Technology in the Elementary Art Program

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Technology in the Elementary Art Program

Abstract
The advancement of technology use in today's schools has provided teachers with new teaching resources. This applies to all teachers in every curricular area at every grade level. One area of instruction in which technology has had an overwhelming effect is the visual arts. Technology has created a new art form with which artists young and old may express themselves visually. Technology has also provided art educators with a unique teaching tool to promote visual learning.

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Technology in the Elementary Art Program

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by
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CHAPTER ONE

Introduction

The advancement of technology use in today's schools has provided teachers with new teaching resources. This applies to all teachers in every curricular area at every grade level. One area of instruction in which technology has had an overwhelming effect is the visual arts. Technology has created a new art form with which artists young and old may express themselves visually. Technology has also provided art educators with a unique teaching tool to promote visual learning. Chia and Duthie (1994) stated:

Computers are making unprecedented aesthetic experiences possible and revolutionizing the way art is conceived, perceived, created and taught. The profound impact of digital technology on the art of the last 20 years and what it portends for the future is only beginning to be appreciated. (p. 197)

Despite the advancements computer technology has created in the visual world its use has not gone without criticism. Many opponents argue that visual images created with the aid of computers are not art since they have been produced by the machine and not the human hand. The art skills requiring dexterity and delicacy of touch that are present with more traditional materials such as clay and paint are absent in computer graphics. This lack of sensory involvement with the production process can be considered a limitation of technology as a medium in the visual arts. Robert Mueller, (cited in Greh, 1990) states: “We should not be carried away by the dazzling images produced with computers. There is more to art than the fun of putting together images and being amazed by the serendipitous
Many of the cries against computer technology and its mechanical production of images are similar to those made against the camera and photography as an art form at the end of the nineteenth century. Photography like computers began as a medium of mimicry of painting before developing into its own distinctive place in the art world (Loveless, 1997).

Just as there are critics of the computer as an art medium there are also many supporters. Melvin Pruitt, (cited in Greh, 1990) observes: “A computer cannot create art by itself anymore than a paintbrush can produce the Mona Lisa. Computer art like all art is the product of the human mind” (p. 4). A statement by artist Pablo Picasso (cited in Loveless, 1997), can also be applied to technology as an art medium, “Art does not evolve by itself; the ideas of people change and with them their mode of expression” (p. 102). Technology has in fact become a new mode of visual expression. Ten years ago most commercial artists worked at drafting tables, today these tables have been replaced by computers. Virtually all commercial art, illustration, production design, industrial design advertising, publishing and animation is done on a computer (Matthews, 1997).

In the technological age in which we live, children are coming to school with a great acceptance and understanding of technology usage. During their daily lives they are bombarded with digital images from all directions whether they are in the form of video games, television, or computers. Given the frequency with which technology exists in daily life and the rapid rate of technological advances its use can no longer be set apart or considered peripheral to the content of an art curriculum.

New technologies offer endless possibilities for enriching the teaching of art. However, despite the ease with which technology may be used to create art its simple presence is not sufficient for learning to occur within an educational
Art educators need to work to develop a sound understanding of the means necessary to successfully use and integrate technology into their programs. They must not mistakenly use the technology, as opponents would argue, to entertain or amaze.

In an active classroom environment, with limited time and resources this can be a difficult task to accomplish. The visual arts curriculum should reflect the knowledge skills, and concepts required in learning the subject. Technology can support the curriculum in numerous ways. It does not replace other mediums or techniques but offers the opportunity to represent visual meanings in new ways.

The introduction of computer technology into an art curriculum can begin at an early age while students are in the beginning stages of their visual development. While older children may be slightly inhibited or unwilling to work either from fear of not being able to draw in a realistic manner or from fear of the technology itself, primary age students generally approach their work with great enthusiasm and willingness to explore regardless of mistakes they may make. Elementary art instructors are integrating computer based art work into their programs whenever possible in order to lay the foundation for future course work and to provide students with a unique visual medium. The successful integration of computer technology into elementary art programs is accomplished by instructing students on how the computer technology works, providing classes time to produce computer based art work, and by making constant links to curricular content. However, there are many technical aspects of computer usage which art instructors should be familiar with when working with young children.

Research Question

What are the applications and strategies which should be considered when using computer technology in elementary art programs?
Terms

Art Elements: Visual arts components such as line, texture, color, form, value, and space.

Art Materials: Resources used in the creation and study of visual art, such as paint, clay, cardboard, canvas, film, videotape, models, watercolor, wood, plastic.

Art Medium: Broad categories for grouping works of visual art according to the materials used.

Contour Drawing: A drawing in which contour lines alone are used. A contour line represents or describes the edges, ridges or outline of a shape or form.

Process: A complex operation involving a number of methods or techniques.

Product: The physical end result of engaging in the creative process.

Scanning: The process of using a hardware device (scanner) to convert pictures into data that can be read by a computer and redisplayed as an image.

Technologies: Complex equipment used to the study and creation of art. These could include, cameras, computer, lasers, and video equipment.

Visual Arts: A broad category that includes the traditional fine arts such as drawing, painting, printmaking, sculpture; communication and design arts such as film, television, graphics, product design; architecture and environmental arts.
CHAPTER TWO

Literature Review

The Role Of Technology In An Art Program

The visual arts are an attempt by artists to express ideas and techniques. The end result of this process is a visual product revealing an artist’s personal signature in the work. Traditional art materials such as clay, paint, and paper can be manipulated with art tools and the interaction with these materials are important parts of the process of creating art. Computer graphic applications have attempted to simulate a variety of physical interactions with art materials like paint and pencil. Traditional techniques of the artist drawing, painting, smudging and blending are imitated by the computer. (Loveless, 1997). However, the versatility of technology allows for numerous applications. For some artists, the technology is the tool that facilitates design and decision, for other artists the work alone is the result of direct computer output; still other artists think of the computer work as a beginning point for further elaboration or a jumping off point for exploration in other materials (Chia & Duthie, 1994). In addition technology may serve as a resource for viewing visual images and gathering information from locations on the World Wide Web.

In order to effectively utilize technology to its maximum potential art educators need to consider many of the technical aspects of its use as well as the strategies they will use in order to effectively integrate technology into their classrooms. Loveless, (1997) states:

the presence of technology can challenge teachers to reflect upon the strategies of interaction and intervention and to consider the complimentary
roles played by the learner, the teacher, and the computer at different times and in different contexts. (p. 105)

In an elementary art classroom it is important to remember that technologies should not take the place of traditional materials or be used as a separate entity. Technology should be used alongside other media to support and enhance instruction. Teachers and students need to determine the most appropriate medium for any art work and to comprehend when the computer is that medium. They need to recognize computers as a tool for creating work; a tool that can extend the potential for experimentation and art production for their students. Students should be allowed opportunities to explore and develop skills in a range of computer techniques so that they may have a better understanding of the advantages and disadvantages of using technology to develop visual images (Chia & Duthie, 1994).

Integration Of Technology In The Art Program

In a Framework for Visual Art, a publication published by the Iowa Department of Education and The Iowa Alliance for Arts Education, (1995) integration of technology into an elementary art program may best be accomplished in three ways.

1. As a medium for visual expression.
2. As a tool for developing skills and ideas outlined in the art curriculum.
3. As a resource for gathering and sharing information in order to develop a better understanding of basic art principles. (p. 32)

Young students begin to use technology to create art in ways similar to those used when working with traditional art materials. Freedman (1989) stated, “As with other media when using a computer and interactive graphics software students often “scribble” or try out” in a manner that acquaints them with the possibilities of the new medium.” (p. 41). Research indicates that children's experimentation with the
medium serves to familiarize them in a non-threatening manner with the computer and its functions. Gradually the students work at the computer should evolve into more structured lessons. However, it is important to note that experimentation activities are something students will revert to frequently. Chia & Duthie, (1994) describe the doodling process as “a means for students to learn for themselves what to expect from particular computer functions and to engage in technological orienteering through the menus, discovering amazing artistic possibilities en route” (p. 199). Therefore it would seem that this experimentation process is a valuable learning strategy and time should be allowed for this type of student-centered activity frequently during the course of art instruction. The exploration of the material however, is only a part of the art production process. It is important that young students begin to reach a stage in their development where they begin to feel comfortable with the computer and their abilities to utilize it to produce images.

Technical Considerations

Before students are able to increase their computer comfort level there are several important technical aspects of its use educators must consider when planning their art programs. These may be summarized as: position of the screen and keyboard, mouse control, and enlarging and reducing (Chia & Duthie, 1994).

Reducing and Enlarging

The ability to enlarge and reduce images quickly is an important function when drawing with young children on the computer. This is particularly true when dealing with perspective and three dimension. Both concepts can be difficult for the young child to represent in their work when using paper and pencil. However, by enlarging and reducing forms and shapes on the computer screen, students are able
to easily represent perspective in their work through the manipulation of an objects size.

**Drawing With the Mouse**

A child's first experience drawing with the mouse can sometimes be a frustrating one. For this reason it is of great importance to allow time for the students to practice drawing using the mouse at the computer in a non-threatening manner. Chia & Duthie (1994) stated:

> Manipulation of the mouse involves a spatial separation of the hand and eye which would traditionally be focused jointly on a piece of paper in a very direct and proximate relationship. In addition, unlike working with pencil and paper, drawing shapes with the mouse requires students to draw from the inside out rather than using a line to draw the outer edges of a shape first. This can make it difficult to control size as well as placement of shapes. (p.202)

However, regardless of initial difficulties in using the mouse, young children seem to develop an understanding of the process of mouse control very quickly. As with most art materials, skills improve with practice.

**Position of the Screen**

In computer-based art work, drawings appear not on a horizontal plane where the hand is as with paper and pencil, but vertically in front of the student. This can be difficult for children to adjust to and it may be necessary to encourage them not to look at their hand while working. This method of drawing orientation shows similarities to contour drawing, which is a drawing practice used in many art classes to encourage close intense observation of objects as students draw the edges of a form without looking at the work in progress (Edwards, 1989). It should also
be noted that some research indicates that children’s observational skills and their ability to draw “what they see” or render realistically improves as a result of students drawing on a vertical plane when creating art with the computer (Chia & Duthie, 1994).

Teaching Strategies

After having examined some of the technical issues of computer based art learning, teachers should begin to consider some of the teaching strategies which could be used to integrate this technology into their classrooms. Greh (1990) states:

Computers provide a playground for ideas and images and many art teachers find that computers restore playfulness in art. Risk taking, experimentation, exploration, and play are all essential to the artistic process and all are possible with computers.” (p.10)

As discussed previously, in the early stages of their computer work young students will need to acquaint themselves with the capabilities of the computer. This experimentation process was described as doodling and is a valuable learning activity for the young child. However this is only one basic application. Used as a tool for self expression, the computer provides young children with endless possibilities in creating visual images. The methods in which teachers and students use the technology are very important. Care must be taken to provide innovative ways in which to learn.

The process of scanning original drawings into the computer and using them as the basis for computer work is another teaching strategy which can be used to introduce children to the process of drawing on the computer monitor. Scanning also helps children to gain confidence in their drawing abilities. In addition, this strategy may gradually help children become aware of the subtle differences between their original work and the scanned image (Chia & Duthie, 1994).
The use of a digital camera or Quick Cam to capture images and display them on the computer screen can also be very useful in acquainting the young artist with computer drawing. Once on the screen, the images captured by these photographic devices can be manipulated using various computer graphic software programs. Students are able to trace over forms, add details, colors, and textures to their compositions. These tools may also be most useful when exploring a portrait or figure drawing by saving the students face or that of a classmate and altering the image by adding a new background or distorting the facial features (Greh, 1990). Student portraits may also be used as the basis for future figure drawing in which the students add their own original figures to a portrait.

In the case of computer graphics the software and hardware that is available will have a direct effect on the quality of the students final product as well as the learning process. The variety of computer hardware and software available for use is overwhelming. There is certainly no such thing as “a computer” or “the perfect computer” program. Computer graphic applications have attempted to imitate a range of materials such as paint, pencil, and photography. Traditional techniques of the artist such as spraying paint, smudging and blending are imitated by the tools that are available on the screen. Whether using the computer to produce visual images or as a resource for information, teachers should examine the software packages that are available to determine which are appropriate for the specific age level student they teach.

Other computer software is available to allow students to visit art museums without ever leaving the classroom. By using these types of programs teachers may supplement their curriculums by providing students with the opportunity to view the works of master artists as well as participate in games and treasure hunts. Software on specific artists is also available to allow students to not only view the
work of these painters but gather information on their lives and painting styles. In addition computer software may be used to reinforce and teach basic design elements such as symmetry, pattern, and balance.

When to using technology as a medium for creating visual work and as a resource to reinforce the teaching of visual concepts, its presence also opens doors to information from around the world through the World Wide Web. Through the use of the Internet, an art instructor can gain access to thousands of sites that can assist in professional development and supplement the art curriculum. Many museums from around the world have placed their collections on line bringing the work of art masters into the classroom. The utilization of collaborative e-mail projects can connect students with professional artists as well as other students from around the world.

Classroom Organization and Structure

The task of effectively integrating technology into the art curriculum requires much time, patience and organization on the part of the art instructor. Many elementary facilities are not as technology rich as those at the secondary level. In order to provide adequate time for students to work teachers may need to be creative in their approaches to providing students with computer work time.

The structure of an art program should provide students with opportunities to work with a variety of materials over an extended period of time. In busy schools where time is a precious commodity not all students can use a computer in every task. If a building lab is not available student work time may be extremely limited and student computer work time may need to occur simultaneously with other activities. This requires much pre-planning on the part of the instructor. Access to the computer may need to be planned over a long period of time in order to give
students the experience of experimenting, deleting mistakes, and refining ideas, before actually printing a final product.

Loveless, (1997) points out that teachers may need to play a variety of roles in the process. Planning requires careful identification of the intended learning objectives. The resources need to be organized and their use demonstrated and modeled. The activity itself needs to be monitored and managed by scheduling individual as well as group work time. Support, interaction, and intervention must be appropriate, and opportunities should be provided for the teacher and students to evaluate and assess the quality of the learning experience as well as the final product. Computer images look very different from images produced from traditional materials and students skills need to begin to be developed which will help them to evaluate this type of work. In addition, students need to be made aware of those qualities which distinguish well-designed computer images from those that are less successful.

Classroom Observations

During the 1997-1998 school year groups of elementary age students in grades K-3 participated in the process of utilizing computer technology as an integrated tool in the elementary art program. At the time of the project, technology usage was not formally addressed as a component of the existing art curriculum. Therefore one of the goals of the project was to gather information and ideas for developing curriculum relating to technology in the art program. In addition, another major goal of the activities was to introduce students to computers and computer software as a learning tool and art medium.

Students met during art classes once a week for a period of time ranging from 30 to 40 minutes. One Macintosh computer was available for student use as well as various production software programs such as Kid Pix and Color It.
Students were also introduced to software programs dealing with topics specific to content areas such as art appreciation, and basic art elements. Lessons were developed to coordinate with and integrate the basic topics and concepts being covered during art classes. In following the progress of these students many of the findings from previously sited research articles were found to be fairly accurate.

The most accurate information which was discussed in the literature review was the importance of students experimenting with the various tools and options available within software programs. This behavior came as no surprise since young children naturally and freely play and investigate traditional art materials in much the same manner. Such activities are developmentally appropriate for primary age children and were greatly encouraged. It should also be noted that the developmental stages children progress through when they are in the process of developing their visual awareness are mirrored when using the computer as an art medium. These stages are described by Chapman (1994) as:

Stage 1: Usually grades K-2. During this stage children begin to create visual symbols to represent figures such as people, houses and trees. Figures often seem to float in space. Proportions are related to the importance that the child places upon a feature (see Appendix A, Figures 1 & 2).

Stage 2: Usually grades 1-3. In picture making lines or borders are often used to represent the ground below the sky. Figures may be placed a line along the lower edge of the paper. Proportion is shown through relative size (see Appendix A, Figures 3 & 4).

Stage 3: Usually grades 3-6. Students try out new ways to portray space in the picture. These explorations often reflect remembered functional or logical relationships more than visual recall. Many students begin to develop a strong interest in trying three dimensional work (see Appendix A, Figures 5 & 6).
Stage 4: Usually grades 4-6. Students begin to search for ways to portray recalled or observed space. Some begin to use perspective to imply near and distant objects. Students also show increased skill in applying design concepts to add interest (see Appendix A, Figures 7 & 8).

Many of the research articles also discuss some of the technical aspects which should be considered when using the computer as a tool for producing visual images. During this study it was found that of primary importance was the manipulation of the mouse. Although completed computer images did show developmental similarities to the use of traditional materials, the actual handling of the mouse as compared to pencil or brush was significantly different. A young child's interest in using art materials is not solely visual. There is an equal amount of interest in the sensory aspect and physical involvement with the materials themselves (Jessel & Matthews, 1993). For this reason it was not unusual for students at the kindergarten and first grade levels to actually tap the mouse on the computer table or pick it up and investigate it closely in order to increase their sensory involvement with the medium.

As stated earlier computer graphics also involves a spatial separation of the hand manipulating the mouse and the work surface located on the computer screen. With mouse manipulation the relationship between action and effect are not directly apparent. During the children's first attempts at computer drawing many were quick to become frustrated with this aspect. However, it should be noted that their anxiety lessened quickly and the students actually do become more intent on the work on the screen and its appearance and focus less on the hand mouse manipulation.

Two aspects of the study which were not often referred to in the literature research were the importance of the use of color and the students pre occupation
with the ability to edit and erase. Both aspects were of primary interest to the students. When creating images with the computer, the colors which appear on the screen are extremely vivid and bright. If images are to be printed the end result can be quite disappointing. On several occasions throughout the school year students indicated their displeasure with the end result of their work since our resources did not include a color printer. It should also be noted that even with the availability of color printers the quality of the printed color is inferior to that displayed on the color computer monitor. As an alternative to color prints students were encouraged to add their own colors to the images with other available materials such as colored pencil, crayon or marker. This is an example of the importance of teacher and student working together to determine whether the computer is the appropriate medium for a given assignment.

Throughout their involvement with the computer activities many of the students were extremely interested in the computers ability to undo and erase mistakes. Most of the research indicated that this was a positive aspect. Students were more apt to explore freely knowing that if they made a mistake it could be quickly corrected without having to start completely over again. However, there were times when it seemed that students seemed fixated on this feature and where often involved in the activity of erasing and editing simply for the pleasure of watching the computer preform rather than focusing their attention of the task at hand. In many cases it became necessary to redirect the students on the intended outcomes and at times even limit the number of occasions they could begin their image again.

It became apparent as the school year progressed that social interaction was an important part of the learning process during computer activities. Having only one computer to work with and a limited amount of class time it became necessary
to often group students to work collaboratively on an activity. Activities where more than one student worked together provided opportunities for students to communicate their ideas and appraise the quality of their work providing valuable learning experiences. These collaborative work times seemed to be enjoyed by the students and it would not be unusual to find a group of students gathered around the computer during scheduled individual work time.

Project Conclusions

The information regarding technology use gathered throughout the school year along with reviews of current literature has provided much insight into the objectives and strategies which may be used to effectively integrate technology into the art curriculum. While many of the literature reviews dealt with art programs in general terms and were not specific to age levels, the information they provided proved to be beneficial. Aspects such as, which concepts should be taught using the computer as opposed to traditional art materials, as well as the role that technology plays in an art class are of great importance. These are considerations art educators must make regardless of the grade level they teach. Additionally, the literature reviews dealing specifically with young children provided information on technical aspects which are apparent when dealing with a young child. These issues such as mouse control and position of the computer screen were observed during actual work with students in an elementary class setting.

At the secondary level of education art content such as painting, drawing, photography and computer graphics are sometimes taught as separate courses. However, it is important to note that at the elementary level technology use in the art program should not occur in isolation but in conjunction with other learning activities related to the curriculum. This is perhaps the most important concept of the study. LeCrone (1997), suggests that when beginning to integrate instructional
units and technology into their programs educators should begin by listing units previously taught and brainstorming which could be addressed more effectively with technology. It is most practical to begin slowly. The use of the computer in the art program requires innovative teaching strategies, time and patience.
As with all new ideas, materials and activities, the integration of technology into an art program requires patience and practice. The computer hardware and software that is available today provides students in visual art programs with innovative ways to learn and express ideas. Art instructors need to consider how these technologies may best be used to teach specific art concepts and at what age the concepts should be taught (Freedman, 1991).

At the elementary age level most art programs emphasize the development of a child's confidence in their abilities and skills regardless of the medium. When using the computer as the drawing tool confidence is built by allowing students time to become familiar with computer hardware and experiment with the features of software programs. Following these periods of exploration students are usually able to apply their skills in order to successfully create original visual images. However, in order to completely utilize the computer as a learning tool and art medium teachers need to be aware of the technical aspects of its use as well as evaluate the teaching strategies they use in their classroom. Research into the roles demonstrated by teachers as well as learners indicates that traditional roles may shift from the teacher being the organizer of tasks and technical advisor, to that of the facilitator and co-learner (Loveless, 1997).

This article has attempted to outline and examine many of the issues and strategies related to the use of technology in an art classroom. All of those discussed can have an effect on a primary child's learning. In addition, art educators must continue to develop new teaching practices if students are to benefit from the
computer as a teaching resource and as a medium for creating art work. (Chia & Duthie, 1994). While providing the primary age level child with the opportunities to create art, educators are laying the foundation for future course work and developing a child's creative potential as well as providing their students with a new medium with which to visually express themselves.
References


Appendix A

Figure 1. Self-Portrait by Taylor K.7

Figure 2. Self Portrait by Catherine 1.2
Figure 3. Figure Drawing by Austin 1.2

Figure 4. Landscape by Ashley 1.5
Figure 5. Landscape by Chris 3.7

Figure 6. Landscape by Brandon 4.5
Figure 7. Ocean Scene by Travis 5.2

Figure 8. Space Scene by Brittany 5.9