TEACHING ART IN AN AGE OF TECHNOLOGICAL CHANGE

DISSERTATION

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By

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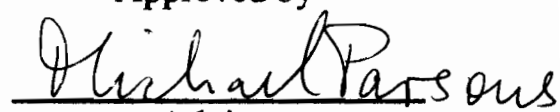

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ABSTRACT

How are computers used in art classrooms? To answer this question, we need to consider who is using the computer and why, what goals these people have, and how they utilize the technology in pursuit of their goals. Otherwise, we risk assuming that the computer will have the same impact everywhere, under all circumstances.

The study focused on twelve Ohio K-12 art teachers and how they use computer technology in teaching art. Data was collected from interviews, classroom observations, researcher's journal, collected artifacts, and extensive literature review. Questions investigated include: Who are these art teachers? What are their teaching goals? How do they use computer technology? What factors influence their use of computer technology, including personal goals and beliefs, as well as cultural/environmental factors? I also investigated issues of constructivist and collaborative learning, gender, and inequity.

Twelve cases are presented. The cross-case analysis showed that teachers who use computer technology in teaching art more likely to be teaching in high schools, to have years of teaching experience, and to be willing to take the initiative. They are also teachers who admit that they don't always have the answers. They continue to learn and embrace the knowledge and skills that students bring to the class.

Art teachers have both similar and different teaching goals. Their uses of computer technology often relate to their general teaching goals, and are influenced by

their beliefs in art, technology, teaching, and learning. The most common computer uses are for art making and conducting research. Most (eleven) teachers feel that the use of computer technology does not much change their beliefs in art teaching.

Individual factors about teachers, especially their goals and beliefs, outweigh the influences of district policy, yet factors at the school level also determine the way technology is used. These teachers use computers in constructivist ways to a certain degree, but there are few cases of projects in which students work in small groups for problem solving, or communicating with people outside of the school community. Inequity does appear to exist, at least in terms of computer access, and most art teachers have not observed gender differences.

Dedicated to my family

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Trees

(For the massive amount of paper use involved in this research)

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- Qualitative & Quantitative Research Methodology
- Computer Technology
- Art Teaching
- Cognition
- Philosophy
- Photography Criticism
- Integrated Curriculum

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CHAPTER 1

INTRODUCTION

> *I have been interested in using the computer with students as part of their art education, but it has been difficult... I will change if I know how.*
>
> -Sheldon

In response to my email titled "Teachers are reluctant to change?" posted at ArtsEdNet, Sheldon, who is an elementary art teacher, described his frustration and his need to know how to use computers in teaching art, although answers to that question have been given by some. Some educators and researchers believe that computers are valuable for classroom use for the following reasons -- student-centered classroom, collaborative learning, global communication, multimedia and nonlinear design, as well as interactivity. Thereby, I will review the different reasons listed as to why the use of computer technology in the classroom is beneficial.

Potential for Using Computers in Classrooms

Many researchers believe that computer use makes possible a more learner-centered environment (Dunn, 1996). Sandholtz, Ringstaf, and Dwyer (1997) compared traditional teacher-centered classrooms with learner-centered ones. They described traditional teacher-centered classrooms as didactic, with instructional emphasis on

memorization and accumulation of facts; learner-centered ones were described as being interactive, with instructional emphasis on inquiry, invention, and transformation of facts. With current educational reform movements supporting a move toward teaching practices that emphasize problem solving, concept development, and critical thinking, technology can be seen as a potentially catalytic contribution to this paradigm shift. With the use of computer technology, students no longer have to learn the same thing at the same speed, at the same time as their peers. Students can be encouraged to pursue their interests, to take active roles, and be responsible for their own learning (Gregory, 1996).

Such flexibility and freedom, some researchers believe, challenge the existing power relationships between teachers and students (Adams, 1985). Teachers would no longer be considered the sole owners of knowledge, as they would work and learn side by side with their students (Gregory, 1995). Teachers, students, and even parents can then participate in a community of learners who engage in collaborative learning processes (Dunn, 1996; Kozma & Schank, 1998).

Many individuals believe that the Internet opens up a window to the world; the classroom no longer has to be confined within four concrete walls. Global communication is becoming a reality as students are able to access online databases, solve real-world problems (Williams et al., 1998), transgress space barriers and communicate with experts to acquire new knowledge and skills in split seconds.

Multimedia environments that incorporate text, images, videos, animations, and sound present information in an engaging way. Greh (1997) believes that teachers who

use multimedia technologies can bring content to life as they personalize material and make it relevant to students' lives. Movies, music, and movement can all become part of the art learning process.

Nonlinearity -- a concept used in Internet and multimedia design -- takes advantage of the complexity of the human brain and individual learning styles (Sewell, 1990). For this reason some believe it to be a better strategy for presenting information to students than a more traditional linear one. Gregory (1997), for example, argues that the human mind does not think in linear terms. Rather it operates through a multitude of pathways linked by meaningful, interesting, or even illogical association. Therefore, nonlinear instructional technology "fits the specific needs of a wide range of individuals with a variety of learning styles and rates" (p. 138).

Last but not least, a key feature of computer technology is interactivity. Sewell (1990) believes that the computer is the only teaching medium which possesses such potential. He believes that interacting with computers promotes more active learning among students of all ages and abilities.

In addition to these theoretical claims, the American public seems to believe in the potential positive effects that the use of computer technology brings. Although existing research has not being able to show that the computer effectively helps raise standardized-test scores, the public (65%) is confident that future research will demonstrate that computer technology can have a major impact on improving education (Trotter, 1998).

Experience in Relation to Constructivist And Collaborative Learning

Of all the promises of educational technology, I am particularly interested in its application to constructivist and collaborative learning, which emphasizes meaning making, multiple interpretations, students' direction of their own learning process, and redefinition of the teacher-student relationship.

After extensive reading on these issues and as well as self-reflection, I realize that my thinking about constructivist and collaborative learning is based on more than a literary and philosophical point of view. My beliefs are grounded in my own learning experiences which have been enriched by the opportunity to study under very different school systems based upon very different ideas about the proper relationships among teachers, students, and a body of knowledge.

In Taiwan, much of my schooling experience was based upon the idea of the teacher as authoritative figure. As a student, my duty was to sit quietly, to listen, to follow instructions, to speak only when the teacher asked it of me, and to work independently from the other students in my class. I was asked to demonstrate my understanding mostly by taking paper and pencil tests. Knowledge was thought of as something that one receives rather than constructs. Most of the time, the historically validated knowledge presented through the teacher's voice was regarded as signifying a singular and unitary truth. A student, in contrast, was conceived of as unable to think "correctly." As a result, I was required to listen to the voice of truth, rather than voice my opinions as an independent thinker.

This history contrasts with my experience at The Ohio State University as a graduate student. This advanced study seemed to require a different set of expectations from me as a student. At first, I struggled -- sometimes to the point of frustration -- with the practice of class discussion. I expected to hear more of what my teachers had to say, and I sometimes grew impatient with free form class discussion. "I'm not paying tuition to hear what my classmates have to say. I'm here to absorb the words of wisdom from my teachers," I thought to myself. Gradually, I began to realize that the process of "being educated" was not just a one way street between my teacher and me. Instead it involves immersion in a learning environment in which everyone is a potential contributor. As each student brings his or her own experience and thoughts into the classroom, there is potential for learning from things that have happened beyond classroom walls or on the book pages.

Looking back on my learning experience in Taiwan, I appreciate how much it taught me. On the positive side, I learned in this primarily teacher dominated and rigid setting to be patient, to listen, to be respectful, and to know that there is always more for me to learn. The trade-off was my relative inability to express ideas in my own terms and a tendency to search for authoritative voices to justify everything that I thought. On the other hand, reflecting on my learning experience in Ohio, I have found that my ideas are also valuable, and that it is all right for me to think differently from culturally sanctioned masters. I have also learned to express my thought.

What I have learned from these two different school systems leads me to reflect on what knowledge is and how one acquires knowledge. Constructivist and collaborative learning theories seem to provide me with some answers that relate to my own

experiences. My personal learning experience as well as my background in art education and computer technology led me to this investigation. I wanted to see if and how computer technology can be a catalytic part of the paradigm shift in art education to a more student-centered, constructivist way of teaching.

Why Computers Are Not More Widely Used in Classrooms

Although the impact that technology has had on education as well as on many aspects of our daily lives is evident, the education literature ironically shows that by and large, computers have not been fully integrated into the daily practice of the average classroom. The most intensive use of computers in elementary education in 1992 was for playing games, learning new materials (tutorials), and drill and practice (Collins et al., 1996). "Despite the current emphasis on critical thinking that students have to problem solve, learn knowledge seeking strategies, and learn to construct their own knowledge," CompEd data shows that application of innovative technology uses were rarely occurring (Plomp, 1996, p. 128). Plomp (1996) observes that only a relatively small number of teachers are currently using computers for instructional purposes. "The types of use are not very advanced, not using the full potential of the new technologies" (Plomp, 1996, p. 128).

Why is computer technology not being used more creatively in most classrooms? Lack of equipment, training, funding, professional development, and administrative support are reasons that researchers and teachers have identified. In addition, several researchers argue that teachers have a reluctant attitude to use computer technology in (art) teaching (Gregory, 1997; Lai, 1996).

Gregory believes that "teachers - including art teachers - have been reluctant to embrace the promise of this new technology"(p.10). This, Lai (1996) thinks, is perhaps because teachers "are not willing to give up their control," or they feel threatened by the new relationship of teaching and learning. Evans-Andris (1996) similarly noted that "the supply of computers prior to its demand by teachers generated anxiety, feelings of encumbrance, and hesitation among teachers"(p. 13).

Although the images of student-centered classrooms, global communities, and active student inquiry made possible by the use of computer technology sounds appealing, living up to such high expectations is certainly not easy. And when reality fails to meet expectations, teachers receive the blame.

> *I feel teachers are given very little time to train in new areas and are expected to pick things up on their own.*
>
> *-Rosikins*

Maybe there is another way to explain why computer technology is not widely adopted in classrooms. Just as the Rosikins reported, although compelling visions are provided in the literature, teachers are often "expected to pick things up on their own" and to find their own ways of achieving these goals. No wonder many art teachers share the feeling of confusion and frustration that Sheldon discussed. While limited examples of how computer technology can be used in the K-12 art classrooms are provided, art teachers continue to be blamed as reluctant to change or unwilling to give up their control.

Lack of Detailed Accounts of Computer Use in Art Classrooms

Instead of blaming teachers, I believe that researchers need to provide more convincing examples of successful uses of computer technology in teaching art and to

explain in detail how computers can be used for specific goals in specific situations. Unfortunately, at the present time, published research like this is hard to find.

More and better research is needed (Trotter, 1998). Trotter believes (1998) that "A more-nuanced discussion of classroom technology - one that emphasizes the circumstances under which it is most effective - is long overdue" (p. 7). Stokrocki (1997) similarly notes that not much is known about those teachers who are using electronic technology in the classroom. With existing studies largely focused on subject areas such as math, reading, and writing, the use of computer technology in art teaching is largely ignored.

With limited literature based upon real experiences in art classroom settings, the direction of my study cannot come from a body of literature. Rather it has grown from the lack of it. Bromley (1998) believes that we need to look at sites where technological artifacts (the computer, for instance) are put to use. "We need to consider who is using it and why, what goals those people have, and how they're likely to utilize the technology in pursuit of their goals" (p. 5). Otherwise, Bromley argues, we risk assuming that the computer will have the same impact everywhere, under all circumstances. Influenced by Bromley, I set out to document how twelve Ohio art teachers use computer technology in their teaching. I identify the goals of these art teachers, and then proceed to address how they use computer technology in their pursuit.

Purpose of the Study

After reviewing the available literature, I came to the conclusion that little in-depth material has been written about art teachers' uses of computer technology in

teaching art. Therefore, it is my purpose in this document to present case studies of how twelve Ohio art teachers are using computers with their students. I will describe their goals, experiences and insights as a way to allow for a better understanding of the use of computer technology in the K-12 art education context.

Definition of Terms

The focus of my research will be on computer-related devices that include the use of computers, Internet, various software packages, and associated peripherals such as digital cameras, CD-ROMs, and scanners. I use the terms "computer technology," "technology," and "computers" interchangeably when appropriate to a context, although technology may be perceived as a more encompassing term than computer technology and computers.

Research Questions

In my study, I focus on twelve Ohio K-12 art teachers. Who are these teachers? What are their teaching goals? How do they use computer technology? What factors influence their use of computer technology, including personal goals and beliefs, as well as cultural/environmental factors? I also investigated issues of constructivist and collaborative learning, gender, and inequity.

Significance of the Study

From a theoretical perspective, my study will provide some contextual information that may contribute to discussion on reform issues. Also, it will add to the

body of knowledge about art teaching, computer technology, and the use of computer technology in teaching art. Educators and researchers interested in these areas will be able to draw upon this study to help understand the role of art teachers and their diverse purposes, goals, and motivations when using computer technology for educational purposes.

From a practical perspective, my research is written for teachers like Sheldon, who are enthusiastic but frustrated about using technology in their art classes. Rather than having an expert tell them what to do, I hope by providing an overview of twelve of their colleagues' experience to offer these genuinely useful and practical information that can help them move forward in their own teaching praxis. I also hope my study will provide a starting point for generating further communication, reflection, and debate among art educators.

Limitations of the Study

The focus of this study is to provide contextual information and to offer useful insights on using computer technology in teaching art. I do not intend to offer generalizations about American art teachers' uses of computer technology at the present time. Nor do I intend to provide a recipe book, to be followed by art educators in the area of technology.

CHAPTER 2

LITERATURE REVIEW

The literature of educational technology describes the great potential of computer uses. However, such claims are not with out controversy. Trotter (1998), for example, observed that the field of educational technology is full of conflicting theories and research results; assessing the value of educational technology is easier said than done, which is apparent by the relative dearth of research on this topic.

Hammond (1994) similarly pointed out that "This is a field in which research assumptions are contestable and results [are] open to widely varying interpretations" (p. 259). Different tales - romantic, tragic or ironic - are told about teachers' uses of computer technology. Unfortunately, "There is a great deal more disagreement than consensus concerning the optimal purposes and uses of computers in educational contexts" (Bryson and Castell, 1998, p. 81) These conflicting results pose significant problems for both researchers and teachers.

To set the stage for my investigations, I will first review some general findings drawn from studies on K-12 teachers' uses of computer technology, bearing in mind that some research assumptions are not explicit and findings may be contestable. I will

discuss how computer technology can be used for teaching purposes in general, as well as specifically in the arts. Then I will discuss factors that may influence teachers' uses of technology.

Second, I will review four studies that are relevant to my own work in terms of research questions, data collection, and writing approaches. I will give an account of these studies, including methodology used, their concerns raised, and their findings reported. I will then reflect on this material and discuss how I will use it in my own study.

Uses of Computer Technology

As pointed out by Becker (1998), during the past decade, expert wisdom, "manifested through articles in educational technology publications" (p. 25), has called upon teachers to use computers in a continually changing set of ways. Teachers were first urged to teach students computer programming using BASIC and LOGO, then to use integrated drill and practice system, then to use word processing, then to use curriculum specific tools such as history databases and science simulations. Since the early 1990s, teachers have been encouraged to take advantage of multimedia and hypertext programs, use email, and conduct research and publish works via the World Wide Web.

Expert opinion on the best and most effective technology uses seems to change along with rapidly evolving computer technology. Current suggestions for educational technology use include word processing, developing spreadsheets and databases, creating drawings, paintings and multimedia products, desktop publishing, modeling, and using computers to aid in visualization (Trotter, 1999), using the Internet, and developing web sites.

Word processing programs have been widely adopted for both classroom and home uses. According to the 1994 National Assessment of Educational Progress (NAEP), the most frequent use of computers for eleventh graders is to write stories and papers. Fourth and eighth graders primarily use computers for playing games, learning things, and writing stories and papers.

Simic (1994) comments that most teachers are concerned with the final product of writing, but have little understanding of the process that successful writers use in creating that product. He argues that writing should be an ongoing, multi-staged process, with equal emphasis given to each of the stages. To write well, it has been suggested that it is best to write as much as possible with constant revision.

For teachers to request students to write and constantly revise seems to be less problematic with the use of word processing than with paper and pencil. "Revision, long advocated but ignored by both teachers and students as too mechanical and painful, is now possible by pressing a few keys" (Simic, 1994, p.3). Clements & Nastasi's (1993) research showed that children who wrote using word processors composed longer and more complex stories, were less worried about mistakes, and were more willing to revise. Many children are able to thoughtfully express experiences, but they have difficulty using pencil and paper to transcribe their thoughts and ideas. Students tend to labor over the first draft and then lose their enthusiasm. Requests for constant revision and recopying become an overwhelming burden even though it is necessary for producing good writing (Simic, 1994).

Word processing, in contrast, allows rapid alteration and manipulation of text, thereby freeing writers to experiment. Immediate access to clean copy may stimulate

language play and further revision. Proofreading can also be easier on computers than with hard copy. In a group environment, multiple copies can be printed for reading in peer-editing groups or a group can gather at a computer station.

Computers can also be useful for organizing and analyzing data. For example, databases and spreadsheets are widely used in industry for these purposes. Aside from preparing students to meet job requirements, it has been suggested that students can also benefit from using these programs. By doing so, students learn to tackle numerical relationships and to arrange data in ways that allow more complex searches and analysis (Trotter, 1999). There are also digital art tools that offer new ways to draw. *Kid Pix* (The Learning Company) with its collection of special effects, is among the most popular drawing programs (Trotter, 1999). By making drawing programs available, teachers of other subject areas can easily incorporate a visual arts component into their classes.

Multimedia and presentation tools such as *HyperStudio* (Roger Wagner Publishing), *MicroWorlds* (Logo Computer System), and *Stagecase* (Stagecase Software), students can turn their research and written text into interactive or animated presentations with sophisticated visual and sound effects (Trotter, 1999). With desktop publishing software, students can create professional looking publications dissemination through the web or through conventional books.

Programs such as *The Geometer's Sketchpad* (Key Curriculum Press) and *Model-It* (Hi-C Research Group, the University of Michigan) have assisted students in understanding abstract math and science phenomena. In this process students are able to create and manipulate various types of computer models.

Using image processing software that many scientists use, students now can analyze digital images collected from satellite-based camera, microscopes, telescopes, and other devices (Trotter, 1999). *NIH Images* developed by the National Institutes of *Health* and *Scion Image* for Windows are two of numerous software programs that allow computer-aided visualization. The Internet, with its resources and ability for instant communication, also provides teachers with more possibilities for conducting research, communicating, and publishing.

Computer Technology Used by Art Teachers

The existing and emerging technologies that are relevant and available to art teachers can be divided into two categories. One is for teachers' personal use; the other is for teaching and learning purposes.

Personal Use

In terms of hardware, art teachers may have access to computers, cable TV, the Internet, CD-ROMs, videodiscs, and satellite technology. The extent of individual teacher's access to existing technology, however, varies from state to state, district to district, and school to school. Most art teachers do, it seems, have access to computers for collecting and analyzing information.

At a personal level, teachers may use computers to store, process, and retrieve information about attendance, scheduling, grades, inventories, and other organizational tasks, especially since this is required by many school districts. Overall, the most common use of computer technology is for word processing, which teachers use to prepare lesson plans and accumulate documentation as well as for desktop publishing.

In addition to using computer technology to assist in their daily work at school, teachers may also use it to access the Internet and take advantage of resources ranging from lesson plans and visual images to enhanced communication capabilities. The Internet allows teachers to tap into remotely located expertise and information. It also allows them to communicate with other art teachers.

ArtsEdNet, which is an on-line resource designed for art teachers, for example, has been very helpful in linking art teachers together. This network, which is funded by the Getty Institute, provides lesson plans, information on art-related issues, and a framework for discussion among art teachers.

In an email posted to art teachers participating in ArtsEdNet, ArtsEdNet was described as "a lifeline," "a Godsend," "a cyber teacher's lounge." In such an on-line community, art teachers -- who often seem to be isolated in their districts or systems -- talk and share ideas with one another around the globe. Among the topics explored are: lesson plans; problem solutions; talk about kids; the teachers' own artwork; supply sources; and current educational issues. An art teacher, Joy McGugan, describes ArtsEdNet as "a wonderful way to get new ideas or solutions for problems" (J. McGugan, personal communication, Nov. 28, 1998). Sandra Hildreth , another art teacher, feels that ArtsEdNet is especially significant to art teachers because they are " in a profession that is fighting on ongoing battle with budget cuts." They also sometimes faced "other faculty who (having achieved an 'academic' attitude) feel what we (art teachers) do is more 'fun and games' with no merit whatsoever" (S. Hildreth, personal communication, Nov. 28, 1998). ArtsEdNet gives teachers a common ground for discussing issues that are unique to art educators and to help isolated art teachers feel that "we are not alone" (S. Hildreth,

personal communication, Nov. 28, 1999). In addition to the use of email and the Internet to communicate with colleagues, parents, and the outside world, art teachers are also able to participate in distance learning courses, access educational research, and retrieve pertinent classroom materials.

In general, art teachers have access to computers, various graphic and multimedia programs, animation software, the Internet, digital cameras, scanners, and videodiscs. They use computers to store, process, and retrieve administrative information such as attendance, scheduling, grades, and inventories. They also rely heavily on word-processing to prepare lesson plans and documentation, and for desktop publishing. Emerging technologies such as DVD-ROMs, virtual reality, VRML, and an Internet with a wider bandwidth will no doubt eventually become available to teachers allowing for an even greater variety of ways that technology can be used to serve educational goals.

Engaging Teaching and Learning Environments

With the technologies available to art teachers, they are able to engage students in a variety of ways by using computer technology in art learning environments.

CD-ROM.

Teachers may use CD-ROMs to provide students access to art-related information. For example, they may give students access to art exhibitions, and information about artists, art works, and museums that would otherwise be unavailable to them. When Internet research is not possible, students can easily incorporate arts-related

information from CD-ROMs into their classes, reports and presentations. In addition to looking for visual and textual information, students can also experience virtual museums by taking gallery tours through the CD-ROM.

Art production software.

Teachers may use computer programs to help students explore their creativity through electronic means. Programs that art teachers may use include: *Kid Pix* (Broderbund), *Fine Artist* (Microsoft), *Dabblers* (Fractal Design), *Corel Draw* (Corel), *Photoshop* (Adobe), *Painter* (Fractal Design), *Freehand* (Adobe), and *Illustrator* (Adobe). These programs offer a selection of painting and drawing tools. Students can use them to create visual images in a non-messy environment which allows them to make changes easily. Beyond the drawing and painting programs, *KidCAD* (Davidson), which is designed for grades 2 to 12, can help students make design choices. Students can use this software to design a park, cottage, home, museum, city, town, or farm (Provenzo, Brett & McCloskey, 1999). Students can further explore their designs by examining different views and rotating their constructions.

Multimedia software.

There are several authoring programs available which help coordinate graphics, video, animation, text, and sound in the development of multimedia projects. These programs include *Hypercard* (Apple), *HyperStudio* (Roger Wagner Publishing), *Digital Chisel* (Pierian Springs Software), *ToolBook* (Asymetrix) and *Director* (Macromedia). These programs allow students to combine different art forms together as well as to develop sophisticated projects around particular issues and themes.

The Internet.

The Internet provides access to various forms of communication, including email, listservs, newsgroups, video conferencing, and MUD (Multi User Domain) environments. With this huge amount of information students can examine resources that are not easily accessible to them in any other way. There are also possibilities for teachers to develop collaborative projects which allow students to work with other students and professionals from outside their own communities as a way of enriching students' thinking.

Videodisc.

A technology with which teachers have a longer history of experience is the use of videodiscs. A videodisc is typically 12 inches in diameter and holds visual images and audio tracks. It creates the image of motion by projecting still images in rapid succession. As computers become more powerful and inexpensive, and as multimedia and hypermedia programs become more accessible, videodiscs are expected to have a life span of almost five to ten years before they are considered obsolete, as art educators increasingly adapt newer technologies for classroom use (Provenzo, Brett, & McCloskey, 1999).

Factors that Influence Teacher's Computer Use

Despite the promises and predictions made by educational researchers in the early 1980s, computer technology has not revolutionized education. In some classrooms computers continue to sit idle in dark corners collecting dust. In others, computers are

used as electronic workbooks for drill and practice (Sandholtz, Ringstaff & Dwyer, 1998). Why are teachers not taking full advantage of computer technology? What factors that influence teachers' computer uses?

Research studies have identified the following factors as potential barriers. They include access to current technology, teacher training, lack of clarity about teaching goals, lack of time and administrative and collegial support, gender issues and inequity.

Access

There used to be a debate whether computers should be placed in labs or in classrooms. Now most people have come to the conclusion that the best place for computers is in classrooms. Current educational reform emphasizes the importance of forming collaborative groups to produce products and engage in thoughtful conversations, especially with the use of computer technology. Becker (1998) argues that for collaborative groups to work well, a typical classroom requires five to eight computers. However, he also observed that "the typical classroom that has any computers present has only one or two" (p. 26).

Educational Week's 1999 National Survey of Teacher's Use of Digital Content finds that teachers who do not use software or Web sites for instruction are more likely to cite a lack of classroom computers as the problem than any other reason (Fatemi, 1999). As for art teachers, David Burton (1998) conducted a national survey in 1997 to which two hundred and forty-nine teachers responded (24.9% response rate among originally selected teachers). Survey results showed that the majority (61.8%) of respondents used computers for word processing. Other uses of computers mentioned included writing

research papers (40.9%), preparing lessons (42.9%), and carrying out administrative duties (41.3%). Burton's research project is the only one I have encountered that investigates at a national level how art teachers use technology. The low response rate to his survey (24.9%), however, makes the research findings potentially unrepresentative.

Burton's survey data also indicate that art teachers think of themselves as knowledgeable and receptive to the use of electronic technology. His respondents felt that they had adequate or better support for professional development and training (58.9%), but access to necessary equipment, software, funding, and infrastructure was lagging far behind their knowledge. Burton concluded that lack of computers, peripheral equipment, and other resources severely limits how far and to what depth teaching and learning uses this medium.

Teachers' Technology Training

Research studies suggest that there is a positive link between teacher training and the use of technology. Teachers who receive more training are more likely to use computer technology in their teaching. Harold Wenglinsky of the Educational Testing Service (as cited in Archer, 1998), for example, found that training in technology is linked to effective uses of computers in 4th and 8th grade math classes. "Effective use," for Wenglinsky, means not using computers for drill and practice but for higher order thinking through simulations and applications.

Although 58% of Burton's research respondents felt that they had adequate or better support for professional development and training, other research studies suggest that although teachers are getting some training, but that is not always enough (Jerald,

1998). According to a 1997 survey by the Corporation for Public Broadcasting, the vast majority of teachers (90%) have had some training in educational technology at some time in their careers. But the National Assessment of Educational Progress reported in 1997 that teachers are less likely to have had training in more advanced technologies, such as multimedia computers and the Internet.

According to an investigation by the Educational Testing Service on the status of technology in American schools, most of the teachers in today's classrooms have had little training or experience in technology (Coley, Cradler & Engel, 1997). Only 15 percent of American teachers had had at least nine hours of training in educational technology in 1994. As of 1996, 18 of the 50 states did not require courses in educational technology for a teaching license. Although studies suggest that more training lead to more or better use of computer technology (sometimes without defining "better" use) research suggests that teachers would benefit from more and better training than is provided now.

Gender

Gender is a recurring theme in educational technology. The literature has suggested that most boys and girls have positive attitudes toward computing, with girls' attitudes being somewhat less positive than those of boys (Huber and Schofield, 1998). The *Computers and Classrooms: The Status of Technology in U.S. Schools* (Coley, Cradler & Engel, 1997) report indicates that female students were less likely than males

to have course work or experience in computer literacy and computer programming. They are less likely to use computers to solve math and natural science problems and they are more likely than males to have experience with word processing.

Some researchers similarly suggest that female teachers show more anxiety or a more negative attitude toward computer technology. Others, however, dispute such conclusions. Gender does seem to be a factor that influences teachers' computer use to some degree. Evans-Andris (1996) found a relationship between gender and style of computing. Most female teachers participating in her study engaged in behaviors toward computing characterized by either avoidance or integration, which I will explain further in later sections. Nearly all the men engaged in acquiring specialized technical knowledge of computers. She concluded that there are gender differences in attitudes toward computing, computing skills, and computer use.

Another interesting study was conducted by Lee (1997). He studied hundreds of teachers who used computers in secondary schools in the state of Victoria, Australia. His study showed that male teachers are "more active in computing and their activity covers a wider range of tasks or applications than occurs amongst women" (p. 258). Male teachers are more confident about using computers and more likely to complain about impediments to their effective use of computing. Female teachers, by contrast, report lower levels of computing use and are more likely to blame themselves for their lack of confidence. They are also more willing to seek external and private solutions such as taking courses paid for from their own income or reading manuals or other self-education

literature. Whether Lee's observation is fair or not is yet to be confirmed or disconfirmed; my feeling is that the gender issue will continue to be closely researched, and debated, and is worthy of attention.

Inequity

Inequity of access to computer technology has long been at the center of attention. Many resources have been invested in the schools by different initiatives and foundations to try to narrow the gap between technology have and have not schools. However, the investment of materials and effort does not seem to be enough.

According to *Computers and Classrooms: The Status of Technology in U.S. Schools* (Coley, Cradler & Engel, 1997), inequity is strikingly apparent. Although ninety-eight percent of all schools own computers, the report points out that there are major differences among schools in their access to different kinds of educational technology. Students who attend schools with a large portion of poor and minority schools have less access to most types of technology such as multimedia computers, cable TV, the Internet, CD-ROM drives, videodiscs, and satellite technology, than students attending other schools.

In addition to less access to newer technology, students from minority groups were also less likely to use computers in English courses and to solve problems in mathematics and natural science. Instead, they were more likely to have courses in data processing and computer programming.

In Wenglinsky's research on how computer use relates to students' achievement in math and science, he observed that low-income and black students are the least likely to have teachers who use technology to its full advantage (Archer, 1998).

> *At the 8th grade level, about 31 percent of white students used computers mostly for simulations and applications, compared with just 14 percent of black students. At the same time, more than half of America's black students had teachers who used computers mostly for drill-and-practice, compared with 30 percent of white students. (Archer, 1998, p. 18)*

According to Wenglinsky, to use technology to full advantages means incorporating simulations and problem solving skills, as opposed to mere drill-and-practice. One question worth examining is whether drill and practice is all bad. At times, I believe it can be a useful way to build skills needed to advance to a next level of mastery. However, drill and practice seems to have a bad reputation in educational research. It is generally acknowledged as a poor computer use. Sometimes researchers have neglected to even define what drill and practice means for different student groups in different subject areas.

Despite this problem, Margaret Honey, deputy director of the New York City-based Center for Children and Technology, has made some interesting observations. She points out that it is the low-income communities that have invested the most in technology for drill and practice. She hypothesizes that this may be due to the fact that many urban administrators expect that students from disadvantaged backgrounds need basic skills and nothing else (Archer, 1998).

In sum, poor and minority students have less access to relatively sophisticated computer technology. The technology made available to these students is categorized as low level, being intended for drill and practice use.

Research findings also show that teachers need supportive conditions at several levels to be able to successfully implement the use of computer technology in their teaching. At a personal level, Means (1994) strongly emphasizes that teachers need to be clear about their goals for using computer technology and to internalize these goals.

In addition, teachers need the support of administrators, colleagues, and other infrastructure staff, who can give rewards, discuss problems, reinforce teachers' effort, and help maintain hardware and software (Veen, 1993; Sheniderman, 1998). Easy access to hardware and software (Veen, 1993), training, and time for making personal, conceptual and pedagogical changes (Schrum, 1995; Lee, 1997) also support teachers' efforts. Funds need to be available to finance teachers' efforts (Lee, 1997; Sheniderman, 1998). Another factor that appears to be important is the presence of computers in teachers' homes (Veen, 1993).

Summary and Critique

Studies on teachers and their use of computer technology vary in focus, scope and findings. Most of the available studies on current teacher training and use of computer technology rely on survey methods. Studies on gender, support needed by teachers and their use of technology have used qualitative research methods. Generally, these studies do not question the value of computer technology in education, and seem to assume that teachers' use of computer technology is necessary or needed. These studies demonstrate the importance of and the lack of teacher's training. As a body, they also lack of information on how teachers are actually using computer technology in their current teaching practices. These studies attempt to discover the relationships between teachers' backgrounds and their use of computer technology, although definitive conclusions are

yet to be drawn. Two important issues, those of gender and inequity of access, have been raised and explored. Finally a variety of support that teachers need in order to better use computer technology in their teaching practices are suggested.

Review of Related Studies

Four case studies that are particularly relevant to my research questions, data collection methods, and approach to writing are presented here. I will give a somewhat detailed account of these studies, their extent and methodology, their concerns, content, and research findings to set stage for my work.

Computers in the Classroom by Gooden (1996)

Gooden's (1996) book investigated how teachers and students from six schools were using technology to transform learning. The first project examined took place at St. Benedict's Preparatory School, Newark, New Jersey. High school students engaged in a cultural, historical, and scientific exploration of their community. The Newark Studies program and the student magazine *Newark InDepth* focus on a community struggle to revive itself. Topics relevant to the city and its health are its primary focus. Students at Abita Springs Elementary School, Abita Springs, Louisiana initiated a Hypertext Folklore project. Students collected and wrote stories based on local folklife. They then transferred them into the *HyperCard* program to create a permanent, electronic folklife encyclopedia for the town's school libraries. A similar Myths and Legends project took place on the Pine Ridge Indian Reservation in South Dakota. Students at Pine Ridge High School used computers to write, illustrate, and animate stories and legends of their ancestors which they collected through interviews with tribal elders.

The Computer Greenhouse Effect is another example presented in the book. Students at South Philadelphia High School cultivated plants and used computers to record growth data, conduct plant growth simulations, and write reports on everything from photosynthesis to acid rain. Students in Ralph Bunche School, in the Harlem neighborhood of New York city, set up an Earth Lab. Working collaboratively, they installed a weather station on top of the school and used computers to track weather patterns. Another innovative program, *Teaching for Transition to the Next Century,* took place in Dos Palos High School, California. In this program, students learned computer skills that helped them make the transition from school into the work world. Since the program was instituted the school has quadrupled its number of college-bound students.

Gooden does not touch on the issues of inequity, gender, and training. She does provide detailed accounts of the people involved with the projects, and how computers were used in the curriculum. The six schools, each presented in a chapter, were chosen from hundreds of schools and educators that were supported by the Education Grants program of Apple Computer. No selection criteria or data collection and analysis procedures are provided in this book. Black and white photos, as well as examples of students' works, are included. Gooden's purpose was to tell the stories of six different classrooms "through the voices of the teachers, students, and administrators" as a tribute to their work and a way for them to inspire others. What happened at each school is represented as a story, with teachers' quotes that are nicely woven into the text.

Gooden argues that "there is no one recipe for success; what works for one school or district may not work for another" (p. 156). Some conclusions, however, can be drawn from the six cases. The study confirms other research findings that teachers need time,

leadership and administrative support to successfully use computer technology in their classroom practice. The environment must also support new ideas and experiments with using computers as a tool. A common vision or set of beliefs is an essential first step which connects a whole school create a framework for practical applications. Gooden rejects the idea that the computer is only a mechanical tool, and emphasizes that computers are quasi-intelligent tools that invite ongoing acquaintance.

An apple for A Teacher by Evans-Andris (1996)

Evans-Andris (1996) seeks to understand the work world of elementary school teachers as they progress through the process of change with computers. She examines "a basic set of theoretical arguments regarding structural and occupational dynamics and the implementation of computer technology in elementary school" (p. 163).

The research was conducted in two phases spanning four years each. Thirteen schools were selected to reflect the full range of teaching environments at the elementary level. Data were collected through intensive observations and interviews. Collected field notes and interview responses were reviewed to search for similarities, differences, and negative cases. Various individual behaviors and patterns of behaviors or strategies were identified.

Evans-Andris identifies three styles of computer use among teachers: avoidance, integration, and technical specialization. The predominant style of computing, Evans-Andris concludes, is that of avoidance. Teachers may take students to the computer labs and provide them access to computers but, for the most part, they did not use the equipment themselves. While students interacted with computers, teachers tended to

distance themselves from the situation by grading papers instead, for example. Their students used software in routine ways lacking creative input or involvement on the part of the teacher. Teachers with this style teach students how to operate machines instead of teaching them to use computers as tools to further their schoolwork.

Among the three styles of computing, Evans-Andris feels that "the style of integration is perhaps the strongest and most relevant style of computing for the elementary school" (p. 153). This style is flexible and nonrestrictive. These teachers who developed this style generally integrated technology into their teaching methods, curriculum, and the learning experiences of students. They used drill-and-practice software when that fit the curriculum goals or students' needs. They went further and introduced a broader range of computer applications as well as developing creative and engaging projects that integrated computer activities with other instructions.

Technical specialization was a third style of computing. Teachers with style possessed computer skills that were notably strong. They used computers at various levels and in a variety of ways. They could be mistaken as integrative computing style teachers at first glance. Usually, it was the students' responses and their teaching content that distinguished them from teachers with an integrative style. During instructional sessions, for example, technical specialization style teachers spent more time teaching about computers than teaching with computers. They focused their efforts on teaching students basic skills and the technical aspects of the computers, such as identifying parts of the machines, keyboarding or presenting elementary levels of computer science. Teachers with this style seemed to find computers to be intrinsically rewarding. Their students, however, were less likely to find such learning experience interesting, exciting

or relevant. Students' comments tended to be "Oh, this is just so hard." "It's boring." Or "I hate computers." Schools, however, commonly value highly these teachers' technical abilities, and reward them with increased status, sometimes resulting in promotion to positions of computer coordination.

Evans-Andris's study is helpful in seeing how teachers react to computers in the classroom. However, the first research phase took pace in the late 1980s and may reflect older uses of technology than current uses. The reasons why teachers behave the way they do remain unclear.

For teachers to successfully use computer technology in learning contexts, Evan-Andris noted that school environments must support new ideas. Effective computing strategies suggested by Evans-Andris included goal setting, principal leadership, effective management, assessing equipment needs, staff development, encouraging teachers to adopt an integrative computing style, providing strong incentives, and computer coordinators with a means of monitoring and responding to concerns about computer use. Periodical reevaluation of computer programs was also important.

Evans-Andris' study took a new approach by investigating the effects of computer technology on the occupational culture of teachers. She found that computer technology created opportunities for some teachers to gain important skills, as well as other positive occupational rewards. She also observed that many teachers and principals did not perceive computers as technology relevant to their jobs.

Another interesting observation in this study is that a teacher's style of computer use persisted despite the acquisition of additional computer equipment, increased familiarity, or ongoing training and experience with computers. Evans-Andris'

observation of a teacher's autonomy in decision making and the persistence of teacher's style seems to be in conflict with other research studies that call for additional equipment and training. It suggests the importance of individual teacher's decision making and calls for further understanding of how teachers make their choices.

"How Teachers Use Computers in Instructional Practice – Four Case Studies in a Dutch Secondary School" by Veen (1993)

Veen (1993) provides a model study of how teachers made their choices in the role of computer technology in their teaching practices. In his study he attempted to find out how four teachers used computers in a Dutch secondary school between 1989 and 1991. Four teachers, whose subject areas were French, English, geography and history, were selected to participate in this study. In a joint-study agreement with IBM, they were each provided with a computer at home, a computer in their classroom, and a computer laboratory with thirteen computers.

The selected teachers included teachers who were not well acquainted with the use of new technology in education. Teachers first received in-service training in computer-assisted learning. Then, teachers were given an overview of the software available and how they could use computers for file handling and word processing.

Data collection methods included classroom observation, interviews with teachers, and review of the teachers' diaries. To eliminate bias in the collected data, all interview transcripts were commented on by one of the members of the research team. Researchers rotated classroom observations as well as interviews. In analyzing a teacher's diary, the method of matrix-displays suggested by Miles and Huberman (1984) was used.

This study found, overall, that the teachers' computer-assisted (CAL) lessons could be categorized into seven types. The computer configuration and the pedagogical setting differed in each type. Also, 80% of their lessons taught were "teacher-centered." Third, school factors such as access to hardware and software, as well as the principal's and financial support were important. However, teacher factors outweighed the school factors; the use of computers was most strongly affected by the beliefs, skills, and routines of the teachers.

In other words, these findings suggest that teachers hold on to their pre-existing pedagogical and educational beliefs while incorporating the computer in their existing teaching routines. Their beliefs about the appropriate content of their subject areas and their beliefs are the most influential factors in determining their levels of computer use.

Veen (1993) is concerned that educational innovators do not recognize the importance of accepting teachers' views. He feels that the use of computers should fit into the existing skills of teachers and should not demand too much effort to change them. If a teacher starts using computers for drill and practice only, he argues, that use fits best that teacher and it should not be criticized.

Evans-Andris and Veen both suggest that teacher factors outweigh school factors. Veen takes the issue further by suggesting that teacher's beliefs are the most influential factor in determining how technology is used. Teacher's beliefs, Veen finds, are comprised of their ideas about appropriate content for their subject areas and their beliefs about pedagogy. Extrapolating from Veen's findings, it seems sensible to speculate that beliefs about the appropriate content of art and art teaching lead art teachers to use computer technology in certain ways.

Teacher's Perception on the Use of Computers In Secondary Art Classrooms" by Cato (1997)

The issue of how art teachers use technology in their teaching practices has rarely been investigated. In addition to Stokrocki's 1997 study of how one middle school art teacher used video technology in teaching art, Cato's dissertation research provides some insights on this issue. The research questions of Cato's study were: How has computer technology impacted art instruction in the component areas of Discipline-based Art Education in high school programs in the United States? and What role should such technology have on teacher training instruction?

His study investigated nine high school teachers and their perceptions of the use of computers in secondary art classrooms. The snowball sampling technique was used to identify art teachers around the United States. Participating teachers were carefully chosen from those teachers who had published articles and made presentations at state and national education conferences during the years 1990 to 1995.

Data collection was based on one time open-ended telephone interviews, which lasted 45 to 80 minutes each. Additional documents such as teachers' lesson plans were collected. In reporting each case, Cato refers to the teachers by number, using one to nine. He summarized each teacher's verbal responses in light of his research questions, with occasional direct quotes from the teachers.

Cato found that eight of the participants stated that the computer was another art-making tool. He observed that the teachers used computer technology in their teaching for various reasons. Although they received some forms of training through workshops, in-service training, and college courses, most of the teachers were primarily self-taught

about computer basics and the use of computers in teaching art. All the teachers interviewed had integrated computer technology into their studio art programs, although the uses and degree of integration varied. All of the participants felt that creative thinking was important. Some were clear about the way they encouraged students to think creatively while using computers; others weren't. Six of the nine teachers felt that students were more inclined to feel that computer images were art than adults. Also, not all of the teachers felt that they received administrative support, although they all recognized the importance of it.

Cato's is the only qualitative research that I found that focused on art teachers as the primary research participants. He is also the only researcher who stated his research assumptions. His study showed how computer technology is used in the high school curriculum, and investigated teachers' perceptions of its usage. His research design and sampling strategies are similar to the one I used. Therefore, I found this study of particularly relevant to my work.

My Research

Similarly to Cato's (1997), my study will focus on how art teachers use computer technology in their teaching. In contrast to Cato's research design, instead of looking for art teachers nationally, I looked at art teachers within the state of Ohio. This geographic limitation allowed me the possibility of conducting face to face interviews and classroom observations, something that Cato was not able to do in his research.

Similarly to Veen's (1993) and Evans-Andris'(1996) designs, my data collection method employed intensive interviews and classroom observations. In writing up each

case, I followed the method Gooden(1996) used in structuring her book. That is, I present each teacher's story case by case, providing descriptions of the place, the people, and the process of integrating computer technology in teaching practice. I wanted to move beyond merely summarizing teachers' verbal responses or referring to teachers simply by number. I wanted to give each teacher a face and a name, and to include a concrete description of what happened and how computer technology was being used in his or her teaching practice.

Cato's(1997) research findings on teachers' diverse backgrounds, reasons for using computers in their teaching, and ways of using technology provided me with baseline information to compare with my own. Veen's (1993) observation that teachers' beliefs are the most crucial factors in determining their computer use supports one of my long-held beliefs. Through the research process, I looked closely at such assumptions to see if similar observations could be made specifically of art teachers.

I have drawn from others research on teachers' use of computers. I also kept in mind the issues of gender and inequity and the controversy surrounding the use of computer technology in school learning contexts.

Reflection

Bryson and Castell (1998) argue that the unreflective and uncritical telling of tales confronts us with the greatest danger. As I began to review the literature on use of technology in K-12 teaching, I was troubled by the fact that few researchers stated how their pre-assumed positions affected the conduct and findings of their research. They rarely expressed how their own biases and assumptions about the best use of computer technology influenced their thinking or affected their findings on this issue. Like Cuban

(1986), I believe that to ask about computer use in schools is to ask what schools are for, why teachers teach certain content, how they should teach, and how children learn. I believe that my research assumptions, which are filtered through the lenses of my language, gender, social class, race, ethnicity and cultural backgrounds, affect what I see in my study and how I interpret it.

CHAPTER 3

LITERATURE REVIEW ON CONSTRUCTIVIST AND COLLABORATIVE LEARNING

As mentioned earlier, my thinking about constructivist and collaborative learning is more than a literary and philosophical point of view. My concerns and beliefs are grounded in my own learning experiences. Constructivist and collaborative learning theories, in a way, provided me with some supports that relate to my personal beliefs grounded in my learning experiences, which came together with my thinking on the use of computer technology.

Current educational technology literature has emphasized the potential of using computer technology in constructivist ways. Therefore, I will provide an overview of what constructivist teaching and learning mean and how a constructivist framework relates to educational technology.

Constructivist Learning

"Constructivist" is an umbrella term. It is used to describe a range of ideas about the production of knowledge and its construction by groups and individuals (Larochelle, Bednarz, & Garrison, 1998; Fleury, 1998). This usage is further complicated by the fact

that the interpretations of the term are articulated differently without a simple, clear-cut, agreed-upon definition. Different authors emphasize different aspects of a constructivist model, although most interpretations can be traced back to the idea of knowledge and how people acquire it.

Knowedge is constructed by the learner. One thing that constructivists do agree on is that learning is an active, and constructive process, rather than a passive act of receiving information. Constructivist theory describes learners as agents who pursue their own purposes in their efforts to construct meaning (Efland, 1999). As a result, it emphasizes the active involvement of the learner. Since the meaning each individual constructs is based upon and grows out of his or her own experience, knowledge cannot be conceived of as the pursuit of a singular universal truth which exists outside of individuals. From this perspective, each individual constructs rather than swallows knowledge. This approach leads to the conclusion that art is no longer the representation of universal truth but a way of sharing the meaning that one makes of the world.

As mentioned earlier, there is no canonical form of constructivist theory. Cobb (1994) identifies two variations – cognitive constructivist and social constructivist. Bonk and Cunningham (1998) further explain that "cognitive constructionists tend to draw insights from Piaget and focus on individual construction of knowledge discovered in interaction with the environment""(P. 32). Social constructionists, in contrast, rely more on Vygotsky's sociocultural theories. On this view, learning is connected with and appropriated from the sociocultural context within which learners are immersed (Bonk & Cunningham, 1998).

Collaborative Learning

Individual Constructivist View

Both cognitive/individual constructivist and social constructivist theories are relevant to our understanding of collaborative learning. From an individual constructivist view, "collaboration can foster debates and eventual disequilibrium," which potentially "encourages students to decenter from their own point of view" (Bonk & King, 1998, p.4).

Piaget argues that children are not just immature humans but people who think differently from adults. Piaget observes that the young child first learns about, and starts to control his/her environment through his/her senses and motor abilities. The young child is at first "egocentric" and "can't see from another's point of view" (Benson & Grove, 1999, p. 137). As time progresses, the child starts to acquire language(s), to be able to see from another's point of view, and to be engaged in both concrete and abstract thinking. Piaget argues that an individual's mental development interacts with the outside world and requires the individual to construct knowledge.

His schema theory explains how people develop concepts by building simple ideas into complex ones. Schemas develop through two processes. They are assimilation, which means to take in, and accommodation, which means to change. "The development and use of schemas through assimilation and accommodation enables adaptation to the changing environment" (Benson & Grove, 1999, p.141).

"In Piagetian terms, the temporary cognitive stability resulting from the balance of assimilation and accommodation is called equilibrium" (Brooks & Brooks, 1993, p. 26). In a collaborative learning environment, students are provided with opportunities to

see things from others' points of view. The process of taking in others' viewpoints (assimilation), and reflecting or changing one's pre-assumed positions (accommodation) helps an individual in the construction of knowledge. A collaborative learning environment helps facilitate the learning experiences.

Social Constructivist View

Collaborative learning, Cooney (1998) argues, was built upon the foundation of social constructivist thought. Social constructivists believe that the individual primarily, and most importantly, is a social being (Cooney, 1998). They follow Vygotsky's socialcultural theories and assert that " the individual's mental functioning is inherently situated in social interactional, cultural, institutional, and historical contexts" (Bonk & Cunningham, 1998, p. 35).

Knowledge is not something "out there" that has to be given by a teacher and memorized as truth. Instead, knowledge "is something that, through interactive discourse, is continually made and remade, shaped and formed" (Cooney, 1998, p. 264). From a social constructivist viewpoint, the social interaction with adults and more capable peers is important to provide a means to guide children to developmental levels that they might not independently attain (Bonk & King, 1998).

Vygotsky did not use the terms constructive or collaborative himself, but his term "zone of proximal development" was adopted by constructivists. "Zone of proximal development" refers to understanding that lies beyond current knowledge and ability. Bruffee (1998) argues that what we cannot learn on our own at the moment, we can learn with the help of others. When an individual learns in a heterogeneous group that includes

diverse experience, talent, and ability, people's "zones of proximal development" overlap. Thus, students are able to analogize, generalize or extend what they know in collaborative learning environments.

Constructivists, Collaboration and Art Education

Constructivists tell us that knowledge is not simply acquisition but construction of meaning. Meaning is in the mind of the knower, and there are multiple perspectives. We can memorize ideas that others tell us, but memorize is not the same as seeking meanings. To make sense of experience, learners need to think about what they have done and articulate what their experience meant to them. They can articulate their understanding through verbal, as well as visual or auditory representations. Meaning making is an individual effort as well as a process of negotiation with others through dialogue and conversation in collaborative environments.

The ideas of constructivist and collaborative learning, I believe, are important in our understanding of art education. Although current art education literature does not refer to constructivist learning theories directly, I have found that literature on postmodern art education reflect ideas being expressed in constructivist or collaborative concepts.

Multiple perspectives, active construction of knowledge, and negotiation of meaning -- concepts that are embedded in constructivist and collaborative learning -- share strong relations to postmodern ideology. Postmodernists and constructionists are both opposed to the notion of an absolute and universal truth. Postmodernism emphasizes that "facts are simply interpretations, that truth is not absolute but the construct of

individual groups, and that all knowledge is mediated by culture and language" (Barrett, 1997, p. 18). Thus, postmodernism goes well with the constructivist way of thinking. The value of oppressed voices and democratic inclusion of multiple voices expressed in postmodern thought also reflect the emphasis on collaboration.

Current art teaching practices are mostly grounded in modernist conceptions of art (Efland, Freedman & Stuhr, 1997), and are therefore limited. For modernism, creative self-expression is the most important philosophy that has guided American art teachers since the 1920s. There is also a strong emphasis on teaching elements and principles of design as the basis for studio production and art criticism. Artists are regarded as innate geniuses who are isolated from the social, political, and economic contexts, and who are able to represent that which is true, universal, and eternal, while showing what is personal. In this view, the modernist concept of identity, based on the idea of the uniqueness of the individual, has prevailed (Efland, Freedman, & Stuhr, 1996).

Art surely offers a means to help the individual express himself uniquely. However, art is also a form of socio-cultural production (Efland, Freedman, Stuhr, 1996). In addition to self-expression, art can comment on the social-cultural environment, tell us something about ourselves individually and collectively. Agreeing with Gablik (1991), I think it is time for art educators to address how artworks are inseparable from their social-cultural environment; to see that an artist is not an isolated entity; to encourage use of art as a means to address larger social-cultural issues; and to let relationships and connections take precedence over individualism and competition.

How Does Technology Support Constructive and Collaborative Art Learning?

> *Indeed, access to the information interactive integrated technology offers has made it possible for art teachers to change the philosophy of their program of study from an Aristotelian to a constructivist approach.*
>
> *(Dunn, 1996, p. 9)*

Dunn (1996) and Gregory (1995) have noted that the use of computer technology has made it possible for art teachers to change the philosophy of their program of study from an Aristotelian to a constructivist approach. Gregory (1995) points out that traditional forms of instruction have been based on an Aristotelian model, which assumes that objective truth exists and that by using rational ways of thinking we can arrive at objective truth, knowledge that can then be taught to others. Within this approach, students are rarely asked what they want to learn or need to learn (Gregory, 1995). Teachers predetermine what information or knowledge students need to know long before the learning situation is at hand and then present the information, usually in a linear, or logical manner.

Computer technology brings easy access to art related issues and information, and provides students opportunities for self-directed learning. In Gregory's view, it holds a great deal of promise for changing the way students come to know and experience the discipline of art. Dunn (1995) similarly believes that we now have the tools to move way from a model based on gifted and talented approaches to a connoisseurship model that holds great promise for the vast majority of our students.

As an Art Making Tool

Computer technology can be used as a creative tool (Dunn, 1996). Some students who believe themselves incapable of drawing have stated that computers make them artists (Freedman, 1990). This may be due to the fact that the students are able to experiment more on the computer than is common with other media (Freedman, 1989; Greh, 1986).

Taking risks or experimenting with image changes in art production, an essential step for art creation, is difficult for some learners. In traditional art-making activities, it can be intimidating for students to make what they believe to be errors. In the electronic art environment, students of all ages are reported to have a greater willingness to "make mistakes" or enlarge upon the "happy accident" than when they are using non-computer based media (Freedman & Relan, 1992).

The sense of confidence-building and spirit of experimentation brought with the use of computer technology in art creation are essential in students' understanding and appreciation of the art making process.

As a Research Tool

In addition to assisting in the art creation process, computer technology can be used as a research tool (Dunn, 1996). The technology-mediated learning environment provides for a level of visualization not possible with traditional media. In the multimedia environment, a vast number of art works can be studied in interdisciplinary contexts enhanced by the simultaneous use of audio, text, animation, video, and graphics. Students can have access to information which is presented in a more engaging way, and look for

answers that suit their own interests. Thus, it is possible for students to take the role of independent inquirer instead of passive knowledge receiver. With the use of computer technology, students can pursue their own interests, look for information provided for them from other sources than from teachers, take active roles and be responsible for their own learning (Gregory, 1995).

As a Communication Tool

The use of computer technology supports discussions, debates, and collaborative efforts without the necessity for people be in the same place. The fast growing use of technology represents the interconnection of communities of learners. Students as well as teachers are now able to converse and collaborate with others all over the world. Technology, in other words, becomes a medium which facilitates global learning communities. Students participate in on-line conversations, and they articulate their points of view and reflect on perspectives provided by other participants as well as their own.

The use of on-line discussion, email, chat, and computer conference can not replace face-to-face interactions. However, these experiences can support learners in unique ways as they engage in reasoned dialogue, collaborate with remote and diverse audiences, and learn to express themselves (Jonassen, Peck, & Wilson, 1999). The use of computer technology helps to make possible global communication, immediate access to wide ranges and multiple formats of information.

Constructive and Collaborative Uses of Technology in Art Learning Contexts

I believe that the mere addition of computer technology to classroom practice does not ensure that the learning taking place is constructive or collaborative in nature. "In the absence of well prepared, critical and caring teachers, the use of computer technology can still result in an information glut where much of the information students get is superficial and indiscriminately arranged" (Hargreaves & Fullan, 1998, p. 76). Students can create fancy projects with the use of computer technology and surf on the web for huge volumes of information; however, this does not in any way guarantee that their understanding and learning of the arts will be any different than it would have been without computers.

This leads to the question of how we can use technology to facilitate constructive and collaborative art learning experiences. Going back to the point that Cuban makes, I think this question brings us to questions about the purpose of art education.

If we believe that art learning is more than producing objects that are aesthetically pleasing to the eyes, art learning should address broader issues that relate to the philosophical, aesthetic, and historical contexts of art; for example, how art reflects the time, culture and place in which it was created; how art can be a vehicle to speak from and search for oneself; how art address social concerns, and how the artist is related to the outside world. Art teaching should be a way to foster creativity, to allow self-expression, to develop critical thinking skills and problem solving.

With the use of computer technology in the art classroom, the emphasis should not be just on learning how to operate the machine, using the software programs, or following strictly teacher's step-by-step instruction for finishing a project which is

controlled and designed by the teacher without students' input. On the contrary, the use of computer technology should relate to specific learning goals. The use of computer technology should move beyond art production, pushing students to think about what it means to create, to be imaginative, to express oneself through the use of electronic media. Teachers can have students describe, share, critique and reflect on their artworks, and, in this way, address the social cultural impact of technology. Students can search and study information about artists and artworks using CD-ROMS and Internet. Students can also debate issues such as originality, ownership, copyrights, and how technology redefines the concept of art. Students should spend time working independently as well as collaboratively with other students to develop shared understanding. As a result, students will demonstrate a new understanding of art, and constantly think about how the new understanding can be applied in their lives – intellectually and personally. Students will not just mindlessly fulfill a required art assignment that is without intrinsic interest.

Relevance to My Research

What I described above are my personal views as well as what I hoped to find in my research. Several criteria can be drawn for analyzing teachers' use of computer technology in teaching art.

The followings are some guidelines, modeled after Jonassen, Peck and Wilson's (1999) rubric, which I found to be helpful in organizing my "looking" at classroom practices.

Poor Use of Technology → →→ Better Use of Technology		
Knowledge Construction		
Students engage in learning activities because activities are required, rather than of an intrinsic interest.	Learners frequently seem to be operating based on a sincere curiosity about the topic of the study	Learners are consistently striving to resolve disparity between what is observed and what is known, operating on a sincere desire to know.
Meaning-Making		
Learners rarely create their own understandings of how things work	Learners are often expected to make sense of new experiences and develop theories	Learners routinely wrestle with new experiences, becoming experts at identifying and solving problems
Collaboration with peers		
Little of the learner's time is spent gainfully engaged with other students	Learners are often immersed in activities in which collaboration with peers results in success	
Collaboration with People Outside of School		
Little of the learners' time is spent gainfully engaged with experts outside of school.	Learners are involved in activities in which there is significant collaboration with people outside of school.	
Negotiation of Meaning		
There is little evidence that learners work together to develop shared understanding of tasks or of solution strategies.	Learners collaborate with ease. Ideas of all team members are valued.	
Learning Goals		
Learners are often pursuing activities that have little to do with the attainment of specific goals	Learners are generally engaged in activities that contribute to the attainment of specific goals	
Technology Use in Support of Learning Goals		
The use of technology seems unrelated to the specific learning goals	The use of technology contributes to the attainment of specified learning goals	The use of technology makes a powerful contribution to the attainment of specific learning goals

When used well, computer technology contributes to an engaging and fruitful learning environment. However, technology should not drive the educational decisions or learning. Rather, decision making should be based on the learning and teaching needs of

the student and teacher. The teacher's role may change, but will not be replaced. We have to take teaching beyond technology, and think about the best approach to student learning.

In other words, we have to examine critically the assumptions being made about what knowledge is and how one acquires knowledge. Constructivist and collaborative art learning provides art educators with another "lens" through which to see what we mean by art teaching and learning. I hope by seeing through these lens and by reflecting more on our assumptions on what art and computer technology are, we will be able to think and teach beyond technology and to address students' learning.

Cuban (1986) wisely observes that unless teachers start out with specific technology goals that support their vision of learning, technology will most likely be used to reinforce the status quo. I hope this research encourages all of us to reflect on what it means to use computer technology in the art learning environment in a constructive or collaborative way.

CHAPTER 4

METHODOLOGY

The purpose of this research was to understand rather than to predict, control or emancipate. As a researcher, I situate myself in the interpretivist/constructivist paradigm. The term paradigm is used here to represent the ontological, epistemological and methodological foundations for my study.

The assumption about the nature of knowledge and reality that underlie my research paradigm is that realities are multiple and socially constructed. Knowledge is created in interaction among the researcher and the research participants. My role as a researcher is more of an orchestrator and facilitator of the inquiry process (Guba & Lincoln, 1994), rather than an outside expert. Methodologically speaking, the formation of a more informed or sophisticated understanding is through a dialectical inquiry process. I continuously dialogued with the art teachers who participated in this study, although I also served in the role of an unobtrusive observer while observing the art classrooms.

I interviewed twelve art teachers and their use of computer technology in teaching art. I employed a multiple site or collective case study method (Stake, 1994). The cases were similar and different in various ways, but each of them has their own uniqueness and voices.

Population

The population of art teachers is Ohio K-12 art teachers recommended to the researcher through snowball sampling strategies. In January 1999, I started a snowball or chain sampling process to seek recommendations from Ohio art teachers, district technology directors, Ohio school district superintendents, and OSU faculty. The method of snowball sampling is designed to identify cases of interest "from people who know people who know people who know what cases are information-rich, that is, good examples for study, good interview subjects" (Patton, 1990, p. 182).

The initial snowball sampling process worked well. Fourteen art teachers, mostly in the Columbus areas, were identified, eight of them being recommended by others at least twice. In addition, a letter was sent out to superintendents and district technology coordinators for some of Ohio's large school districts such as New Albany, Canton, Akron, Yellow Springs, Lima, Kettering, Cincinnati, Cleveland, Dayton, Youngstown, Springfield, New Middletown, Holland, and Toledo. Twenty-three letters, which explained the purpose of my research and asked for recommendations of art teachers were sent out on April 1, 1999. As a result, four recommendation forms were returned identifying five teachers. On October 19, 1999, I sent out an email explaining my research and asked recommendation from members of Electronic Media Interests Group (EMIC) of National Art Education Association. Eight art teachers responded to my email immediately and seven of them described how they used computers in their teaching.

In all, thirty art teachers have been identified to date. Among them, twenty-five are located in Ohio. Twelve art teachers were selected according to the following criteria

and graciously allowed me to interview them. Of the teachers I interviewed, some were in the midst of supervising student teachers, and were not teaching class at the time that I visited. I observed seven teachers' classes whenever the opportunity arose.

Sample/Participants Selection

I used the following criteria to determine the final case for my study.

1. Each art teacher must have been recommended to me at least twice.
2. Each art teacher indicated an interest in participating in my study, as well as having had some experience using computer technology in his or her teaching. The art teachers consented to further observation and interviews in verbal or written form.
3. The school environment in which each teacher is working meets his or her needs in the area of technology. By this I mean that the available equipment and facility are not limited so that each teacher could implement his or her ideas about using computers to enhance art teaching to a degree that he or she considered generally satisfactory. I developed this criterion because the purpose of this research is to study how art teachers use computer technology in teaching art, rather than why they are not doing so.

   Among the variables encompassed with this criterion are: the amount and age of available equipment, the facility in which the equipment is located, the pertinent training available to the teacher, and the administrative support for teacher's efforts. All the above conditions did not need to be "perfect."

However, the teacher must have felt that his or her general needs were met and that the school environment was not so limiting that it created impediments to teaching.

4. The diverse uses of computer technology in teaching art were, to the greatest extent possible, represented among the chosen cases. The most common use of computers in art curricula that I have found was for creating computer graphics and doing on-line research. Other uses such as multimedia project development, on-line distance learning courses, integrating art with other subject areas, etc., are included in my study as I discovered them in my preliminary survey of the cases.
5. The selected cases were of intrinsic value to me and are worthy of further investigation. My own hunches as a researcher who is beginning to develop some understanding of the phenomena under consideration were honored. I believed that in order to build the strongest analysis possible, the cases I selected to explore in detail needed to be of enough interest to me to justify exploring them in depth (Stake, 1994). For example, one art teacher was recommended highly by other art teachers, a student's parent, and a state education official. He taught several classes in the computer lab, and a project that his students worked on collaboratively sounded very interesting. I was interested in knowing more about why he, in the minds of others, is a great art teacher, as well as seeing how he used technology to facilitate meeting his teaching goals. Another art teacher was recommended four times for using computer technology in his art teaching. During an interview in May 1999, he

expressed the view that a developmentally appropriate time for students to use computers is after the 8th grade since computer technology is designed in a very logical manner, which may impede students' creativity. His thinking and justification were interesting to me, particularly as he also acknowledges that my presence and probing questions help him to reflect in greater depth on his own beliefs.

6. The selected art teachers ideally represented diverse teaching backgrounds. I hoped to represent a broad picture of the different uses of computer technology in teaching art in different social-cultural contexts. However, most of the art teachers recommended to me seem to be working in schools located in middle-class neighborhoods. Also, the art teachers that I talked to were all white. In my selection, I included both male and female art teachers, and I actively sought opportunities to include teachers of color and a variety of ethnic backgrounds as well as art teachers who teach students of color or who were from low socio-economic backgrounds.

Last but not least, although it is not a criterion, I hoped that the art teachers with whom I worked would not feel threatened by my probing questions and that they would be comfortable with our possible differences in interpreting situations. The art teachers with whom I spoke were generally interested in my study and welcomed my visits. However, I kept in mind the complexity involved in collaboration and hoped that the art teachers had positive feelings about sharing their ideas with me.

Phases of the Study and Timeline

I started my dissertation proposal writing as well as literature review in the fall of 1998. The process of developing the proposal took more than six month and involved numerous meetings with my advisor and committee members. Toward the end of proposal writing, I started generating a list of potential participants through snowball sampling strategies. The solicitation of potential participating art teachers lasted from early March to November of 1999. Based on the list generated, I started interviews and observations to collect information about participants. The data collection phase started in March 1999 and lasted over one year. Starting in January of 2000, interview tapes were transcribed and analyzed. Thus, I began to write up cases and rewrite my dissertation.

Data Collection

Data was collected using a variety of strategies: classroom observation; open-ended, in-depth interviews with participants; informal conversations with students; artifacts such as written information about particular schools, curriculum materials, course syllabi, students' work, and email correspondence with the participants; and my research journal.

Classroom Observation

Being present as an observer does not mean just sitting in a chair.

(Roberts & McGinty, 1995, p. 115)

I understood that being present as an observer did not mean just being a distant observer and jotting down notes. It involves the engagement of all the senses (Adler & Adler, 1994) in order to gather impressions of the surrounding world. I was aware that

my classroom observations might shift in range and character from the early stages of my project to the later stages. My initial observations tended to be "descriptive" and general in nature (Spradley, 1980). Once I became more familiar with the settings and grasp the key social groups and processes in operation, I was able to shift my attention to more focused observations. Based upon the research questions and phenomena that interested me, I observed more closely the details of the environments, the people in them, and the ways in which they behaved (Adler and Adler, 1994).

According to my research plan, I visited two participating art teachers' class regularly, which helped to reduce the potential of generating observer effects as the participants became accustomed to my presence. Overall, as Spradley(1980) noted, the stages of observation are like a funnel, progressively becoming narrower while providing deeper access. Based upon my fieldwork in the beginning, I narrowed the focus of my observations. I focused on classroom settings, teacher-student roles, and the structures of lessons and the ways in which they proceed. In order to properly set the stage, I provided background information on demographic characteristics of the students and the environment in which each school is located. I also had informal discussions with students to gather information on their opinions of their teacher and the way their class was structured.

Interviews

Another strategy that I used to collect pertinent information was to conduct a series of open-ended interviews. The interviews were audio-taped and transcribed. I chose to conduct multiple interviews with each research participant when possible, which

helped me to form stronger interviewer-interviewee bonds. This strategy provided the opportunity to ask additional questions and get additional information or corrective feedback relative to previously obtained information (Reinharz, 1992).

The interview questions related to the teachers' educational philosophy, goals as art teachers, past experiences, observations regarding their classes, future plans, and their beliefs about art, technology, and the proper roles of teachers and students in the classroom. Interviews were started by soliciting general background information from the teachers, and then moved on to more focused questions designed to elicit information that was directly related to my research objectives.

Researcher's Journal

Starting in September 1998, I began to keep a researcher's journal. My journal served many purposes. It was an emotional outlet which helped release my worry, and confusion, as well as documenting joyful encounters and exciting discoveries. It was also a place where I developed and refined my working hypotheses, recorded hunches, and kept a record of related literature that might provide me with new insights. It was like a memory jar in which I stored memorable moments. I was able to use it to trace in time how decisions were made, as well as what factors I took into consideration when I made decisions regarding my research. It also served as a mirror to help me reflect with a critical eye upon my judgments, feelings, perceptions, biases, subjectivity, and assumptions in relation to my research undertaking.

Following the suggestions of Lather (1994) and Smith (1998), I asked myself such questions as: What are my practices of self-reflexivity? Did I, as a researcher,

address the inadequacies of language, or do I position myself as telling a "real" story with a "final" say? What was the object of my analysis? What are some likely positive outcomes from this study? What are some possible negative outcomes? How could the negative outcomes be eliminated? What knowledge will I gain from this study? What knowledge will my research participants gain?

Data Analysis

> *... our discourse is the meaning of our longing. Derrida's 'the always already' means that how we speak and write tells us more about our own inscribed selves, about the way that language writes us, than about the 'object' of our gaze.*
>
> *(Lather, 1991, p. 119)*

> *Once upon a time, the Lone Ethnographer rode off into the sunset in search of "his native." After undergoing a series of trials, he encountered the object of his quest in a distant land. There, he underwent his rite of passage by enduring the ultimate ordeal of 'fieldwork." After collecting 'the data,' the Lone Ethnographer returned home and wrote a 'true' account of 'the culture.'*
>
> *(Renato Rosaldo, 1989, p. 30)*

Unlike statistical analysis, there are no standard techniques for qualitative analysis. Consequently, I came to the realization that I would have to develop a method of analysis that worked particularly for my study.

I will first describe the process I went through as I analyzed my data in general. Second, I will talk about the initial codes that I have developed based upon the data gathered. Finally, I will describe how I used them to answer my research questions.

Assertions

The process of data analysis helped to generate and test my research assertions (Erickson, 1992). The following are some examples of my assertions. These assertions in a way also reflect my assumptions prior to the research:

1. There are different uses of computer technology in teaching art. Some uses are more appropriate than others in certain contexts.
2. There is no universal recipe for using computer technology in teaching art. Whether the computer technology use is appropriate or not depends on the particular context.
3. A teacher's teaching styles, personality, teaching philosophy, and years of experience influence the way computer technology is used in any particular instance.
4. A teacher's philosophy and his or her beliefs about art, technology, and art education are the most significant factors in how each individual uses computer technology.
5. Most art teachers are not aware of any gender differences exhibited among students using computer technology.

These assertions arose from my personal beliefs, my review of literature, or the data collected in the field. They were tested and closely looked at through the lenses of different data collection and analysis methods.

Coding Developed from Data

In addition to the assertions that I've made above, some codes have emerged from reviewing of my collected data. The following is the coding that I have developed.

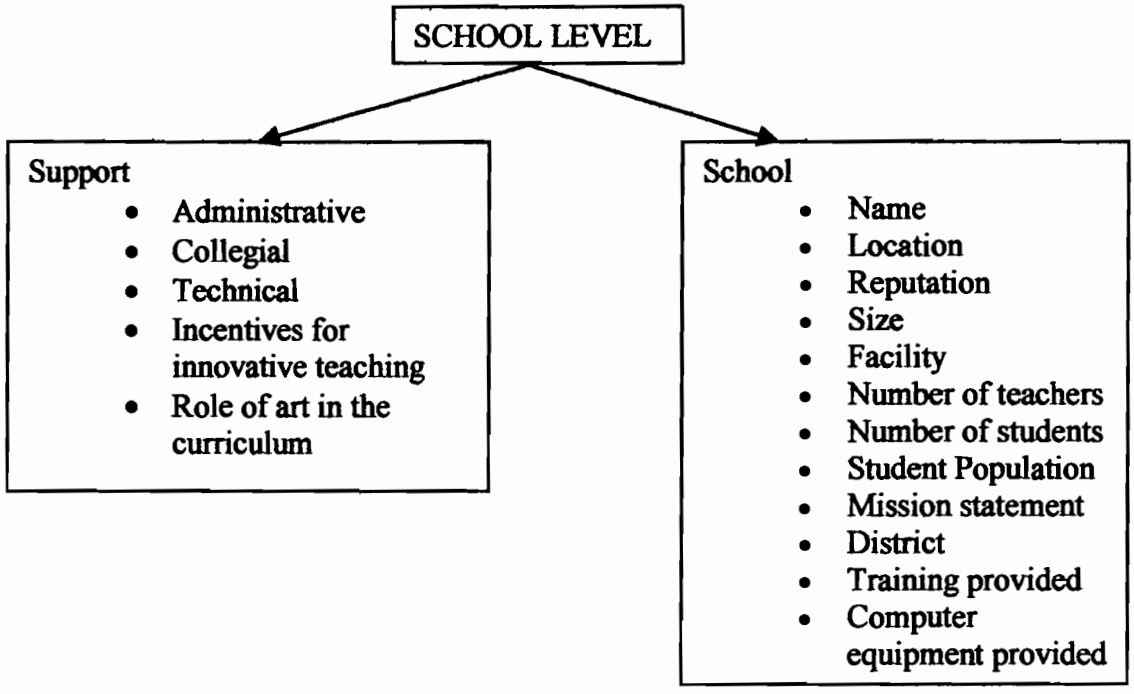

Fig 1: Coding Developed from Data – at the school level

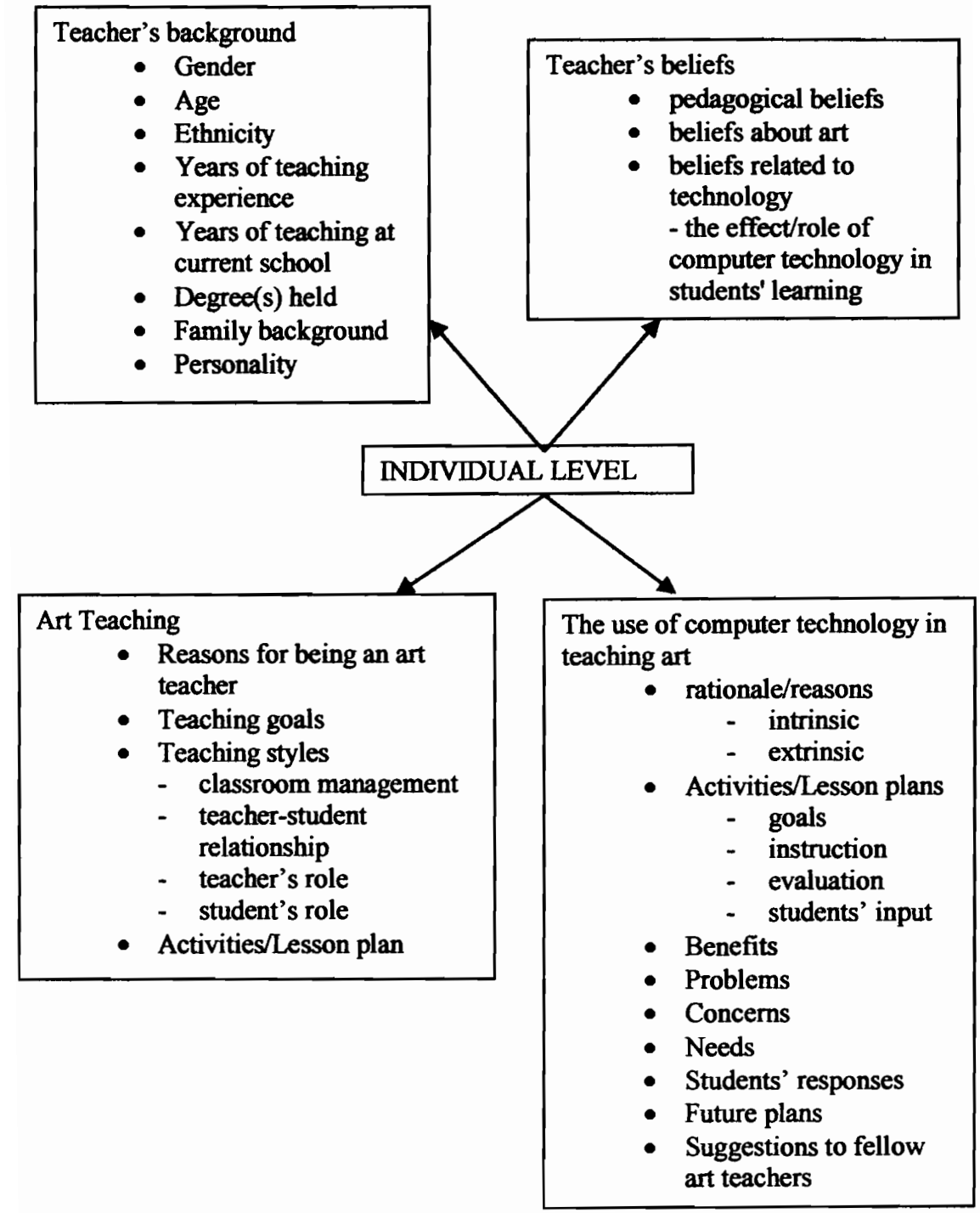

Fig 2: Coding Developed from Data – at the Personal Level

According to Greene (1990), in good qualitative research working hypotheses are connected not to a priori theory but to a context-specific, often emergent, inquiry, which may or may not be informed by existing knowledge. The categories of data analysis, therefore, emerged from the data itself and were not speculatively imposed prior to data collection (Janesick, 1994). The coding system that I defined continued to evolve throughout the research process.

To do justice to the riches of my data, I avoided presenting my research findings in a technical and, perhaps, boring way. I continued to look for ways to weave the text and coding together, and tried to bring to my readers engaging stories that demonstrate how art teachers are currently using computer technology in teaching art.

Process of Analysis

Most researchers would agree that writing is not just something you do at the end of a research project. Denzin (1994) argued that fieldworkers can never make sense of what has been learned or what needs to be learned until they sit down and write the interpretive text, telling the stories first to themselves and then to others. Writing is a method of inquiry (Richardson, 1994) and sense-making (Denzin, 1994; Wolcott, 1995) which speaks to the purpose of data analysis. For me personally, data analysis and writing text were closely related. In the following section, I will first describe the process I used to analyze some key issues arising from the data.

In the analysis process, modeled after suggestions of Erickson (1986) and Richardson (1999), to start, I first coded and categorized the data thoroughly. Then I identified a few frequently occurring patterns or themes. Each of these patterns or

emerging themes was supported by a few quotes from my fieldwork using exact transcriptions of my informants' words. Following each quote, I have a few sentences of interpretive commentary in which I explain what I think the person meant by what he or she said. I also added any needed contextual information that conferred meaning on the quote or clarified its significance.

Second, I developed each theme through narrative vignettes. I offered a few sentences to identify the context of events, which included specific details such as observed non-verbal behavior, direct quotes, and descriptions of physical setting. As I presented each vignette, I made it clear to my reader that it is an instance of at least one of the substantive assertions that I made.

Third, I provided alternative interpretations of my data by drawing upon insights from the research literature. To maximize the chance that I would discover things that I had not noticed before or had taken for granted in my data, I used literature from several different theoretical framings to help me look at my data. On at least a few occasions, I experimented with different writing styles to present interpretations and stories from a different point of view.

Fourth, I reflected upon what I learned from these experiences with a focus on how my thinking changed in the process of analyzing the data in my journal through this process. I tried to be open to new information, disconfirming evidence, and new theoretical perspectives. I did not wish to be doing fieldwork just to document my favorite hunches or the assertions with which I began the study. At the end of the research project, I hoped to be able to show how my old hunches were deepened and, therefore, could be seen in a new light. I also wanted to see how new ideas, insights, and

puzzles emerged as I progressed in my research. I documented in my journal how my research questions and assumptions changed, and what experiences or readings led to these new ways of thinking.

Triangulation and Reflexivity

I understood the disadvantages of relying too much upon a particular research method. Take observation, for example. On the positive side, using this particular strategy, researchers have first-hand access to entire settings and can observe behaviors directly. Instead of working with predetermined categories, the researcher is able to refine his or her research questions, foci, hypotheses, and working theories. Observation can also yield insights into new realities or new ways of looking at old realities (Alder & Alder, 1994). On the negative side, observation, used as the sole data-gathering strategy, has been criticized for relying too heavily on the researcher's perceptions, which raises questions about reliability.

In qualitative research in particular, over-reliance on a single research method raises the question of validity. Although I wanted to present the stories of different art teachers and thereby come to understand how they construct meaning in what they do, I could not, in reality, write from inside the head of anyone but myself. To claim to do so would only destroy my credibility as an ethnographer (Richardson, 1997). I am only able to write "accounts," as Richardson argued. She believed that for researchers, there are three options: write about themselves and their own subjectivity; write reflexively; or

combine these two genres to produce stories, field notes, and analyses which produce meaning and depth in the context of the whole text. I attempted to "make meaning" in these ways when I wrote my stories and accounts.

Validity/Trustworthiness

To ensure trustworthiness/validity, the following strategies were used (Creswell, 1994; Lincoln & Guba, 1985):

1. Triangulation of data – Data was collected through multiple sources to include interviews, observations, email correspondence, curriculum materials, students' works, and researcher's journal. Beyond looking at triangulation as the collection of multiple data sources, I also looked at triangulation as "a mode of inquiry" (Huberman & Miles, 1994). Throughout the research process, I self-consciously set out to collect and double check findings through the use of multiple methods, data sources, and theories (Lather, 1986).
2. Prolonged engagement – Repeated observation of similar phenomenon and settings occurred on site over an extensive period of time. The contact with two participants, whom I'll write in depth case study, I interviewed and observed their classes over one year time span.
3. Researcher's journal - as I mentioned earlier, the researcher's journal served several purpose. By writing and reading my journal, I could think about the way that I conducted my research as well as factors that I did or didn't take into account.

Limitation of the Method

The snowball sampling strategy that I chose to adopt helped me locate Ohio teachers who are using computer technology in their classroom in interesting or innovative ways. The snowball sampling strategy served my research focus but had its limitation.

One limitation arose because this strategy required recommendations from others. It is possible that teachers with longer years of experience are more likely to be recommended than art teachers who are in the beginning of their professional lives, and who are not well known by school administrators or parents. It is also possible that teachers who are more vocal in describing what they do are more likely to be recommended.

CHAPTER 5

TEN COLLECTED CASES

In this chapter, I present partial stories of ten teachers who I interviewed. Pseudonyms are used to protect their anonymity. The data was gathered from interviews and classroom observations.

The purpose of presenting partial stories of the ten teachers is to give more background and contextual information, which will be pertinent for the following cross-case analysis.

Case 1: Angela

Angela teaches at a K-5 Arts Impact Elementary school in Cleveland, Ohio. The school has 600 students with 72% African-Americans and 28% Caucasian and students of other ethnic backgrounds. The school is located in an urban area and students sign up for the school from all over the city. A lottery system decides student enrollment and 90% of the students are eligible free or reduced-price lunches. Although students do not come from extremely economically or socially-privileged families, the teacher and parent groups are very committed to the students' academic performance, as well as to their involvement with the arts. The school has been involved with various grant projects, and for the past few years, the proficiency test scores of the school are among the top in its

league. Angela started teaching here when the school was in the process of becoming an arts magnet school, and she has continued to serve major leadership role in the school.

Angela's Background

Angela is in her mid-thirties. She holds a B.F.A. degree in graphic design and illustration. After graduating from college, Angela worked in industry, doing graphic design work for two years. But she found herself "hate(ing) every minute of it." She described the work environment as "not a friendly, happy place."

> *I didn't get to do my own work. It was always doing someone else's. Then, it was the same thing over, over, and over. And the people in the field are not very nice. And they're all, you know, very back stabbing. (1-25-1999)*

At that time, Angela was living with her parents and had two little sisters and a nephew in the house, too. The sisters and nephew were not in school yet, so Angela was always thinking up activities for them to do. She had never thought about being an art teacher before that. But working with them made her start thinking about choosing art teaching as a profession. She then decided to go back to school in 1987 and to become an art teacher. She earned a bachelor of science degree and a master's degree in art education. After changing her career, she enjoyed life much more. Although she only has time for her own art in the summer, she enjoys the flexibility and freedom of a teaching career.

The Art Classroom

Angela's art classroom is located on the second floor. It is a big space and the walls are decorated with color reproductions of artwork. Angela just repainted the walls

white. The first time I visited, the sunlight reflected by snow came though the window on one side of the classroom and helped to create a nice learning environment. Computers are located at one end of the room, while the teacher's desk and a sink are located at the other. Students' desks and workspace are located in the center.

The theme of the year for the school is "Europe," so the images on the wall are mainly artworks of European masters. Names of some famous artists such as Van Gogh, and Picasso, as well as names of some European countries, are posted on the window. A display that shows the differences between portraits, landscapes, and still lifes is on the bulletin board. The grading policy is posted above the door. It says: "Grade based on following directions, work completed to the best of individual potential, attitude/behavior, sketchbook/notebook." Art rules are also posted: "respect everyone, finish work to the best of individual's potential, work quietly, keep room clean."

How Technology Is Used

At the time that I visited in January 1999, Angela had explored ways of using art-related CD-ROMs with her students. Some of the CD-ROMs that students used were *With Open Eyes*, which is an interactive CD-ROM which contains information and activities related to certain collections at the Art Institute of Chicago. *Van Gogh* and *Leonardo, the Inventor* were also used because the school wide theme for that academic year was European culture. *Time Traveler* is another CD-ROM database system that Angela has had students use to search for information about particular time periods, artifacts, or histories of particular cultures.

The art room at that time did not have Internet connection capability. So Angela had students use the CD-ROMs to look for information. Other than using CD-ROM resources, Angela asked students to write their art reports about artists and artworks on computers and use graphics programs such as *KidPix* to create digital images. Her next step was to engage students by exploring the potential of other graphics programs such as *Printshop* and *Photoshop* to create slide shows and design cards, posters, banners, and stationary.

In general, Angela uses computers for students to look for information on CD-ROMs, type up art reports, and create digital images. She did not give specific examples of the activities that students do, but on several occasions, I have observed students working in pairs or independently to explore art-related CD-ROMs during class time.

Angela's Teaching Goals

It was my assumption when I began this study that the way computer technology is used is related to teachers' teaching goals, as well as beliefs about art, technology, teaching, and learning. For Angela, the use of computers in her curriculum has helped her achieve her goals.

Angela personally never learned about any artist, or any primary or secondary color until she was in college. She does not think that was right. "I think all the students need to know that, because art is not just about making something cute hanging on the refrigerator. There's a lot more to it. We need to make it more valid as a subject. Not fluff. So, that's my job to do. Make it more valid," (1-25-1999).

Every year, Angela would engage students in doing an art report on a particular artist or artistic movement. She uses CD-ROMs for students to look for information. This seems to be a natural fit with her existing curriculum. Another major goal for Angela as an art teacher was to inspire students to like art. She tries to get students "all focused and inspired" and to "work diligently." The use of computers seems to be helpful in achieving these goals.

Angela observed, "I think the computer just excites them (students) so much. It reminds them more of a game" (1-25-1999). When students are on the computer, Angela noticed that they are usually working. Although some students would refuse to give up their computer seats to other students, which makes classroom discipline more challenging; overall, using the computer as a reward has helped maintain discipline in the classroom. "Why not have the hardest worker to work to your advantages and to involve them in working on the computer?"(1-25-1999) Angela asked. When the hardest worker is given the privilege of working on the computer, computer technology has contributed to developing positive learning attitudes, which fits Angela's teaching goals of having students work diligently.

Problems and Solutions

With so many programs and so many things to learn, Angela admitted that she sometimes feels overwhelmed. Over the years, she has learned to rely on others. "I ask for help. I am not afraid to ask. I will ask whoever knows something that can help me"(1-25-1999). Before she teaches a new software program, she often takes it home and learns

on her own how things work. It certainly generates extra workload but for the benefit of having students enjoying their learning, Angela felt that it is worth the extra effort. Another problem to which Angela had not found solutions to was the time limit. Angela only saw the students once a week for 80 minutes. Having computer class for only 80 minutes seemed too short, especially when students were not technology efficient. Sometimes Angela found herself spending time teaching students basic computer skills rather than focusing on art teaching.

Angela was not sure what the students learned from the use of computers that they don't learn from other media.

> *What do they learn that they don't learn from other media? I don't know. (pause) I don't know. I think the computer just excites them so much. It remind them more of a game. Well, they think it's a game. But they are learning at the same time. (01-25-1999)*

Angela was certain that students do learn from that experience. The concept of seeing using the computer as "gaming" works both for and against Angela. On the one hand, it helps to motivate students to learn, and in achieving Angela's teaching goal. On the other hand, "playing" on the computer threatens Angela's goal of demonstrating that art is a valid subject area.

It seemed that Angela used the computer as one resource among others. The use of computers does not change her way of thinking about art teaching, although it does require some modification of classroom routine and discipline management. Because the computer "is just another resource. It's just the same as giving them a book," Angela has not thought much about what unique learning opportunity computers can bring to students' art learning experiences.

The Ideal Situation

When I asked Angela to dream of a perfect situation in which she could have all the equipment and support that she wanted, she described the dream situation this way:

> *The students would be knowledgeable. And I wouldn't have to teach them the basic skills. How to turn the computer on. Just the program. They would already know computers and we would have digital cameras and all that. (1-25-1999)*

The literature of educational technology often suggests that the inclusion of computer technology can change the ecology of classroom dynamics and teachers' roles. Therefore, the way the classes are handled needs to be changed as well. When I asked Angela if the use of computers changed her teaching style, she immediately responded that the teacher needs to be more flexible in order to be attentive to different students' needs. "You have to be in more places at once" (1-25-1999). With more than 20 students in the classroom and 7 computers, it was important for Angela to work out a routine or schedule to help students at the computer stations.

Other than being more flexible and creating routines or schedules, Angela felt that the use of computer technology did not change her way of thinking about art teaching at all. For her, "It's just another resource. It's just the same as giving them a book"(1-25-1999).

Case 2: Bessie

Bessie's Background

Bessie teaches at an elementary school in a suburban area east of Columbus. She described the school district as affluent. The building in which she teaches has about 350 children enrolled. The number of students in each art class ranges from 17 to 22.

Bessie has been teaching at this current elementary school for 20 years. She teaches K-5 art classes, and serves as the area coordinator for art teachers in the district. Before teaching at her current school and attending graduate level classes at the Ohio State University, Bessie taught art education courses at a college in New Jersey. She enjoyed those years and found scheduling much easier when teaching at a college level. While she was writing her dissertation, she accepted a job offer at the school where she now teaches. She found that she enjoys teaching in the public schools. Getting her dissertation written is no longer a high priority.

Classroom Setting

Bessie's classroom is located in the basement. It is spacious and the walls are decorated with students' works. Work tables are grouped in the center of the room. And three computers are located at the farthest end of the classroom, near the window. One of the three computers is for Bessie's personal use. It is a machine that runs Window's (PC) which has Internet connection capability. Bessie uses her personal computer for checking email and gathering information on the web.

For students' use, Bessie has acquired two Macintoshes. With only two computers in the classroom for students, Bessie usually decides who works on the computers that particular day, while other students work on a different project. Students switch seats with these students when they finish their computer assignment.

Using Computers

Bessie was not sure which year she started using computers. She did remember that the first one was an Apple IIE machine. Since then, she has had five or six different computers. She just bought a new Macintosh at home, and she now has two Macintoshes and one PC in her art room. When asked if the school required teachers to use computers, Bessie responded this way, " You know, we have a lot of teachers who don't use it at all. Don't like it. Don't use it" (10-28-1999).

Although Bessie said that she was not very knowledgeable about computers, she was very receptive to the idea of using computers for teaching art. She has engaged her fifth graders in the use of a multimedia presentation program, Astound, to investigate their family history.

The Family History Project

The idea of the family history project was initiated by the social studies teacher during a summer vacation at home with her daughter. The social studies teacher, Mary, went to visit her mother with her 12-year-old daughter. They stayed in the three-story family home for a week. One day, her daughter went up to the third floor attic and found boxes containing 30 years worth of family treasures. The grandmother said to the girl that

she could have anything she wanted from the boxes. As granddaughter peered through all the boxes, she was very taken with what she found. Mary, described her daughter's emotions this way:

> *You would have thought that she was just so taken with what she found. She found, like, old pictures, like from 1898, of my grandparents who immigrated to United States. So she was finding out all these things about her great grandparents. There were different things that my mother used to have like on her dresser and stuff that we don't use anymore, like a brush with a beautiful bow, like different vanity type articles and stuff. And she is like finding all these stuff. So my mother said, "Anything you want." And there are like religious things up there. And she said, "Anything you want, you may have it." And so that's how it gets, or kind of gets started for myself and my daughter. (10- 28- 1999)*

The next school year, Mary told Bessie about this summer experience. And according to Mary, Bessie "is always trying to help kids understand how art and history and the past, like, how it was, like, cyclical and how these link, and how you can make that be really interesting"(10 -28-1999). They applied together for an Ohio Department of Education Grant and decided to work on a family history project together.

The purpose of the family history project was explained to me this way by Mary:

> *We think a lot of this has gone away like the oral tradition in families. And people don't have time anymore to share the stories of when they are a child. You know, grandparents and those kind of thing. How this whole thing with society, and the whole rushed life-style and there isn't much of that sharing of the family values and traditions. (10-28-1999)*

Mary and Bessie worked with fifth grade students on the family history project. Students were asked to bring in objects, artifacts from home, that are part of their family. A professional photographer was brought in to set up a studio and photograph these objects. Students brought in wonderful things from the Civil War, old photo albums, grandma's wedding dress, certificates, and a wide variety of other objects. After the

photos were taken, students scanned the images into the computers, and used the program to create multimedia presentations that combine images, text and students' audio recording of family history.

Response from the Community

The project was well received by the community. Many parents came to the teachers and said how much their kids had become interested in their families. They even understood and took an interest in their family histories which they had never done before because of the project. "So that was pretty neat. We were pleased with that," Bessie said. This year, the two teachers decided to work on this project again.

The Role of Computers

In this case, the use of computer technology helps to bring two subject areas, social studies and visual art together. In addition, the use of technology leads students to be even more engaged and invested in their family histories. Bessie said:

> *I think the compellingness of that project were they (students) were really invested in their family history, so the subject matter has hooked them. And they are into that. So then doing that in this technology piece makes them more interested in making a piece that is really valuable because it is them and it is part of their family. (10-28-1999)*

From Bessie's point of view, too often computer technology is just used as a substitute for paper and pencil. She believes that the use of computer technology has to be more sophisticated than that. "I think the Astound

presentation is certainly not something we can do with paper and pencil. The audio makes the presentation a little more than if you just had it flat on a printed out form" (10-28-1999).

Problems and Solutions

Students' technology skills and limited class time are not major problems for Bessie. She felt that seeing students once a week for 70 minutes is enough time for ongoing projects, although the family project took almost the whole year. Time is not a major issue, but Bessie felt that classroom management is a concern. "The difficulty with technology so far," Bessie said, "is a class of twenty some children and two computers and how do you do something out there and something over here at the same time" (10-28- 1999).

Observations on Technology

Another problem that Bessie has observed has to do with the fact that students do not always use software in the way in which it is intended to be used. She pointed out that Kelly, a student, was using *Type to Learn* software during our tour in the library. She had the wrong fingers on the key. Kelly was just trying to finish a required assignment without a teacher's assistance and without the awareness of the proper posture.

As another example, Bessie mentioned students' use of a CD-ROM called *Oregon Trail*, which is rated highly for its educational value. Bessie observed that students do not play the game in the way it was intended to be played.

And all they will do in Oregon Trail. They figure out how to blow up things so they just spend the whole time blowing up whatever they can blow up. So you know, they don't do it the way it is intended to be played. To me, they don't learn a whole lot. They just learn to get around and do some of that stuff. (10-28-1999)

Another example of students not using technology responsibly related to the district network system. When the computer network works, teachers can access their school email from remote places. But there have been occasions in the past when high school students intentionally tried to disrupt the system.

Bessie continued, "The high school kids do things like they try to email five thousand people at once, and then the whole system goes down." The technology team then spent three days trying to get the network working again. "When it works, it's great. It's just that it's down too often. That's where we are," Bessie said.

The school has two technology specialists. But for Bessie, that is still not enough because the computer network is frequently down. In addition, "getting teachers professional development that really addresses technology has been difficult" (10-28-1999).

Future Plans

The next step for Bessie was to get one more Macintosh in her classroom so that she can have the sixth graders edit their own video using *iMovies*. She also planed to have the family history project photographs developed in a digital form to skip the scanning process to save some time. Her ultimate goal is to rely on students' expertise to share and teach each other.

My goal is always I'm going to show one how to make a flip book (for example), then two kids can sit and the one who knows how they can teach the other one how to do it. And then they will make a flip book. Then they will teach the next kid how to do it and so on. (10-28-1999)

Case 3: Cheryl

Background

Cheryl teaches at a newly opened middle school in a suburb area of Columbus, Ohio. The school opened in September 1999 and has attracted many teachers and students because of its new facility and visions in technology. The attitude towards technology is very positive. Six hundred students were enrolled in the school. And the superintendent and the community in general have supported the vision of making this a technology model school in various ways.

In terms of facilities and equipment, one teacher from the school described it as "phenomenal and amazing." Each classroom has three computers, a laser printer, and a color inkjet printer. There are two brand new computer labs, each with more than 20 computer stations. All the computers in the buildings are networked, which makes it easy for teachers and students to save and retrieve information anywhere in the building. In the industrial technology classroom, for example, students can design their own T-shirts and print them out. In the music class, students can create and record their own midi music. Teachers can also access a digital copy machine from their own classroom computers.

Students in the sixth grade are required to take a computer class that covers keyboarding, word processing, data base and spread sheets, basic desktop publishing, multimedia production, and *PowerPoint*. There were technology workshops that covered

a wide variety of topics taught at the computer lab for teachers' professional development during the 1999 –2000 academic year. In addition, teachers are encouraged to take classes, attend statewide or national workshops and conferences that fit their instructional need.

The school has parent-teacher conference rooms and a teachers' work room based upon suggestions from teachers at the time the building was being planned. There is also a satellite dish and centrally controlled media center for teachers so they can preview and show videos. Obviously, this building is unusual in its relative technology richness.

Personal Background

Cheryl is one of the two art teachers in the building. She used to teach for another middle school, but decided to follow its principal and move to this new school. Cheryl has been teaching for over 26 years, and she is very involved with the school community and state-wide art education organizations. Her devotion and involvement have won her numerous state and national awards and recognition.

Cheryl described herself as an army brat, which has influenced her to emphasize classroom discipline. A class usually starts with Cheryl presenting lessons or techniques through demonstration. Students are encouraged to fulfill lesson requirements in imaginative ways. Handouts and examples are always available, and expectations for students are presented very clearly with assessment rubrics.

Using Technology

Cheryl incorporates computer technology into several projects during the year. Mostly the computers are for research and for creating computer graphics. There is also a virtual museum club. The two projects that are particularly dependent on using computer technology are:

Hearty bowl and plentiful dinner.

Cheryl feels that the use of computers helps to motivate students to learn more about art history. Consequently, one of her assignments is to ask students to do an Internet research project on an individually chosen artist. Students are asked to download three digital images of the artist's works, and find information about the artist and his/her specific artistic style. Then, students write reports that include the images, their own critique of the images, and other interesting facts about the artist and his or her artwork.

After students study the artists' work, they are asked to design a table setting consisting of a placemate, cup, and bowl, that reflects the artist's style. In addition, during the school year, people within and outside of the school community are invited to attend a special gathering, in which students present their works and raise funding for homeless people or the people in need within the community. Clay models of the bowls made by the students are given to each participant as a token of appreciation for their support. This past year, they raised over $2000 for charity.

Computer graphics.

Cheryl has taught students at various levels, but has decided to teach at a middle school. She feels that middle school is a crucial stage for students' artistic development. She tries to build a solid foundation for her students exposing them to various media, techniques and styles. Computer graphics is one of the media that she introduces to students. Since there is only one computer in the art room, Cheryl schedules a lab time to take her students to the computer lab to create digital images. Students start with exercises as a way to explore the basic functions of the software, such as cut, past, rotate, mirror, and paint. After a guided exploration of the software, students are asked to create digital images based upon self-portraits, including photographs of them taken using a digital camera.

Virtual museum group.

In addition to talking to Cheryl, I also interviewed some of Cheryl's students. They showed me their artwork on the computer, and some of them described a virtual museum group in which they participate. It is an after school special interest group. Students sign up for the group, and the special assignment for the group is to collect students' works from all of the art classes, and select exemplary artworks based on criteria that they developed as a group. They then digitize the selected artworks, create a *PowerPoint* presentation, and showcase some of the works at the school website. Each month the Virtual Art Teams (grades 6, 7, and 8) record the chosen art pieces for display. They add these selections to the presentation and update the Fine art section of the school website. (The URL for the Virtual museum is http://www.westerville.k12.oh.us/Genoa/Acad/FineArts/Art/virtual.htm)

Beliefs About Art Teaching and Technology

Cheryl does not use computers just because it is required for her job. Even when she taught at another school with outdated Apple IIE machines, she tried to introduce students to the idea of computer graphics. In the handbook that she designed collaboratively with another technology teacher, Cheryl strongly emphasizes the idea of being imaginative and creative. In terms of classroom management, she is strict regarding discipline, yet very gentle and caring. She is very specific in what is expected of the students. Every assignment consists of specific criteria that she wants students to meet, yet, she allows students freedom to achieve that. "Notice, I told them exactly what I want and how they do it is their creative output."

Although Cheryl believes that it is important to expose students to different media including computers, she does not believe that the use of computer is part of the basics of art education. When students are younger and when students are just learning the basic art concepts, Cheryl feels that it's hard to use computers. "If they have knowledge of the computer and they have knowledge on the subject, the two can come together. But in the beginning, NO."

Problems

For Cheryl, using computers to teach art has several benefits; however, it is not without problems. When asked if the use of computers has a negative impact on classroom discipline, Cheryl responded that the use of computer technology in classroom settings sometimes takes care of discipline problems, sometimes, it creates the discipline

problems. For example, when she tries to give students instructions, sometimes they are so eager to be using computer, and they do not even hear what she is saying. She also gave this example.

> *In Charlie's case, he is very different to begin with. He knows something some kids wish they know but they don't. So, it like bothers some people because he is very superior and he is very good at what he is doing. He interacts with people very well but they don't know how to accept it cause he is a sixth grader and he is showing eighth graders things. It's very hard in the middle school for a younger kid to show older kids something and vice versa. It's very well accepted to have older kids showing younger kids. The reverse is really stepping on toes. (2-18-1999)*

When asked if she minded that her students know more than she does, Cheryl immediately says no. During the interview process, Cheryl repeatedly mentioned the importance of recognizing the fact that teachers do not always have the answers. She also describes herself as someone who is constantly learning. Cheryl feels that sometimes it is hard for teachers to feel that they are not in control.

> *You're going to have the people that are going to see who is going to be in control, me or you. And then occasionally, I get a little share of it because I decide that I'm going to be in control (smile) no matter what they think. And sometimes no matter how hard you try, you just come to school and have a bad day or something. But you've got to change it before you walk in the door. However you feel they (the students) probably feel worse. You have to impart to them your knowledge. You only have a short time. (02-18-1999)*

Gender Issues

When asked if male and female students have different attitudes or ways of using computers, Cheryl says no. Cheryl admits that the gender issue is a big one. As a teacher, she tries not to differentiate between male and female students, but she knows that there are gender differences. She tries to allow all students the same opportunities, knowing

that their future choices may be different. But overall, she does not think there is any difference in terms of gender differences in students' attitudes, interests or ability in the use of computers.

Case 4: David

David's Background

David has been teaching for 25 years. He started teaching in 1968 in a middle school up in the north western of Ohio, which was close to where he went to college. He left education for a while, went to business and industry wanting to try something else, and finally decided that his interest was teaching.

Having earned a doctoral degree, David originally wanted to continue teaching at the college level. However, the job description for his lecturer position changed and his current position at the high school became available. He took the job, but was not sure how he was going to teach. "But along the way, I kind of enjoyed myself. I found myself bringing in experience that I had. I arrived at the conclusion I love this... I know what my strengths are. I am right where I need to be" (3-03-1999).

David is obviously a proud and enthusiastic art teacher. His whole family are teachers. His wife is a teacher and his daughter will probably become one. David is very proud of being a teacher and having the chance to make a difference in students' lives. All his life, he has played with art materials and he is still doing the same thing, playing with scissors, paints, and papers. Sometimes, he wants to pinch himself to see if he is really awake. Working with students and teaching art is great fun for him.

> *They gave me this budget and beautiful space down there. Six period of the day, wonderful children come in and we have fun. And they pay me to do this. Sometimes, I want to pinch myself. Is this for real? Because I have such a good time doing this. (3-3-1999)*

David is a water colorist, and is the president of the Central Ohio Watercolorist Association. Students help him keep in touch with himself. "I must grow with them," David said. He shares both his successes and failures with his students. He believes that it is an important part of role modeling.

David describes himself as a "right brain" person and a dreamer. He loves to start things, but has a hard time "shuffling paper works". He is reluctant to sit down and write grants. He prefers working with children. "I think I have a wonderful relationship with my students. It's the human side of me that I think that is the strength - my feeling of coaching, and encouraging" (3-3-1999), David concludes.

He also describes himself as a risk-taker. "I feel comfortable taking risks , knowing that it's not a mistake." He has always embraced new ideas and new art materials with open arms.

> *Every time something new comes out I want to try... I love facing a blank canvas. A blank canvas is not an artist's block for me. Let me on. So when acrylics came out, I was ready to do them. When I was an undergraduate when they first came out. Everybody painted in oils. I asked my instructor "Can I paint acrylic?" He said no. He didn't understand it. But I did it anyway. I painted in acrylic. When oil pastel came out, I had to try. (3-3-1999)*

David is an eloquent speaker. His words are passionate. His love for his students and teaching are undeniable. He is visionary and positive about the close relationship between technological advancement and society. Yet trying to use computer technology in his teaching presents him with some difficulty.

Uses of Computer Technology

David has been using computers since the early 1980s. When asked how he is currently using computer technology in his teaching, David explains that he only uses computers on a limited basis. Two restrictions on this usage are the curriculum and access to the Internet. For David, the curriculum is set in certain ways and is therefore not flexible in allowing for experiments. The school has also failed to get online in an expeditious manner. Although David is extremely interested in engaging students in real time dialogue with living artists, the idea have never been implemented. David explains that he has limited space and he cannot work around the computer lab's schedule. Since he doesn't find it possible to make the Internet accessible to every student, the idea of real time dialogues with living artists has not been implemented. David also finds that the bureaucracy and tradition in education make new ideas for teaching and learning difficult to introduce.

> *In education, the bureaucracy and the tradition is strong and stronger than anything I know. When there comes a time for some kind of reform, you will meet resistance over time from some other colleagues that put the pressure on but they really can hardly understand the stride. (3-3-1999)*

Beliefs About Computer Technology

For David, the computer is more than just another medium. It represents a paradigm shift. "There are a lot of things out there I believe we're just beginning to understand," he said (3-3-1999). Fifty percent of the children in kindergarten now, he predicts, will have jobs that have not even been invented yet. By the time they get out of school, they are going to be following paths that we can't imagine now. New rules are being written as we go in response to the many things that are changing.

The role of the art teacher, according to David therefore is to help students be prepared to address these changes. That is, to help maintain a workforce of people who are prepared to fill these roles. David speaks of Howard Gardner's multiple intelligences theory and argues that "the picture smart is obviously what art teachers can do" (3-3-1999). In general, David sees the arts as visual communication and as one way to express oneself. He believes that art teachers teach how to perceive and how to understand.

David speaks strongly about his vision. He wants to go beyond teaching computer graphics and animation. He does not want to think of computer technology as another discipline, distinct and separate from other bodies of knowledge. He thinks of computer technology in light of E-commerce instead. For him, an innovative way thinking about computer technology is more than as just hardware and software. "It is a different way of thinking. It's a system. It's a system of interaction and information gathering. It can actually be a way of life," he says.

David believes that as access to information is exploding, the need for artists will explode with it. In some ways, creating artworks is becoming easier because students are not constrained by their ability with a brush. Now he can teach children who would have had difficulties handling traditional art media to become much more comfortable with making their own art.

Future Plan

In thinking about the future, David has an ambitious idea for his "art room rats," the students who are very comfortable in the art room, and who probably will ultimately pursue further education in the arts. David explains:

And basically what it would do is to teach art shop rats how to start a company. And an internship, externship, however you want to call it, that would provide real services to the community. And their potential clients are the ones that are smaller businesses, community-based businesses. They'll be outer home businesses, pottery industry. So what we can do is to provide different services to them in the area of graphic design, illustrations, type studying, website design, and website management. What I would like to do is to design a class where they go to their classes in the morning, and in the afternoon, they come down and we open the shop to provide services. And I train them. They deliver the services and they have the access to make their calls during the day. And they get a salary for it. (3-3-1999)

The idea of having a shop owned by a teacher and students who provide services for local business requires tremendous support from the school administration in hiring another art teacher to share David's teaching load, and in upgrading and providing needed computer equipment. When asked how likely David thinks it is that he will get such an idea approved, David demonstrates his frustration with the school board:

Well, we have some bone heads right now sitting on the board. Who whenever you talk about additional staff, their mind is set. I think the minority of people voted for these people. A voting block voted for these people. And I don't know how long they are going to be here because I think the community is understanding what has happened and how they halted progress in the community. (3-3-1999)

David explains that his idea requires a commitment from the board and he cannot put that idea forth because the bone heads school board members are hard to understand sometimes. Plus they seem to have their own agendas.

Self-Reflection

David describes himself as a dreamer and a risk-taker. His understanding and embracing of computer technology, however, do not impact what he does in his classroom at the present time. Looking toward the future, David is still hoping for positive changes.

> *I just need time and space to use it in my curriculum. That's really what we're talking about. I have to figure out how to use it in a way that is not superficial. Just now, there are some people finding out that they are not even wired in. We are working on bugs. This is where we are but I am very confident that soon it will work. I've been terribly impatient. But it's going to happen. (3-3-1999)*

Toward the end of our interview, David concludes that "We have a lot of grand ideas, and maybe you should be coming back a year or two farther down the road for our journey" (3-3-1999).

Case 5: Elbert

Elbert talks fast and has the ability, like many teachers do, to juggle several things at one time. One colleague of his described him as a computer nut. Although not satisfied with his school's computer equipment, Elbert has taken an active approach to making things happen for teachers and students at the high school where he works. Elbert served as the head of a digital design team for the school, and brought art teachers together to share computer resources and make plans for future equipment purchases.

Background

Elbert teaches at a metropolitan education center which includes two divisions: The Arts and Academic High School and The Career Center. The Career Center includes

18 intensive one and two year programs in the areas of Business, Health, Performing Arts, and Visual Arts. Students apply for these programs for their junior and senior years. If they are accepted, they come to the center for half a day from other area high schools. Elbert teaches commercial photography in the Career Center.

Using Technology

Elbert started using mainframe computers for retouching his design work back in the 70s. Early on, he was very aware of the possibilities computer technology brought to the art disciplines. At the school he used Apple II E's for bookkeeping, and as soon as the Macintosh came out in 1984, he started teaching students to use Super Paint to retouch photographs in a Mac computer lab. Currently, he teaches commercial art and design students photography and the process of pre-press paste-up and pre-publishing design. Students are required to print a small book that combines images and words by using applications such as *PageMaker*, *Photoshop* and various word processors. Senior students are also required to develop multimedia projects and design websites. Every senior has a portfolio on a CD-ROM. Elbert's students are also responsible for designing the school yearbook. The yearbook features photos and copy digitally produced by students and sent to the printer on disk. The yearbook is also published yearly as a CD-ROM. In addition, Elbert assists students in publishing a literary magazine, *Fortfolio*.

In fall of 1999, Elbert joined the Virtual High School (VHS) program. In exchange for his participation, his high school can enroll twenty students in any of the hundred or so NetCourses offered in the VHS Catalog. VHS courses range from

advanced academic courses to technical and specialized courses and unique electives. The class that Elbert offers is called "Expanding Artistic Visions Through Photography."

VHS NetCourses are either a semester or a year in length, and they are delivered to students around the world via the Internet. Students access the course by browsing the information available through the VHS web site (http://vhs.concord.org). They interact and exchange information with classmates as well as join group discussions. All discussions take place within an online CourseRoom. The CourseRoom database sorts discussion "threads" by data, time, and subject matter. Students can then follow and join ongoing conversation.

For Elbert, this class is about expanding artistic vision through photography. It focuses primarily on looking at and making photographs, as well as responding to the photographs of fellow students. Elbert explains in the course catalogue that "in twenty years of working as a photographic artist and teacher, I've developed a sense of the basic elements of photographic vision that can be exploited to expand vision and facilitate personal expression." In this particular class, Elbert is less interested in the technical aspects of photography such as light, film, and the developing process, but rather in exploration of photographic vision and meaning. Students enrolled in the class need to have access to a camera and scanner or a digital camera. Prior formal photography class experience is not necessary.

The asynchronous feature of the course is important to Elbert. He feels that the course enables students and teachers from multiple time zones and with various school schedules to participate fully in the same course. It also allows students to contribute

equally to discussions. Elbert also speaks of another benefits of distance learning classes, that of allowing teachers and students to teach or take higher level classes when these classes are not offered at their home schools.

Perelman's 1992 book, *School's Out*, has greatly influenced Elbert's thinking. He agrees with Perelman that, economically and technologically, the organization of schools needs to be restructured. For Elbert, the book was not just about technology but about the organization of delivering learning and how it fits into the economy of society. Elbert notes that many people are thinking about rearranging small parts of schools. He thinks that might not be enough. Elbert believes that Perelman's book is a good source of ideas, so he brought multiple copies of the book to give to his friends.

Elbert spoke about the asynchronous nature of on-line dialogue that allows flexibility and collaboration. He is very positive about the potential of distance learning and is convinced that "school" as we know it is on its way is out.

> *And that's going to happen we know. That has to happen. We can drag our feet. We can kick and scream. We can stick our heads in the sand, but it's going to happen regardless. (03-11-1999)*

Problems

Elbert is frustrated by a number of problems at his school, such as the wiring for computer networks, the number of computers in the school, and other teachers' indifference to the impact of computer technology.

> *The problem so far for the school is that we are not totally wired. And we don't have enough computers. So people have not adopted technology as a way to communicate, let alone use that for their class... So that's a little bit frustrating. And I think the teachers kind of don't realize how this (Internet) will change the way they work with their students. (3-11-1999)*

Case 6: Francis

Francis' Background

Francis has had 19 years of teaching experiences. Francis has a B.A. and M.A. in art education. Her original interest was working in a museum's educational department. She honestly admits, however, that the pay for working in a museum is terrible. So, she accepted her current job offer. Being in charge of a gallery does allow her to pursue her interest in museum education. Francis teaches at the same Arts Impact High School at which Elbert teaches. My interview with Francis took place in her office.

Using Computer Technology

Francis started using computers ten years ago in a very small way by using a grading program. She also explored a primitive drawing program on a Mac Plus machine. Six years ago, in 1993, she started using *Photoshop* with her Photography students. And About the same time, she started having students use the library database system to look for periodicals before the Internet started. Now, she has students use the Internet for their research. From her experience last year, she observed that in many cases, it is easier for students to go to the library. On the Internet, Francis says that students can find information about famous artists like Renoir, Monent, and Van Gogh. Students can also find websites of contemporary artists. However, Francis observes that minority artists, such as African American artists ones, for example, are harder to find.

Self-Reflection

Francis is very positive about the use of computers, but she uses them selectively in order to reach her goals as an art teacher and gallery director. She believes that teachers are very important in guiding the direction of a class, as opposed to letting the technology drive the curriculum objectives.

> *I think some always say that computers are going to replace teachers. I don't think it will ever replace teachers because we need to guide them with what our objectives are. There is just too much out there. So we have to have good teachers who have good lessons, and who say here is where we are going with the computer. (3-11-1999)*

Francis focuses her instruction around the concept of diversity. Current Internet technology, unfortunately, is not that helpful for achieving this goal. Ten years from now, Francis feels, it will be very helpful to use the Internet to find artists from various backgrounds. For now, however, it is often faster and easier to go to the library.

Information about artists on the Internet, although limited, can still be useful in that students can sometimes find interesting facts and insider stories that are not included in art history books. Francis gave an example of a unit on documentary photography in which she asks students to conduct research on the Internet:

> *There are a lot more stories. There are a lot more interesting facts. It's really difficult to get students to want to read a biography. It saves so much time. So, this way they get some of that information without reading the biography. In biography, you get that kind of new thing but it won't give you contemporary angles on what's happening with art history and their lives right now. (3-11-1999)*

Other than using the Internet for online research, Francis relies on computers for grading, word processing, and designing invitations and brochures for gallery exhibitions. She also teaches video editing classes.

Benefits and Problems

For Francis, time, money and access to the computer lab make the integration of technology in her teaching difficult. The use of email that allows her to collaborate with other nationally certified teachers, however, is very helpful. The benefits of being invited to attend workshops and meetings have helped her tremendously. The use of email also helps to sustain collaborations, but it is the fact of having joining the national certification program that has made her teaching practice rewarding.

Future Plan

Looking toward the future, Francis hopes to have a kiosk in the gallery in the next couple of years which will provide pertinent information on current exhibitions. This kiosk will be connected to the Internet. A website for the gallery is also part of her plans.

Every year, Francis has 30 students working in the gallery. They help with the exhibits and they are trained in gallery display and management. Francis wants to have students photograph the works in the gallery and create a website including the images, information on the exhibit, and useful links regarding the display. Because some schools cannot visit the gallery, Francis hopes to establish a way for local high school students to engage in dialogue with students from other buildings. She explains:

> *So kids from other schools can go in and see what's in our gallery and to have a dialogue between students and students with what's happening in the gallery. Students can ask questions through email. You know which is a fairly easy program to set up but it's just the time. I have a student working on the gallery website right now. So we've got the website started. Then I want to have an interactive website that kids can see what's in here, and email questions (to us). And our kids will have to answer the questions. (3-11-1999)*

"So that should be fun," Francis concludes.

Case 7: Gary

Many art teachers for his innovative way of teaching computer graphic and animations recommend Gary. After several rounds of phone calls, we decided to meet for the first time on May 25, 1999. I went back one more time to visit Gary in the fall, but the meeting was not as productive since Gary was about to undergoing surgery and was busy coordinating an anti-drug campaign at the school, leading the chess club for a regional competition, covering for another art teacher, and teaching.

I am going to present a transcription of my first interview with Gary, after I describe the school in which he works. I decided to present Gary's case this way for four reasons. First, I wish to capture the relationship that Gary has with his students. Second, I believe that it is important to show Gary's complex ideas about computers, art teaching, and their relationship to children's cognitive development. Third, I will be sharing an example of the interview process used to gather information. Fourth, my role as a researcher and the awareness of my own biases will be more transparent.

The School

Gary teaches at an inner city high school. Seventy per cent of the students come from urban areas, thirty per cent come from suburbs. Sixty to seventy percent of the student population is African American. Other minority groups include students from Ethiopia, Somalia, Vietnam, Uganda, Spain, and Morocco. In general, most of the students are from lower middle class economic backgrounds.

Gary's Background

Gary has taught for 11 years. He taught at the previous middle school for eight years. This is his third year teaching at this high school. Gary uses *Delux Paint IV* for teaching students computer graphics and animation. He has access to cameras, Televisions, two color-inkjet printers, digital cameras, CD-ROMs, and laser disk players. The art room is wired for Internet access but it is not yet on line. Students do have access to the Internet in the school library. In one corner of the art rooms are 18 Amiga 2000 machines that Gary brought to the high school from the middle school where he used to teach. Students use them to create computer graphics and animation in the art class.

The Interview

I walked into the building where Gary works and immediately spotted a police officer standing in the hallway. A teacher in the administrator's office volunteered to take me to Gary's room. I asked if today was a special occasion because the students in the hall appeared to be talking and hanging out with an unusually high level of energy. I thought it was getting toward the end of the spring quarter and maybe the senior students had a special gathering. She paused for two seconds and said, "No," it was not a special day. "Everyday is like this," she said. We walked passed the police officer, who had his eyes fixed on certain students.

Gary's room is by the food court. People who work in the cafeteria greeted me with smiles as we walked by. I walked into Garry's room and he was standing by a group of three students, watching two of them playing chess. He noted my arrival and asked the students to finish the game quickly. Students begged him to allow them to finish the

game, so Gary waited for them for five more minutes. He seemed very patient and understanding. Other than those three students, two students were drawing on the blackboard. Others were just hanging around and talking to one another. Two students walked in and they exchanged a short kiss and embraced one another. I was not sure if this was class time or if it was recess. Gary then introduced me to his student teacher, who was an undergraduate student from my department. I then was told that it was the art teacher's planning period, and the students were just hanging out in the room. Gary also explained that he is in charge of the chess club and they were getting ready for a cross-school competition.

A male student immediately showed interest in my visit. He asked why I was there, and if I already had a boyfriend. Garry explained that the boy had just lost his date for the prom, and he is seeking a girl to go with him. After some waiting, Gary put the chess set away. Then we sat down to start the interview.

GARY: *Here the computer is considered as another medium. At the middle school, I taught a whole course on computer graphics.* (I explained to him that he is kind of famous; people keep mentioning his name to me. So he then described how the program got started in his previous middle school.)

GARY: *The principal (at the middle school) needed to hire a third art teacher. He did not have an art room, but he had an empty computer lab. And when he hired me to teach computer graphics, I developed a program on Apple IIE computers first. There are ALL Apple IIEs. That was challenging, but it worked for two years. Then, I knew people at the Amiga Cooperation, and they gave me a machine. And IBM gave me a machine to look at, at the same time, you know. So I told them that*

I'm going to buy computers. And we compared the machines. Amiga, for the price, is a better machine. So, I convinced the school that it's an excellent idea to have a computer graphics lab. And they did. So, we didn't write a grant or anything. They took the Apple IIEs, moved them to another school that needed them. With the money they would have spent buying a lab for that school, they bought me the new lab.

LIYAN: And that is the school you...

GARY: *Shih... Sha..shih...* (He tries to quiet the students. Two male students behind us are drawing on the blackboard and talking to each other. The students quiet down a bit.)

LIYAN: Do you want to compare the two schools and their different approaches?

GARY: *It was completely different. Now, you know, instead of teaching strictly computer graphics as the art media, you know, I use it as an art medium within a traditional school setting. So, instead of running a lab that you can throw pots, you have a lab that you can produce digital art.*

LIYAN: Is there one way that you prefer more than the other?

GARY: *Oh, I prefer being back in the traditional art setting.*

LIYAN: Why?

GARY: *Um. Do, do, do. It is the same as if you would teach pottery for the rest of your life. You know. You have to be (pause) like a practicing potter. My interests are all varied. You know.*

LIYAN: So. Your interest is not (in) just computer graphics, your interests are more than that.

GARY: *Drawing, painting, photography, sculpture.*

LIYAN: (I looked over to where the computers stations in one corner of the room.) Is it a lab? I didn't see chairs.

GARY: *We moved the chairs over from the cafeteria because the chairs are used in the library. The chairs we were using in the lab from the old school had to stay there. All I took with me here in the school is that* (pointing to the computers).

LIYAN: Oh! So the computers are from the old school. (Gary continued to explain that the students can move chairs in the art room to the computers when they need to use them.)

LIYAN: So, that is the Amiga machine?

GARY: *2000. Amiga 2000.*

LIYAN: Can you tell me about the course? How is it structured? How much credit do students get?

GARY: *The class is a double period that runs for 84 minutes a day, five days a week for a semester. The beginning students cover basics of the animation with Deluxe Paints. With the advanced kids, they do more complex animation.*

LIYAN: Does the school have any plans to upgrade the machines?

GARY: *Not currently. We'll have a new lab in the building. There is a great deal of money that has been put aside for that. After the lab is introduced, I plan on writing a grant to show that these are older machines. And we need to upgrade for the rest of the school.*

LIYAN: So, there will be a lab in the school? Like at what time?

GARY: *They will be coming. They will be coming. The district is on hold because of the stuff going on. They still have problems.*

LIYAN: So, still not sure when you will have this....?

GARY: *MAYBE by next year. Maybe in the beginning. More definitely by early spring of next year... It's going to be late. Very late.*

LIYAN: And the lab is for the arts?

GARY: *It's not, but I can move in.*

LIYAN: You mean, you can teach there, and have a computer graphics class.

GARY: (He smiles and keeps nodding)

LIYAN: (l laugh.) That's cool. (W then discussed the grant, and the school district in which Gary works.)

LIYAN: I guess what is interesting to me is the structure of your school district. I'm wondering what's the impact on you. How do you feel about this? To have to be waiting, waiting and waiting for the machines to come, yet not knowing when it's going to happen?

GARY: *Right, right, right.* (pause) *It's OK.*

LIYAN: It's OK?

GARY*: When you are in a BIG, BIG system...* (Students start making noises again. He tries to shush them) *Anyhow, within a big system, you have to have patience.*

LIYAN: But you also said earlier that you are pushy.

GARY: *Um. If it takes too long.*

LIYAN: Do you consider moving to a different school district where they may have better equipment?

GARY: *Not necessarily.*

LIYAN: No?

GARY: *Because I like the population.*

LIYAN: And you said you like to work with students of this range (lower middle class). Why?

GARY: *Oh, they tend to be the most misunderstood group. But they are just as curious and creative as students from wealthier districts. They just don't have the money. The money, of course, is not there. That kind of thing. You know the budget per student. In wealthy districts, you have more money to spend on students than you do in urban districts.*

(Pause)

LIYAN: I'm just curious because life may be easier to teach in a richer district?

GARY: *Yeah, I know. I know.*

LIYAN: What makes you feel that it's worthwhile to be here?

GARY: *Life is actually easy here, too. You know. It's just the attitude you have toward the student. Umm. You know. There are a lot of misconceptions. And you have to understand the culture of the students. And if you understand the culture that students are coming from, they pick up on that, you know, within you. And they turn out to be just like any other child.*

LIYAN: Does it come from your background, that helps you relate to the students more?

GARY: *When I was little, I had always traveled a lot as a kid. So I was exposed to people from all over the parts of the United States, and other cultures. So, consequently, I am sympathetic. More so than most of the American teachers maybe. Typical*

American teacher. (He talks about students coming from different cultural backgrounds comes with different learning styles and needs. And he can switch and be flexible.)

LIYAN: Why do you think it's important for students to learn computer graphics? Is it more so for your students?

GARY: *Umm. I think I can go into a long diatribe. I think students should learn computer graphics once they entered, umm, about eighth grade.*

LIYAN: Why? Why eighth grade?

GARY: *I don't think they should lean it prior to eighth grade.*

LIYAN: Is there a reason? Why eighth? Why not seventh or ninth?

GARY: *They become young adults. They tend to leave the innate childhood creative behavior. You know. Because the playful creativity that every child tends to be put away as they become older. And they have puberty and they have to see themselves as important within their peer group. And worry about their identify, and so forth. And they really, really, really begin to appreciate the media. Painting, or clay, or computer graphics, or anything. They begin to focus and appreciate the media more, right? And become more analytical toward the media, you know? Because they are leaving their abstract childhood thoughts. I am sorry. They are leaving their concrete stages and becoming more abstract, and you can deal with aesthetic issues much more in-depth. But the whole reason behind why you should wait is just my personal philosophy; although it's being mimicked by others in the field, I've noticed. Computers are very logical. And*

creativity is not logical. And I really think you do creativity an injustice when you (pause) *enforce the logical part.*

LIYAN: You said that computers are very logical and creativity is not logical so you shouldn't...

GARY: *You shouldn't give them a creative outlet that is based on logic. No matter how simple or complex, still based on logic. Because you are setting the parameter's of the media guided by the parameters of the software. You know, like there are different type of printmaking, but you must conform your ideas to the media or the photography. There are certain limitations. And you can only do so much with a block of wood. But if you get a piece of stone and you work with wax on the stone that completely changes it. But you can only do so much with the wax on the stone.*

Liyan: So, you are saying each medium brings students something new to the art learning experience, but each medium also has its limitations. Because computers are so logically designed, it might in some way force students to think -

GARY: *I've actually seen very creative students become frustrated with the parameters of the software. They wanted to do something that they cannot do.*

Liyan: But it seems that right now the software is getting so much better and it's not going to be that much of an issue. Is that possible?

Gary: *Well.* (Pause for five seconds.) *There is also an argument. Instead of giving an answer, I'll give you an argument. Every time I look at a computer graphic, I ask myself aesthetically could this be done better in other media. What is it that the computer can do that is unique to it's own medium? And one of the essential*

things that computers can do that is unique to itself is transformation. A computer can take an image or an idea and transform it. Like manipulating a photograph digitally or manipulating reality virtually. So transformations are a big part of that. And a child really, really comes to understand and appreciate abstract transformations when they are older. So, when you see younger children's computer graphics, continuously, I am wondering why don't they just use markers and crayons or pencils? And the argument pops up. Oh, it's a new medium and they should all learn it. It's a new medium but not everyone can learn it or should learn it at a young age, because there is a lot to keep track of. When you take a very good photograph, why don't we teach photography at the elementary level? Why do we wait until high school to teach photography?

Liyan: I thought it's because of the equipment or the space.

Gary: *Same argument. There is equipment and there is space and that's very expensive.*

Liyan: So you are saying that it's more developmentally appropriate to wait, like to teach photography in high school, and the same with computer graphics and animation.

Gary: *I'm not saying it for photography. But the reason is an example maybe. Because the parameters of photography are not necessarily like written around the logic of the program. If you watch a child work on clay and you watch a child work on computer graphics, there is an edge that's missing. They will bring to the computer, the techniques they learned within the traditional media first, right? If their techniques are limited because of their age, then they are not going to be able to push the machine effectively or utilize it effectively. The larger the child's repertoire is in other media, the more they will pull from that repertoire and*

apply it to the software programs. That's another reason, and maybe the big reason, behind why I think children should wait. Or why teachers should wait. They should have a very good background and grounding in a variety of media before they jump into computer graphics or digital media. And having taught sixth grade, seventh grade and eighth grade, I've seen that. And having been to elementary schools where there are computer graphics, I shake my head every time. And I walk away with (a sigh). *They are using it the same, the way they are using a marker or collage. And they can be doing so much more with it. And another reason too is teachers should have a background in computer graphics before they ever teach it.*

Liyan: Computer teacher or art teacher?

Gary: *Art teacher should have a background in computer graphics before they ever teach it. And they should have a decent knowledge of art history and the historical aspects of computer graphics. Here is the very first animated films by Chuck Csuri of the humming bird. It was all about the transformation that computers do. Chuck Csuri says that. "Hey, this is what it does. This is what it does best. This is what we should always use it for." You know?*

Liyan: To me, humming bird at that time looks still...

Gary :*Very perky, jerky.*

Liyan: Ha, a little bit.

Gary: *Yeah.*

Liyan: People don't really understand how difficult it was to create that at that time. People thought that it's awful, and not art, and not aesthetically appealing at all.

Gary: *There is a very famous piece by Bell Labs that I used. I gave the kids their first piece to critique. It was done by two programmers. They are not artists. They are programmers at the Bell Labs. And they took famous works of art. And for every pixel they assigned a random little icon like a smiley face or a tank and they assigned a gray scale. When they digitally scanned the old photographs, the computer randomly applied an icon to every pixel. And decreased and increased the darkness to fit the same gray scale of the photograph. Stunning pieces, and they were done 30 years ago. And the technology, in theory, you know was lost. And now, rediscovered so to speak.*

Liyan: Your understanding of computer graphics and ways of teaching it. Did you just learn it on your own? Or what's your background?

Gary: *A way long time ago in the 80s. I was at the Cranston and Csuri Center at that time. A lot of really famous works were being done. I was just an undergraduate.* (Gary describes how he was inspired by the vision of being innovative, a computer artist, and an Art Education Professor.)

Liyan: Your experience is part from being a student at O.S.U, and being influenced by the idea of transformation and pushing the boundary. And right now, do you just continue to learn on your own?

Gary: *Umhum. I'm in a transition period because the computer and software, although they are still very good, they are out-dated already. And the money is not there to buy new systems immediately... So I'm patiently waiting for my time to sort of do it all over again. Get the new machine. Get the new software. And then, you know, just go crazy all over again like I did ten years ago. Because again, you are*

limited by the parameters of the software. You know clay doesn't become outdated, photography doesn't become outdated. Computer programs become outdated.

Liyan: You mean, using computer programming methods to create computer graphics becomes outdated?

Gary: *Yeah. The one you might currently have, OK, they have upgrades. Right? But a whole new package comes out and makes the other one too slow. And you jump to that one. What other medium do we do that with? I mean clay is clay, is clay. Photography is photography. Yes, there is digital photography. But no one is throwing away their 35 mm camera yet. See. And the leaps are so fantastic. Computer labs should be recycled every ten years, or less, to keep teaching computer graphics acceptable. One interesting point about the whole thing is kind of ironic. Remember I'm describing the image from the Bell Labs, and all of sudden you see it in the 90s, you know. But in between, they couldn't do that technology, in between. Because no one has ever written the software for it again. And the size of a pixel shrinks, and the whole techniques is based on that pixel. And what they did is they grouped the pixel into a field to be able to do what they do now. But it's still the same theory. The same aesthetic theory that went into the early print. But again, it was lost for a while. But what art media do you know has an actual aspect of a loss? Glass blowing would be a very good analogy because there are techniques of blowing glass that are lost. And we have yet to rediscover them from talking to glass blowers, you know, and looking at the ancient glass.*

(The other art teacher calls to the students. Gary: "Hey guys, you're too loud over there." Students stop pounding. "Thank you.")

Maybe that would be a nice analogy. I don't know. I'm going to research on that one, more. I haven't sat down and talked to anyone like this for a very long time.

Liyan: Ha ha ha.

Gary: *So, I have let all my arguments get rusted.*

Liyan: So you're saying that it's good that I have come and talked to you?

Gary: *Yes. Makes me think more. For a number of years, I just kept meeting people. This is great. This is great. This is great. This is great. And they were not teaching to really use the medium. And I, just like, you know, you have a $2000 machine that can produce fantastic movies and yet you are having them do this simple cell animation. I wonder why? You might as well make a flip book.*

Liyan: So, for your animation assignment. What's your focus?

Gary: *They do computer animations that move objects in XYZ space. So, I really, really tie in mathematics. To have objects flying in and out of the screen and they have to plot that.*

Liyan: I assume that you have students create an illusion that's moving in 3D space, not just flat 2D images.

Gary: *No, no, no. It's not bad. They have an object come in and interact with another object, and they both exit the screen.*

Liyan: The software is not a 3D animation software.

Gary: *Yeah. It's a fantastic software, but it's not. They started to distinguish the software to the 2D or 3D, or parts of it can mix. But they are not in one package as much*

any more. I guess they make more money if they sell two packages instead of one. So, the art teacher is being limited, too, by the software, as well. And ironically, some art teachers have said that to me. They are bugged out by the limitation of the software. It's usually art teachers who have been training some of the older traditional medium like painting or weaving. They are the ones who really get frustrated.

Liyan: What you mentioned earlier about the appropriate age to use computers, this really interests me. You also speak strongly of transformation and pushing the boundary. Is it possible to teach students at a younger age about computer graphics and animation but still with the same idea of transformation as a way of expanding students' repertoire?

Gary: [He shakes his head] *No.*

Liyan: No?

Gary: *If you talk to a developmental psychologists, you know, a child roughly around the age of eleven or twelve you know, if a vase breaks, a little child would say, "Oh, oh, it falls and boom-boom." Eleven or twelve, they might say, "I hit the table." Or, " I bumped into the table." And when they are eleven or twelve, "Oh, the wind blew it over." A 10- or 11-year-old would tell the truth, because they won't make up a story just yet. There are certain things that they can't fathom yet because of the developmental age of the brain. And there is something that happens, you can see it for yourself if you teach fifth graders, sixth graders, seventh graders, and eighth graders. You can teach something with the eighth graders and you can pound it into the brain of the sixth grader. But you are led to*

believe in maybe only a handful of students, really understand it, if they get it down all. It's amazing! I've seen it. Because of their developmental age. You could base the computer program on their developmental structure and you can work with it. But then why thousands and thousands of dollars at that age, on something that they are not going to push to its limit? Why not wait and use the money more effectively? Or take the thousands you would spend on the elementary level and put it into after school programs or guidance or something else in art, like visiting artists' tours? Or just give it to art teachers to spend on art supplies? You know. Development and money are, I think, two very large reasons why you should wait. Because the funding for elementary art programs is so low. It is. The money should supports teachers on supplies. [pause] *And you know, if kids learn it on their own early on at home, that's fine. It's like having a camera at home. They might pick up mom's and dad's camera and play with it. They would take good pictures, but they won't take splendid pictures. You know, when they come to the school later, in high school, they would be taught how to take stunning pictures. And they would have an understanding of the media. But there will be things taught to them, but they will still be like, "Why?" I never do that.*

Liyan: Teachers being recommended to me are mostly high school art teachers. I wonder if it's because, like what you say, the developmental level of the students, or funding or…?

Gary: *I've never run into anyone else. I think it's funding, number one. Funding is a big part of it. But I've never run into anyone who argues about developmental process*

like I do. I really, really think a child should not be exposed to simple logic games until they are much older. They should be left playing in the sand box or playing socialization games, because the computer is not a socialization tool. It's a very asocial toy.

Liyan: But how about Internet? Internet is basically a way of networking, talking to people, finding information. It sounds like there are new ways of communication. Because of computer technology it becomes possible.

Gary: *This is true. And you can play a game on the Internet, etc., but you are still communicating. Who talks on the phone for a long, long time, we tend to lose track of our surroundings. We become engrossed in the conversation. And people who talk on, or deal with the computer or any digital device, they are involved with some human interaction, they become absorbed and you lose track. You sit at the computer, "Oh, my god. What time is it?" You know? At a younger age, for someone to lose that much time in cyber space, as opposed to losing that time playing with friends, or even losing themselves in a book, which is a mentally active process where as you are in a passive situation behind the computer. You are merely manipulating data, even if you're speaking to someone else.* [pause] *There is no comparison. Occasional work on the Internet at a younger age is fine. I really think that, you know, a thorough background in traditional media and a thorough grounding in play and literature, which is human play, and human literature, is much more important. You know, these students are students who have grown up with digital media. This is some of the first generation and their*

social skills are different. Much different. They have very simple logic with regard to anger. If something is not going well, they immediately become angry.

Liyan: You think, this is because of technology, or their association with technology?

Gary: *I'm not a psychologist. But if I was exposed to a game that has parameters, but if I did not learn the parameters of the game, OK, faster enough or whatever, I would become frustrated. Or if I learned them and because there is a software package that only goes so far. When you read the game receptively, it's rote; you become bored. So frustration and boredom are integral parts of digital interaction. And if you base a child's play and move them in frustration and boredom, what were you creating? The danger of what you were creating is mean.*

[The other art teacher is standing by and observing our interview and my vigorous writing.]

Liyan: OK. I'm just copying what he said, because he said something very interesting.

The other art teacher: [smile] Just in case.

Liyan: Yes, just in case I forget.

(A female students brings her art work to Gary and says to Gary, "I love you." Gary responds, "I love you, too. That's wonderful.")

Liyan: You are his student?

Gary: *I taught her when she first came here.*

Case 8: Hilary

Hilary's Background

Hilary has a B.A. in fine art, and M.A. in art education. She has been a professional photographer for 25 years. She teaches at a university and offers a lot of art workshops. Before she went into teaching, she was in art administration and organized festivals. After ten years of writing her own grants, deciding her own salary, and developing her own program, she decided that it was time for a change.

Hilary currently teaches at a suburban high school. And technology education is the number one goal of the district. When I first visited her in April 1999, it was her first year teaching there. Before teaching at the high school, Hilary taught art on a cart at a middle school. She found herself "spent more time organizing the materials because they need to fit on the cart"(10-28-1999) than focusing on teaching. Also "there is very little art actually in the middle school"(4-18-1999). Art was required for the eighth grade but it was completely eliminated two years ago. The current high school needs someone to teach the computer graphic class. The district administrators asked Hilary to apply for the position, and she was hired. Agreeing that she would teach the computer graphics class without much experience, Hilary immediately started planning. When I asked how she managed and dealt with such a challenge, Hilary responded:

> *I'm old enough, more than enough. I know what it is going to take. I was here 12 hours a day. I talked to people and the technician of the school. He didn't know anything about the program. The other thing is that I had to write all the curricula. The curricula that's out in the field I think it's terrible. So, after my kids did their first project, I took them to someone who knows, Carol. And she said that they are really terrific so that encouraged me. Writing the curriculum, learning the computer, I didn't know computers that well. I learned the programs. It's really hard, but not impossible.*

Hilary stayed late at school, came up with the curriculum, learned *Photoshop* mostly on her own, and worked vigorously to prepare for the computer graphics class. Her hard work seems to have paid off and the class is going well.

Uses of Computer Technology

Hilary teaches in the computer graphic lab which is equipped with G3 Macintoshes, a color printer, and two scanners. The class focuses on the history of graphic design, visual communication, and studio work.

Hilary engages students in various projects in which art history, criticism, aesthetics and studio production are interwoven. Two of the projects from Hilary's curriculum are:

Artists circle.

In this project, each student is asked to select an artist. The criteria for selection is that the artist must have an established body of work and that is well documented. The chosen artist also should not duplicate any one else's artist.

Students then read about their artists and complete a worksheet that Hilary provides. The worksheet asks: The name of the artist? Where and when the artist lived and what the artist is like? How successful the artist was during their own life time? The art style or movement that best describe the work? And definition of the art style or movement? Students are asked to describe what the artist's works generally look like, select one image for re-design, and give some information about the selected research image. After the worksheet is completed, students are asked to give oral presentations of

two minutes minimum of quality information. Students are encouraged to practice at home since they may NOT read for their presentation. If they provide less than two quality minutes, they receive one-half credit for their presentation.

Following the presentations, students redesign their selected artwork. Hilary leads students in looking at examples of original works and re-designs of them. She emphasizes the importance of maintaining the integrity of the original work giving appropriate credit to the original artist.

Students are asked to look thoughtfully at the research image and identify four visual characteristics of it for redesign. Students then scan part or all of their research image into computers, and redesign it as a circle within a square. Students need to make a minimum of three successful changes using the four characteristics that they identify. The project is titled as follows: Homeage to _____(artists' name): Re-design by _____ (student's name).

Hozho balance circle.

This Hozho Balance Circle project explores concept of harmony and balance both on an individual basis and as member of a broader worldwide community. Students are asked to choose a particular artwork by a specific cultural group. Students then explore the characteristics and meaning of the chosen image, use selected imagery in their own design in recognition of the thoughts and ideas that inspired their original work, and then share information about the selected image and cultural group in a presentation.

Hilary explains the meaning of Hozho in a handout.

> *Hozho is a word from the Navajo language. The Navajo are a Native American people in the North American Southwest -mostly in Utah. It is usually translated as the word beauty as this is the closest English word we have for the concept... but it is inadequate. It refers to a total environment that includes beauty, harmony, happiness, and everything*

that is positive. Life for the Navajo consists of taking steps toward enhancing hozho, to live and die and continue to be part of the total environment in a positive way.

Students are asked to think about the culture in which they live and list one aspect of American culture that they think reflects hozho. The idea of being balanced as individuals and as members of a world community is important for Hilary. During conversations I had with Hilary, she referred to the idea of being balanced on several occasions. In the handouts provided for the class, Hilary asks students to reflect on the following questions.

BEING BALANCED --- AS INDIVIDUALS

- When you hear of a person being "off-balance" what does this mean to you?
- What major areas in the life of an individual do you think a person needs to remember to develop and to keep in healthy balance?
- Of the areas you just listed, what do you think works against achieving them and keeping them in balance?
- Of the areas listed above, what do you think works to support achieving them and keeping them in balance?

BEING BALANCED --- AS MEMBERS OF A WORLD COMMUNITY

- Individual people are also part of life on earth. As members of this broad community, what areas do you think care should be taken to keep in balance with each other?
- Of the areas you just listed, what do you think works against achieving them and keeping them balanced?
- Of the goals listed above, what do you think supports achieving them and keeping them balanced?

Students think about the major areas of importance in their lives that should be kept in balance as individuals, as well as major areas that are important to care for and keep in balance as members of the world community. For the studio project, students make a graphic design that is inspired by their own ideas about personal and community life. Students identify their philosophical ideas and develop symbols for them. Then

students select an artwork from a Native American tribe or nation or another appropriate cultural group and use this as a resource pattern throughout the piece following research on the life and artwork of their chosen cultural group.

The resulting graphic design consists of three circles. The inner circle represents three or more areas of personal balance and contains patterns and symbolism. The middle circle is mostly negative space, and the outer circle represents three or more areas of world community balance and contains pattern and symbolism relating to them. Hilary showed me her own design. In her center circle, she used a turtle to symbolize home, four blocks to symbolize people in her family and a bear to symbolize personal strength. Hilary believes that it's important to lead students to understand the symbols behind their and others' designs.

> *You know, in lots of art, especially in multicultural art, some teachers they just take the design. The kids do not really learn or understand what these symbols mean. It's just surface. So this project after they do their circles they actually go in and read. When they are sharing the circles that they would like, they are expected to tell something about this artwork. They can use my file or they can go out and do research. So, this one has a lot of content.*

In Hilary's computer graphics class, she uses carefully designed guided research and reflection to lead students toward thinking in about their lives, their relationship with others, and the world community. Hilary teaches and emphasizes design principles, yet students' works are more than just creating visually appealing images. Instead, almost every studio project is combined with research, class presentation, and sometimes even quizzes.

Beliefs About Technology and Teaching Art

Hilary's goals for herself as an art teacher and for students in her computer graphics class are multiple. "I want them to learn basic computer management. And I want them to learn how to use technology as a tool. And I want them to learn the creative potential of specific programs. And to learn about other artists" (10-28-1999).

For Hilary, the computer is a tool, but it is also a means of creative expression. She feels that most art teachers do not address the creative aspects of computers, nor do they value computer graphics as an art form in itself. In addition, Hilary believes that it is important for students to be aware of successful communication and personal meanings.

> *I think in each project students need to learn some kind of technical skills, whether it is how to mix paint or how to use shadows. So I think it should always be that. I think the students should also think about composition and design and learn how to use the digital structure. Most people refer to it as the elements and principles of design. The third thing is an awareness of communication or personal meaning. I do that by asking the students, "What is it you are trying to say? What is it that you want to communicate? What is it that you feel is important? What does it mean to you?" To make it very personal to the students. So they are learning skills, they are learning how to communicate with those skills, and give meanings to what they want to communicate. (10-28-1999)*

Problems & Future Plan

Although teaching a computer graphic class is a new experience for Hilary, the class is obviously going very well. When I asked if there are any problematic areas or things she wants to change, Hilary said she finds that it's sometimes hard for students to get their minds off their own work and get back to concentrate on the teacher's instruction.

Another frustration for Hilary is the resistance to accepting computer graphic images as an art form at regional and national competitions and exhibits. She recalls the insignificant representation of the medium at a particular show. "There were 15 computer graphic works out of 533, which is .03 percent. It's an incredibly low percentage of the show. It is still a very traditional show"(10-28-1999). In the future, Hilary wishes to have a private exhibit for her students' computer images because "that would be nice when traditional competitions and exhibits become more open to computer images"(10-28-1999).

Case 9: Irene

Irene's Background

After several email exchanges, Irene and I schedule to meet at the Ohio Art Education Association Conference. Irene has a B.A. in art education. She taught K-12 for four years and went back to get a Master's degree in arts management. She was a museum director for three years at a university gallery. Now, she teaches at a university in Ohio and offers online courses for a university in Utah.

Irene started learning HTML in 1995 in order to create a website for the museum. In 1996, the provost of the university that she worked for bought a web server. The provost said to Irene, "Here. Do something with it. You are the artistic one." At that time, the board of Regents was trying to promote technology in the classrooms, so they applied for a grant, which they received. She then started to develop the online course.

First, she scanned slides of objects from the museum's permanent collection. Then using existing curriculum, she decided on a text book. She then created an illustrated lecture, created web links to other museums, and developed an online quiz.

Uses of Computer Technology

Irene has three types of students enrolling in her online art appreciation class: high school concurrent enrollment students; the regular college students from Utah and California; and what she calls life-time learners, who are retired people and people who are interested in art. The course content covers materials, production, art history, aesthetics, and criticism. Irene describes her class this way:

> *We first talked about what art is and then the purpose and function of art, that type of thing. And then, we start getting into the medium so they understand the different materials that artists used. One week we talked about drawing. Another week will be painting and another week will be printmaking. And then we talked about art history for several weeks. It's a brief summary of art history, real quick. Thrown in there is criticism and aesthetics. And then, what is art? It kind of follows the text book "A World of Art" by Henry Sailer. That's the textbook that we use. (11-11-1999)*

Students from Ohio, Utah and around the worlds register for the course. Students access the web site at a time that they find most convenient and there are certain assignment due dates that they have to meet. The assignments are mostly written essays. As the course moves along, email correspondences among students increases. The first few weeks, according to Irene, there is not a lot of interaction among them. Once they got to know each other, however, they start responding and arguing back and forth. Irene tries to encourage such discussion.

"How do they get to know another person?," I asked. Irene explained that students are asked to write introductions for themselves the first week, including talking about their experiences. "They really reveal a lot of personal - I don't know, a lot about themselves actually," Irene observed.

To deal with students of different ages and with different background, Irene has tried to separate high school students from those from colleges because of complaints from some of the college students.

> *The high school kids are more immature. The older students are going "What are they talking about?" you know. And sometimes, it starts getting carried away. "Oh, my boy friend, blah, blah, bla"... "No, no, no. We are not talking about that kind of thing here." I had a few students who tried to date each other online. That was very strange. (11-11-1999)*

Students never exchange pictures of themselves, and Irene comments that she sort of has images in her mind of what she think they are like from each one's writing. In addition to teaching the online course, Irene also teaches the same class face-to-face at the university level. Personally, she likes the online class better, because of the student interaction.

Irene feels that she knows her online students better than her university students because she spends a longer time responding to them, while she only sees her face-to-face students three hours a week. The online students seem to feel it is safer to express more. "A lot of shy students talk more," Irene observed. "It seems like students reveal more of themselves to me than maybe in the classroom," she added. And for her face-to-face students, she feels that it is like "pulling teeth to get them to talk some days."

> *They just sit there. You don't know if they are just bored to tears or they are just not getting it. This one [on-line course] they have to write. You*

understand exactly what they are understanding, what they are not understanding. You kind of refocus the direction. (11-11-1999)

Irene has never met any of her online students, and she enjoys the anonymous feeling. In the online environment, students who are not native English speakers also have more time to compose their thoughts, and they generally do very well. However, one draw back for Irene's online students is the difficulty of working with materials. Irene teaches about drawing, painting and printmaking techniques in the classroom, but her online students can only watch the CD that comes with the book. They do not actually experience how to paint or how to draw.

> *That's the bad part about it right now. I'm trying to think of different ways to integrate that in, too, but it's kind of hard when you can't watch them do it and say, "Oh, no, no, no. You need to do this instead." I could have just said, "Oh, try water color painting," you know. But I can't see it, to see if they are doing it right. Then it's kind of pointless. (11-11-1999)*

Despite the difficulty, Irene once tried to work with online students on the concept of value. She had students do value lines out of a magazine. They picked one color, revised it, scanned the image, and sent it to Irene. Irene commented that it worked pretty well.

"So, not being able to see them and help them in their production, does that change very much what they learned from the course? Or it doesn't really affect it that much,?" I asked. Irene responded, "I don't know. I guess it's just different. I guess. I don't know. You have to study that and let me know [smile]."

This is the fourth year that Irene is teaching the online course. Over the years and she has learned several things.

> *You need a lot of time. People think that you put your lectures on line, you are done teaching. You need a lot of time responding to their email, responding to their assignments, cause everything is written. And technology problems pop up at the worst times, server crashes, or different things go corrupt. The server administrator leaves town for the weekend, and doesn't tell you, and it crashes. Yeah. I've talked to a lot of faculty thinking, yeah, this will be an easy way to live. To just put everything online, and do it that way. But, it's a lot more work than everybody expects. I probably spend at minimum five hours a week on my class in terms of responding to their assignment email.*

In addition to the time spent corresponding with students, it also takes a long time to design, complete, and redesign the website. After Irene taught the course for two years, the university switched from quarters to semesters which meant she had to adjust her course. Also, the required text book went out of print, so Irene had to redesign the entire site which took about 600 hours. Having taught the class, Irene restructures the site and redesigns the visual navigation structure so that students can easily access needed information.

Generally speaking, students go to the website, note their weekly assignment, read the textbook, read Irene's lectures, and visit other links or view the CD, if it is part of the assignment for that week. Then the students do the assignment and take a quiz. "Oh, they take an online quiz?," I asked.

Irene: *Yes. It's an online quiz. It's multiple choice, true or false. They just click on the little thing, hit the submit button. And it's automatically processed. And I get the result of their score.*

Liyan: But it's online.

Irene: *Oh, they can cheat. They have cheated. Yeah! It's a very small portion of their grade. A lot of it is just that I know they read the material, and not scanning through. It's open book.*

Liyan: And you also give quizzes to regular classroom students.

Irene: *No, I don't do that. No.*

Liyan: Why?

Irene: *Isn't that interesting! You know that's a good question. Why? Most of this is just I don't want to grade all of them. It's terrible to say. OK. I don't. It's a lot of grading. I have about 75 students every quarter, so it's a lot of grading for face-to-face students. On line students is about 30 students. (11-11-1999)*

Toward the end of the interview, I asked Irene to summarize the benefits of online courses. Irene responded that "students are able to open up more and think through before they respond. Plus the convenience of taking the class whenever they want. Also the high school students, rural communities, students in very outlying areas, or are on the reservations, can take the course" (11-11-1999).

"Does teaching the online course change your teaching style or the way you think about art teaching or students?" I asked. Irene paused for three seconds and said:

> *It has changed. It used to be a lot of lecture, take the notes, here is the information, take the test. Now, it's more discussion based. I used to go in and lecture, you know, expect them to write so many papers, and take the final exam. (11-11-1999)*

Liyan: And you said it's because of teaching the online course?

Irene: *Yes. Because you had to make it more discussion oriented than just lecture.*

Liyan: And you realized discussion oriented is probably better than lecture?

Irene: *For teaching art appreciation, yes.*

Liyan: Can you say a little bit more why you think that is the case?

Irene: *Um. A lot of it is the students' being able to look at art and actually being able to judge for themselves whether it's good art, bad art. Whether it is art, not art. So, most of that just comes from practice and taking time to look. So by being able to direct their thinking and reading assignments as such, I may be able to do that a little better. (11-11-1999)*

Case 10: Jack

Jack is not currently teaching at a K-12 school, but I decided to interview him because of his experience working with hundreds of teachers from 21 counties in Ohio. This interview with Jack served me as a type of check of my other data gathering.

Jack's Background

Jack did not think he had a serious interest in using computers until he was an undergraduate in the Art Education Department. He took an Art Education class and was inspired by a computer graphics artist. To Jack, the use of computer is a whole new art form. That learning experience inspired him to buy his home computer and he started "playing around with graphics."

After graduating from college, Jack first taught at an elementary school with no computer equipment at all. After six month, a different district hired him. He described himself as being "pushy at the new teacher orientation" (12-08-1999). When the district

technology coordinator came in to talk to the teachers, Jack's great enthusiasm and willingness to be involved with technology was apparent. "Being an art teacher at that time - this is 1985- wanting a computer in the classroom, in an elementary classroom, was sort of an odd request at that time," he said. The technology coordinator then would make sure that he was aware of the opportunities to be involved with the district technology plan and to have a Mac Plus computer in the art room.

As time went by, computers became more accessible and Jack moved to another school. When the Apple Company donated Macintoshes to the school, the staff had to decide whether to put the computers in a lab or in classrooms. The final decision was "to put computers in the classroom so they would be a part of the classroom rather than this isolated tool"(12-08-1999). For Jack, the decision to put the computer in the classroom was very important. In his opinion teaching a special computer class in the lab isolated from the rest of the curriculum was unwise. At times, when he didnot have his own computer in the art room, he was limited to working with children after school or during recess in the lab, or offering separate computer classes for students.

His past experience of integrating computers in his teaching had its difficulties, especially because of no access, or limited access to computers in his art classroom. Despite the difficulties, he has been a strong leader and an advocate for the use of technology for many years. In one of the schools where he taught, he served the dual role of art teacher and technology coordinator. Outside of his regular art teaching job, he has helped other teachers with computers, although in most cases, it was not related to art.

Uses of Computer Technology

Right now Jack works for a state funded non-profit organization to provide assistance to parents, students, and teachers. The organization offers computer classes and teachers' training at K-12 schools in Ohio. From years of experience of working with teachers, Jack has observed that there are two extremes. On the one end, there are teachers who will plug the computer into the curriculum just because they think they need to or they have to. An example of this type of computer use is having students sit down and do keyboarding or self-guided software. The other extreme, according to Jack, is the teacher who uses computers as tools only when it's appropriate. In between the two extremes, there are teachers who require the use of the computer for specific parts of a project. For Jack, to use the computer only for drill and practice purposes or to think of using computers as a requirement, is self-limiting.

Jack describes a computer as a visual processor and a mind-expanding tool. Although software design and teachers' access to computers has improved in recent years, there are still certain factors that prohibit Ohio art teachers from using computers in their teaching. These include: access to computers in the classrooms, funding, district and school philosophies, and teachers' training. Teachers' skill levels and comfort levels are also two important factors.

Appropriate Age For Students To Use Computers

The issue of the appropriate age to introduce computers in the classroom was brought up when I was talking to another teacher, so I asked Jack if he feels that there is an appropriate age. Jack brought examples of his five-year-old daughter and how

involved she is with computers to illustrate that younger kids can learn, and do learn, from the use of computers. For teachers in general, Jack feels that it is appropriate to use computers only when it makes sense in the context of each individual teacher's curriculum and his or her goals for students. Jack also notes that the decision of when and how to use computers is closely related to each teacher's teaching philosophy. For example, if a teacher subscribes to the idea that students have to draw realistically before doing anything abstract, he or she teaches in a sequence that respects that. Otherwise, he believes there are ways to allow students at different grade levels -- even with limited numbers of computers -- to use computer technology to enhance their art learning experiences.

Suggestions for Teachers

Based on his years of experience, Jack offers teachers the following suggestions: (1) keep it authentic, and (2) provide training along with the purchase of new equipment. First of all, he wants teachers to make sure that the use of computer technology is really enhancing and strengthening the existing curriculum with solid educational purpose and reasoning. They should not be used just because it looks good or to demonstrate that a lot of money has been spent on technology. Second, he wishes to remind school personnel that when they are making purchase plans, they should set aside an equal amount of money as will be spent on hardware and software, for teaching teachers how to use the computers.

For Jack, it is also important for teachers to understand that the computer is just another tool. When teachers do not need them, computers do not always have to be in

use. He further recommends that teachers and professional development trainers to embed a technology component within existing curriculum, rather than letting the technology drives the curriculum.

Problems and Future Vision

Jack has not observed any teacher who totally changed his or her teaching philosophies because of their involvement with technology. He has observed that many teachers are able to see more teaching possibilities when technology is available, and they are often a bit more open to other new possibilities today than they have been in the past.

One potential problem of using computers, from Jack's point of view, is students' lack of understanding of the importance of having adequate time during the creative process. Because students are able to create digital images very quickly, Jack feels that they may get the wrong message. Jack believes that teachers need to stress that to have a quality art work, a necessary amount of time must be spent in its creation.

Jack remembers seeing schools five or six years ago letting computers sit in classrooms without using them because teachers were afraid of having the expensive computers get broken. Now, with the availability of computers in schools and in homes, Jack sees the computer more part of the scenery. As the Internet becomes faster and more available, he believes that computer will become more of a window to a variety of resources, rather than isolated machines hosting with a bank of software.

CHAPTER 6

TWO IN-DEPTH CASES

In this chapter, I present two in-depth cases – Ingrid and Micah. I have tried different ways of presenting these two cases, hoping to catch the multiple dimensions of these two art teachers. I also reflect on my personal learning experience, which Lather refers to as a "reflexive tale." Lather (1993) views a reflexive tale as a place where researchers come clean, tell "how they are invested in the research situation and what is said of it, and what comes of it" (Anderson, 1993, p. 180). It is a time when the researcher can say what guides her work and give the reader a chance to learn how the researcher's personal interests shape her research.

Among twelve art teachers that I interviewed and observed, I chose to study Ingrid and Micah more in-depth. The ways they use computers in teaching art help answer my research questions. Aside from their technology use, the way they teach their classes is also attractive to me, and I began to ask myself why. Here, I reflect on my own beliefs, which are shaped greatly by my past learning experience.

Memory

I remember clearly the first drawing class that I had in middle school. It was a still life drawing activity. The class had more than 45 students, and still life drawing was one of the early assignments that we did in the art class.

The tall and beautiful art teacher brought some fruits and stacked them up in front of the class. Students sat in 7 rows with chairs and desks facing the teacher's desks and blackboard. The assignment was to draw a still life of fruits. The only instruction that the teacher gave was to start with outlining and then to move into the details of what we observed. After five minutes of introduction, the art teacher sat down and started reading the newspaper. The rule was to work quietly so that we wouldn't bother each other.

Following thirty minutes of newspaper reading, five minutes before the classroom bell rang, the art teacher gracefully finished her newspaper reading and started walking around and advising students. "What are you doing?," she asked one student. "Is this what I put up there? I gave you oranges but you draw me watermelon. What is this that you are doing? You are doing it totally wrong. Things are totally out of proportion. Now, turn your paper over and do it again," she said. The class was filled with giggles. Everyone was interested in what this poor student had done and thinking about making fun of him during the recess. Joining the smiling and giggling crowd, I looked back at my paper. It was out of proportion. It didn't look as realistic as I would like it to be. Suddenly, I was grateful that I was not the one being picked on. "Hopefully, she will never notice how untalented I am in art," I thought to myself.

Not all art teachers in Taiwan are like the one I just described. But having such an art teacher presented me with challenges and new opportunities. After a struggle to regain confidence and love for visual art, that experience later greatly influenced my decision to choose an art education major. There is more to art than drawing realistically, I believe. Not knowing what it was, I began my years of extensive study and constantly asked myself what else I needed to bring to my students to enrich their art learning experience.

To be honest, Micah and Ingrid are the art teachers that I wish I had had in my past K-12 art learning experience. I see Micah and Ingrid as teachers who think of art in a much broader way. It's not just techniques, or media, or doing it the right way. It's more about communicating ideas in artistic way, developing skills and understanding key design elements, yet not being restricted by the rules.

I also enjoy the way Micah and Ingrid interact with their students. Among the teachers that I interviewed, I sense that the way Micah and Ingrid approach the class is more in line with constructivist learning. I will present these two cases in this chapter, and reflect on their teaching styles and use of computers at the end.

Ingrid

What Should My Fake Name Be?

The following is an excerpt from a taped conversation that took place on October 22, 1999, in the art room in the basement of a high school in Ohio. The radio is on. Seventeen students from the Photography I class are working on individual projects, which are due the following Wednesday. Some are still developing film in the dark room, which is next to the big, crowded art room; some are writing in their reflective journals; some have already started working on the next assignment. Ms. X, the art teacher, walks around the room. Students come to her for suggestions and to ask questions. It is my third time visiting and observing the art class.

Liyan: I have a question.

Ms. X.: *Yes?*

Liyan: I think that when I write about you, I'm not supposed to reveal your real identity because of the human subject protection principle.

Ms. X.: *Right. Sort of like the witness protection program, which I am in, by the way.*

Liyan: So, how about choosing a pseudo name for yourself? A name that sounds more like you.

Ms. X.: *Oh, gee. What should my fake name be? (pause) Something exotic!*

Liyan: Yeah!

Ms. X.: *Something bizarre... like Alvira. Ha ha ha.*

Liyan: Alvira?

Ms. X.: *Ha, ha, ha. Vince!* (She calls a student who stands next to her.) *What could my name be? You know that the witness protection program thought my name is Ms. X. What would my name be if I'm going to...*

Felicia: It's a trick question, Vince. Don't answer her! If you answer it you're going to get a bad grade.

Vince: Hansel.

Ms. X.: *Hansel. Ha ha.*

Kevin: Natasha.

Ms. X.: *Natasha?*

Kevin: I have a classmate whose name is Natashia. Very cool.

Ms. X.: *Natasha is a cool name?*

Kevin: I think so.

Ms. X.: *That's much more exotic than my real name. (Both Liyan and Ms. X laugh.) Much more exotic. Natasha! So do we want Natasha? Let's vote on that.* (Some students shake their heads.) *What do you think?* (She turns around to another female student.)

Lisa: Na.

Vince: Ingrid.

Ms. X.: *Ingrid.* (Laughs. Finds the name suggestion process amusing.) *Ingrid! From the same boy who said Hansel.*

Lisa: Yeah! I like that name, I think it's a pretty name.

Ms. X.: *Ingrid or Hansel? Ha, ha, ha.* (pause)

Lisa: We can do Ingrid. Ingrid is cool.

Ms. X.: *We can do Ingrid. Ingrid is fine.*

Liyan: How do you spell it? I-N-G-R-I-D.

Ms. X.: *If I'm Ingrid, that's how I'll spell it.* (She laughs again.) *We need to have kids' names. We'll come up with some real cool names.*

Liyan: OK.

Liyan's Reflection

So, there it is. Ingrid, an exotic name, was chosen with the help of her students. It is typical of Ingrid to ask her students' opinions, and the dialogue above is an example that displays Ingrid's style of classroom interaction. In particular, I found the process of collectively deciding a name for Ingrid amusing and significant because names are central to our identities and who we perceive ourselves to be. I believe Ingrid's act of having students choose a name for her is an indication of her openness to her students and to their impact upon shaping her identity as a teacher.

The dynamics of Ingrid's class and the stories that she shared with me attracted me and kept me going back to her classroom over and over again. As a researcher, I

understand that I may not be able to capture Ingrid in all dimensions. But by allowing Ingrid to speak to the reader directly and in her own words, I hope to provide a rich account of who she is and what she thinks about art, teaching, students, and technology. The following are taken from interviews, and Ingrid's words are presented in italic.

In Ingrid's Words

I hate kids!

Ingrid: I have never thought about changing careers. Not at all during all these years. I'm going to stay in art teaching. Even if I'm going to finish this Ph. D. degree I'm not going to the central office. I had opportunities to go into photo departments and business stuff. But I don't want to do that. I like working with children.

Student: Oh, boy! (A student looks surprised as if he has found out a big secret.)

Ingrid: You tell anybody that and I'm going to hurt you. (She jokes. All three of us laugh.) *So, I usually tell them that I hate kids. After a really good day, kids will say -"Remember, you hate kids." "Oh! I forgot. I HATE KIDS."* (Ingrid looks me in the eye.) *I think this is where you affect most changes, in the classroom. To have kids having a good appreciation of the art. They are not going to get everything they ever wanted to know, but it will be user-friendly and they're going to think that art is approachable, and that anybody can do this, and this is for me too. Art is for everybody not just for talented kids. Everybody in my graduate class so far would say*

"UmUm~ I don't have any talent." SO? That's not the point! The talented kid is going to do it much better. Their work may look better, but that's not the issue.

You asked me if I ever felt frustrated or overwhelmed. Oh, My gosh! If you did it on a day to day basis, on a day like today when I don't have a break and I have the hectic things going on with the overture thing, umm, I feel like a clock hit me. And I have to leave. If I could just stay in the school and get some stuff done and hang out until seven o'clock, cool! But, I can't.

I always missed the classroom.

When did I decide to become an art teacher? When I was not in the classroom I know I always missed it. I have a bachelor's degree and certification to teach. I taught for a year, then I stayed home with kids. When they were in school full time, I went back to school and I upgraded my B.A. to a B.F.A in graphical arts. In the sixties, women didn't go into a lot of different things. You were a teacher, secretary or nurse. It was expected. Very few people did anything else. To get a degree in fine arts is a real cute thing for a woman. That was really CUTE. Seriously, everybody thinks, "Isn't it nice?" you know. I don't think they expect you to ever work. The expectation is that you're going to have a family and stay home. They didn't have day care or all kinds of stuff around, they didn't exist in the number that they exist now. Very different time period. I'm glad that I stayed home; you know that's not a problem. The fact that I stayed home was not

unusual. It's not like "Oh! You're going to stay home with the kids?" It's more of "Of course, you're staying home, right?" You know, it was expected. So, it's different.

The first year teaching is usually very hard because you have to learn everything anyway. I had 2200 students [my] first year. I was at three different schools, K-8 schools. I was the first art teacher for two of them... ever seen. I had to write two new art curricula. It was really hard. But, I missed being in the classroom. So when my kids started to be in school full time, I started substituting, not just for art, for any subject. And then you start seeing some of the problem teachers who are out there. "I can teach math better than this person." (Ingrid laughs.) *I mean, really, they are just not good teachers. There is a lot of not good in all careers. By that time, the little guy* (her son) *was in the 5th grade, then I started teaching in a district.*

<u>My goal here is not to just nail them.</u>

A lot of people I see don't really care about the kids. Well, they know their names; but my goal here is not to just nail them. "Oh, you didn't bring your film in? Ahha!" (She dramatically acts as if she is marking down students' grades.) *Or that I'll give them a quiz if the goal is that not too many kids are getting an A. So their grade will get knocked down. And until that happens, they* (students) *don't believe you, cause everybody does that to them. Not everybody, but almost every teacher does that to them. Now, why? What's the point? I start telling them what's going to happen, why I give them a quiz. I really needed to know whether you*

understand what we're doing. And the quiz is all in their journal and their books. They can study a few pages, and some of the stuff is plain silly. You've been doing it for a few months now, not a problem. It should be an easy A. I got a few people who will just make stupid mistakes. I'll take them aside, and we'll do that orally, and I will understand that they just froze or they just had a headache, or they just couldn't think that day. So, the goal is for them to understand this. I'm not going to make you memorize the time chart or what's the name of the chemical. It's the developer, that's all you need to know. The rest you can look it up. A lot of that to me is busy work -- the jeopardy question stuff. There is always a funny question like, Umm. Well, the class that just left, we found this in a magazine. (Ingrid points out a visual image from a magazine.) *So this is going to be on their quiz. We just had a 410th anniversary of the kneading machine. See, which (question in the quiz) is stupid. The thing that just hangs in here which is just a funny thing. This* (a sign that says that the maximum occupancy for this room is 115 people) *is always out. This is always asked. I always ask what's the maxim occupancy of the Photo room. And it's like - Duh! - it's right here.*

There are just a few things that I need to know that they understand. This group this year is real insecure. They're all afraid that they're going to make a mistake. "Is this going to be OK?" You don't need do this. They have been here for nine weeks. One year, everybody bombed the quiz. Bombed it, big time. I said to them, "Guys, I think you just all froze up." So, we went over it all, and we did it again. I just need to know. And you know this! You're not as dull as these responses. That's the point. But they don't get that. They get jeopardy questions

from everybody. Or, "You have to learn this!" My theory is that if the reason to learn something is no more than because you have to, or because I said so, or because I go through this, or because it's in the book, there has got to be more of a reason. So, try to make it much more relevant to them, which I think is important.

Every once in a while, there is a question they just don't get. And if everybody doesn't get it, I just didn't do it right. I'll say I obviously didn't teach you to do that correctly. Let's go over this. But they don't get that. Test me, and they're going to get nailed and it's going to be stupid information. What's the point? And I don't get that.

I'm one of those type A personalities.

I'm a photographer. You know. But I'm one of those type A personalities, who has to be doing something all the time. And you don't just sit and watch TV, or read. You know, I have to do something. I have to be working on stuff.

The way that I run the class is very different from the way my colleagues running a class. The fact that there are due dates. I keep track of it. The traditional art classes are much more loose. The idea is for kids to spend weeks, weeks, and weeks on an assignment. My class is real fast-paced.

Controlled chaos is kind of how I operate. I know where everybody is; I know what everybody is doing; and I know what you are supposed to do. I don't like it when it's too quiet. I don't like it when everybody is sitting there. You know. And I give written tests. I like when there is a lot of hubbub, and it's kind of crazy,

and everybody is doing their own work. I tell the kids, "You are here to investigate insanity and the deviant behavior in the art room." And they are all like, "Oh! You picked the right person."

The Classroom

When I first visited in May of 1999, there were six computers in the classroom. Each computer was named after an artist that students had chosen as a group. The computers are named Georgia O'Keefe, Jackson Pollock, Henri Mattise, Edward Munch, Pablo Picasso, and Andy Warhol. On top of each computer monitor is a quote from that particular artist. The border of the computer monitor is framed with color images that show the artist's style. So does the chair at each computer, which was painted by students.

Ingrid chose a quote that she liked to display on top of each monitor. Here are the quotes, which may reflect upon her personal view on art and life.

Georgia O'Keefe (1887-1986):

> I believe to create one's own world in any of the arts takes great courage.

Jackson Pollock (1912-1956):

> The modern artist cannot express the age of the airplane, the atom bomb, and the radio in the old forms of the Renaissance.

Henri Mattise (1869 - 1954):

> I don't paint nature. I paint the feelings nature produced in me.

Edward Munch(1863 - 1944):

> Nature is not only all that is visible to the eye -- it also includes the inner picture of the soul.

Andy Warhol(1930 - 1987):

Everyone should be famous for fifteen minutes.

When I visited in March of 2000, the six computers had been moved from the center area of the classroom to one corner. Ingrid had also gotten an additional new computer. On that day, the students were voting on how they should name the new computer. The finalists were Renoir, Dali, Paul Cezanne, M.C. Escher, Monet, Vincent Van Gogh, and Mary Cassatt. The naming of the computers is a small touch. But it helps to bring artistic and humanistic elements to the cold inhuman concept of a machine.

Ingrid's Computer Background.

I like school. That's the point. Why not? I look forward to it. I had a B.A. in fine art. They didn't even give B.F.As out. And then I went back and I upgraded my degree to B.F.A in print making and graphic arts. And then I'm also working on a master's degree in art ed. So I don't know. I don't know about the computer stuff. I haven't thought about it.

I started using computers nine years ago. The district invested a lot of money for the computer equipment. After the computer was delivered in April, we were told that everyone was going to take their computer home over the summer. We had to practice using the grade book. A very difficult grade program was what we had. And I was determined that I was not going to be intimidated. I just decided that I can do this. I'm intelligent enough. I can do this. So, that's how we started. So I take a bunch of classes you know. My first contact with any kind of

visual computer stuff was through IBM. I got involved with the IBM graphics representatives from Cincinnati and Dayton. And they are helping me with what was out there. I did a workshop with them. A lot of it was just over the phone. Kind of what should I look for? What should I be doing? Because I don't know anything. Then, I took a class through one of the Microcenter kind of things. And I took several classes over at Miami University during the summer. I took a class specifically on Photoshop. I took a class specifically on Fractal Painter. I did a class on PageMaker a while ago and CorelDRAW. And as I see things, I try to take some classes. I'm to the point now where I don't have to do anything for a little while.

The Rich Kids?

The school population is like 2400 students for the whole district. There are approximately 600 kids in the high school right now. We have a wide spectrum of students. We have a couple of students on food stamps. We do have some things like that. We also have some groups that are extremely wealthy. Most of the parents are professionals. A lot of lawyers. A lot of moms don't work, they play tennis.

All kids have a computer at home. At this school, there are probably four kids who don't have a computer at home, and there is one family on free lunch. There are disadvantages to working with kids from rich families. A lot of emotional issues. You get a lot of students who feel

that there is nobody for them. Yes, so they are not on the food stamp and they have a nice house to go to, but there is not much difference. They are still kids.

Defining Technology

We defined technology when we wrote our curriculum three years ago. There are only seven of us in the art department, K-12. One teacher said it was the slide projector. Somebody else said that it was the light table. Yeah! They are technology at some point or another if you draw on films and do animation, and I've done that with little kids. Well, that's technology, you know. So, any kind of new development is going to be at some point called technology. I think technology is relative to your situation. For some teachers, having a scratch board is a major technology. Or being able to use acrylic paint is a major technology. Or a potter's wheel or whatever. Umm. You know, technology to me is more like video. Photography is usually listed in there for a lot of people because they do not have photos for the school they are in. Technology for me is the electronic media, that kind of thing.

How Technology Is Used In the Class

Perspective drawing.

Ingrid has found that graphics programs help her to demonstrate some art concepts, such as perspective drawing, much more easily. Rather than using pencils and rulers, she has students work on the computer, using the line tool on a graphics program

to create compositions using perspective concepts. Occasionally, there will still be kids who find the concept hard to understand. But working on the computer helps to ease students' fear of needing to draw realistically. Developmentally, Ingrid finds it much easier to demonstrate perspective drawing on the computer than using paper and pencils.

Dream collage.

Ingrid also gives at least one assignment that requires computer use to every class that she teaches. One of the assignments given to students in the Photo I class is call Dream Collages. Ingrid introduces the concepts of collage and surrealism, and presents works of some famous surrealist artists such as Salvador Dali, Rene Magritte, Marcel Duchamp and Man Ray.

Students are then asked to use photo images from magazines, newspapers, and their own snapshots to create an 8 1/2 × 11 inch collage that represents a dream or nightmare presented in a surrealist style. The following are Ingrid's guidelines for students:

- The dream does not have to be an actual one you really had.
- Think about the theme or feeling you want to express and find pictures, textures, shapes, and colors that help create that feeling.
- An interesting composition! No random placement of images!
- EMPHASIS - Consider what you want the viewer to see first.
- Collect your imagery first. THEN begin to paste everything onto the background. Glue the background first, middle ground second, and foreground objects last.

After students hand in their collages, Ingrid grades students' work according to (1) theme or mood created; (2) composition and placement of imagery, overlapping, depth, and emphasis; and (3) craftsmanship. Ingrid then introduces students to the use of scanning and *Photoshop*. Students are then given a follow up assignment which is to produce a surrealistic collage on the computer.

Students are asked to scan their collage imagery, open *Photoshop*, experiment with the tools of the program, manipulate the collage, and record their work time on the class room chart for this assignment. Students' work are graded using the same criteria as the previous assignment with the addition of an innovation criteria. Degree of difficulty for the student, time on task, and the work ethic of the student are also considered.

Andy Warhol project.

Another project that Ingrid assigned to her Photo II that required the use of computers is the Andy Warhol project. Ingrid once said to me "if Andy Warhol were alive, he would be using the computer" (3-16-2000). One of the photo assignments was to take a portrait. Following that assignment, Ingrid talked about Andy Warhol -- his life, his artistic style, his choices of subjects, and the pop art movement. Students are then asked to scan one of their portraits using the Photoshop program to create an "Andy Warhol" series using one of their own photo portraits. Students must create a series of at least four portraits using the same photograph. The four portraits must include one that emphasizes cool colors, one that emphasizes warm colors, and two that use filters in the *Photoshop*

program. Students are encouraged to use at least the basic functions such as Copy, Paste, Image Adjust, Rotate, and Layers. The finished piece is then saved to Ingrid's zip disk. After Ingrid grades the work, she prints out students' works, and assists the students in trying various ways of displaying an image, such as printing it in various sizes and on different textures of paper, weave and juxtapose the print out images. Ingrid says that she tries to work with students thinking about various ways to extending the assignment rather than just letting the final image be a computer print out.

Chuck Close project.

In the Photo II class, Ingrid also introduced another project that combined art history, graphics, other art media, and basic design principles. The project started when Ingrid distributing a short biography of Chuck Close. She showed examples of Chuck Close's works through slides and then introduced the assignment.

Students select one of the portraits they had taken from a photo assignment, scanned them into computers, and used the marquee tool to select just the face portion of the photograph. A rule of thumb for the image selection was that the face should touch at least 3 edges of the frame. Then students were asked to enlarge the selected area to fill an 8 1/2 × 11 inch area, posterize the portrait to show a good separation of grays, and then print the portrait in black and white.

Students then taped the posterized portrait under a GRID (1/2" = 2") sheet that Ingrid provided. Each student chose a medium from among tempera paint,

pencil, and crayon. The final project was a 34 × 44 inch artwork using a medium that incorporated the grid enlarging procedure. Students' final works were evaluated to see if they were able to successfully scan, save, manipulate/posterize, and print the image, as well as create an accurate grid. The final work was also judged on how well students reproduced details in enlargement, followed the grid accurately, managed the medium chosen, and how much the final product looked like the original.

Outshine Math and Science Program

Umm, the district isn't ready for this. They are kind of like... They're still trying to get science and math teachers to be interested in this kind of stuff. So the fact that I'm the only one who is doing anything here kind of throws them off. They don't know what to do with me.

Well, this is a very college-bound, mainly Anglo-Saxon, white population with a smattering of African American and Asian kids. Umm. They are mostly from very upper-middle class families. A lot of doctors' kids. When they think of education, they think of math, science, all that stuff. I think it's almost an embarrassment to them and to the administrators to have the arts department to do anything that outshines the... like the math department.

And, they don't give me too much grief except I get sidelined a lot. You know. "You're going have to wait" - that kind of thing. A lot of being a pain in the neck. You have to be pushy, assertive about what you're trying to do. You know. It's not just for me. My computer is at home. I don't need this here. So, it's not just

for me, guys. I don't care whether I have this for me. I think the kids should know. It's this visual literacy thing and it makes them see what's happening culturally. What's being fed to them. And to be able to read and be involved.

Two interesting points surface in Ingrid's discussion. First, Ingrid describes her situation within the school system culture. Teaching in an affluent school district, Ingrid probably has more access to computers and technical support than do most art teachers. However, the support for the use of technology in art requires a lot of effort and "being pushy" by Ingrid. She is fighting the perception of art as not being "academic" or important enough to justify her emphasis on cutting edge technology. While she was allowed to have her first computer nine years ago after a lengthy debate and after one of the board members persuaded the others that the art teacher needed a computer at least for grading in order to meet the district technology policy, no one acknowledged its potential as an artistic or teaching tool.

Students in the district are required to use computers in each of their classes, so the use of computers is no longer exciting for them. When Ingrid first gives out the computer assignment, she often hears, "Oh, I hate computers," from students. "Oh, let me show you those drawing tablets," Ingrid will say. "You know, and then they get hooked."

Ingrid finds art teaching important. In her class, she focuses particularly on visual thinking and visual literacy.

Visual Literacy

This semester, I'm doing a visual literacy piece every week. Every Monday, everybody but the AP[Advanced placement] kids, we do somekind of

analyzing of something related to the visual work. We analyzed the Wheaties' box. In fact the box is still in my closet. We looked at a Wheaties' box and said, "What kind of elements and composition are we looking at?" What colors do they choose? Why? What's the image? What do you look in front of the box? Why did they do it this way? We looked at the beginning of The Dead Poet Society. We watched the first four minutes of that and looked at point of view, compostion stuff that we have already studied. Line, direction, contrast, emphasis. This week we look at letter boxing. We watched Last Crusa part of it that is modified to fit your TV screen. And we watched the part that is letter -- boxed so they can see what the film maker really did, and how much information they lost on the side. So when they see this on TV they realize why it's being done. We looked at newspaper pictures that I just pulled out of a newspaper. Like, "What cultural clues are you seeing in this? You know, where do you think this picture was taken? Why was this picture taken? What is it telling us?" You know the kids picked it out that it's some diaster. It's in Russia. So they pretty much figure it out that, " Oh! Look at the clothing on the people. It doesn't look like it's taken in Ohio." You know the whole thing. What else do we look at? We look at fine art photos. I can't remember whose it is. And it's working really well. Cause boy! The first couple of weeks, it's like pulling from them. Now they look out and go "Oh! Obviously. Look at that." They start talking. Which is great. So it doesn't take a lot for them to notice all these stuff that they are supposed to be looking at.

"Why is it important for them to know this?," you ask. So they can have control of what they are seeing and not manipulated by the press and not

manipulated by advertisers. I think it gives them more power. And they are in control of what they are seeing, and when they can make those decisions. So you're going to buy the things you want, not just because the ad says buy this and fight cancer. You know, it's like you pick what you want. So I think with more information they have more power.

One of Ingrid's goals as an art teacher is that her students are aware of the hidden messages. Ingrid teaches students to be inquisitive about images, films, and commercial products. She refers to this critical ability as "visual literacy or "visual thinking." And the importance of understanding the messages behind the text, according to Ingrid, is that students will be more "in control" and have more "power." This empowerment, although never spoken about directly, is important to Ingrid, as demonstrated by the way that she describes her teaching goals. Even though it is not a way she uses computers, the idea of students having power and being in control reflects a more constructivist idea of teaching.

Never a Dull Moment

Oh, man! Never a dull moment. I set it up to have everybody be individual. It's so much easier to have everybody do the same cutout thing. No wonder I'm tired. You can understand why people who have been teaching for thirty years just start, you know, "Here is paper, here is the crayons."

I have always been teaching like that – very individualized. I set it up purposely. For every class I teach, there is some kind of requirements. If we're working on value, we're going to stay value, talk about value, and identify value.

Then we're going to do a drawing or whatever. And that's what we're looking for. Everyone is supposed to use value, but their works don't look the same. Everybody will do something different, which is good. But it makes life a lot harder. Real different materials you know. It's better for the kids, but it's not real easy for the teacher at all. I can understand why people start regimenting everything, cause it's easier. So, hopefully I'll quit then. I'll say, "That's it."

If you can't have fun, I figure it's not worth doing. When it becomes painful to come in, I don't want to do it any more. You know.

Ingrid's teaching is very individualized. Students are allowed a lot of freedom in making artistic and academic decisions. Why does Ingrid teach this way? It's not easy for her, but "It's better for the kids." Ingrid's teaching goal is not just to have students mirror back what she asks them to learn or do. She wants them to rely on themselves to make informed decisions in the making of and looking at arts. In Ingrid's classes students operate within a specific framework that Ingrid creates, but it is important to Ingrid that their work does not all look the same.

Computers Add Validity to My Class

I think it adds some validity to the art classes. These are rich people. Not all of them. But I mean quite a few parents don't want their kids to go to art cause you're going to starve and live in a basement. I know exactly where they are coming from. When my son came home... He was a junior in Miami and walked into the house. He was commuting. And my husband and I were sitting in the family room reading papers. He came in and went, "Mom, Dad, I've decided I'm

going to change my major." We went, "Oh, really?" He is already in his second major, starting out in engineering. "I'm going to go into theater." "Oh, really? What makes you change your mind?" "Well, I'm really loving this lighting class." He wanted to be an electrician originally. "Oh, cool. OK." Well, I spasmed. He went out of the room, we went, " AHHHH (scream)*." And I called the dean.* (laugh) *I called the dean. I pulled some strings and I called the dean* (at Miami). *I told him the problem. I told them what had happened. I said, "He is going to live in a basement. My grandchildren will live in the basement. He is never going to able to support himself." You know, on and on and on.*

Liyan: Are you an art teacher at that time?

Ingrid: Yeah, I was an art teacher. This is only - He is 26, so I mean it was (not too long ago). He said, "Just a minute." He got back to the phone. He said, "I'm giving you to the associate dean. She is a theater professor." I said, "Ok, cool." But on the phone, she asked me all about him and said, "He is going to be fine. He doesn't want to be the star. He wants to work back stage. If he is good, he will never be without work." On and on and on. I mean, she is right. There is plenty of work. There is not a problem. He is doing very well. But I spasmed so I can tell exactly when parents come to me. Boy! I used to counsel parents all the time. I know now exactly what you are talking about because it happened to me. So, if they are just going to learn how to paint, who is going to give him a job?

So, all of my kids in AP. There are twelve kids in AP and eight of them are majoring in art. And all I said to them was you have to think about what you are going to do with that label. And that's what we tell the parents. It's great to major

in painting but what are you going to do with it? So you have to keep that in mind. So, it's been real helpful to say that we're going to include technology. The president of the student body is one of my kids. He has been in class with me every semester. He announced his sophomore year he is going to major in art. But his parents wouldn't let him major in art unless it has a four to five for real solid degree involved. He could not get a B.F.A in painting. He is going into graphic design. He wants to work with virtual reality stuff. And his parents are fine with that. His portfolio looks great. He is allowed to do all the stuff he wants, as long as he has it for real. So, I think it's been really helpful and added some validity. You can't be as dumb as you look because "Gosh! She can even do some computer stuff." (Mimic parents' reaction.)

Now, they don't know what that means and they just know - Ooh! Computer? Oooh~ You know, with a little bit of left brain thinking, they are figuring you (Ingrid) are OK. I think that's added some strengths to what the heck I'm doing. So, the class is certainly popular. The most part is with the parents, I think it adds some validity. I think so.

Ingrid describes how the inclusion of computer technology helps to legitimize her art class. The fact that she can "do some computer stuff" makes her appear to be competent in parents' minds. Ingrid also gives an example of how the combination of art and technology, graphic design, for example, helps to ease parents' fears about having their kids choose an art major. But the cultural concept of the impoverished artist obviously does not exist for this specific group, since Ingrid is able to relate it to her own experience as a mother.

You Have To Be Much Pushier

We got just as many awards when we had one computer in the room. But there are a lot of districts where they don't even have a computer in the room. And I'm working with one woman working outside of Akron, I think, who is trying to get technology into the art room and the administration doesn't believe that the art people need it. Well, we did that too. They weren't going to give us computers. We said we needed one. They were thinking of number crunching stuff until a board member said, "Don't they have to do grades? And you are making them do grades." Oh! You know. So, that's the only reason. So, we have the same stuff, only some body figured it out a little faster.

I'm not a tech snob where it has to be certain equipment and has to be really nice. We can make do with a lot of junk, but you have to have something available. And some of these schools don't even have electricity available, especially like in Adam's county and in the middle of nowhere. It's not possible. It's not going to happen. So, where are those kids? Well, not as many of them will go to Ohio State, and be overwhelmed because they don't have keyboarding skills. Yeah -- Definitely we have the advantage because you have the constituency.

*My pool of parents are educated. So they want their kids to be educated. They want their kids to do computer stuff. So, a lot of it is, I say we're doing computer assignments. They go, " Oh!!" So it gives me some validity as an art teacher. "Oh! You do Com-puuu-ter (*amazed*)." They don't have a clue what that means, but it's "Woo. Because that's important." You know. Definitely, it makes a*

big difference. The money available for equipment - there is a lot of grant money out there. There is a lot of places to get free equipment. So, you have to be much pushier.

Teaching in a more affluent school district, one would assume that Ingrid is automatically granted with great computer access. However, she still seems to need to constantly prove herself and demonstrate that the computer equipment is worth giving to her class.

The need to constantly prove oneself and the validity of the arts seem to exist in every school, regardless of whether it is rich or poor. In 1993, Hicks, from a cultural change perspective, stated that including technology in the art curriculum can improve the status of art programs and art teachers. He believed that technology in the art classroom fits into the "technology as mainstream" way of thinking. Therefore, this can be a vehicle for art to become a part of the educational mainstream.

The idea of using technology to promote the status of art was a bit troubling to me. And it did not sound like a legitimate reason to justify arts education when I first read Hick's comment. I have since changed my mind. I think now that it may be perceived as a practical reason that will appeal to the larger educational establishment. Hopefully this practical strategy will assist art teachers who have struggled for a long time with their role as defined in current schooling curriculum.

Future Goals

The goal is I would like to have a class with just new media. I want to do video. I want to do some film work. Animation stuff. A lot of new things. Photo is usually

thrown in there. The viewfinder stuff. I think the computer screen is a view finder. The view finder art. I would like to have a class on that. I think it will attract kids who feel like they are not arty. And since I want to work with the average kids, it will bring some of those kids in. We still do an awful lot of art history. We still do an awful lot of talking about art, compositional stuff, aesthetics. We still do all of that junk but who cares what the medium is? That's what I wanted to do. And I want them to feel comfortable.

Ingrid would like to have a class just focusing on just new media. One rationale for this for Ingrid is that the class will attract kids who felt that they are not familiar with or competent in art. Ingrid is always concerned about the feelings of the not-arty or average kids. "I want them to feel comfortable," she says again and again. Ingrid is concerned about reaching students who have a wide range of skills and interests. Ingrid's art education is not just directed toward educating the selected few gifted with artistic genius, but to educating everyone.

When I asked Ingrid to give suggestions to other art teachers, she responded this way:

> *It's been real easy in Photo. Because every photo is touched by a computer. Everything they see is touched by a computer. So, it's been real easy. And because we are very tied in with art history. The assignment I have chosen to extend to the computer have been assignments that have connections. Like, to do an Andy Warhol thing, and have the kids repeat it, is like a no-brainer. I don't know. I just try to find natural ways. I didn't try to force it. And I didn't try to have an assignment that everybody has to be on the computer at the same time. Cause I don't have those facilities. So it had to be something where we can kind of like an ebb and flow." OK, you are finished with this, get over here on the computer." "OK." They sort of rotate. So, I don't know. It hasn't been all that difficult.*

Due to Ingrid's years of experimenting with ways of using computers in the classroom, it has not been difficult for her to integrate them into her classes. A contributing factor to her success is that she has not tried to force the integration. "I just try to find natural ways, I didn't try to force it," she said. Students rotate and decide for themselves when to use the computers within a specific time frame. With seven computers in the room, Ingrid does not try to have an assignment that requires everyone to be on the computer at the same time. Ingrid also only uses computers when she finds the use appropriate and if it connects to her teaching goals.

"Buttons" Poem

Ingrid loves buttons. She has a whole bag worth of them that she has collected over the years. She wears her buttons everyday and changes them according to the occasion. One afternoon, I browsed through Ingrid's button collection, picking out buttons that reminded me of Ingrid. Using the selected text from the buttons, I composed the following poems as one form of interpreting Ingrid and the way she teaches.

I'm a teacher.

I know what you're thinking.

All these and a body, too.

My job is secure. No one else wants it.

I know this sounds strange but all I want is a normal life.

I thrive on chaos.

I don't do normal.

Yes, I am famous.

Sorry. No autographs.

I love my job.

I love my job.

I love my job.

Is it Friday yet?

I need a vacation and I need it now.

Don't follow me. I'm lost.

No idea.

It isn't easy being weird.

I can handle any crisis -- I have children.

I have no life.

My inner child is a juvenile delinquent.

(I ask my student)

How far can you open your mind?

Now you know what a perfectionist looks like.

Stay tuned. I could say something BRILLIANT at any moment.

My Reflection

Ingrid claims that she hates kids when she obviously does not. She told incoming students to not take her classes because the teacher is REALLY mean, when she is really quite the opposite. Ingrid fills her rooms with visual images, cartoons, funny signs, students' work, a bag of air from Wisconsin, and all sorts of interesting stuff. The music is always on. Students walk around the room and work on their individual projects. Laughter is always a key component in the air. Students come to her for artistic and technical suggestions for their art works, as well as with more personal ones, such as fight with parents and career and college choices. Some kids just hang out in the hallway outside of her room during their recess time. This is a place that has a certain magic that has attracted me into coming back again and again. Ingrid has granted me access to her domain with open arms and a friendly smile. Visiting her re-energizes me for my research process.

Ingrid has specific ways of using computers in her classroom. She believes in integration. She believes it makes much more sense to have everything she does interrelated, but she has also observed that most art teachers she knows who are teaching computer related projects are mostly doing them in a separate class that is specifically geared to computer art.

Although she is more focused on art making than on computer technology, Ingrid wishes to show students the possibilities of using technology as part of the art making process. She wants to reach all students, especially those that are average and not

particularly artistic. The use of computers has helped her to ease students' fears about drawing realistically. She has also found that some concepts, such as perspective drawing are easier to demonstrate using computers.

Ingrid doesn't describe herself as a "techy" person, someone who likes technology for its own sake. Instead, she tries to do make the best use she can of the computer technology that is available in her classroom. She also tries very hard to get grants and to be pushy with her school district in asking for more computer equipment for her students.

But if one wants to be critical of Ingrid, one may say the graphics program is used for image manipulation, and its full potentials for creating images are not fully explored. Sometimes, the evaluation seems to emphasize more on formal qualities. Also, additional uses of computer technology, such as having students visit Andy Warhol museum web site and conduct their own research, can be added than giving lectures and slides.

Why Ingrid?

From all the teachers that I interviewed, why did I choose to present Ingrid's case in more details? Ingrid first attracted me because of the stories that she told about herself, her teaching goals, her philosophy, and her attitude towards technology. Every time, I walked into a classroom in the course of my research, I would envision myself as a student and asked myself about how I felt about the particular environment, and what I might learn from this class. Ingrid's classes are the ones that I wished I had been able to participate in during my K-12 public school experience. Gradually I also found that

Ingrid's case presented ample opportunities to think about teacher's decision making, the context in which they teach, and the uses they make of computers in the art classroom.

My first visit to Ingrid's class left me with mixed feelings. I was happy for Ingrid's students to have such a strong art teacher. I was also quite impressed by the facility, including the art room spaces and materials, and the vision and support provided at the district level. As a result, I began to wonder about the likelihood of such support being provided for teachers working in less affluent districts. At the time I secretly thought to myself that what Ingrid does is great but it's probably because she has far more support than most teachers.

Later that day, Ingrid related her experiences of how she needs to constantly prove herself, and try to receive grants and awards for equipment and support that she feels her students need. Even teaching in an affluent school district, it took her nine years to get the seven computers she now has in her room. Ingrid may not have the problems of students not having home access, or students with limited computer experiences, but she faces many of the same challenges as other art teachers. I then realized it was not fair to conclude that Ingrid deserves less respect because of the school context in which she teaches. Instead, she deserves great respect for her determination, vision, and the warm and productive relationships she has with her students.

Micah

Micah teaches in an urban Arts Impact high school. The school believes in the importance of learning through the arts. One of the school buildings is dedicated to visual

art. It has an art gallery on the first floor. The second and third floors are for vocational arts programs as well as regular high school arts classes. There is a ceramic studio in the basement.

Micah is a high school art teacher. His background is in Ceramics and Fibers. He has a limited budget, but, because of the extra funding the vocational arts program has brought to the school, Micah is able to teach computer graphics classes in the computer lab. The computer lab is next to the art room where Micah teaches Art survey, ceramics and bookmaking classes.

Micah has 22 years of teaching experience. This is his 17th year teaching in the high school. Before teaching there, he worked with a museum outreach program. Ten or twelve years ago, he took four one-week summer courses on aspects of computers and early technology. One was a week-long introduction to computers in the art classroom. Another was on early multimedia programs. From there, Micah is basically self-taught about the uses of computers in the art class.

Teaching Goals

Micah describes teaching as a calling of his life: "Like I don't know what else I would do, I really can't imagine not teaching" (10-14-1999). He says the reason he likes teaching is "watching the light bulbs go on in people's head when they get the concept" and "they make the bit of knowledge their own"(10-14-1999).

Micah observes that his view of education has gotten broader over the years. One of the bandwagons in education, Micah observes, is to teach students to be life long

learners. "So if we really wants students to be life long learners, then who is teaching beyond grade 12 in America." Micah said that he constantly encourages other faculty to think about teaching beyond high school.

Micah teaches humanities courses, but art is his main subject. "I think art education allows you all these kinds of other ways of accepting and understanding kids, and kids understanding themselves," Micah said. Micah recalled his own learning experience at a traditional American high school in the 60s, where he observed a lot of students falling through the cracks.

Micah observed that it's usually the athletes and people who are good in academic areas who receive the most attention and become teachers' favorites. "I don't think it's wrong for teachers to have favorites," he says, "as long as they realize that that's what it is and there are other kids in the classroom too, who are valuable or smart in other ways" (10-14-1999).

Micah comments that he struggled all the time with seeing students being neglected. He made a promise to himself then is to treat students the way he wants his own kids treated in school. Micah goes on to explain his view on teaching.

> *So mentally, sort of subconsciously, I think of my students as being my own kids. And I talk to my students the way I talk to my kids and I harass my students the way I harass my own children. You know. I'm pretty straightforward in a lot of ways.*
>
> *Life is really short. I hate wasting time. I decided a long time ago when I started teaching that I wouldn't assign busy work that serves no real reason expect for filling in my students' time. I hated busy work when I was in high school. I'd rather have my students learn how to use their time more efficiently. So a lot of them will just talk, that's fine with me. I think a lot of people have lost the ability of what I call social skills in this country. Just being able to sit down and have a conversation with somebody. Anyway,*

it's not a lot of time in my class that it happens, but there are times when students rush through stuff. Then, I will say maybe you should redo the assignment.(11-02-1999)

Micah also mentioned that he wants kids to see that "they are in control of how they present themselves to somebody else." One person who nominated Micah did not know in detail how Micah uses computers in the classroom, but she commented: "Micah is a good teacher. Whatever he does will be good." Another person who nominated Micah described him as "know-it-all" type of guy. Micah surely is very knowledgeable and confident in his teaching. When I asked Micah how he would describe himself, he hesitated for a bit, then responded: "I think I'm a good teacher because I see light bulbs going on in students' head. I see students coming back after leaving high school and because I really try to teach beyond June graduation year."

For Micah, art is the subject that teaches students about life and about themselves.

I used to think that I was really important... (Now), I just think everything is valuable and nothing is better than anything else. So, that's changed a whole lot in my thinking. I used to think I'm the art teacher and I do this. Now, I see it as I'm just this person who is teaching students to be intelligent or learn about the world while rather doing it necessarily through reading or scientific study, we are doing it through art. So, they are relating to the world pasts, present and future in my class through visual exposure as opposed to literary closure. That's how I changed. I think it's very valuable. For myself but also for my students, art is their saving lifeline in school. It's why they come to school maybe. Since in some cases because they have art, they can do art, they can make art and they are valued for being a person who is creative and not necessarily the smartest. (10-14-1999)

The Computer Graphic Class

First quarter.

Students come to Micah with diverse computer experiences. So during the first quarter, it's important for Micah to make sure that students all start on the same footing. Micah chooses *Photoshop* as the main application. Students do not work on the computer immediately. For Micah, it is important to get to know his students first. One of the ways to get to know students better is to ask students to gather images that they like, and create a portfolio box that reflects something about themselves. All of the handouts, images and written assignments of the class are stored in their portfolio boxes. Micah uses this assignment to observe students' attitudes, ability and the way individual students work.

The first computer assignment is to create a skull and skeleton, using a simple drawing function in *Photoshop*. The art class is not equipped with drawing tablets, and students need to use a mouse. For Micah, the purpose of the assignment is to build up understanding of *Photoshop*, and to develop hand-eye coordination in terms of using the mouse to draw. The choice of skull and skeleton is not random. For Micah, it serves the purpose of showing students that their leanings in different subjects are connected to one another. "Students don't make connections between academic courses or anything because everything is in these individual boxes. By choosing the skeleton assignment I can reinforce work that was done in Spanish class," Micah said.

To develop an understanding of Photoshop, to develop hand-eye coordination, and to show how different subjects connect are not the only purposes of the skull and skeleton assignment. Following the drawing of skull and skeleton, Micah hands out readings on a Mexican festival - the Day of the Dead. Students are asked to write a

summary, to report back what they have learned about this festival, and to compare the festival with Halloween. Following the reading and discussion of the festival, students are asked to come up a pinwheel design. The pinwheels are to be designed with patterns of skulls and need to meet certain criteria. Students' designs are printed out on paper, physically cut, pasted, and turned into actual pinwheels. All pinwheels are displayed, and students vote for the best designs.

For Micah, this project is a way of introducing different cultures into his class, and it is also with an agreement with the Spanish teacher for the students to get extra credit. It provides a way of showing high school students time management and how to meet different requirements by working on one instead of two separate assignments. "I'm constantly saying let's get double duty out of all these projects, so that's why skeletons, just because it works two ways. It's seasonal. It's a way of introducing cultural experience to my computer graphics students. It builds up eye-hand coordination with the drawing and also the copying and pasting. There are lots of layers here," he added.

Portrait.

The following assignment deals with photo manipulation using pictures of Micah taken by a digital camera. Over the years, Micah has found that with their own portraits, students do very safe kind of things. When it is the teacher's pictures they are working with, students manipulate images more freely.

Micah gives students photos to manipulate with specification on the width and height of the finished images. The idea is for students to explore more deeply what the

application can do and how to manipulate things. Micah also wishes to get students to feel comfortable with the program, and not just go with what he calls simple answers, such as adding blue eye shadow and changing hair color.

Micah often notices that students "do all kinds of wacky stuff and the problem is they also do it very flat" (03-11-1999). So the idea of the assignment has to do with the separation of foreground, the portrait, and the background, and the idea of layers, which is what *Photoshop* allows them to do. Micah provides examples from other artists and emphasizes the use of exaggerated lines, exaggerated color, and expressive lines.

For Micah, all of his assignments are multi-layered because "I don't have time to teach each layer separately, so I try to work in lots of things in every assignment." Micah wants never to teach a lesson unless it has at least three layers to it. "It's not worth it," he said. He shares this belief with his student teachers and asks them to think about the multiple layers that every lesson can have and to be in control of all these layers. Micah believes that the more layers the better. The purpose, for Micah, is to think about the layers, plan them, and use them to the best of the teacher's ability and to get as much across to students as possible.

Following the portrait of Micah, students move into their own self-portrait, and are allowed greater freedom for self-expression. "By the first quarter, I know that they know these things pretty well," Micah said.

Second quarter.

In the second quarter, Micah focuses on *Photoshop* and introduces *TextureScape* and web design. The purpose is to use *Photoshop* as an art tool as

opposed to a photo manipulation kind of application. But this year things are a bit different. Micah has a student teacher, Lou, who has designed two animation assignments using *TextureScape*. Lou asks students to first create an animation that shows the change of seasons. After students have gotten to explore the software more deeply the second animation assignment is to tell a story.

> *So they are a little bit into TextureScape which I teach anyway at this time period because I want them to do web design. And it's a great way for doing background design and it also has an animated side to the piece. (3-10-2000)*

TextureScape is the program that Micah often uses to teach students background design. The program also has an animation side to it, but Micah's animation assignment focuses more on expression of different textures than telling stories. Students this year spent more time working on the animation. Micah described what his lesson plans during the 2nd quarter usually look like:

> *... mostly a combination of learning how some computer artists create something on the computer and then digitize them and then rework them in the machine. So, there would be some of that along with some works that are done strictly on the machine. And it would gear more toward learning how to use certain filters in certain areas to create the illusion of watercolor or charcoal drawing or whatever. So it's more of a textural kind of thing and to explore that a little deeper. And then just sort of collage in the computer. (03-10-2000)*

Web design.

Following the use of *TextureScape* for texture design, students are introduced to web design. Students first spend two classes in the library browsing web sites. The purpose is to explore. "I just encourage them to go every place. I

am totally aware of the concerns of parents and schools as far as the porno sites but I think it's important that students learn to be responsible on their own and not to be policed" (03-10-2000).

Micah explains to students how easily they can be tricked or go into a "wrong" site. Whitehouse.com, for example, is a porno site, and it tricked one of the schoolteachers. Micah observes that students may go into "wrong" sites unintentionally, but feels that most educational institutes and libraries want to basically "execute" students or sort of "make an example of them because they make a mistake." Rather than making an example out of students' mistakes, Micah emphasizes the importance of being responsible.

Micah feels that to teach students to be responsible is more effective than not allowing Internet access at all. He explains to students the consequences of spending time on the "wrong" sites: library cards are taken away, web sites are closed for the entire school. He emphasizes the idea that a student can not rely on not getting caught.

> *If they go some place that's wrong, and they know how to turn away from it as opposed to being yelled at... they are warned and everything, but these things will happen. And they are going to get tricked and duped and those things because I can't warn them about everything so you know the whole idea of if they want responsibility, they want the maturity level, they want to be treated whatever, this is how they can gain that responsibility. (03-10-2000)*

During the exploration, Micah usually has students work in pairs. In a way, it helps to reduce the chance of students going to the "wrong" sites. In addition, students take turns documenting the web sites that they have visited as well as evaluating how well the site is structured and designed.

Mental institute.

Micah explains that computer graphics I students generally work on projects that Micah assigns. But toward the third and fourth quarter of computer graphics I, and in computer graphics II and III classes, students are given much freedom in choosing the direction of their learning. One year, students were interested in multimedia programs so Micah had students work on a CD-ROM project collaboratively. Students created characters, images, scenes, and dialogues in a mental institute.

Micah explained that in this country, people name hospitals after famous doctors. One of the doctors is named Choly. Another one is Melanny. The name of the hospital, as suggested, is Melancholy. Students had to write files about a person in the mental institution. The characters can play the role of doctors, staff members or patients. Students described what this person sees in the hospital. They also planned the hospital layouts collaboratively.

The viewers are introduced to individual patients. Each patient has a hero, someone that patient looks up to. Students also create dialogues and artworks for the character. Reading the story line, the doctors, who think they are the sane ones, are in fact the patients, while the patients are not lunatics at all. Micah explained: "It's a joke. It's sort of absurd. Most teenagers get into it because it's absurd" (03-11-1999).

Beliefs about the Use of Computers in Teaching Art

For Micah, computer graphic class is like a regular art studio class. Instead of using paint, brushes, clay, or wood, he uses technology as the material. Micah is very

familiar with various kinds of programs, but he emphasizes that he does not like to TEACH or lecture at students. "I insist I that I'm sort of a resource person," he said.

> *I don't think that teachers have all the knowledge. Also teachers have to value what students bring to the students. So I try to lead my students to see that it's not only that I'm teaching them today. They will be out in 6 or 8 month. It's not just me having the answers. I'll be here and I can answer their questions until I retire. But it's easier for them to explore and also trust one another for answers. So that's the way I do assessment - who is able to help whom. (03-11-1999)*

Micah explains that he can give students an artificial test. But the real test is to be able to tell the person next to them. "The idea is that if someone asks you, and you can not tell them, then you obviously don't know."

> *So that's one of the assessments. That's why I don't feel bad when I don't know. I know students who do something better than I do because they are spending so much time on that. Kids can do things faster. I'll have to look for manuals to know where things are. Then, there are some who are better than I am. And just go with them. They are almost like a target, you know. (03-11-1999)*

To rely on the expertise that students bring, Micah purposely puts students of different levels together. Since there are graphics II and III students in computer graphics I class, beginning students are able to learn from their peers by talking to and observing them.

Micah also explains that he teaches differently every year, partly because of changes in technology but also because of differences in his students' interests. The computer graphics I class is similar almost every year. But computer graphics II and III depend greatly on students' interests. One year, a lot of students were interested in three-dimensional modeling, so the class did lots of modeling. One year, students were more interested in multimedia, so the project was designed to suit their interests.

To be aware of students' interests, Micah asks students' opinions and also closely observes how they spend their free time. Micah encourages students to explore unfamiliar software on their own. By observing which programs most students spend time with, Micah is able to determine which types of program interest the specific group of students that year.

Support from the School

Although the district that Micah teaches in is not a particularly affluent school district, Micah does have adequate access to the computer lab because of the collaboration with the vocational program in the school. The philosophy embedded in the Arts Impact school is also unique. Micah teaches in a school where art is valued, which is not the case for most art teachers. I asked Micah if he would be able to do what he does now in a school environment that did not provide the support and opportunities that he has now. Micah interpreted my questions as whether he will continue to be an effective teacher. He responded:

> *I think it's a really lame excuse for a teacher to say that they don't support the art room much in my school. Being artistic, you can do it with crayons. I can do it with charcoals from a Bar-B-Q and a brown paper bag. I think I can still teach about great art. I mean it's how creative can you be. That doesn't mean creative necessarily in an art sense. It means creative in lots of ways.*
>
> *I have a lot of interests in lots of areas. So therefore, I wonder if that's why I'm good at coming up other ways of teaching. I teach this humanities course, and I come up with these ideas. (People ask me) where do you get these ideas? I go like, I don't know, I just think it would be fun, I guess. Or really! What am I trying to teach here? Also how to do something differently so that students are responsible to take over their own learning.*
>
> *(03-10-2000)*

For Micah, the lack of support from the school can not be used as an excuse for not being a good teacher. It is how creative and knowledgeable a teacher can be that brings something fun and meaningful to students. Micah's emphasis on students taking control of their own learning is a goal that is less emphasized by other art teachers.

Other Perspectives

A student's teacher and Micah's students' perspectives are presented. I interviewed Lou during lunch time, and summarize his view below. The purpose is to bring in multiple perspectives in understanding Micah's teaching, and the school context.

Lou – the student teacher's perspective.

I'm Lou, 24 year old. I was born in Laos, and my family and I moved to the State when I was a four-year-old. My father used to be a teacher, and now he works for a factory. The move is a big change for him and for everybody in my family.

This is the first school where I have been a student teacher. I will be here every day for another two weeks before I go to a different school. Originally, I didn't think that I would like high schools. I thought I would prefer teaching elementary. But I have actually enjoyed it so far. The students here respect me although I look young, like someone of their age.

I came from East High School. I find students here more focused and motivated. There are only a few who are not motivated. It is a good school and there is a campus feel with several buildings around. The facility is good. They have enough wheels for students to throw pots, and not every school has the computer equipment they have here.

Micah, the art teacher, is very helpful. He gives me pointers on behavior management and makes suggestions on my lesson plans. Micah believes that by allowing me opportunities in teaching, I will learn more from my own experience. Micah is sarcastic and students find him humorous . Students are more attentive because of that. I liked Micah's first lesson for his art survey class. He gave students a test the first day of the class. Students were saying "A test in an art class?" Micah has posters on the wall labeled from A to N. He asked students to look at the art prints and answer questions about each print. They were questions like origin, content, which countries those prints are from. Micah told the students that as long as they filled out every question they would get an A. The student can put in Jell-O if they don't know the answer. They will still get an A if they fill out every answer Jell-O. The purpose is to see where the students are and observe how they work and how serious they are as students. It's like playing with the mind. I like that, and I think I will try this method for my future classes.

I enjoy teaching at this school and respect Micah as a teacher. He doesn't speak over me. And he tries to hide in the background and allow me to take control. That's pretty helpful for me.

*I think to incorporate computers in art teaching is a good idea. Computers are around, and students are really interested in using them. Like Dwight and Alex (*students in the class*), they experiment a lot. Students would be more interested in learning if teachers incorporated electronic media. It's a totally different media. Students can click and choose. They can make changes, and they are more active in a way. If I can have my own class, I will start with teaching Photoshop. I probably won't require a prerequisite before taking the computer graphics class. I think students can learn composition, texture*

and other concepts when they are working with graphic programs. I don't believe in learning "basics" such as color theory before using computers. I think students do need to know color theory, such as mixing yellow and blue makes green. But the computer is a whole different medium.

The school doesn't have Internet connection abilities yet. If they did, they could do research and a lot of other things. I don't think there are any gender differences in terms of male and female students' attitudes, confidence and art works. Female students work as hard as male students. Some of their works are even better.

Students' perspectives.

In addition to talking to the student teacher, I also talked to three of Micah's students. The students who I interviewed were picked randomly. Based on my observations, their views present what students generally feel about Micah's teaching. Their views on Micah's teaching and on the school are summarized below.

Emily:

- He is my favorite teacher here. He is compassionate toward people and it's cool to talk to him.
- He is very educated and always tries to help the student to be a better person.
- He is real humble. He does a lot of behind the scene stuff trying to help students.
- I have friends going to different schools. From what I hear, I think people here are more serious in what they do. There is not a lot of distraction.

Abby

- I have taken Mr. (Micah) Hui's class before. I'm not in his (computer graphics) class this quarter.
- I don't like computers very much but I do learn my basics at home.
- I'm his student helper for this session so that I can skip homeroom.
- Mr. (Micah) Hui is caring. He cares more than other teachers. He is willing to bend the rule for the benefits of students.

Andrew

Andrew: *Mr. (Micah) Hui is a nice guy. He is an interesting teacher, and a lot of teachers here or art teachers around are either really pretentious and full of themselves, they think they need to be respected because of their background, or just not very nice people, or a combination of the two.*

Liyan: When you say not nice people that means?

Andrew: *They are just generally nasty, unpleasant people. You know.*

Liyan: OK~ Can I say you guys think you're much more mature and when people like Mr. Hui give you respect, you like that?

Andrew: *Not everybody, but some people, I and my friends.... If I don't think somebody is mature enough to communicate with me on the level that I communicate with my friends on, I'm not going to spend my time.*

Liyan: So what do you enjoy learning or doing in the art class?

Andrew: *Trying new things. Just being different. Mr. Hui, he doesn't have a strict set of rules. He will let you kind of explore, try things out for yourself. A lot of teachers have a set curriculum like what you have to do and how you have to learn it, and*

what's right, and what's not. You know, it's not always necessarily true. Well, a good example is Robert Pinaky. Do you know who he is? He is the poet laureate of the United States right now, who teaches in Boston University. Poetry is an art form, you know? Language art is an art form. What he said is a really, really good rule for art, I think, that there are no rules but when you set a frame of reference, you have to stick with it. And a lot of art teachers teach in a form that there is a frame of reference you know already set - rules that you have to abide by and you don't really get to change.

The conversation with Andrew, who was in Micah's computer graphics I class, intrigues me. Andrew claims that this is the only art form that does not require fine motor skills. The second time I visited Micah's class, Andrew volunteered his viewpoint on Micah's teaching styles.

I enjoy the way Micah and Ingrid interact with their students and the projects they engage students in combining computer technology and art. Among the teachers that I interviewed, I sense that the way Micah and Ingrid approach their classes is more in line with constructivist learning.

Both Micah and Ingrid value greatly what students bring to the class. They are able to get their ideas across but still emphasize that there are other possibilities. Although I believe there are still some potentials in terms of the use of computer technology in teaching art that neither Micah nor Ingrid has explored, I have learned a great deal from them.

Comparison of Ingrid and Micah

Similarity.

When asked to comment on their teachers, it is interesting that students recognized more of the personality of the teacher than their professional styles. Students described both Ingrid and Micah as caring, loving, and humorous. Both Ingrid and Micah have vibrant personalities. It is also important for both of them that the classroom environment is fun and enjoyable. They develop very good relationships with students. Students often come to them with important issues other than art - a fight with parents, complaints about other teachers, the movies or books they have just read etc.

Both Micah and Ingrid have the same goal of using computer technology in producing fine art pieces. For Ingrid, the use of the computer graphic program is more of an extension of what she teaches in photography class. Micah's class, in contrast, is more computer graphics focused. He uses the graphic program, mostly *Photoshop*, as a means for artistic expression rather than an extension of another medium.

Although Ingrid and Micah often say that they are not the ones who have all the answers, they do have answers to a lot of questions. They are knowledgeable in various media beyond their specific medium - Ingrid in Photography, Micah in computer graphics and ceramics. Both Ingrid and Micah mention the importance of integration. Ingrid tries to integrate different art media, and Micah tries to integrate art with different subjects. Neither observes gender differences exhibited among students in terms of the use of technology.

Difference.

Although Ingrid and Micah are similar in some aspects of teaching philosophy and teaching styles, they are also very different. Ingrid is female and Micah is male. Ingrid teaches in a dominantly white suburban affluent school district that greatly emphasizes academic achievement and technology. Ingrid's school provides her greater technical support, although to have computers in her room is not an easy battle. Micah teaches in an urban Arts Impact high school with students coming from mixed social-cultural backgrounds. Micah has less budget and technical support from the district, but the school is very supportive of the arts. Micah is able to teach computer graphics classes because of the vocational programs in the school.

While Micah is fortunate to have other teachers in the school, Francis and Elbert, who are enthusiastic about the use of computers, Ingrid works with another high school teacher who does not believe in the use of newer technology in art making. Micah belongs to a digital design group where teachers decide on a computer equipment purchase plan and share ideas and resources, while Ingrid finds it difficult to communicate with her peer who holds a different view on art, education, and technology.

Ingrid uses the six computers she has in the classroom while Micah teaches in a lab environment. All of the classes that Ingrid teaches -Photography, Craft, Art I, Advanced Placement – have assignments that involve the use of computers. For Micah, it is only the computer graphics classes that use computers. Students of his Clay and Art I classes do not use computers in most cases.

Micah designs his classes specifically so that students at different levels are able to teach and learn from one another. There are also projects that require students in

Micah's classes to work collaboratively. Students in Ingrid's class do make design decisions together at times and they also comment on each other's works, but the use of collaborative learning is less extensive.

CHAPTER 7

CROSS-CASE ANALYSIS

In my study, I set out to find answers to a number of questions by looking at twelve Ohio art teachers. Who are these teachers? What are their teaching goals? How do they use computer technology? What factors influence their use of computer technology, including personal goals and beliefs, as well as cultural/environmental factors? I also investigated issues of constructivist and collaborative learning, gender, and inequity. In this chapter, I will present my findings related to the above questions.

Who Are These Teachers?

A body of research has attempted to identify the relationships between age, gender, training, and learning style and the teachers' use of computer technology, but, the relation between the demographic variables, such as age and gender and teachers' use of computer technology is inconclusive. Some studies suggest that there is correlation between a teacher's age, gender, attitude (Levine, & Donitsa-Schmidt, 1997; Panero, Lane & Napier, 1997), learning styles, and prior technology experience (Levine, & Donitsa-Schmidt, 1997) and a positive attitude toward and better use of technology.

Others disconfirm such assertions. Evans-Andris (1996), for example, concludes, based on 8 years of research, that teacher's age was not found to be a factor related to attitude about computing or computing practice.

Grandgenett and Harris (1994) analyze 81 research reports on computer phobia and conclude that computer anxiety is not significantly related to gender. More experienced teachers tend to use the Internet resources more than less experienced teachers. But given adequate opportunities for training in technology, teachers do not seem to be limited by factors such as age, anxiety, gender, or previous computer experience.

In general, it is difficult to create a profile of (art) teachers who use computer technology in their teaching. Nevertheless, in my research, indications of who they are begin to show. Teachers who use computer technology in teaching art are more likely to be teaching in high schools, and to have years of teaching experience. They are willing to take the initiative. They are also teachers who admit that they don't always have the answers. They continue to learn, and embrace the knowledge and skills that students bring to the class.

More High School Teachers

Of the thirty art teachers recommended to me, eighteen are currently teaching in high schools. There are several explanations for this interesting fact. One argument for using computers in school is the prepare-student-for-the-real-world argument. This argument usually starts by asserting that technology is the present and the future in employment. New jobs will be created and old jobs redefined, and most of them will

require technology skills. Schools are expected to take the responsibility for preparing students for the workforce. Computer courses designed to meet job market requirements should be offered, especially in high schools. This is one reason why high schools in most cases are better equipped than elementary or middle schools with computer labs and newer equipment.

Another concern is the developmental age of students. One of the art teachers, Gary, feels that students prior to eighth grade should not use computers. He believes that younger kids are not able to take full advantage of the new media and since computers are designed logically, it may hinder students' creativity. Two teachers, Ingrid and Jack, report that some administrators believe that students at a younger age are not able to take full advantage of the new technology. The administrators think, "What can little kids do with computers?"(Ingrid, 03-11-2000). Therefore, middle and elementary schools sometimes get second or third hand machines and are not as well equipped as in high school. I personally do not agree with Gary's position, but teachers and administrators' understanding of student's developmental stages can limit the access of elementary and middle school students.

In terms of course structure, most elementary and middle school art teachers only see students once a week. The meeting time ranges from forty to seventy minutes. The computer is considered one of many media. If a teacher does not believe that the use of computers is essential to students at this stage, he/she may spend the limited time on "the basics," which do not necessarily include computer technology.

In high school, some art teachers are able to teach in a lab environment and are able to meet students for a longer time. With more equipment available, more

instructional time, and the possibility of a separate class focusing on computer graphics, it seems more likely for high school teachers to adopt such technology than elementary and middle school teachers. It is also possible that more experienced teachers move from teaching in elementary or middle school to high school.

Experienced Art Teachers

Most of the recommended teachers are experienced art teachers with more than seven years of teaching experience. This finding may be in part a result of the snowball sampling strategy, in which teachers with more experience are more likely to be known. But the fact that more experienced art teachers are the ones who are pushing the use of computer technology challenges an old assumption.

In terms of computer use, some argue that art teachers teach the way they were taught. Since the use of computer technology is not part of most art teacher's educational background, one would not expect them to use computer technology in their teaching. The younger generation of teachers is then thought of as more readily involved with technology. They are expected to take the lead in teaching art with technology. My study, however, suggests otherwise. Of the twelve teachers that I studied, all have more than seven years of teaching experience. In terms of age, they are in their late thirties to early sixties. Many of them started using computers in smaller ways, such as grading and word processing, and began using computer graphics since the late eighties. For them, the adoption of computer technology has been a gradual process, not a revolutionary ones.

Although most of their schooling experiences prior to graduation did not include the use of computer technology some of them have relied on workshops and taken graduate level classes since graduating from college to become proficient in computer use.

Taking the Initiative

Several art teachers that I studied mentioned the status of the art in the school and the importance of being assertive and "pushy" to gain computer access. Teaching in an Arts Impact School, Angela enjoys the support of the principal yet feels that she is looked down on as an art teacher.

> *In other situations (schools), I'm not being respected for what I did. So to speak, I'm more of a planning period. And still here, you're still a planning period. I provide two planning periods. So, a lot of teachers still feel like they don't care what you're doing here. You're an eighty-minute planning period. (1-25-1999)*

The support from the principal, Mrs. A., has been very important for Angela. Mrs. A. had been an art teacher before and is very appreciative of the arts. "She has been in our place so she does not ever leave us out" (1-25-1999). The principal used Title I funds to make sure that all teachers, including special/arts teachers, have access to computers. If it wasn't for the support of the principal, Angela believes that to obtain computers for her art room would be very difficult.

She gave me an example of a fellow art educator in another school. In order to get a computer, the art teacher volunteered to become a SchoolNet grant technology liaison: "Otherwise she would have been left out. She wouldn't have one. So there are ways to get your foot in the door, but you really have to want it as an art teacher" (01-25-1999).

Angela is not the only teacher who pointed out the low status of the arts in the school and the difficulties that art teachers experience in gaining computer access. In

responding to my email at ArtsEdNet, Gail, an art teacher and the head of a technology committee for a private school, said: "My school does not see the validity of computers for the most part and because I'm a specialist, I am considered below the regular teachers " (11- 29-1998). Another art teacher, Ann, commented similarly "... it seems that since I've been put on a cart I am 'a second class citizen' " (11-29-1998).

The comments of Angela as well as other art teachers describe the feeling that they are regarded as less important than regular or "academic" classroom teachers. Art teachers are second class citizens and the art room is the last place computers will be put. The fact that computer equipment is available elsewhere adds to the impression that art is not valued, or that administrators are not being supportive of the arts. Access issues regarding computer equipment for art educators and students seem to suggest a deep-rooted and conflictual issue in the school culture.

Art teachers, in general, feel that they must justify the job they do so that the importance of their work and the importance of art in students' lives will be recognized. Some art teachers, based on my observation, do not feel comfortable about fighting to get computers in art classrooms. I wonder if it is, in part, a result of their insecurity with regard to the low status of arts in the school.

The teachers that I studied, however, are not afraid to take the initiative and are pushy when they need to be. Ingrid described how she applies for grants, proves herself in various ways, and is pushy, "sometimes just being a pain in the neck," to get more computer equipment in her room. Elbert serves as the head of the digital design team to

help art teachers share resources and integrated technology in teaching. When Elbert found that the school equipment was not able to support what he wanted to do, he went ahead and used his home equipment to teach the online course.

Gary also described how he took the lead in making computer purchase plans, and designed and established a new computer graphics program in the middle school where he previously taught. Now, still waiting for his promised computer equipment to come, Gary has realized that "when you are in a BIG, BIG system, you have to have patience." Yet, he commented that he could be pushy "if it takes too long."

Art teachers who are using computer technology in teaching art seem to be the ones who are open to challenges, who are willing to take the initiative, and who are not intimidated by obstacles. Even in situations where the arts are not valued, they are assertive and persistent in getting what they need, or, at least, in finding other ways to solve the problem.

Continue to Learn

Although others may think so, these teachers do not think of themselves as "techy" or computer nerds. They recognize that students often know more than they do about computers and feel that it is important to value what students bring to the class. Cheryl described it this say:

> *I'm a real believer that I don't know everything. I think the kids appreciate it when I'm honest with them instead of putting on that hoity-toity: I know everything and you know nothing. I will teach the class not you.*
> *(02-18-1999)*

Cheryl's philosophy is that a teacher is in control when the students appreciate the fact that the teacher is there for them. When I asked Francis how, in light of her busy

teaching schedule and responsibility of being a gallery director, she finds time to keep up her computer skills, such as web site design and video editing, Francis immediately responded, "I don't know how to design web sites"(03-18-1999). She has been teaching herself little things one step at a time but she has a student designing the web site. She said, "Use them 'cause some of the kids are wizards when they are eight-year-olds. You know they are computer wizards and they know more than you" (03-18-1999).

Francis admitted that she still has a lot of things to learn, but she is not threatened by students knowing more than she does. Bessie provides another example. After describing the family history project that they had done in class, Bessie tried to show me examples of students' work from last year, but the computers were not working right. In the mean time, Max, Bessie's student from the previous year, walked into the room. Bessie immediately called upon him: "Max, you are just the man. We were just trying to find your Astound presentation from last year. Come over here" (10-28-1999). The program did work at the end with Max's help. The students' work was impressive, but what impressed me even more was how Bessie naturally called upon students for problem solving.

Angela also described herself as one who is constantly learning and one who has learned to ask questions and rely on all the human resources that she can think of: "So many programs. So many things to learn. But I ask for help...I will ask whoever knows something that can help me" (1-25-99). Knowing that she does not have all the answers, Cheryl admits that to show signs of weakness could be difficult, especially for teachers.

> *OK. How many times do you feel stupid enough you have to go down and ask stupid questions to people and they probably go, "Woo. She comes in one more time with her stupid question. What did I tell her, you know." You got to be able to admit that you don't*

know everything and ask when you don't. That's a biggie for teachers because we tend to feel that we are superior.
(02-18-1999)

Cheryl described the choices that she had to make in facing the new technological challenges. She is a confident individual, and her class is going well. To start something, like technology, that she does not feel comfortable with takes a lot of courage.

Someone would say, "Why put up with the hassle? I'll just do it the way I feel comfortable with, which is the same way that I've been doing it for twenty years." Well, everybody changes. Kids change us. If we don't change with what's happening around us, I'm afraid that I'm going to be left behind. (02-18-1999)

Teachers in my study all agree that they are not the ones who have all the answers. They are still learning, and they are open to embracing the knowledge and skills that students bring.

What Are Their Teaching Goals?

Instead of letting computers drive the curriculum, the literature recommends that teachers need to be clear on their teaching goals (Means, 1994, Gooden, 1996). I usually started my interviews by asking about teachers' backgrounds, teaching goals, and why they chose to teach art; I believe that understanding why art teachers teach and what goals they have can help us to understand why and how they use computer technology in their teaching.

Teachers in my study described both similar and different art teaching goals. Most of them mention the importance of teaching art making, art history, aesthetics and art criticism, a Discipline-Based Art Education approach. Teachers also talk about helping students to look at the world through aesthetic lenses, and using art to introduce students to new ways of expression. Some teachers - Ingrid, Cheryl, Micah, and Hilary - mention

the importance of understanding and appreciating arts from different cultures. And some stress the importance of exposing students to various media, styles, and techniques.

These teachers' uses of computer technology usually relate to their general art teaching goals. Ingrid, for example, wishes to reach every student in the class, not just the talented few. She wants students to have a good appreciation of art, and to know that art is approachable. The use of computer technology helps her to reduce some students' fear of not drawing realistically. That way, students who are less confident in their drawing ability can understand that art is approachable for them, too.

When I asked teachers if the use of computer technology changed their teaching beliefs or teaching goals, most of them, except Irene, said no. In fact, teachers' uses of computer technology not only reflected their general art teaching goals but also reflected their beliefs about teaching, learning, art, and technology.

Bessie, for example, believes that computer technology needs to be used as more than a substitute for paper and pencil. She carefully decides when and how to use technology. One of her teaching goals is to show the cyclical connection between art and history, so her students investigate their family histories and create multimedia presentations combining text, images, and narration. She chooses to use computers in this project because it explores the potential of technology as more than a substitute for paper and pencil.

Gary, in contrast, wishes to emphasize the transformative and innovative nature of computer technology. So, when students design computer graphics and animation, Gary focuses more on the innovation and transformation aspects. Hilary offers another example. She is interested in using technology as a tool for self-expression and for

introducing design principles to students. Thus, a lot of her assignments emphasize the elements and principles of design, and how to use design principles to communicate personal meanings.

In general, all of the teachers that I worked with believe in the importance and power of art education. Yet they articulated their goals with various degrees of clarity. Some teachers were clearer in articulating their teaching goals than others. There is sometimes also a gap between what art teachers say and what they do. It is obvious that how teachers understand art, technology, teaching and learning influences they way they choose to use computer technology in their teaching.

Toward the middle of my research, I began to realize that to be clear about teaching goals is not enough. Some teaching goals are broader than others. In cases where the teaching goals are quite limited, the use of the computer, even if it serves the purpose, may be less significant. I believe we need to start looking at how teachers form their teaching goals, which are greatly influenced by their beliefs and understanding of art, technology, teaching and learning.

How Do They Use Computer Technology?

Years ago art teachers considered computers primarily tools for art making, now Phil Dunn (1997) argues that they are powerful tools for educational reform, research, curriculum development, and assessment, as well as creativity. In the literature review chapters, I described how art teachers could use computer technology for their personal uses, and for enriching students' art learning experiences. In this section, I will discuss how teachers in my study use computer technology in their teaching, and compare what I observed with what has been suggested in the literature.

Art Making

As the age of electronic images has begun, rapid social change and the proliferation of new technologies immediately affect almost all aspects of our lives. Especially in the art world, computers are making new and unique aesthetic experiences possible and changing the way in which art is conceived, created and perceived (Goodman, 1987). With the advent of new technologies, artists are utilizing computers in various ways, such as creating digital images, animation, virtual realities, videos, and multimedia productions. Every day, those involved in the arts become increasingly aware of the impact of computers and their growing presence in the world of creativity.

Art teachers in my study have also explored the possibilities of the computer as a tool for artistic creation and production. Among the various art making possibilities, the most common use is creating computer graphics. The most widely used graphic program in high schools is *Photoshop*. Micah and Hilary teach computer graphics classes that are specifically designed to use the computer as an art medium. Gary and Cheryl include computer graphics in their regular art curriculum. Students are asked to create graphics and portraits, to critique and redesign advertisements. In addition to computer graphics, Gary's and Micah's students create animation; and Bessie has her fifth grade students use a multimedia program. Overall, teachers regard computer-mediated images as a valid art form, whether they teach a separate computer graphics class or include the medium in their regular art classes.

Different projects in which the computer is used as an art making tool are presented in previous chapters. Hilary, for example, develops the Hozho Balance Circle project to explore concepts of harmony and balance. Students choose a specific artwork

from a cultural group. After exploring the characteristics and meanings of the chosen artwork and research about the cultural group from which the image is created, students present to the class what they have found. Students also reflect the major areas of importance in their life that should be kept in balance as an individual, as well as major areas that are important to take care of and keep in balance as a member of world community. Students then create graphics designs that incorporate symbolism to reflect the idea of personal and community balance.

However, it is a source of frustration for Micah, Hilary and Ingrid that others do not regard computer-mediated artworks, especially computer graphics, as valid. Hilary talked about the low level of acceptance of computer graphics in local and national competitions. The skeptical attitude of Ingrid's colleague, who believes that photography and computer graphics are not art, also makes Ingrid uncomfortable. Another example that Ingrid mentioned concerns one of her Advanced Placement students. The student is very interested in digital media, and she has created a series of artworks on the computer. Ingrid is supportive of the student's interest, but also concerned that the student's works will not be considered as valid or strong by the judges. Both Micah and Hilary feel that students are more receptive to thinking of computer graphics as valid than adults. Facing these challenges, the art teachers in my study do integrate the use of computers in their teaching. Students are encouraged to explore the potential of art making with computer technology.

What I did not find, however, was a discussion on the impact of computer technology on art. Freedman (1997) argues that the formation of and debate about aesthetic questions is an important aspect of teaching about technology-based images.

Agreeing with Freedman, I believe that questions teachers should address in class include: What is a work of art? What makes a work of art valuable? How does computer technology challenge our assumptions about art? Who is the artist(s)? What part do software designers play in creating digital art? How should computer graphics be displayed? What are the unique qualities of computer-mediated images? How should these images be judged?

Research

The Internet and CD-ROMs give students access to art exhibitions, and information about artists, artworks, and museums that would otherwise be unavailable to them. Images unavailable in print, slides, or poster format are available to students on the World Wide Web (Koos & Smith-Shank, 1997). Online discussion groups provide a means to ponder, confer, and analyze. Dunn (1996) has suggested using computers as a research tool. "In what seems like the blink of an eye," Dunn observes that the role of teachers has "evolved into functioning as facilitators who can point students toward information that will lead them to new knowledge" (p. 9). Dede (1998) similarly suggests that students should use computers to search out and sort vast amounts of information, generate new data, analyze the data, interpret their meaning, and transform them into something new.

Art teachers in my study do have students use computer technology as a research tool. Angela's elementary school students, for example, use *With Open Eyes*, *Van Gogh*, and *Leonardo Da Vinci* to learn about the artists and their artworks. They explore CD-ROMs at their own pace and engage in interactive activities in the CD-ROMs.

Another common use of computer technology for research is for students to look for information about particular artists or artworks. Cheryl's students are asked to conduct an online research on an artist that they choose. Browsing through web sites, students download at least three digital images of the artist's works, find out information about the artist and his/her specific artistic style. Students then write a report that includes the images, their critique of the images and other interesting facts about the artist or artwork. The research project serves as a foundation for the following studio activity in which students design a set of placemate, cup, and bowl that reflect the artist's style. People within and outside of school community are invited to attend a special gathering in which students present their artworks and raise funding for the homeless people or the people in need within the community.

Cheryl, Francis and Hilary have students conduct research and write art reports. Overall, students enjoy using CD ROMs and the World Wide Web to look for information. Unfortunately, although students are given freedom to choose an artist or artwork, they are not usually asked to generate their own research questions. I observed that the research process is mostly teacher-directed. Cheryl and Hilary, for example, provide handouts and questions to students. These guided questions serve as good starting points. But, often, students just fill in the blanks and report back what they have read, without further analysis, interpretation and construction of meaning.

When students write the art reports, the process does involve a certain degree of generating, analyzing, and transforming available information, as described by Dede (1998). But it would be better if students were asked to generate their own questions, to help shape the direction of the research projects, and to be encouraged to reflect, see

multiple interpretations, and make meaning of what they read. If students' role is to answer teachers' questions and to report back what they read on the Internet, they are still not in control of their learning. Used in this way, the computer technology will not move teachers from a traditional model to a more constructivist one.

Communication

A distinctive feature of computer technology is the possibility of global communication. Jonassen, Peck and Wilson (1999) describe the Internet as a vehicle that keeps people connected -- "talking with each other, noticing and appreciating differences, working out divergent views, and serving as role models and audiences for one another" (p. 119). Dede (1998) similarly suggests that digital technologies can be used to interweave schools, homes, workplaces, libraries, museums, and social services to reintegrate education into the fabric of the community.

Elbert and Irene make good use of the communicative feature of World Wide Web. They teach online courses and engage students in collaborative learning. Their students come from different geographical locations and are of diverse backgrounds. Through the Internet, students communicate with and learn from one another. Irene even comments that the distance learning course has helped her move from a traditional, lecture-type of teaching to a more collaborative and communicative one.

However, other art teachers in their regular art classes do not do much to explore much the potentials of online discussion, emails, chat, and computer conferences. The teachers do use emails for personal communication, but no cross-site collaborative

project that involved students was found. I wonder if this is because the development of the Internet is a relatively newer technology, and art teachers are less experienced with its potential uses.

I asked Ingrid and Micah what they thought about starting a collaborative project with teachers and students at another geographic location. Both of them said they feel that it is a good idea, but not what they are particularly interested in doing at this moment. Ingrid's concern is that she does not know whom to work with, and it is important for her to know the other person and build a trusting relationship before starting the project. Micah agrees that to have an online dialogue with living artists is OK, but feels that high school students may not be able to carry on a sensible dialogue for long. Micah observes that students are often silent when guest artists visit the classroom. He suspects that long-term collaboration with others will not work well.

Contrary to Micah's view, I feel that students who are usually silent may feel more confident to ask questions using the Internet. Even so, it is important to listen to art teachers' concerns and see what kind of support or mechanism is needed to encourage more art teachers to take advantage of the global communication aspect of technology.

Factors

Research studies have identified factors that influence teacher's computer use. They include access (Veen, 1993; Becker, 1998; Burton, 1998), teacher's training (Schrum, 1995, Lee, 1997; Burton, 1998; Wenglinsky, 1999), teaching goals (Means, 1994), and administrative and collegial support (Lee, 1997). Some of the factors are at the teacher's personal level, some at the school level.

In response to the question who in the current reform movement has the power to put more computers in the classrooms, Besser (1993) stated that corporations, higher education leaders, the military, the federal government, and the scientific community are the ones who have the power. Besser believes that the history of public education with its reform movements was shaped by the corporate need for a trained work force and the competitive need to keep America ahead economically and politically.

Cuban (1986), in contrast, observes that teaching practices are not easily changed. For Cuban, teachers are the ones in control. Cuban observes that although the governance, curricula, and school organizations have changed substantially since the closing decades of the nineteenth century, classroom practice has changed only to a modest degree. Cuban has examined how educational technologies from 1920s to 1990 (chalks, radio, TV, computers...) have been adopted for use in the classrooms, and how/why their use has failed to meet their promised potential.

The technology of chalkboard and textbooks remains a major component in most classrooms. Cuban believes that the tools that teachers have added to their repetoire over time are "simple, durable, flexible, and responsive to teacher-defined problems in meeting the demands of daily instruction" (p. 58).

Cuban (1986) also observed that:

> *Teachers will alter classroom behavior selectively to the degree that certain technologies help them solve problems they define as important and avoid eroding their classroom authority. They will either resist or be indifferent to changes that they see as irrelevant to their practice, that increase their burdens, without adding benefits to their students' learning or that weaken their control of the classroom.*
>
> *(p. 70-71)*

Cuban's observation is interesting because he contradicts what most reformers would like to believe in terms of the power of new technology. Early in 1980, Papert envisioned a positive role for the computer in breaking down the barriers that existed between different subject areas. His claim implied "that computers can play a cognitive role; and influence our perceptions of what constitutes intelligence, and our conceptions of what children can and cannot do" (Sewell, 1990, p.12). Roy Pea (1985) has also argued that the integration of human and computer intelligence can radically extend and alter "what we think of as human imagination, intelligence, problem-solving skills, and memory'" (p.13).

So far, our understandings of human imagination, intelligence, problem-solving skills, and memory have not changed drastically because of the use of computers. Nor has new computer technology transformed curriculum and the work of teachers as Provenzo, Brett, and McCloskey (1999) hoped. Why?

Cuban (1986) believes that teachers are the ones who make instructional decisions and choose to embrace, resist or be indifferent to the use of computer technology. From my study, it is clear that although the policy makers or school administrators can emphasize and require the use of computers, teachers are the key persons who decide how the computers will be used. If teachers do not buy into the technology vision of the district, they may just meet the minimum requirements rather than work hard to change the teaching and learning environment, or implement the technology with thoughtful reflection. In schools where technology is a major focus and where technology support and training are in place, teachers still describe how some of their colleagues "don't care about it," or "don't use it."

Although I believe that teachers are the most important people in deciding how computer technology will and will not be used, the district policy and school environments do play a major role. I have observed that in places where computer technology is used on a regular basis, the school environment needs to be at least supportive of art and technology.

In a school where technology is not a major focus, art teachers face various difficulties with access to computer equipment, training, and funding, in addition to personal ones. In schools where art is not valued, art teachers comment that their roles is just to provide a planning period for their colleagues, and the art room is the last place where computers will be placed. Hilary offers a good example of how the school environment impacts her teaching.

Prior to teaching in her current high school, Hilary taught at a middle school that did not value the arts. The art room was given to other teachers for class expansion, so Hilary went around the school teaching art from a cart. She observed that she spent more time organizing the art materials so that everything would fit on the cart than focusing on art teaching. If her current school did not support it, she comments that she would not use technology in her teaching.

Thus, although teachers' personal factors outweigh the district policies, the school environments do have a strong impact on what art teachers can or can not do. As Means (1994) observed:

> *Educators are not likely to take on the reform challenge unless they have internalized a new set of goals requiring such change and have the necessary supports, including the time, access to knowledge, and flexibility, to learn new ways of teaching and of organizing schools. State and local policies cannot force*

change, but, with sustained leadership, they can set the stage, provide the direction, and offer the supports. (p. 188)

Constructivist Learning

Educational literature suggests that computer technology should be used to support constructivist way of learning. Do art teachers in my study use computer technology in a constructivist way as the literature suggests? The general answer is yes, but only to a limited degree.

A constructivist way of using technology means that the curriculum focus is on meaning making and recognition of multiple perspectives, rather than memorization of facts and training of basic skills. Students' viewpoints and pursuit of their questions are highly valued (Brooks & Brooks, 1993). Teachers behave in an interactive manner to facilitate the learning experience, not in a didactic manner to disseminate information to students (Brooks & Brooks, 1993; Dunn, 1996; Gregory, 1997). A constructivist teaching practice may combine student project work and group work as well as the more intellectually challenging activities such as reflective writing, debating, and problem solving.

To make sense of their learning progress, Ingrid, Micah, Cheryl, and Hilary have students write reflective journals. Since a lot of the projects are studio-oriented, the reflections are often about the art making process. Students reflect on the design decisions that they have made, describe what they have learned in the project, and talk about what new changes can be made to improve their images.

I did not observe students engaging in debates or extensive group work, so it is difficult to say that students recognize multiple viewpoints. However, when teachers give

students feedback on their work, some teachers emphasize more than others that there is not a single way to approach art, and allow students greater freedom to create and express.

The teachers, in general, do serve the role of facilitator rather than lecturer. Demonstration of techniques and explanation of vocabulary and assignment, as well as brief lectures usually take place at the beginning of the class. The rest of the class time is mostly for students' creative visual problem solving, with teachers helping students on an individual basis.

Different degrees of constructivist teaching were observed among teachers. This relates to how much freedom and control students have in their learning process. In terms of classroom atmosphere, Ingrid and Micah's classes have a more relaxed feel. Students have some freedom to walk, talk and share information with one another, while Cheryl's and Hilary's computer graphics classes are very quiet and teacher-directed. Students work individually in the computer lab, and they interact with one another only when teachers ask them to. In terms of the content of the class, Micah's students seem to have greater opportunities to use computer technology in ways that interest them most. Ingrid also asks for students' feedback on the direction of the class at times.

Collaborative Learning

To explore its full potential, Jonassen, Wilson and Peck (1999) suggest that teachers using computer technology engage students in collaborative learning with peers and with outside experts.

Collaboration with peers is evident in the online classes that Elbert and Irene teach, but not in other regular art classes. Students from different geographic locations communicate and collaborate with their peers in Elbert's and Irene's online courses. But, with the exception of Micah and Cheryl, I did not observe that other classroom art teachers had designed classroom activities to take advantage of the collaborative potential of computer technology. Students also do not work with outside experts.

Jonassen, Peck and Wilson (1999) feel that by engaging students in cooperative learning, students can learn to collaborate with others and "socially negotiate the meanings they have constructed" (p. 8). However, their vision is not yet fulfilled in most art classroom contexts.

Students of Cheryl and Micah work together as a group to create multimedia presentations. However, most classroom activities that I observed are not specifically designed to engage students in collaborative learning or negotiation of meanings, although a lower degree of collaboration, such as sharing computers and materials, as well as giving feedback on each other's work, were observed.

Sharing computer resources, I believe, does not qualify as a significant act of collaborative learning. Why don't art teachers have students use computers in a more collaborative way? Are art teachers unaware of the potentials of collaborative learning? Or is collaborative learning not considered as important as other art teaching goals? If so, is this because art, in the teacher's mind, is an individual creative expression but not a collective meaning making effort? New questions are raised which call for further investigation.

Gender

A growing body of research studies indicates that gender differences exist in computer use (Freedman, 1997). The literature suggests that most boys and girls have positive attitudes toward computing, but the girls' attitudes are less positive than those of boys (Huber & Schofield, 1998). Boys have more access to computers at home and at school. Where computer programming is offered, more boys take the subject than girls (Scott, Cole & Engel, 1992).

A report of theAmerican Association of University Women (AAUW) Educational Foundation in 1998 reviewed nearly 1000 studies, and confirmed that there is an alarming and deepening technological divide between girls and boys, although girls are catching up to boys in mathematics and science. The report showed that both inside and outside of school girls of all ages tend to have less exposure to computers and to say they feel less confident about using them, compared with boys (Viadero, 1998). Weinman and Haag (1998) observe, "Girls are significantly more likely than boys to enroll in clerical and data-entry courses, the 1990s version of typing" (p. 44). Although the Internet is attracting more women, the users of more powerful areas of the Net are still 85 percent men (Tarlin, 1997).

While using computers, Turkle (1986) observes that boys and girls emphasize different uses and values. Turkle concludes that the risk-taking style characterized by mastery and manipulation of the environment is a predominately "masculine" orientation, while the relational style that sees computers as a tool, or a means to an end, is more commonly a feminine orientation.

In general, girls do not get as much computer experience as boys, and, even when they do, girls continue to believe that boys are "better" at computers (Chen, 1985). Faced with such troubling findings, Bruner (1998) points out that such a distinction between genders goes beyond the use of computer technology. Bruner(1998) notes that "the means of communication, collaboration, and integration – so central to women's interpretation of technology – have not played a central role in how we, as a society, choose to apply or envision technology" (p. 5).

Knupfer (1998) believes that gender stereotypes are interwoven among the advertising media, culture, society, and classrooms. She observes that most advertisements portray females in supportive or even helpless roles while males are shown using the technology in productive ways that benefit their careers. Captions in advertisement for multimedia products also promote stereotypical uses, based on gender. However, "there is a danger to accept these gender-laden messages as a natural reflection of reality and model our own attitudes and behavior on them" (Knupfer, 1998, p. 55). Knupfer therefore calls for a more fair representation not just in numbers of women depicted in technology advertisements but also in the way they are depicted in those advertisements. She also asks teachers to critically analyze this issue, and be aware of their role in perpetuating cultural stereotypes.

These troubling findings serve as a good reminder. Yet, to my surprise, the teachers that I talked to, except for Hilary, say that they do not think there are gender differences. The comment "Oh! Here is the gender biased question" was made when I asked one of the teachers if he observes any difference in terms of attitude and uses of the computer between male and female students. Several teachers, Micah, Cheryl, Ingrid and

David, commented that male and female students face difference career choices in life. They all agree that there is gender inequity in life but not necessarily in computer use. Cheryl commented that the gender issue is a big one. Yet in their own classroom, the teachers have not noticed any gender differences.

Ingrid describes herself as an advocate for girls, and is interested in reading studies that report gender inequalities in the computer use. Puzzled by the issue, Ingrid comments that some boys are just as clueless using computers, while some girls seem more confident and more efficient than boys do. One possible explanation for Ingrid is that "male students know how to hide it better." She recalls one incident where she required students to use a power saw. Female students were more vocal in expressing their uncertainty and unfamiliarity of the equipment while the boys pretended to be in control, although their facial expressions indicated otherwise.

Is the literature wrong or are teachers not sensitive enough to notice a subtle difference? I have mixed feelings. On the one hand, I noticed that one of the computer graphics classes had fourteen male students and one female while a data processing class in the same school had dominantly female students. I also had several female students tell me that they are not interested in using computers.

On the other hand, some girls, as their teachers describe, are very interested and very proficient in computer use. When students were asked if there are gender differences, the response was no because some of their female friends or family members are interested in computers. If these observations are true, why does existing literature strongly suggest otherwise? I believe that the gender issues need to be investigated further.

Inequity

Inequity has long been at the center of attention in the educational technology debate. Visiting classrooms in various school districts made the issue of inequity seem even more real to me. In more affluent school districts, like those of Ingrid, Bessie, Cheryl and Hilary, technology is a major goal. More and better equipment is provided for teacher and students. Full time technology consultants are provided to maintain and upgrade computer equipment. In Hilary's school, teachers are required to attend technology training every month. In Ingrid's, Bessie's and Cherly's schools, there is no set technology training time, but training is encouraged and available. There is also a higher expectation that students will be technology proficient.

In a less affluent school district, such as those of Elbert, Francis, Micah and Gary, no systematic training is provided by the district, although technology is one of the district goals. The current focus is more on how to provide better equipment and access to students and teachers than how to provide training or encourage better use in the classrooms with existing equipment. In less affluent school districts, the expectation of students' being technology proficient seems to be more lip service than a goal with systematic plans and actions that involve teachers. Technology consultants in these districts are available, but, in one of the largest school districts, only a small technology staff is budgeted, which appears to be insufficient to school needs. In Micah's case, he has learned to rely on his own knowledge to fix computer problems since technology maintenance is not readily available. For teachers who are less knowledgeable about computer maintenance, the lack of technical supports adds another level of frustration.

Gary's case is probably an indication of how serious the gap is between technology have and have not schools. Gary is still using the Amiga machines from the late eighties, and patiently waiting for his new lab that was promised long ago.

In schools where computer technology is used in the art classroom on a regular basis, it seems that the school has a clear vision and action on technology, or at least is supportive of the arts. Have a clear vision and action on technology, unfortunately, often means the schools are in an upper-middle class neighborhood. These districts tend to be smaller in size; they have invested a lot in providing technology access and training, and keeping the pressure on teachers to use the technology.

Reflection

This research was initiated partly because of my dissatisfaction that the blame for not using technology effectively in the classroom was put on teachers. Instead of pointing a finger, I wish to present stories of art teachers, and provide concrete examples of how they use computer technology in their teaching. In the course of writing, I was very self-conscious about making negative claims. Although the line between being critical and negative is sometimes blurred, over time I have learned to work through my emotional discomfort. I have tried to give teachers' credit for their accomplishment, knowing how little support some of them get, yet to look between theories and practice, and to discuss what further steps need to be taken in current art teaching praxis.

I believe the crucial role of technology is to provide a chance for thinking differently about instructional practices. Like any other strategy or technology, the computer is not the answer to every instructional need. Yet, it is the right answer to some. I believe technology has the potential to change art education in beneficial ways, but only

under certain circumstances. Numerous factors can inhibit the successful use of computer technology in teaching art. Some of the barriers, such as access to computers, are easily removed if sufficient funds are available. However, obstacles that are deeply embedded in the school structure, such as the low status of the arts, are not as easy to remove. Even more difficult to change are deeply held beliefs about the purpose of art education, about teacher and student roles, and about the nature of learning and instruction. All of these factors influence how much impact computer technology has on art education.

CHAPTER 8

CONCLUSIONS AND IMPLICATIONS

Overview of the Study

It has been suggested that computers are valuable for classroom use because they facilitate the following educational goals-- student-centered classroom, collaborative learning, global communication, multimedia learning, nonlinear design and interactivity. Although the images of student-centered classrooms, global community, active student inquiry associated with the use of computer technology sound appealing, living up to such high expectations is certainly not easy. And when reality fails to meet expectations, teachers receive the blame.

With limited literature based in real art classroom settings and experiences, the direction of my study does not come from literature, but from the lack of it. I believe that "we need to consider who is using it[technology] and why, what goals those people have, and how they're likely to utilize the technology in pursuit of their goals" (Blomley, 1998, p. 5). Otherwise, we risk assuming that the computers will have the same impact everywhere, under all circumstances.

In my study, I focus on twelve Ohio K-12 art teachers through a series of questions. Who are these teachers? What are their teaching goals? How do they use

computer technology? What factors influence their use of computer technology, including personal goals and beliefs, as well as cultural/environmental factors? I also investigate issues of constructivist and collaborative learning, gender, and inequity.

Methodologically, I situate myself within the constructivist framework and employ a collective case study method. Data were gathered from interviews, observations, researcher's journal, and collected artifacts.

Summary of the Findings

More elaborate discussions are presented in the previous chapter. The following is a summary of the findings drawn from my research.

1. More high school art teachers were recommended than middle school or elementary school teachers.
2. Most of the teachers recommended teach in upper-middle class neighborhoods.
3. Art teachers use computer technology in their teaching in different ways, but, computers are most commonly used for art making and conducting research.
4. Teachers' teaching goals, and their personal beliefs in art, technology, teaching and learning, influence their attitudes toward and use of computer technology.
5. Individual factors about teachers, especially their goals and beliefs, outweigh the influences of district policy, yet factors at the school level also determine the way technology is used.

6. Technology use is not recognized as essential in art foundation courses. Art teachers agree that the computer is an important tool, but some think that students should use computers only after a certain age or after they have a solid foundation in traditional media.
7. Most (eleven) teachers feel that the use of computer technology does not change drastically their beliefs about art teaching. One teacher commented that the experience of an online course helped her move from a more traditional teaching approach to a more student-centered, inquiry-based one.
8. In the classrooms observed, there are few cases of collaborative projects in which students work in small groups for problem solving, or communicating with people outside the school community.
9. Inequity does appear to exist, at least in terms of computer access. The art classrooms that I visited range from spacious air-conditioned ones with ample art materials and advanced computer equipment to those with limited art materials and out-dated computer equipment from the 80s. It is reasonable to assume that restricted computer access limits what some art teachers do.
10. Most art teachers do not observe gender differences.

Future Implications

The study, as a whole, yields the following interpretations and implications. First, there are inconsistencies between the educational literature and what I observed in current teaching praxis. The use of computer technology, for example, does not revolutionize the classroom situation, as some of the technology advocates have suggested. On the positive

side, this means that the use of computer technology has not driven the curriculum. Teachers are still the ones in control of how they use computer technology. However, the fact that the new media does not change teachers' teaching goals or beliefs raises some questions. It is possible that some teachers only use computers to do what older media do. The use of computer technology does not challenge their assumptions about art, teaching, and learning, and they fail to recognize the unique qualities and full potentials of computer use. The relationship between theory and practice needs to be further investigated.

Second, issues raised about the use of computer technology in teaching art lead us to rethink the questions of basic in art education. Should the basics of art education include computer technology? And how should computer technology be included?

Third, gender is an issue that needs further investigation. Fourth, this research provides concrete examples of how computer technology are used in art classrooms. With the rapidly changing nature of computer technology, studies that investigate the art teacher's computer use should be continued and expanded beyond Ohio teachers.

Concluding Thoughts

As I have argued earlier, the controversy surrounding the use of computer technology provides a way of reflecting on what it means to teach and to learn about the arts. Constructivist and collaborative art learning approaches are useful ways of revitalizing our understanding of art teaching and learning and provide reasons for making access to computer technology in art classrooms easier.

Joseph Corn, editor of *Imaging Tomorrow*, names the three fallacies most common in predicting the impact of new technology: "(1) new technologies bring about a total revolution in their field by totally replacing all other existing forms; (2) new technologies will perform only old known tasks and fulfill only known needs; and (3) new technologies will bring about miraculous utopian, global change" (As quoted in Lovejoy, 1997, p. 253).

Agreeing with Corn, I believe that new technologies do not replace old ones. Artists will continue to paint, draw, and sculpt. Rather, new and emerging technologies extend the potential and definition of art, as well as the range of possibilities for expression, perception, and communication (Lovejoy, 1997). Projecting into the future, I foresee the power of computer technology having an even greater impact on art, science, and education, as well as on our daily lives than it has now. However, that technology in itself will not change education; what matters is how it is used (Sandholtz, Ringstaff, & Dwyer, 1997).

This dissertation writing process that I have undertaken has helped me flesh out my own thoughts about computer technology and its relationship to art teaching and learning. I believe that the more we all think and talk about technology and its relationship to art and education, the closer we will come to a shared constructive understanding and thereby, be able to make wiser decisions on how computer technology can be used in K-12 art education.

APPENDIX A

LETTER REQUEST FOR RECOMMENDATION

Do you know any art teacher who is using computer technology in an interesting or innovative way?

Dear Superintendent:

My name is Liyan Wang, a Ph. D student at the Ohio State University. My specialty is in computer graphics, multimedia, web design and their application in art education. For my dissertation, I'm documenting a few art teachers in Ohio who use computer technology in their teaching practice in an innovative or interesting way. The research will involve one-on-one interviews with the teacher and visits to the classrooms. Exemplary teaching practice will be documented and shared.

If there is anyone that you know that meets the above description, please mail back the enclosed recommendation form or contact me by phone or through email. Your nomination is highly appreciated.

Some teachers may feel that teaching is a lonely business. However, by making exemplary teaching public, we are able to learn from it and celebrate the hard work of art teaching.

For further questions, please don't hesitate to contact me at (614) 292-0285.

Liyan Wang

Graduate Research Associate
Ph. D. Program
258 Hopkins Hall,
128 North Oval Mall
Department of Art Education
The Ohio State University
Phone (614) 292-0285
Email: wang.347@osu.edu

Recommendation Form

Recommended Art Teacher: _____

School: _____

School Phone: _____

School Address: _____

Email address (if applicable): _____

Description/Recommendation

Print Name _____ Title _____

Signature _____ Date _____

*** Or contact Liyan Wang by phone: (614) 292-0285**
fax : (614) 688-4483
email : wang.347@osu.edu

APPENDIX B

EMAIL REQUEST FOR RECOMMENDATION

Subject:
art education
Date:
Sat, 19 Oct 1999 6:23:19 PM
From:
Liyan Wang <wang.347@osu.edu>
To: EMIG

Hi,

My name is Liyan Wang, a Ph D. student at the Ohio State University. I'm looking for art teachers, especially art teachers in Ohio, who are using computer technology in their teaching in an innovative or interesting way. The purpose of my dissertation research is to document, share best practices and discuss issues surrounded the use of computer technology in teaching art.

I've met some great teachers who are doing interesting things. Several of them use computers for students to produce computer graphics and art reports. I'm wondering if there is anyone out there who is using technology for other purposes (e.g. distance learning, on-line correspondence between students across different geographic locations, multimedia projects...). It will be best if the art teacher is located in Ohio so that I can visit him or her in person. If not, I'm interested in knowing more of what you know.

Please send me an email and recommend the art teacher you know with his/her contact phone number, school name and/or email address. I would highly appreciate your help.

Have a great day!

Liyan Wang
Department of Art Education
The Ohio State University
258 Hopkins Hall,
128 North Oval Mall,
Columbus OH 43210
Phone: (614) 292-0285
Email: wang.347@osu.edu

APPENDIX C

SEMI-STRUCTURED INTERVIEW QUESTIONS

Interview questions:

1. Can you tell me a bit about yourself?

   Years of teaching

   Educational background

   Family

2. How would you describe yourself as an teacher?
3. Why do you want to be an art teacher?
4. What's your goal/mission as an art teacher?
5. What gets you interested in using computers in your teaching?
6. What are the software, CD-ROMs you choose to teach/use? Why?
7. What are the benefits of using computers to teach art classes? In what ways?
8. What are the problems that surface?
9. What are the changes that occur in terms of your teaching style/your teaching philosophy/student behavior while integrating computers in your art teaching?
10. Compare teaching without and with the use of computer technology, what do you feel? Which one do you like or feel more comfortable with? Why?
11. What have you learned about teaching with computer?
12. What concerns you at this moment in terms of using computers in your art teaching?
13. What are the suggestions you'd like to give to other art teachers who're struggling with integrating computers in their art classes?

14. What's the biggest road block – Time, equipment, money, professional development, your knowledge base, technical assistance…..
15. If you can have all the equipment, facility, supports (everything you want), can you describe to me the scenario you foresee? Under the "perfect" situation, what do you like to do? What would you like to teach to your students?
16. Some art teachers expressed frustration for being marginalized at the schools and felt that "art classroom will be the last place the computer being put in," what's your response to that?
17. Where do you get your ideas from?

(Student Behavior & Teacher's expectation)

18. Does students' behavior change when they work on computers? Why do you think so?
19. Do you have the same behavior expectations for your students when they work on technology? If the answer is yes, why?
20. Do you have a general/classroom rule describing your expectation of students?
21. Do you have a grading scale or rubric that outlines criteria that you use to evaluate students' work in the area of technology?
22. Are the two different or similar?

23. What's students' attitude toward the use of computers?
24. What barrier do you see that affect students' achievement in the area of technology?
25. What kind of strategies do you use to accommodate students' learning styles?

26. What's innovative use of computer technology in teaching art?

27. What activities do you have student do?

(software)

28. What software do you use? How do you choose the software you use?

29. Have you move beyond what the software can do?

30. What do you consider to be the strength and weakness of each software?

31. Have you developed any strategies to address/strengthen the weakness you find in the software?

32. Have you designed lessons/strategies to help students in the area of technology?

APPENDIX D

HUMAN SUBJECTS APPROVAL SHEET

THE OHIO STATE UNIVERSITY

RECEIVED OCT - 7 1999

Protocol No. 99E0219 (Office Use Only)

APPLICATION FOR EXEMPTION FROM HUMAN SUBJECTS COMMITTEE REVIEW*

All research activities that will involve human beings as research subjects must be reviewed and approved by the appropriate human subjects review committee, or receive exemption status, prior to implementation of the research.

Principal Investigator: (Must be OSU Faculty) Parsons (Typed name) Last, Michael First, J. Initial, Michael Parsons (Signature)

Academic Title: Professor Phone No. 292-0273 Fax No 688-4483

Department: Art Education Department No 0225

Campus Address: 258 Hopkins Hall Room Number Building, 128 North Oval Mall Street Address

Co-Investigator(s): Wang (Typed name) Last, Li-yan First, Initial, Liyan Wang (Signature)

(Typed name) Last, First, Initial, (Signature)

➤ PROTOCOL TITLE: Cases of Art Teaching with the Use of Computer Technology

* THE ONLY INVOLVEMENT OF HUMAN SUBJECTS IN THE PROPOSED RESEARCH ACTIVITY WILL BE IN ONE OR MORE OF THE EXEMPTION CATEGORIES LISTED ON THE BACK OF THIS APPLICATION.

➤ CATEGORY: (Check one or more) #1 X #2 X #3 _____ #4 _____ #5 _____ #6 _____

➤ SOURCE OF FUNDING FOR PROPOSED RESEARCH: (Check A or B)

A. OSURF: Sponsor _____ RF Proposal/Project No. _____

X B. Other (Identify) Self

Office Use:

EXEMPTION STATUS: ✓ APPROVED ____ DISAPPROVED**

10/14/99 Date, Don M. Gelf Chairperson

** Principal Investigator must submit a protocol to the appropriate Human Subjects Review Committee.

IMPORTANT NOTICE TO INVESTIGATORS: Exempting an activity from review DOES NOT absolve the investigators of the activity from ensuring that the welfare of human subjects in the activity is protected and that methods used, and information provided, to gain subject consent are appropriate to the activity.

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