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Reflections on Teaching Strategies for Integrating Technology Based Activities in Art Curriculum

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A Thesis

In

The Department

of

Art Education

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Arts (Art Education) at
Concordia University
Montreal, Quebec, Canada

August 2002

ABSTRACT

Reflections on Teaching Strategies for Integrating
Technology Based Activities in Art Curriculum

Anne Kaye

This study explores the role of technological tools in the art classroom and how they may be integrated into the art curriculum. In order to study both the role of the educator in the integration of technology with traditional media, and the response students have to technology-based art, two computer art projects were developed and implemented with groups of grade six students. The teacher's role is examined by investigating obstacles for the use of technology in the art curriculum and the ways in which the computer's tools can be used by the art educator to promote creative activity. Student class behaviours are studied to assess responses to technology-based art making. Conclusions are based on observations of the participants' actions, an interview with an art educator and the results of the projects.

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- **Introduction**

This study was inspired by an ongoing investigation into my own art making practice. Over the past two years I have taken part in activities that utilize both traditional media and computer technology as art-making tools. My experiences have been both challenging and enlightening and I was prepared to develop the ideas and skills I had acquired by proposing similar activities to a classroom of students.

After several years of part-time teaching in schools, I witnessed the ongoing challenges that face educators and students with the appearance of computers in their classrooms, and the many new considerations they must confront with this new tool. By exploring my own methods of presenting new technologies to students, I suggest strategies for the integration of technology in the art class.

This study will analyze and interpret activities that were developed and implemented at Miss Edgar's and Miss Cramp's School (ECS) in Montreal. The participating students were all girls from two grade six art classes. As a visiting instructor, I led two projects over the course of two semesters that introduced the students to new and unique ways of using technology to express their creativity. In both projects, students were meant to incorporate traditional arts and technology-based arts into one assignment.

In the context of this research, "traditional arts" refers to work achieved through media such as painting, drawing, sculpture, printmaking and photography. For the purpose of this study "technology-based art" will encompass artwork created using

graphic software programs (such as Adobe Photoshop, KidPix and Painter) and computer equipment (including scanners, digital video and/or still cameras).

The incorporation of technological media with traditional ones was devised in an attempt to propose a context for new tools in the classroom. Through these projects students were given opportunities to make connections across several art disciplines.

Before educators can attempt to teach technology-based art, they must discover how the computer can be used as something other than a word processing tool. This study looks at approaches teachers may use to design their art curriculum using technology as a facilitating and creative tool for teaching art principles and techniques. Technology presents the educator with new materials to expand the scope of art and its imaginative capabilities. New techniques and applications provide teachers with opportunities to develop lessons from initial stages of research to frequent occasions of interaction and cooperative learning with students.

Art educators interested in using technology in their classes are often unsure of the place of technology among traditional tools and projects. This study investigates one way of smoothly moving from traditional media to technology by working somewhere between the two. As the main instructor in the classroom, I used "familiar" strategies for introducing concepts, developing a theme and building up student confidence in a project.

In a world where many of today's students are, for the most part, computer savvy, the idea that creative content can be produced using technology is not a "hard sell". Most students are eager to jump right into a project without following a structured lesson. My goal in developing the two projects was to provide both the educator and the student

some time to learn and explore the technological tools through a multi-phase process requiring reflection and imagination.

A new tool for art making

How do educators and learners approach the computer, a relatively new and complex tool, as an instrument for art making? Can the combination of traditional media and technological processes become an effective method of integrating computer use into the studio art classroom?

Traditional methods such as painting, drawing, sculpting, printmaking and photography have long been the obvious sources for the creation of artwork. The introduction of technology into the sphere of art education has appeared with both enthusiasm and criticism.

Through my own art-making practice I have realized that by creating an environment where technology can be used comfortably, learners take advantage of endless creative possibilities. By using the computer in conjunction with traditional media, I experienced a process that highlighted the advantages of using technology for art making. I became less intimidated by the software and I found myself exploring new ways to use computers for art making.

After reviewing my experience I found that the process I used could be effectively incorporated into art education programs. My methods of using technology in conjunction with traditional media in one art piece changed my attitude toward the computer and I hoped that my approach could be applied in a classroom environment.

Some educators have been hesitant to include computer art instruction into their elementary and secondary level art classes. Their reasons are often justified but the problems they encounter are often due to a lack of creative curriculum developed for computer art courses. The largest obstacle in teaching computer art, as expressed by Rosemary Cyr, the art teacher at ECS, is the lack of resources available to inspire ideas for creative lessons and projects for the students. Cyr was often blocked by a tendency to focus on the functions of teaching the software and not the content of the assignments.

For the educator, the challenge is to develop material for computer art lessons without letting the technology take over as the developer of ideas and creativity. Lessons must be created to foster individual thinking and personal inspiration instead of relying on the machine to provide answers to the assignments.

Literature Review

Integrating technology into the art curriculum

Many educators have expressed some frustration toward the inclusion of computer work in their art curriculum. The computer may be in the room but the challenge is to plan curriculum for it. In order to properly teach with technology, many teachers feel they must be computer literate and comfortable with the medium. Many educators feel threatened by new ways of approaching art because they must revert to the "beginner" stages of learning their applications (Schreiber, 1998, p.33). Students often become the "teachers" because they have been raised in this age of technological awareness.

Teaching students how to think creatively and express themselves can still be an active part of teaching technology. It is possible for students to explore the computer programs themselves, gaining confidence in their own abilities and giving teachers a chance to learn simultaneously. It is not necessary for teachers to feel pressured to be completely computer literate before attempting to teach their students.

One way educators can attempt a painless entry into the technological world is by treating the computer like any other tool and paying close attention to its unique characteristics. If teachers lead discussions on the differences between traditional art forms and computer art they may discover and uncover what students think about their art-making processes.

In her article on teaching technology, Kerry Freedman, associate professor of Art Education and Curriculum Studies at the University of Minnesota, makes it clear that computers should be studied for their original contributions to art making.

"Any curriculum that focuses on visual technologies should include consideration of the aesthetic peculiarities of computer graphics and mass media imagery. In computer graphics the elements and principles of design are apparent and have antecedents in the fine arts. However, they are often used somewhat differently when computers are

involved. Light is emitted as well as reflected; simulation becomes hyper-real (...) and movement is at breakneck speed." (Freedman, 1997, p.9).

Having an understanding of the computer's distinguishing qualities can give students an educated perspective on the tools they are using.

Another way to promote the use of technology in the art curriculum is by creating projects where students combine computers with other media in the art room. As I have experienced, there are many advantages to bringing new media and traditional methods of art making together. The educator has the opportunity to make use of the unique aspects of computer technology without giving the impression that it is any more or less useful than paints or pencils in expressing creative ideas. A student who may be repelled by the tactile and physical "messiness" of traditional media may overcome feelings of inadequacy by first exploring the "virtual" tools offered by the computer.

Obstacles for the use of technology in the art curriculum

There is much discussion based on the theoretical and practical uses of computers in art education but it is the educators, above all, who must be convinced that technology can be used as a creative tool. Much opposition to the integration of computers into art curriculum comes from teachers. Many educators hesitate or avoid learning technology for a variety of reasons.

One major obstacle for teachers is their lack of vocabulary and basic skills needed to teach technology. The lack of knowledge in the area of new media is frustrating for educators and poses many difficulties in even approaching the hardware. This problem is mostly technical but there are deeper issues that stall the use of computers in the art class. Some teacher attitudes toward technology are discouraging because they are based on preconceived notions about computers. There is a negativity that stems from the fact that a computer is a machine and therefore cannot interpret or express anything associated to human expression. As John M. Hicks (1993), professor of Art Education and Art at

Drake University, has observed that some educators in the field of art believe that, "there is a dichotomy between human and machine. The assumption is that people make art, that machines do not make art. (...) One is traditional and therefore acceptable whereas the other is the new kid on the block and apparently not acceptable." (p.42)

It has often been thought that creativity is lost when the computer is used as a tool for art-making, and that the practice of using technology will actually turn the art process into a mechanical function void of personal expression. James W. Marchand (1996), professor of Germanic Languages and Literatures, Comparative Literature, and Linguistics at the Center for Advanced Study at Princeton University, has even coined his own phrase stating that, "the problem is not that machines will come to think like humans, it is that humans may learn to think like machines." (p.167)

Technology has been perceived as an application for the study and teaching of other more structured and logical disciplines such as math and science. Some educators feel that art knowledge and experience will be reduced to those "cognitive universals", and that art will no longer be art as long as the computer is involved (Sasowsky, 1985). The fear that the computer's basic function is technically based implies the conclusion that computers can only offer a development of form and not the development of content in art making. (Heise and Grandgenett, 1996)

A final point of opposition to computers is the fact that they have so quickly entered the art scene that they can often be perceived as a passing fad. Technology has occasionally been viewed as just another method of occupying our children's time when we do not feel like teaching them. Zina C. Munoz (1993), founder of MC Design Group, and volunteer teacher, ponders whether we are "teaching our children to use a tool, or are we using the computer to replace what we ourselves should be doing with them?". She goes on to ask if "we are taking the easy way out: using technology just because everyone else seems to be doing so?" (p.48).

It is evident that there are many obstacles to overcome in the integration of technology into art education and that it has become necessary to change the attitudes of many teachers in this regard.

It is important to note the fact that, on their own, monitors, microchips and keyboards are not the solutions to criticisms of curriculum. (Gregory, 1996, p.54) It is the responsibility of educators to use technology they have at their disposal as a device to diversify and improve programs. With computers increasingly more common in the art room, teachers are obliged to provide creative and interactive courses for learning. With so many innovative ways to integrate computers into art curriculum, educators are being offered an unprecedented opportunity to design their own programs and illuminate a whole world of knowledge for their students and themselves.

Why integrate technology into the art curriculum?

There has been strong support from the world of art and from major arts advocacy groups to include computer technology in existing art programs. (Hicks, 1993, p.42) Besides the outside support, Hicks (1993) describes three important reasons why art programs need to embrace technology in addition to the traditional arts:

"The first reason is the growing importance of visual symbols, iconography, and complex communication systems throughout the world. (...) A second reason for including technology in the classroom is the growing importance of technology-related aesthetic decisions, both on individual and cultural levels. (...) The third [reason] is the growing social need for "connectionism" or the emphasis on how phenomena relate to one another." (p.42)

Technology has also offered a good "excuse" for art to be taken more seriously as an essential discipline. Art is often thought of as a "frill" by administrators, parents, and the general public. Technology is considered, by these same members of the community, as an important part of society, due to its role in science and mathematics fields. Infusing

this "serious" and "respectable" element into art education can change its level of importance in the eyes of the general public and those who provide funding for programs. (Hicks, p.46)

Hicks (1993) views the very nature of aesthetics redefined within the context of the technological, information age.

" Aesthetics would include an extended vocabulary, a greater focus on process, openness to collaboration and cooperation, a revised definition of originality, greater focus on spontaneity and the unexpected, an expectation for greater diversity of imagery, greater focus on cross-cultural and cross-technical connections, and a look for closer relationships between art and science, mathematics, engineering, and even manufacturing." (p.44)

Hicks' arguments support the idea that once art becomes a component for social survival that it stabilizes its position as a basic content area in education.

How can technological tools be used by the art educator to promote creative activity?

A Multitude of tools

Computers offer intricate tools for the production of art and the development of ideas and creativity. Some of the programs that are available and used in classrooms are *Adobe Photoshop, Adobe Illustrator, Corel Painter, among others*. These software packages provide opportunities for students to use tools similar to traditional media but that allow for a further exploration of visual elements. The amount of manipulation and the speed with which work can be executed is a great advantage for students who are used to flashy, dancing images popularized by television and video games. If students are presented with technology that they are familiar with, it can create a comfortable environment for learning and also give them access to the instant gratification which the media presents.

Early critics of the use of computers in Education predicted that the production of images on the screen would create isolated and antisocial environments for students, but it has been discovered that just the opposite is true. Through classroom research, it has been demonstrated that students of various ages actually work best in groups when using computers in school. The meaning of "groups" can be interpreted as pairs of students in a classroom or students who correspond by email. (Freedman, 1997, p.8)

Computers can provide motivation because they offer the student many choices and diverse opportunities to create. Experimentation eliminates the threat of compromising the end product. This is an element that computer artist Sharon Steuer finds useful in her work. In an interview with J. Barry, she states that, "Only with the computer do I have the unlimited ability to incorporate any editorial changes without ever compromising the 'original'." (Barry, 1999).

The use of technology can encourage and enhance creativity. The opportunity to "undo" any mistakes or changes and to save many versions of an artwork gives the students confidence to be free and experimental. Steuer sees this aspect of the computer's tools as beneficial to her artistic practice.

"...I use (the computer) because I can save incremental versions of an image as I work and then return to earlier version to rework those as needed. This ability to both save and continue to work on 'finished' images is an unimaginable boost to the creative process.

Instead of saying, 'This is working, I'm pleased with this,' I can now say, 'And what would happen if I did this!?' while still being able to return to the version I was pleased with. This makes me more daring with traditional paints as well, although I am often frustrated that I can't 'undo' in my painting studio!" (Barry, 1999).

Steuer's experiences with computers accurately expresses responses I have experienced myself and also observed in the classroom. The creative energy I gain while working with the computer overflows into my painting process, making it more rewarding. Technology provides opportunities for one to study the art making process,

step by step, and make adjustments and improvements along the way. The computer allows the user to track each step of action taken towards the final product and become more introspective of specific choices.

Another important element to having computers available in the classroom is the possibility of access to the Internet. The Internet provides students and educators with a rich resource that enhances computer art lesson plans and provides access to global perspectives on any topic.

Students can use the Internet as a tool to research information about artists, art periods and art from around the world. Freedman (1997) suggests that, "our roles as teachers will be to help students critically reflect on their writing and image-making and perhaps even guide students to create their own curriculum as they explore the net." (p.8) Encouraging children to think critically is a task that can be undertaken by taking advantage of telecommunications. Art criticism and the study of aesthetics can utilize resources available on the World Wide Web in order to gather information but also to host discussions about art. Students can create dialogs with each other by sharing information they have gathered from innumerable web sources.

Internet access presents an opportunity to blend multicultural, multi-age, gender-inclusive visual resources and contextual information from many different cultures. (Heise and Grandgenett, 1996, p.13) By allowing students to gather a wide variety of historical information regarding the context in which works of art were created, they are provided with a better understanding of the artist's intentions.

By logging on to the World Wide Web, students can search for information that would not be accessible otherwise. For, instance, there are in-depth websites for galleries and museums that offer virtual guided tours. A student who does not have the opportunity to travel to a museum on a different continent can simply click on a mouse and simulate walking through an exhibit. (Dunn, 1996, p.9)

The use of the Internet is beneficial to students because it can challenge them, accommodate individual styles of learning and provide options for varied interests. (Heise and Grandgenett, p.14-15) Access to the web is also essential for the art teacher who may need to gather information to prepare for a lesson. For educators not trained as art specialists, the Internet gives them a chance to research external and internal facts surrounding artworks. (Keifer-Boyd, 1996, p.37)

How do students respond to technology in their art class?

As technology has become an important and popularized tool for people around the world, it is inevitable for computers to have reached the field of art education. Today, many students at the elementary and secondary level are "computer literate": they type their class assignments on a computer, they communicate by email, they "surf the web", and they play computer games. Children seem to be ahead of most adults in their facility with technology. Experts have found that, "[Young people] have an intuitive comfort with computers their parents will likely never possess." (Cribb, 1999).

Students have developed a new way of thinking and learning that is different from cognitive processes common to other generations. Jane Healy, an educational psychologist has found that children "appear not to have the same mental constructs that we used to expect children to have." (Cribb, 1999) The changes in the world have made an impact on young minds and it is now important, more than ever before, to train ourselves, as educators, to embrace technological systems.

In terms of efficiency, motivation and creativity, a student can benefit a great deal from access to technology in the studio art class. For the student, computer technology carries with it many advantages for the learning process. The computer is a comfortable tool for the new generation of students. They have become accustomed to popular media that offers them instant gratification through flashy, colourful images shown at mind-

boggling speeds and intervals. Therefore, students have become efficient in handling the vast amounts of information presented to them through computer technology.

In a paper written by Sandra C. Dilger of the Florida Department of Education and D. Craig Roland of the University of Florida, it is clear that computers have a positive effect on student motivation.

" For many art teachers, technology has provided an answer to unmotivated students. There have been numerous reports by practicing arts teachers of a dramatic increase in interest and excitement among their students as a direct result of introducing computers into the curriculum. The novelty and ease of working with a computer as a creative tool apparently releases inhibitions. In visual art classrooms, for example, students afraid of drawing with a pencil are often quick to try their hand at drawing with the computer. Clearly the potential of technology to spark student interest should be taken into consideration in determining its value or place in school arts programs." (Dilger and Roland, 1993, p.14)

Computers can offer opportunities that expand and foster creativity. A conference co-sponsored by Intermedia Arts Minnesota and the Minneapolis College of Art and Design supported the view that "quickly developing technologies have had an extraordinary impact on visual artists and their creative process." (Hicks, p.42) Like artists, students are now presented with a wide range of software applications and digital tools for expression that would be difficult to compile using only traditional media. For example, students can use photographs they have taken with a digital camera and immediately view the image on the computer screen. Then, by using applications that can change scale, colour and a multitude of other variables, the student is free to create an image that can eventually be printed. The creative process does not have to end with the printed form of a final product. It can be used as a model for another artwork or as a section of a bigger work incorporating paint or other traditional media. The possibilities are endless and create

many opportunities for students to have new and expanded ways of engaging the creative process.

It is clear that today's student can benefit from the presence of computer technology in the art classroom, but it is the method with which it is integrated into the curriculum that is the key to its success.

Teaching for the Develepment of Creativity in the Computer Lab

In light of the ideas found in the literature (see previous sections) towards the use of computers as art making tools, I set out to explore how I could include technological tools amongst all the pencils and paintbrushes. I was offered an opportunity to take part in the Electronic Artroom Project, an initiative by the Art Education Department at Concordia University, funded by the Ministry of Education of the Government of Quebec and Les fonds pour la formation de chercheurs et l'aide à la recherche (Programme de soutien à la recherche pour le développement et l'utilisation des nouvelles technologies d'information et de communication (NTIC) en éducation).

This research project provided me with the opportunity to enter Rosemary Cyr's grade six art class at Miss Edgar's and Miss Cramp's School over the course of two semesters and teach my own lessons on computer art. My aim from the very beginning was to integrate computers, as seamlessly as possible, into the regular routine of the art curriculum and develop teaching strategies for art educators using computers as tools for art making.

The time I spent at ECS was enlightening and beneficial not only to myself but to the resident art teacher as well. Rosemary was at the beginner to intermediate level in her knowledge of the software and she had expressed some frustration when

using technology in conjunction with her art curriculum. She experienced a creative block when imagining ideas for lesson plans utilizing computers and would often find it difficult to find resources that provided ideas for art and computer program planning.

Planning and Teaching Project 1

After speaking to Rosemary and spending some time speaking to the students I developed the projects with several goals in mind:

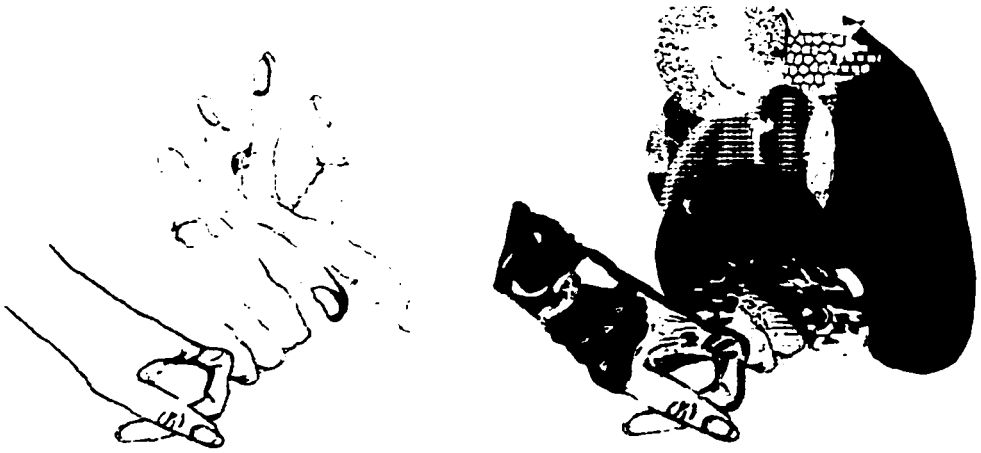
- Developing a model lesson that successfully integrated technology into art teaching by creating projects that use technology as an art making tool rather than a tool for instruction.
- Creating projects that included both technology and traditional media to ease computers into art-making activities.
- As a teacher, I wanted to think like an artist, not like a technician, and consequently have the students do the same.

My first day in the classroom was designed to evaluate the students' attitudes toward computers. I asked them which tools they knew how to use and what tools were unfamiliar, and which ones they favored or disliked using. I wanted to assess their level of technical knowledge, but I also wanted to know how they felt about using computers as a medium for creating art. The responses to these questions would help me assess their abilities and shape their assignment.

Rosemary had been reviewing some basic tools of *Adobe Photoshop* during several classes before my arrival so that the students had some knowledge of simple cut and paste, and paint tools. The tools they found harder to handle were the rubber stamp tool,

the layers palette, and the dodge/burn tools. By assessing their collective strengths and areas for further instruction, I was able to design a lesson that would utilize specific tools and functions.

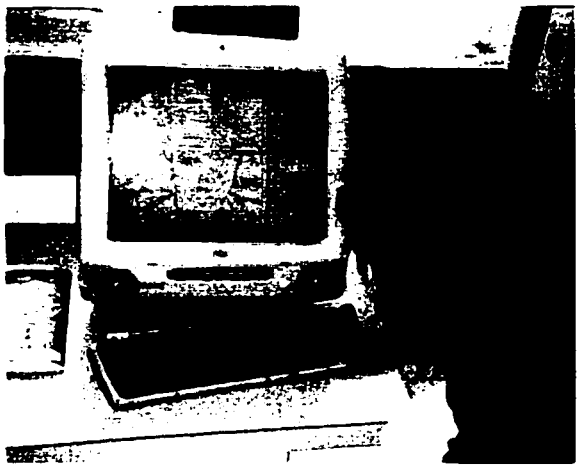
When asked how they would compare the tools they could use in *Adobe Photoshop* to the tools they would use in the art room, the students said that they enjoyed the tactile quality of paint, paper, and sculptural materials but that they appreciated the immediacy of production that the computer could offer.



The first project (*see Contour Drawing and Computer Art Lesson Plan, Appendix 1*) I attempted to enhance the students' creativity with the computer and their knowledge and comprehension of the tools available. Rosemary and I planned that she would teach contour hand drawing during her art room period and I would develop the lesson further by having the students use their drawings as the starting point for their computer project. The students' contour hand drawings were scanned into their individual student files on the school's server. Then the students used the tools in *Adobe Photoshop 4.0* to create a

dynamic (expressing motion or energy) composition using colour, line, filters and other effects.

The theme of the project was "Movement" using dynamic images created through visual illusions. I discussed with the class how they would go about creating a sense of movement in a drawing or a painting. The responses included the uses of colour gradation, line, change of shape, and the duplication of images in one frame.



Almost immediately it became clear that a careful balance of technical instruction and creative development would be essential to the flow of the lesson. For instance, many students were getting confused about the file saving process. I decided to draw a diagram on the white board on the wall to show them where their digital files were going once they were saved. Using boxes and arrows, I carefully explained the difference between saving their work on the school's server versus saving to the desktop of their individual computers. By identifying the "journey" their work would travel, the students were able to better visualize their actions and recall the steps of the saving process for next class.

After the discussion of the theme, students were allowed to freely explore the tools of *Adobe Photoshop*. I decided that this would be the best way to evaluate the skills of each student and plan my procedure for the remaining classes of the semester. I experimented with intermittent mini-lessons on the functions of the colour palette tools, the paintbrush options, and the uses of layers. I would decide which tools to introduce to the entire class

when I would notice several students struggling with a particular tool, or not using the tool to its greatest potential. This way, I found that I could keep the majority of the students on track in their exploration and not completely disturb their creative process. Both the teacher and I worked with individual students to resolve problems or to explore unfamiliar functions of the software. It was clear that at the beginning of the project most of the students were uneasy about being creative and were concerned with using the tools 'correctly'. My response was to encourage each student to experiment with as many versions of their work as possible in order to be uninhibited in their exploration process. I encouraged one student, who was initially very cautious with her work, to allow herself to make mistakes and experiment with as many tools and techniques as possible because she would always be able to start over (i.e. the original scanned drawing). As the weeks passed, this student went on to demonstrate a much more relaxed attitude towards her computer work and she created an image that was far more developed than her first attempts.

Results and Reflections on Project 1

Through this first project I realized that I needed to provide a context for the students' work in relation to the general field of art and art history. At the end of the project I felt that the creative process was missing a motivational element and a specific perspective on the art world in general. Without this background information about traditional artworks, the lessons seemed to lack an element of inspiration. By introducing traditional artwork that was trying to achieve similar goals as the work they were developing on the computer, I suspected that creativity would be heightened. I hoped that links to traditional

media would soften the transition from traditional art making to technology-based art making.

As the lessons progressed and the students became less concentrated on the functions of the tools, they shifted their focus to the creation of images that were unique and that expressed their interpretation of dynamism. The works were becoming more experimental and the students were interpreting "dynamic" in a more conceptual sense rather than literally. Students were moving away from "movement lines" that denoted some action of the hand. Instead, many students used colour, bold shapes, patterns and motifs to create action in their compositions.

Students were not afraid to experiment and make mistakes because they would always have the option to erase or start over. This was a liberating feature for many students but at times, a burden for Rosemary and myself. Some students had trouble focusing on putting together a final image because they were so caught up in the exploratory phase of their creative process and the multitude of tools and options that were at their fingertips. I decided that the next project would address some of these problems and offer solutions to improve the structure and the value of each lesson.

Planning and Teaching Project 2

The following semester, I worked with two new groups of grade six students on a project that more closely linked their computer work to their studio practice. I developed and taught the Self Portrait project (*see Lesson in Appendix 2*) which employed a digital camera, web research and digital imaging. This project was aimed at exposing the

students to historical elements of self-portraits and allowing them to explore a digital image of themselves using *Adobe Photoshop*.

In the first part of the project, I introduced a variety of historical styles and artists (Van Gogh, Rembrandt, Picasso) who used the self-portrait as a form of personal expression. Textbooks and websites were used to present images showcasing a range of periods and techniques. The students were asked to identify the strategies and techniques the artists used to express a specific mood. Discussions about colour, brushstroke, composition, scale, shadow and light, and level of realism, were instrumental in providing a range of technical and formal inspiration for the students' own work.

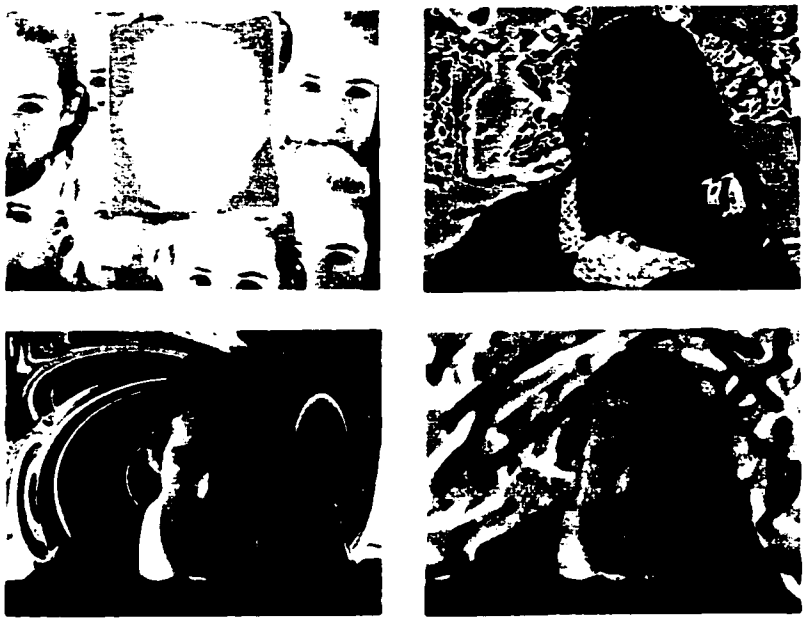
First, each student was photographed by Rosemary (or by a fellow classmate) using a digital camera. Then, Rosemary and I set up the pictures in individually named files on the school's server. The students would have access to their work from any computer in the school and they would be allowed enough storage space on the server to save even the most complex images.

The assignment consisted of the manipulation of one self-portrait photograph, interpreted four different ways, expressing four different moods. The final four images would be assembled into a grid format, drawing inspiration from Andy Warhol's *Marilyn* series.

Following the same procedure as in the first project, I gave mini-lessons on some of the additional palette tools (in addition to the basic ones already introduced by Rosemary, I included the layer palette, the rubber stamp, filters, the options palette, colour manipulation, etc.). The majority of the students picked up these tools very quickly and many took my instructions a step further by discovering new uses and options for a tool

and would often share this information with their classmates. I would walk around the class to spend time with individual students in order to make sure every student was on track. This was a strategy that was very useful to me as an educator because it gave me an opportunity to assess the progress of each student and pick-up any feedback on the way the course was being taught.

Results and Reflections on Project 1



In the previous semester, Rosemary had already familiarized the students with *Adobe Photoshop* software through short tutorials (e.g. "Veggie Face", see page 26, Interview with Rosemary Cyr). These tutorials were very effective in preparing a group of students who were ready to embark on a creatively challenging project.

Some students were working independently and felt at ease with the flow of their work. There were very few students who were not sufficiently motivated to use the software in a creative manner. For these students (one or two), I decided to encourage them to go back and continue looking at art historical references and also at contemporary examples on the Internet and in books. I hoped that this activity would help spark some ideas and

some reflection. For the most part, these students got back to work more motivated and with renewed inspiration.

Like the first project, I noticed that some students tended to explore the tools with little direction and (what often seemed like) vague intentions to produce their final four images. It was proving difficult for some students to focus and work in a product driven manner. The challenge would be to get the students to assess their own work and decide when one image was 'finished' and it was time to move on to the next one. I wondered if by using a tool that allows for quick changes and easy disposal, that this kind of behaviour would be inevitable. Finding a way to structure the development of images without encroaching on creativity became my aim. A simple solution was to advise some of these students to stop creating new files and to go back and reconsider the unfinished images they had already saved to their folders. This approach worked in many cases and seemed to impose limits for students who needed that kind of structure.

By the end of the project the majority of the class was able to produce four - and often many more than four- compositions based on their self-portrait. Some students had produced so much work that they were forced to edit their folder and chose their favorite four to include in the final piece.

I considered the Self Portrait project a success due to constant communication between myself (as an instructor), Rosemary, and the students. The learning process flowed in all directions creating a unique dynamic that fuelled the energy of the teachers and the students.

I found that I was able to discover my own capabilities as a teacher and improve some of my weaknesses. My patience level increased through individual contact with

students at their computer terminals. We often discussed the goals they envisioned in their minds and the many ways to achieve what they wanted to express using the tools at hand. This improved my ability to communicate with each student by discussing the work as it was evolving.

Reflections on Both Projects

I was able to reflect on my own learning throughout these projects because of the unique opportunity to discover new functions and methods of experimentation with the students. I felt that I was teaching and learning at an almost equal rate and that the students were also given opportunities to teach me things that I had not yet uncovered in my own computer art making practice. It was interesting to find that Rosemary also expressed that she was learning as she was teaching, and that this back-and-forth process with her students was unique to the computer-based lessons. No doubt this was because, for Rosemary, the computer was a relatively new medium for making art.

The students were also demonstrating how this tool was conducive to cooperative learning. I was impressed with the enthusiasm I witnessed when one student discovered a new tool and other students rushed over to find out how they could do the same thing. This empowered many students when they had the opportunity to instruct their classmates. I found that, by working with a tool with so many creative possibilities,

students could encounter moments of discovery in art that they may not have experienced since they learned to draw, paint or sculpt in kindergarten.

It was evident that most students were very computer literate. They could easily and quickly learn, and remember, technical information that most adults would take more time to assimilate. The students often discovered tool functions on their own and embarked on a series of experiments that led to unexpected creative outcomes.

The combination of photography, art history, colour theory, contour drawing and computer imaging seemed to have enabled a smoother shift from traditional materials to digital media. By treating the computer as 'just another tool', students were comfortable using it for art making because logical extensions were made from artwork originated in the studio class.

At the beginning of my involvement at ECS, Rosemary had expressed a need for project ideas in the area of computer art. These two projects attempted learning activities that could utilize her expertise with traditional media to inspire her computer art program planning. Her response to my ideas was very positive. The students seemed to enjoy these periods and we both observed how student work was imaginative and creative.

Arguments may be made for both the inclusion and exclusion of computers in the art room, but it is clear that many things are to be learned about students' artistic development as well as the educator's teaching development when computers are involved. My interview with Rosemary at the end of the final project was very useful in assessing the value of computers in the art class.

Interview with Rosemary Cyr

After my last class at ECS I spoke with Rosemary Cyr in order to discuss her views on my projects, her experiences teaching technology in an art class, and her vision of the future of computer technology used as a tool for creative art making in schools.

On the value and position of computer technology in the art curriculum...

A: When you first started with technology how did you envision it fitting in with everything else?

R: I wondered how it would fit in, whether it would stand quite apart from what I teach in my curriculum or if it was going to compliment it and work with it. I questioned whether certain things that were in my curriculum before could be taught through a technological approach. For example the "Gradient" tool in Adobe Photoshop- could it help in an exercise that I taught in the studio? This is a pencil shading exercise where students use very abstract, or non-objective forms/shapes developed into forms through shading. My conclusion is that they really need to work with a pencil in that respect...

A: They need to work with a pencil to actually learn the technique, because maybe the computer does a lot of the work for them?

R: Perhaps the limitations of the computer are no longer what they were before but perhaps the gradient tool might not be sensitive enough to the intricacies of form/shape that the student might develop. An amorphous form may need a complex gradation- it varies in a way that the computer might not cope with- and in that respect the computer could not teach gradients. I don't know if students would even understand why a form

was shaded in a certain way if the computer were able to "wack" the shading onto the shape for them. That's something I'm not fully certain about.

Its place in the curriculum... In the senior grades I see Adobe Photoshop assisting with composition particularly- working with layer masks, integrating various images created by the students or photographs to look at how compositions or elements can be linked. I thought that was quite an exciting application and I am working on how to use it in the same way that I might use collage in a studio. I see collage as a great way to teach composition, unity, and balance.

A: Did you find that the computer could give you the transparency to play with the images in a new way?

R: Yes. And the layer mask allows you to put back what you might have taken away because you want to play with something and move it. So I see a great value in that. As a place in the curriculum, I see that it should take perhaps a small part, or time-wise, perhaps no more than a fifth or sixth of the curriculum in the senior school so that the students actually learn how to work with this technological tool since they themselves find that the hands-on approach is best in art. I would agree with them, and I have been torn about that; I have talked with Art teachers from other schools who refuse to bring computers into their curriculum, believing that students should learn to use them later. However, I think that our students are lucky that they leave with some exposure to the computer as an art-making tool.

A: Do you find that there is a specific studio art that benefits from the use of the computer as a learning and developing tool?

R: The computer can maybe help with reinforcement of concepts? For example, grade five students draw from observation from each other on black paper using a white pencil to create silhouette figures. Then they cut these out afterwards and rearrange them in a picture space, concentrating on the negative spaces- trying to make beautiful negative spaces- to see the importance of seeing both the negative and positive shapes in composition. So then we go to the computer where they have the ability to move, cut and paste shapes. They use the lasso selection tool to draw their own figures from a photograph found in the Adobe Photoshop program files). They bring each figure onto a separate layer so that they can move them around, create a background of their own using other tools. So again they get a chance to play with space in a composition.

A: So this is an instance where the computer doesn't necessarily do a better job, but it allows students to use technology to take the project to a different level.

R: Yes, and it gives me a chance to show them how layers are important so that they can move separate parts of the picture around and create a background layer. This way they can learn about some tools, knowing what it is they are to do with the tools beforehand.

A: That they have a purpose before learning the tools?

R: Yes. But there is another question in my mind: What's the most effective order when introducing tools, content or technique?

On student learning styles with the computer...

A: What comes first, the chicken or the egg?

R: Yes, exactly, and it's interesting, one year I handed out a survey to Grade 6 students at the end of the course. I had taught tools with specific exercises - like the "Veggie Face" where they used selection tools to take pieces of vegetables or fruit from a photo to put together a face. That was very, very structured. Afterwards, I said, "OK, you've learned some tools, now play." My questionnaire afterwards asked what learning methods they liked best. The class was split almost right down the middle, half saying "just the way you did it- you taught us some tools and then you let us play." The other half answered that I should let them play the whole time and let them learn the tools as they go, proving that they have different learning styles; some want to just be let loose and others want structure.

A: Those different styles could apply to the way they learn everything or is it specific to computer learning?

R: I don't know.

A: Do you think that computers have become instrumental in the students' artistic development?

R: Instrumental to their learning in art... I don't think so. I've thought perhaps that it would be best to teach Layers and photomontage using their own artwork rather than opening up photographs provided because that is like using a colouring book: the images are already there. The best way to get around that, of course, is to have them scan their own artwork to use. That was what was so nice about your portrait project. At least they're working with an image of themselves. It would be nice to have their artwork

already scanned but you can't always start the year that way. So you rely on the photographs that are there and create something really cool with somebody else's photography. So that's not ideal. They're only learning a technique at that point. Some students have said that they're not too keen on the computer because it makes certain things too easy.

A: Is that a matter of not knowing all the tools and all the options they have or are they used to just learning how to use materials through a process.

R: If they're just using filters then they have not really accomplished much. The kids themselves recognize that. If those gimmicks are accompanied with the knowledge of enough other tools and the requirement of other processes, well then they will get past that.

On technical problems...

A: Are there any problems you've had with technology, something that you really do not like or find "counter-artistic"?

R: No. My greatest problem has been with the computers not acting the way they're supposed to. So there are technical problems with the computers. Or there are students who are not up to the same level of knowing how to use the computer as the others, so you cannot go forward with those who are ready because your attention is given to those who are missing the background or skills (with saving a file, for example).

On professional development...

R: To learn how to integrate technology into art I would have to go back and take more classes. I have had the opportunity to take a course in Adobe Photoshop and it would be nice to go back and take a computer course that is more of a Computer Art course.

A: Something that is geared specifically to artists and to be able to do more creative work?

R: Yes. If there were courses offered at Concordia, perhaps in integrating art curriculum into technology and vice versa, I would want to explore that.

A: What do you think could be done to help you as a teacher, teach technology, learn technology yourself? Have you found the best way to acquire knowledge in the area of computers and art?

R: I've found your being here very helpful. I was thrilled with that, because I felt that was what I needed- somebody who is really new to teaching, at the beginning of a career, and had the computer as part of your learning tools while you were learning about art. The computer was part of your hands-on. Sometimes it is difficult to make connections between what I've been doing for 25 years and computer applications for that. Your input has been very useful and I'd love to have you keep on coming in. That's been very, very useful because, in fact, in some ways I have found confirmation for some of the ideas I've had, and had others refreshed or, in fact, fit in new ideas. It's about making the links between what we do in the studio and how the computer can enhance that and reinforce that.

On making links between computers and traditional art making practices...

A: Have you found many areas where that can happen or has it been limited?

R: Well, I am grappling with them bit by bit. One of the things that has helped me a lot lately is to take an artist like Chagall or Van Gogh, have the students study about that artist and try to work in the spirit of the artist on the computer and that might feed in some ideas. In looking for an end objective and ideas, I was helped this year by using Chagall's fantasies, for example, and Van Gogh's bedroom. Kids like their own space. Maybe they paint something on each layer and shuffle them around. With Chagall and all of his floating, dream-like images, again the layers allow them to play with space. (*showing some student work*) The student has become enthusiastic about what Chagall is doing in the process. I have these wonderful *Scholastic Art* magazines. The students read a very short and easy article on an artist and his style and then they see what other students have done having studied the artist, as these magazines always have student work at the end. My students can look at how different artists use pattern and different angles of the face. This is something I would have liked to do with the camera, taking pictures of them at many different angles- thinking of (the artist) David Hockney where he assembles many photographs taken from the same subject. That means a lot of photographic involvement, and as we are going to have 2 new digital cameras in the lab next year that will be an interesting possibility.

A: Now that I won't be here where do you think you'll go with this course?

R: I'm going to use your portrait project!

I hope to scan more of their artwork because they don't have work to scan at the beginning of the year. And if we do three-dimensional work they still may not have a portfolio of drawings.

A: Well the contour hand drawing project that we did last year can be done pretty quickly.

R: Yes I would repeat that one too. I guess one problem we run into is taking the time to do all the scanning. I am thinking of getting a couple more scanners for the art room- I think it would be worth our while- presently, we can have only two students scanning during a whole period, especially if they want three of their drawings. It is very slow, and that is a technical glitch as far as I'm concerned.

On benefits of technology in the development of student creativity ...

A: What do you think your students get out of using computer technology?

R: I'm hoping it, for one thing, opens up their understanding of the possibilities in the art world- because in our school students are pressured into the maths and sciences- our best artists are usually strong in math and sciences. I am hoping that by being exposed to the digital imaging that they will become excited about the possibility of a career in art- that it could actually pay the bills.

Our graduating class is only about 6 students. They often go on to study the liberal arts. One of six will go on to fine arts. One of my award winners is going into commerce at Concordia!

You ask me what they get out of it (using computers), right?

A: Maybe something they don't get out of other art activities?

R: I think that the student that does not draw well, can find the possibility for creating something very interesting in another way other than by hand.

A: Does it affect their confidence level, then?

R: Yes, it probably does. And some of the girls get very, very excited about it. We don't teach it after grade six. One of my students through grade 7 and 8 kept asking if she could do more- of course the answer is yes - but she kept on wanting to get back to it. That was only one out of a large group, but some are quite involved with digital art, and take a lot from it and see great possibilities and will probably end up working with it. I don't know if they take any more than the knowledge that it's just another tool. I hope that maybe someday if they have to bring imagery into other projects, that they are going to feel confident in their ability to do so. I sometimes wonder if some of the effects that can be achieved will then feed into what they do with traditional materials as well. I'm not sure.

A: I guess there's no way of measuring unless they suddenly improve in other areas.

R: I haven't been able to detect that.

A: That leads me to my next question-basically the same question: Do computers help them in other areas in art or vice-versa?

R: Well, it's hard to say. It might be interesting to have a before and after studio class on something like the figure, or a positive/negative exercise to see if they do any better after playing around on the computer, but I don't do that because I think I'd be flogging a dead horse by then. It would just be dragging something out too long and I'm just happy when I have a project going on in grade 8 when they say: "Oh, is that a bit like what we did in

grade 5 when you were teaching us positive/negative?" That makes my day. I'm not able to measure whether a computer art project has helped and I think that by keeping that in mind, I will try to keep on coming up with tutorials or exercises on the computer that might feed into the curriculum in that way.

A: Do you find a different level of creativity in a student when you compare their work in the studio and their work in the computer lab?

R: I can't say that I've seen a student who has suddenly found great reward and success on the computer when they were discouraged in the studio.

A: Are the same students who are the strongest in the studio also strongest in the computer lab?

R: I think so. I think the two are related. Just as I said before, I find that the students who are really good in math and science are the best artists. I find there is a very strong correlation.

A: They're good technically or are they also very interested in the creative aspect of making art?

R: I think they have been very interested because they have had such success with it.

A: But are they successful technically or are they just very creative?

R: Maybe technically. I hadn't thought about it. I guess the ones that have been the strongest in a creative sense have stuck with art. They haven't gone over to the sciences. I have seen students who went to science in college, and two or three years into their course, switched over to art. It has happened a few times.

I think that since I see students once in a nine day cycle for computer art, I don't get to know them well enough on the computer to be able to compare.

On configuring the computer lab space for optimal learning...

A: Did you like the set up that they used to have better- in horizontal rows facing the front of the classroom?

R: This (circular pods with 4 computers each) is somewhat improved but it's not good enough yet. It will be better next year when the new computers come in and they won't be so high- they'll be much smaller.

A: Why do you like the circular set up better than the rows?

R: Actually I'm not crazy about the circular pods. I think what might be nice is having the students around the edge of the room. The room is never going to be set up that way. I think it would be nice if the teacher could have a central position in the room. Presently when you're teaching, you have students having to turn around to face you. It's very easy in this configuration for them to be so absorbed by the computer that it's hard to get their attention away from it to you.

A: Do you think that it might be useful to have a digital media projector?

R: Yes, absolutely. And I was very frustrated all year by trying to have it set up and finding out that it might be in another part of the school. It has to be moved and hooked up every time; it was not there in place to just go in and just have it. I found it enormously frustrating that I have not gained much experience using it. I thought that it would be so much better if I could give a quick demo for everybody to see at the same time. If there was anything exciting and new I would want to show the class, but I had to work at one computer with a small group of the class gathered around. Certainly with a class size of 24 it is just not practical.

On the output of final work...

A: How about assigning a final project. Do you find that the final result of the work should be printed or should it be saved on the computer in a file? Do students demand to have a printed copy, or are they just as happy to see their work on the screen as a digital file?

R: We didn't have enough printers to make printing practical, and besides, it would be very costly if students had a free hand at sending things to print every time they fancied doing so. They got used to the idea that their work was to a certain extent experimental and exploratory, and that they would eventually arrive at something special enough to warrant printing. I think that they would all like to have their work printed out. In the computer lab there was no colour printer for a while- it wasn't functioning- prints had to be sent down to the library. For the most part printing has been put on the back burner and they have come to accept that.

A: Does it affect their goals in terms of a finished product?

R: I don't think I've come to enough finished products and gotten to know the kids well enough to be able to answer that question. I don't think so. I think they can get wrapped up in the goals and not be concentrating if they're going to have something in their hand later on. It may be that if they are not walking out of that room with a piece of artwork like they do in the studio that they may not take it as seriously. It's a good question.

A: Motivation. Do you think it's very important to have art history elements as motivation so that they don't get carried away with the technology –and all its effects- and to be more creative and original with their work?

R: That's something I'm still struggling with. I think they need to have an end goal, an assignment, so that it will keep them going because sometimes they'll play for a while and think they've exhausted all the possibilities. But then the tutorial has to be set up in such a way that they will have to explore different tools. For example, with the Chagall assignment, the tutorial went so far as to show them how to get their own painted images on different layers. They need to do something with each of those layers to make the final more interesting and enriched with texture or whatever. So there have to be enough stages and processes required, because I think that if they don't have that structure it may be that they found something really cool in the filters again and that's it: their end product.

On teaching strategies...

A: Are there any specific teaching strategies that you found work well that you consciously use with technology, perhaps demonstrating and allowing them to play? Is there some kind of order that you find works better than others?

R: I'm not sure what works best yet. I've had very structured lessons, attempting to show a couple of tools and saying, "Now play with the filters and see what you can do to change the appearance." Right now what's fresh in my mind is the work I have done with the grade 4 and 5- it's definitely at the experimental stage. The problem there is that I see them once during a nine day cycle, which works out to once every two weeks. And

there are 24 of them; the classes are too big as far as I am concerned and they have to share computers. This is why I'm a bit vague on some of the stuff. I don't know. I really don't know what has worked best. I have found that the group is too large to get to know. When there are two to a computer I don't know who's in control all the time- who's following, who's leading. Strategies: At that grade I would have to have them standing up and turn and look at me so that their hands would not be on the mouse. In our set up it is easy for a child to disappear behind a monitor and I cannot see who I am talking to or who is listening.

A: How about when you're teaching the tools. Do you teach them slowly as you go along or do you try and give them an overview of everything at the beginning of a project? What was your strategy?

R: I tried to teach a few at a time. I would lose them if I would try and throw out too many at a time. I try to give a hand-out - which I type up and distribute - to go through a number of tools and explain what will be learned in a project. Some of the tutorials will have a list- *(for example)* "this is what you will learn", and then the blow-by-blow description of how to go about it.

A: Do you find that they went in and explored certain tools on their own?

R: The whole disadvantage to this approach is that they are waiting to be told instead of becoming more exploratory. So I'm still searching for how to balance the lesson.

A: So you do find that some of them wait and only follow your instructions.

R: Some will wait. And that's why I think the projects with the hand and the portrait were very good because you gave them an idea of what their goal was but the way you

described their goal made them realize that they should be trying a few different things to enliven the drawing- make it more dynamic.

A: Do you find that they worked collaboratively with each other to learn things, more so than in the traditional studio? Do they help each other, share techniques?

R: I think so. I've seen students pop up from the computer when they've heard a question and they want to run over and show others because they're very proud that they know how to do it. It's collaborative in that way. When they're working in pairs, I know that they're working together physically but I don't know who is actually doing the work. In a class of twenty-four students, you throw in some technical glitches, some students who don't know some of the basic things you assume they already know, and your attention is focused on helping to solve those problems. I'm not finding out how good they are with teaching one another but I have to assume that they are helping. Some students who are very quiet and passive are going to lose out. You almost have to say: "Your ten minutes controlling the mouse are up, you have to switch". However, I don't remember to do that because I get so distracted by so many people needing attention. That's why I don't think it works with a class of twenty-four and half that number of computers.

This interview with Rosemary was a valuable opportunity to review the impact of my projects at Miss Edgar's and Miss Cramp's School. Our discussion was interesting because we were able to look back and evaluate the projects and assess their placement within the visual art curriculum.

Judging from the resulting work from the lessons, it is evident that the presence of digital technology in the art classroom is a worthy experience for both the educator and the students. It would be interesting to continue with this investigation and document a comparison between student behaviour in the art class versus the computer lab.

Conclusion

Over the course of my research, I have developed and discovered several strategies for the integration of technology-based art in the visual art curriculum. The most significant ones are highlighted here. After concluding this study, some questions are revealed that require further exploration.

Using a Student-Familiar Approach To Making Art and Making Connections To Traditional Art Making Practices

Through my work with the students and the teacher at ECS, I found that an effective method for using technology as an art-making tool was to integrate the computer's use into a lesson involving traditional media and art study. As I uncovered in my review of the literature, many art educators are uncomfortable using technology in their teaching practice because they are not experts with the tools. This project and my interview with Rosemary demonstrated how teachers and students do not need to be fluent in their knowledge of the software when embarking in projects such as these. It is possible to slowly ease into the tools that are available and develop technical skill alongside creative development. At times, it seems as though this kind of organic development is best and most suitable to the medium. **By dividing technical lessons into stages that are woven into the process of creating artwork, the students gain opportunities to work through their own creative practice, and it also allows the educator to feel less overwhelmed by the technology.**

Structuring the lesson

A factor in the success of the last project was the structure of the lessons. By beginning the project with a lesson on art historical examples of the self-portrait, students understood how they would tackle their own work before thinking about how to use the technology to do so. I presented motivation in the form of art historical examples; I discussed conceptual as well as technical elements of artworks with the students; and I gave direction to students who asked for it, or who needed assistance. Having been inspired by the work of Dali and Van Gogh, students could already form some creative goals before being limited or controlled by what was possible with the software.

By developing and teaching these projects I have realized that my strategy of structuring a technology-based art lesson in the same way I would organize a traditional art lesson, was a reasonable idea. Through these projects, students learned to view computers as tools not only for play, but also offering the potential for the creation of original artworks. It was clear that some structure was needed to balance the amount of 'play' (i.e. experimentation and exploration) with 'serious work' (i.e. achieving a goal or final product). At times students had to be reminded that they would have to make some final decisions and complete a piece. This proved to be the biggest challenge: **students assessing when they were 'finished'.** Computers facilitate limitless options and an infinite amount of outcomes that for a few students becomes overwhelming, while for most others it is liberating and exciting. The difference is visible in the works themselves. Some student work is playful and spontaneous while others are obviously controlled and deliberate. Students who often demonstrate short attention spans in the art studio have been known to work more effectively with computers because it offers them instant

results and a chance to move quickly from one work to the next. In this sense, computer technology allows students to easily dispose of work and edit their ideas at a rate far greater than if they were using traditional media. I found that this allowed many students a certain liberty to experiment freely and not worry about wasting materials. As much as this is an advantage, it is also a disadvantage. Students have a tendency to lose sight of their aim: the completion of a final image. As I experienced with these two projects, **it became my responsibility as a teacher to guide these students and rein in their explorations, so that a finished work could be achieved within a reasonable amount of time.**

Promoting and Developing Creative Activity

In using digital technology to make art, students get used to the fact that computers are not only useful for practical functions (such as Internet research or typing out school work) or for entertainment (such as playing computer games). Students and teachers discover how everyday applications and skills learned from computers can contribute to the production of original, creative technology-based art.

By the end of the projects I concluded that it would be difficult for an educator to inspire creative activity through the technology itself. Students would have to be motivated independently of the computer to then, in turn, use the technological tools in an inspired manner. In order to work creatively, the students would have to channel their personal experiences, aesthetic preferences and exploration in relation to their level of technical proficiency.

Through both of the projects it became evident that students are living in the technological world and, for the most part, they have never known a different learning or living environment. It was therefore not up to me to convince students that the computer was a good tool for making art, but it was my challenge to produce programming that would pique their interest.

The key to promoting creative activity in this medium is most definitely in the hands of the educator. An exciting and engaging lesson is the best vehicle for promoting successful student artwork.

In the literature, many scholars' feared that the computer's tools would take over and become the "thinker" while the user's ideas and creativity would become invisible. In my experience with this group of students, I do not believe that technology over-powers the user. The computer's many tools did entice students to explore with few technical limitations and really allowed them to make their own aesthetic and conceptual decisions. I think that this project demonstrates just how students are no more controlled to create a specific mark on their computer screen than they are to mark a canvas with a paintbrush.

As a result of my study, I propose that educators accept computers as permanent fixtures in their classrooms without delegating them to a dark corner at the back of the room. By isolating the computer from other media we take away its greatest potential for both students and teachers. **The harmonious use of technology and traditional media is the best way to foster both creativity and open attitudes toward the computer in the art room.**

The Classroom Environment

As I discovered throughout these projects and in my discussions with Rosemary, the physical learning environment also proved important to the success of the lessons. The way the computers were set-up in the classroom was a key factor in the overall communication between students and teacher. I was lucky enough to be teaching over two semesters because during that time the computer lab tables were rearranged from rows to circular pods and this allowed me to make some comparisons. As Rosemary mentions in our interview, the main problem when conducting a lesson is to capture the students' attention away from the seductive nature of the computer screen in front of them. Rosemary and I found that in order to have their complete attention, students would either have to turn off their monitors or in extreme cases, they would have to stand up at their stations to prevent them from playing with the computer while the teacher spoke. I did not find many differences in attention levels between these two configurations. An advantage that the circular pods had over the horizontal rows was that students would not get distracted by their neighbour's work because they could not see the screen next to them.

If I were to do the project again I would definitely specify a digital media projector. The visual explanation that the projected image would provide would attract the students' attention away from their screens while they could more easily visualize the instructor's explanations.

The Presence of a Visiting Educator or Computer Artist

As she mentions in our interview, Rosemary found my presence in her classroom very key to her development of future computer art lessons. My visits allowed her to experience another person's point of view and teaching style in the area of computers and art. Perhaps this strategy is essential for teachers who have been working without computers for most of their careers, only to be suddenly faced with a new medium for teaching and making art. By bringing in an educator who was more experienced with computer art, Rosemary seemed to feel less pressure to reinvent the curriculum she had developed over the years. As a result, she was inspired by some new ideas and approaches to art making with technology.

Ideally, all art teachers would have access to student teachers or visiting computer artists who could facilitate the integration of technology into the art curriculum. This would provide new perspectives for students and teachers on the definition of art and art making in the twenty-first century.

Questions for Further Study

It has become evident by the end of my study that more research on this subject could answer the broader question: How are technological tools best used by the art educator to promote creative activity? As more teachers begin to introduce computers to their students as a tool for art making, more valuable strategies will emerge to be shared with the art education community. My hope is that, as new art teachers enter the classroom, we will begin to see more optimistic outlooks on the creative possibilities offered by technological media.

Many more questions are yet to be answered in the area of technology-based art education: How does creative work differ in the traditional art studio compared to the computer lab? Are some students more confident using technological tools rather than traditional media? Rosemary and I have discussed these very issues and have concluded that these would be interesting areas for further study. Rosemary had observed that students who were strong in mathematics and science were more likely to be successful with their artwork. Further exploration of this hypothesis could be part of a larger research project focusing on student behaviours with art and technology. More research and comparisons between student behaviour in the computer lab and the art room could better explain how students respond to technology as a tool for art making.

Student Work, 2000
Contour Drawing and Computer Art lesson

Appendix 1

Contour Drawing and Computer Art

Level: Grade Six
Computer Literacy: Beginner/Intermediate Level, Adobe Photoshop
Duration: 3 to 4 one hour classes or equivalent

Activity: Drawing the contours of one's hand in several positions on a single page. Developing the drawing further by using digital technology to create a dynamic 2D image.

Goal/s:

- Explore ways of combining technology and traditional studio art lessons.
- Learning how to use the tools of the available software (*Adobe Photoshop, Painter*, etc.) to develop a final artwork.
- Provide links between drawing skills and computer skills.

Objective/s:

- Learning how to draw the contours of the hand from a variety of perspectives and in various positions.
- Learning how to use a scanner and make adjustments to the quality of the image using Adobe Photoshop.
- Explore the notion of movement and identify the meaning of a "dynamic" composition.
- Discuss elements and techniques that express movement in a picture.
- Improving skills and knowledge of the software to become comfortable with computers as a tool for creative expression.
- Sharing ideas and discoveries with fellow classmates.

Materials:

- Pencils and erasers
- 8.5" x 14" white paper (2-3/student)

- Paper Bags (for each student)- Medium to large size (to fit paper and hand of student)- ends cut out
- Scanner
- Computers for each student (if possible) with Adobe Photoshop
- Photoshop help book, for assistance with the software (e.g. Weinmann and Lourekas, Photoshop for Windows and Macintosh: a Visual Quickstart Guide) One per class for reference.
- Colour printer
- Mount boards or thick construction paper for presenting final print-outs (one for each student)
- Glue sticks

Implementation:

Contour Drawing Lesson (one 60-80 min. class)

- Explain the meaning of contour drawing by utilizing questioning techniques: What is the contour of an object? Ask students to demonstrate its meaning by delineating the contour of their hand with the index finger of the other hand.
- Begin with simple looking and drawing exercises of a hand. Encourage students to really look at each line of their hand in one position. Students should spend more time looking at their hand than at their paper. To ensure that the students are looking at their model hand only, provide paper bags that will be used to envelop their paper, pencil and drawing hand. By drawing inside a bag they cannot view the results of their work until they are finished. This technique allows the students to focus on their model hand and really study its shape and curves.
- Discuss elements of scale, perspective and proportions (envisioning the space the drawing will fill, drawing only what is seen and not what is known to be there, etc.).
- The exercise should continue using a new sheet of paper (without the paper bag). After one hand contour is drawn, students should change the positioning of their model hand and create another contour drawing on the same paper. After 2-3 position changes, the students should have individually unique compositions of several hand drawings on one single paper.

Computer Art Lessons (two to three 60-80 min. classes)

- The drawings will be scanned into the computer- either by the students themselves or by the teacher (depending on time constraints). This task may take a whole period of class time.
  Using the drawings that have been saved to the school's server:
- The project begins with an explanation and discussion of the term "dynamic". The student will be engaged in a question and answer period with the teacher that will uncover the elements of a dynamic image.
  What stylistic elements create movement? --> the use of lines to denote direction, the use of light to dark and vise-versa, objects becoming bigger or

smaller in relation to surrounding elements, the use of active/bright colours, the use of patterns, etc.

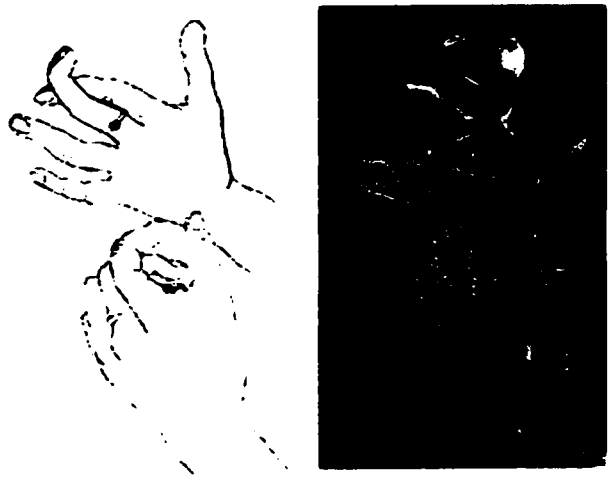
- Using the tools of the software, the students will apply their new knowledge to their drawing compositions to create hands that express some kind of visual dynamism.
- The students will be taught basic tools in *Adobe Photoshop* allowing them to begin the assignment. List of tools needed to begin: Paintbrush, Paint Bucket (+Options), Selection tools (Marquee, Magic Wand, Lasso, +Options for each).
- Allow the students to experiment with these tools for most of the class time. Close to the end of the class introduce the Layers and History Palettes. This information may take longer to explain because they are often tools that are completely unfamiliar to students. To explain Layers it may be helpful to use visual aids in the classroom to demonstrate the concept spatially.
- Students should receive a handout that accompanies a clear explanation of Saving procedures.

Next Lesson(s)

- Students will be working on their compositions and will require the teacher(s) to circulate through the room to help with problems or respond to questions.
- During the lesson (and the following lesson- if needed), other tools may be introduced to expand the students' knowledge of the software and allow them to develop their ideas even further. Tools to introduce that are appropriate for this project: Filters, Rubber stamp (to create patterns).
- The students may save several different versions they have created and chose one for printing.

Final result:

Each student will mount their printed work on a black/gray mount board or black construction paper to prepare for display in the school or at home.



Appendix 2

Self Portrait

Level: Grade Six
Computer Literacy: Intermediate Level, Adobe Photoshop
Duration: 3 to 4 one hour classes or equivalent

Activity: Using digital photographs, students utilize the tools of Adobe Photoshop to express mood in four self portrait compositions.

Goal/s:

- Explore ways of interpreting one's own image using various tools of manipulation.
- Learning how to use the tools of the available software (*Adobe Photoshop, Painter*, etc.) to work creatively using a single source image.

Objective/s:

- Developing a theme and following it through until the end of the project.
- Looking at art historical examples of the "self portrait" and discussing various interpretations.
- Understanding how "mood" is expressed through various artistic techniques.
- Creating a short series of self-portraits that can achieve the lesson goals individually or as a group.
- Becoming familiar and comfortable with the tools of the software and discovering their possibilities.
- Developing a sense of composition throughout the project.

Materials:

- Art history text book(s)
- Photoshop help book, for assistance with the software (e.g. Weinmann and Lourekas, Photoshop for Windows and Macintosh: a Visual Quickstart Guide) One per class for reference.
- Digital camera
- Computers for each student (if possible) with Internet access
- Some Websites:
  http://artworld.co.kr/artist/picasso/self-portraits/self.htm

http://www.rdc.puc-rio.br/wm/paint/auth/rembrandt/self/

http://vangoghgallery.com/painting/main_se.htm

- Color printer
- Mount boards for presenting final print-outs (for each student)
- Glue sticks

Implementation:

1st class

15-20 mins.

- Present (books, websites) and discuss works by artists who have painted or drawn self-portraits.
- Point out how mood is created using variations of technique, colour range and composition.
- Some artists to present: Rembrandt, Van Gogh, Mary Cassatt, Salvador Dali (many interesting styles), etc...
- Show examples of portraits (not only self-portraits) that exemplify the many interpretations of portraiture. Artists: Manet, Andy Warhol, Chuck Close, etc...

- Allow time for questions.

How did the artists use certain techniques to express a certain mood?

How was color used?

How were brushstrokes manipulated in some cases to define the mood?

How does the setting affect the portrait?

Does the style of the work influence the mood?

40 mins.

- Using a digital camera, take pictures of each student- from the shoulders upwards- in front of a neutral background.
- Alternately, the students could take turns taking pictures of each other.
- Encourage the students to think about a series of four self-portraits that they will begin in the next class using the ONE picture that was taken. Each portrait will have to represent a different mood. *Some time will have to be taken by the teacher or a few of the students to load the digital pictures onto the computer before the next class.

2nd class

5-10 mins.

Using the photos that have been loaded onto the server:

- Remind students of the purpose of the project: creating self-portraits (4 interpretations). The four portraits will end up in a grid format (like Andy Warhol's Marilyn series) once the final images have been printed.
- Briefly review the expression of mood in each version. Do they want to express happiness, sadness, boredom, craziness, or confusion? Is the setting outdoors or indoors, day or night?

15 mins.

- An overview of the software's tools.
- Encourage the use of tools that manipulate the image beyond the adjustment of colour. For example: In addition to the paint tools (airbrush, paintbrush, paint can), students should utilize the dodge and burn tools, filters, rubber stamp, cut and paste and the selection tools (marquee, lasso, magic wand).
- The Options window allows for further manipulations of each tool.

25 mins.

- The remaining time will allow the students to begin the project.
- Using Layers: It may be most efficient to work on the four versions using layers in order to make creative choices freely without compromising any previous work. (i.e. In addition: The students may copy the original photo onto 3 separate layers and work on each layer individually. This allows the student to flip between versions quickly by simply clicking the eye icon, instead of opening and closing multiple windows.)
- Encourage the students to view all their images side by side (by opening all the files at once) to contemplate the final work as a cohesive composition of the four portraits.

3rd and (if needed) 4th class

- During the course of the class introduce additional options that are available for each tool that may allow for more experimentation. (e.g.: opacity of colour, feathering of edges, frequency for selection tools, etc...)

Final result:

Each student will complete four versions of their self-portrait, each of which will be printed and mounted in a grid format. In order to achieve a nice size print it is advisable to print 2 images (one above the other) on each of 2 pages.

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