologies into the classroom?	What types of electronic media are you interested in teaching? When did you begin integrating electronic media into your art class? Why did you decide to do so? What types of encouragement or frustration have you encountered?	Connection between teacher knowledge and practice in the context of electronic media usage. Teacher experience in integrating art and new media.

*(table continues)*

Table A1 (continued)

Question	Potential follow-up questions	Research interest
Interview II		
What is the art project(s) or curriculum about?	<p>What did you consider when designing your curriculum?</p> <p>Why did you want the project(s) to do?</p> <p>What did you try to achieve in the projects for your students?</p> <p>How many times did you teach this project before?</p> <p>Are there differences in terms of your curriculum strategies?</p>	<p>Practice of visual literacy in the context of classroom.</p> <p>Teacher belief in teaching art with technology.</p>
How do you feel about teaching art with technology?	<p>How do you view your role in teaching these technology-related art projects?</p> <p>How do you view the role of electronic technology in your classroom?</p> <p>How did different electronic media work in your classroom?</p>	<p>Teacher practice of visual literacy in social contexts.</p> <p>Teacher awareness of his/her role in teaching with technology.</p>
How is the project going?	<p>What are the students' responses to the projects?</p> <p>How do you feel about the students' learning outcomes?</p> <p>What kind of changes might you make next time?</p>	<p>Teachers' professional knowledge in art and technology integration</p>
How do you feel about the way students respond to the projects?	<p>What types of difficulties did you observe your students having during this project?</p> <p>What types of difficulties did you have teaching this projects?</p>	<p>Teacher observation of visual literacy practice and electronic media.</p>

(table continues)



Table A1 (continued)

Question	Potential follow-up questions	Research interest
Interview III		
What does visual literacy mean to you?	<p>What does it mean to be a “visually literate person”?</p> <p>How do you describe visual literacy in relation to electronic media?</p>	<p>Teacher perceptions of visual literacy.</p> <p>Teacher understanding of visual literacy.</p>
What should students learn from your art and technology integration class?	<p>Why did you want the students to learn these skills?</p> <p>Why is it important that the students learn these skills in art class?</p> <p>How can students develop these abilities over time?</p> <p>What are the challenges for you in assisting students develop these abilities?</p>	<p>Teacher attitude toward the value of visual literacy development in art education.</p> <p>Teacher insights into the skills needed in the information age.</p>
What kinds of support have you received from the school in integrating art and technology?	<p>Do you feel the demand to integrate technology into art?</p> <p>Have you received administrative and technical support frequently?</p> <p>Do you have IT staff to take care of your computer maintenance?</p> <p>How did you overcome these difficulties?</p> <p>What makes you continue to engage technology in your art class given that the technology support is inadequate?</p> <p>Do you think the support from the school affects your motivation to teach art and technology?</p>	<p>Teacher working conditions in relation to the quality of teaching and learning.</p> <p>The influence of contextual learning environment in teaching and learning technology.</p>
What did students get from these projects?	<p>What have your students learnt from the projects?</p> <p>Did the projects turn out as you expected?</p>	<p>Student learning achievement in relation to teacher notion of and practice related to visual literacy</p>

APPENDIX B

Table B1

*Student Interview Protocol Design*

Question	Potential follow-up questions	Research interests
What is this project about?	<p>Why did you take this class?</p> <p>What is your artwork about?</p> <p>Why did you choose this issue/topic/idea for your artwork?</p> <p>What types of messages did you try to convey in your artwork?</p> <p>What types of footage/images did you use to communicate your message?</p>	<p>Student learning reflections on their learning motivation and visual artifacts.</p> <p>Student reflection on their decision-making process.</p>
How is your project developing?	<p>What was your plan in making this piece?</p> <p>Did everything go as well as you planned?</p> <p>What was the best part of this project?</p> <p>How did you feel working with other people?</p>	<p>Student learning experience with planning and organizing ideas.</p>
What does art and/or technology mean to you?	<p>Do you like working with technology?</p> <p>What kinds of art or technology classes have you taken before?</p> <p>What are the differences between learning technology in art and in other subjects?</p> <p>Do you like to work with conventional or electronic art media? Why?</p>	<p>Student learning experiences with electronic media.</p> <p>Student understanding of the relationship between art and technology.</p>
What did you get from this class?	<p>What have you learned from Mr./Ms_?</p> <p>Did your artwork come out differently than you expected?</p> <p>What was the most difficult thing when you were doing the projects?</p> <p>What would you improve if you had a chance to make another piece?</p> <p>Do you think things you have learned from this class will be helpful in your future? In what ways?</p>	<p>Student reflections on their learning outcomes.</p> <p>The connectedness between visual and lived experience.</p>

APPENDIX C

Table C1

Lincoln high School's Portfolio Plan Sheet

Portfolio Contents Plan Sheet/Checklist

Student \_\_\_\_\_  
 SRT Mentor Teacher \_\_\_\_\_

List and briefly describe the items you have included in your portfolio. Remember to write a reflection on each item; five-sentence paragraph minimum, entered electronically, titled to correspond to the item, saved in the permanent portfolio folder. Your SRT Mentor Teacher will initial, and date when items are submitted, and reflections are completed. Photocopy quarterly and place in SRT teacher's file.

WRITTEN COMMUNICATION

1 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 2 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 3 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 4 \_\_\_\_\_  
 \_\_\_\_\_ / /

ORAL COMMUNICATION

1 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 2 \_\_\_\_\_  
 \_\_\_\_\_ / /

SIX CONTENT SAMPLES from any of the following areas:

- |                           |                      |
|---------------------------|----------------------|
| VISUAL OR PERFORMING ARTS | PROBLEM SOLVING      |
| MATHEMATICS OR SCIENCE    | COLLABORATIVE SKILLS |
| PHYSICAL/KINESTHETIC      | LEADERSHIP SKILLS    |
| VOCATIONAL                |                      |

1 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 2 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 3 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 4 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 5 \_\_\_\_\_  
 \_\_\_\_\_ / /  
 6 \_\_\_\_\_  
 \_\_\_\_\_ / /

APPLICATION OF TECHNOLOGY (BEYOND KEYBOARDING)

1 \_\_\_\_\_  
 \_\_\_\_\_ / /

SERVICE LEARNING

1 \_\_\_\_\_  
 \_\_\_\_\_ / /

RESUME UPDATED

\_\_\_\_\_ / /

INDIVIDUAL CAREER PLAN

\_\_\_\_\_ / /

Checklist photocopied and turned in quarterly.

Q1 \_\_\_\_\_ Q2 \_\_\_\_\_ Q3 \_\_\_\_\_ Q4 \_\_\_\_\_  
 \_\_\_\_\_ / /

Senior Practice Presentation Completed

\_\_\_\_\_ / /

Senior Project Presentation Completed

\_\_\_\_\_ / /

My signature below indicates that all components of the checklist have been completed.

Student \_\_\_\_\_

Teacher \_\_\_\_\_  
 \_\_\_\_\_ / /

## AUTHOR'S BIOGRAPHY

Ching-Chiu Lin was born in Pingtung, Taiwan. She has a B. Ed. in art education from National Pingtung Teachers College, Taiwan, and a M. Ed. in art and art Education from National Taipei Teachers College, Taiwan. She was a visual arts teacher at the elementary school-level in Taiwan for seven years before pursuing doctoral study at the University of Illinois, Urbana-Champaign in 2004. In the academic year of 2004-2005, she was a recipient of a pre-doctoral fellowship from the School of Art and Design in the University of Illinois. During her time at the University of Illinois, she has served as a course instructor teaching Art in the Elementary Grades for elementary education majors, a supervisor for pre-service art education student teachers, and a graduate assistant developing learning modules for community-based youth organizations. In addition, she has taught art and media integrated courses to Latino/a and Asian American youth in different community settings in Central Illinois. Her research interests lie in issues of technology and community in art education and in maintaining her scholarly experiences of collaborative partnership in a multidisciplinary or cross-disciplinary environment.