Balancing Act: Bridging the Traditional And Technological Aspects of Culture Through Art Education

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Abstract

This paper addresses the benefits of connecting and balancing education in the visual arts and in technology through discussion of actual examples. This balanced connection accomplishes three goals: to further advance and enhance quality of life, to cultivate humane and ethical behaviors, and to initiate global dialogue on issues that matter among people from diverse cultures, languages, countries and ethnicities.

The visual arts and technology are mutually dependent upon one another. In fact, much of yesterday's technology is today's fine art. Two excellent examples of this are printmaking and photography. Printmaking techniques were once used to simultaneously print text and image, to spread religious doctrine and communicate important information to the literate as well as the illiterate. Photography, a less labor intensive process than printmaking, replaced it, and is another example of a technological advance that is used for scientific, commercial and fine art purposes.

Technology is a boon to the arts in that it presents artists with another set of tools in which to express their creative vision and make it easily accessible to a broader audience. The arts need technology to grow, flourish, and meet the changing aesthetic tastes and needs of an increasingly global society. Technology needs art to envision possibilities, to make it more palatable, more humane and to raise questions about the effects of technological advances on our values, morals, ethics and natural environment.

Through a balanced education, that connects the arts and technology, placing equal weight on the importance of each within the curriculum, teachers can encourage both right and left-brain thinking. In this way we secure for ourselves a future in which our imaginations are unbounded and creativity translates into a well thought out and carefully planned reality that ensures the health and happiness of future generations.

Introduction

It is often easier to dwell on the dissension and problems created by difference than it is to find consensus between dissimilar groups with varying modes of thought. It is my intention to find the common ground shared by scholars and educators in the visual arts and sciences through an examination of how digital technology acts as a bridge creating balance between the two.

While the intellectual snobbery C.P. Snow (1964)[1] wrote eloquently about nearly fifty years ago still exists between scholars in the arts and sciences, advances in technology, namely digital processes, have built a tenuous bridge connecting the interests and concerns of these two disparate cultures creating a hybrid, visual culture, in which art and science harmoniously coexist.

On the science end of the spectrum, graphic illustration and digital technology are used to "visualize" data, as Tufte (1983)[2] writes about in his seminal text, *Envisioning Information*. Tufte, described as the "Leonardo DaVinci of Data," states that "at the heart of quantitative

[1] Charles Percy Snow, *The Two Cultures: And a Second Look; An Expanded Version of the Tow Cultures and the Scientific Revolution* (Cambridge University Press, 1964).
[2] Edward R. Tufte, *Envisioning Information* (Cheshire, CT: Graphics, 1994).

reasoning (science/math) is a single question: compared to what?"[3] Tufte presents data in a variety of visual formats and suggests that truth and clarity involve layering detailed information into proper relationships by using differences in shape, value, size and color.[4] This visualization of data and naturally occurring phenomena enables scientists to more accurately predict and measure trends in cause and effect and to more concisely depict information in ways that may be clearly understood by the layperson.

Tufte's recent book, *Beautiful Evidence,* continues his narrative of images as evidence and explanation. "Science and art have in common 'intense seeing,' the wide-eyed observing that generates empirical information. *Beautiful Evidence* is about 'how seeing turns into showing,' how empirical observations turn into explanations and evidence presentations."[5]

Arnheim (1986) said: "Drawing, painting and sculpture properly conceived pose cognitive problems worthy of a good brain and every bit as exacting as a mathematical or scientific puzzle."[6] Tufte (1994) describes designing information as "cognitive art" that works "at the intersection of image, word, number, art."[7]

Global positioning satellites allow us to view and receive images in great detail, quickly, from almost any point on earth. The effects of global warming and other environmental anomalies have become easier to understand, predict and correct because of this digital technology. In the medical field, lifelike computerized mannequins that may be programmed to simulate a variety of physical ailments assist medical trainees in developing diagnostic skills. In forensic science skeletons may be visualized as actual flesh and blood beings by artists using digital technology. On my college campus, the University of North Carolina at Charlotte, there is an excellent example of how science and art through digital technology work together.

The Visualization Center, a department within the College of Science and Technology, is a place where the principles and concepts of computer science, art, architecture and communications intersect. The department's mission is "to develop and promote the science of visual analytics and to advance interactive visualization as an integrative discipline that is

[3] IBID., 6.
[4] Cheryl M. Hamilton, "Chapter 6: Using Artistic Strategies," in *Creating Meaning through Art: Teacher as Choice Maker*, Judith Simpson et al. (Upper Saddle River, NJ: Merrill Prentice Hall, 1998), 243.
[5] Edward R. Tufte, *Beautiful Evidence* (Cheshire, CT: Graphics, 2006).
[6] Rudolph Arnheim, *New Essays on the Psychology of Art* (Berkeley: University of California Press, 1986), 146.
[7] Edward R. Tufte, *Envisioning Information* (Cheshire, CT: Graphics, 1994), 9 as cited in Cheryl M. Hamilton, "Chapter 6: Using Artistic Strategies," in *Creating Meaning through Art: Teacher as Choice Maker*, Judith Simpson et al. (Upper Saddle River, NJ: Merrill Prentice Hall, 1998), 209.

indispensable for attacking key real world application."[8] Course titles include: visual communication in computer graphics and art, illustrative visualization and information visualization. Courses are interdisciplinary and descriptions are designed to attract students from a variety of disciplines. For example:

> Computer Science: Broaden your understanding of all things visual, and how that can be applied to your work; see new ways of communicating information; interact with artists, and learn to understand their language; learn some useful, non-technical skills.
>
> Art and Architecture: Explore ways to apply artistic principles to the understanding of data; apply your knowledge and experience in a different context; see some cutting-edge research and technology; interact with computer science students, and learn to understand their language.
>
> Communication: Expand your understanding of communication into the visual realm; apply your knowledge in a different field. Everybody: Think about abstract data in a visual way; discover patterns and trends in real-world data sets; design new means for depicting data.[9]

In a nutshell the center is about virtual reality design for science.

On the art end, the fusion of digital technology and visual art creates virtual fantasy worlds that closely imitate reality in the form of video games, films, two-dimensional art works displayed on flat screen monitors and kinesthetic sculpture making the imagination, once restricted to individual mental cyberspace, more real and tangible. Information technology has allowed artists and designers to make interactive works that welcome public intervention. This technology is present in most museums. Digital technology has also made art works from museum collections across the globe accessible to anyone with a computer and internet access.

Each new technological development is accompanied by an element of fear, fear of an imbalance in hegemonic relationships, fear of moral, ethical and aesthetic decay and a basic fear of change itself. Walter Benjamin (1936) wrote about the arts in the age of mechanical reproduction. Benjamin stated, "that which withers in the age of mechanical reproduction is the aura of a work of art."[10] Benjamin defines aura as a "unique phenomenon of a distance however close it may be."[11] In other words, a reproduction while very similar to the original actually

[8] The Charlotte Visualization Center, the University of North Carolina at Charlotte, http://www.viscenter.uncc.edu/ (accessed May 23, 2007).
[9] IBID.
[10] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations* (New York: Schochen, 1968), 221.
[11] IBID., 243.

detaches, removes, and distances the artistic traditions involved in creating the original, thus the paradox of being the same, yet far from it. Anderson and Milbrandt (2005) interpret Benjamin as "anticipating the issues of ethics and ownership that have arisen in the digital era, when anyone with rudimentary computer skills can manipulate any image to alter its content, meaning and authorship, simply by wielding a mouse or clicking a button. Who is to say this cannot be done? Who is to say it should not be done"?[12]

The marriage of visual art and technology has not only created new art forms, but provided artists like Barbara Kruger with a means of manipulating existing imagery, incorporating text and other elements to create a contextual paradigm shift for the viewer. Works that already exist out in the world can be manipulated to express socially significant statements regarding power and privilege. Much in the same manner that artist Fred Wilson repositions and juxtaposes objects to create entirely different meanings. Over ninety percent of the information we receive on a daily basis is in visual form, this includes works by famous artists, all available for anyone to own in digital format to be manipulated as they see fit.

The Historical Relationship between Visual Art and Technology

Much of what we consider to be fine art today was at some point in history considered a technological advance. Two excellent examples of this are printmaking and photography. As a printmaker myself, I have a healthy respect for technology and how it can enhance or improve upon traditional, hands-on, printmaking processes. Relief printmaking with wood blocks is one of the oldest forms of technology. In ancient China and Egypt carved wood blocks were used to create stamps of symbolic impressions for wax and clay to visually communicate information as well as create decorative patterns for textiles.[13]

Once the secret of papermaking reached Western Europe, wood cut printing was used for functional as well as aesthetic purposes. The widespread use of paper helped the woodcut evolve into a fine art process.[14] The invention of moveable type and the Guttenberg Press made printmaking more commercial as it was used to spread information, particularly religious

[12] Tom Anderson and Melody K. Milbrandt, "Chapter 9: New Technologies and Art Education," in *Art for Life: Authentic Instruction in Art* (New York: McGraw-Hill, 2005), 156.

[13] John Ross and Clare Romano, *The Complete Printmaker* (New York: The Free Press, 1972).
[14] IBID.

doctrine, to both the literate and illiterate population through imagery and text printed simultaneously.

As technology advanced, relief printing with wood was replaced by lithography, grease pencil drawings on stone, which was less labor intensive and lent itself more readily to fine detailed work. However the invention of photography quickly outstripped lithography in terms of mass producing realistic imagery. As each process became obsolete for commercial use, it found popularity as a fine art form. Digital photography is quickly making traditional "wet" photography obsolete for commercial purposes. Those of us in visual art know this, the slide projector, once our staple for projecting artistic reproductions to a large audience has been supplanted by laser projectors. Slide projectors are no longer being made, the same will one day happen with film, and film cameras.

Thus technology and the visual arts share a mutually dependent, love/hate relationship. Artists and art educators must possess technological competencies in order to be successful. For example, a painter trying to establish herself in the art world needs to both create art and market her work to galleries and other public exhibition venues to establish a client base. It is seldom possible for the painter to show the gallery owner or curator, particularly one located in a different geographic region, her original paintings. So the artist must use technology to duplicate the work in a portable form. Until recently this meant making photographic slides. To thrive, the painter has to understand photography and know digital processes to be competitive. While technology assists the artist in reaching a broader audience through the world wide web, it does not come without frustrations, namely its fast-paced, ever changing nature which can be difficult to grasp and expensive to maintain.

For the art educator, technology has been a boon in that it helped put visual art into the curriculum. Technology via the Industrial Revolution was greatly responsible for mandating that drawing be a part of the curriculum. Technical drawing skill was needed to design quality mass produced artifacts, an important aspect of the economic growth of the US and European countries exporting cultural and domestic goods. Technology also made it possible for art educators to bring the world of art into the classroom through photographic reproduction of famous artworks. This helped spawn the picture study movement in the early twentieth

century. [15] While it is always preferable to expose children to original works of art through museum and gallery visits, many rural areas do not have these institutions readily accessible. Even in this day and age there are many children who have never visited a museum or gallery or seen an original work of art. Today's children born into a world of digital technology have an additional set of tools with which to visually communicate and decipher visual, material culture in an increasingly global society.

Art, Art Education and Technology

The harmonious blending of art and technology is ever present in our every day lives. We are surrounded by visual and material culture that takes full advantage of the highest quality forms of visual digital technology. Our youth are totally immersed in this visual culture and art educators must make it a part of the curriculum. Developing visually literate adults should be a primary concern. Through an examination of visual culture and technology we can teach our students to deconstruct the imagery they are daily bombarded with, to make intelligent choices and be socially conscious of how power and control are maintained through the dissemination of visual information. We can teach them how they can use technology as a tool to create artistic imagery that effectively communicates their concerns and interests.

We can encourage our science colleagues to incorporate visual strategies in their own teaching to assist students in making their thought processes and problem solving strategies visible. "Artistic strategies are educational techniques that combine seeing and doing. They incorporate graphic images, symbols and formats as the basis for communicating meaning instead of relying solely on words and numbers. Artistic strategies make thoughts visible to both the sender and the receiver. They usually consist of drawing or constructing processes that range from simple to complex."[16] For example it could be as simple as a Venn diagram to visually depict the relationship between concepts. In art it could be a process journal detailing the artist's thought processes and problem solving solutions in creating a work. "Observing, visualizing and drawing combine outer perception and inner images in concrete graphic forms. Graphic ideas

[15] Arthur Efland, *A History of Art Education: Intellectual and Social Currents in Teaching the Visual Arts* (New York: Teachers College Press, 1990).
[16] Cheryl M. Hamilton, "Chapter 6: Using Artistic Strategies," in *Creating Meaning through Art: Teacher as Choice Maker*, Judith Simpson et al. (Upper Saddle River, NJ: Merrill Prentice Hall, 1998), 208.

provide holistic, spatial, metaphorical and transformational opportunities."[17] Teachers must consciously employ a variety of strategies to reach students who learn in a variety of ways

"Artistic strategies are concrete visual representations of information about time, associations, objects, places and characters that involve sketching, recording, clustering, mapping, charting and sequencing--all allow for a wide variety of teaching and learning strategies."[18]

> Artistic learning involves recognizing, creating and communicating meaning through symbols. Drawing is an act of translation, requiring transference from perception to representation through a meaningful graphic language of symbols. Identifying their own graphic symbols may be the most relevant and best approach for beginning readers as they connect personally drawn symbols with the written ones of their culture. [19]

Artistic strategies help us in observing, remembering analyzing, synthesizing and solving problems. By visually recording our ideas we can come back to them at a later date.[20] For children with special needs, learning disabilities, and second language learners learning is less frustrating and more successful when their thinking and feeling processes are made concrete--involving the students in solutions and supporting their learning process. Learning is an abstract proposition. "All children go through a stage of making concrete relationships. Exceptional learners continue to rely on concrete relationships longer than other children. To understand materials, they need to see, touch, smell, taste, hear, feel and 'be' them."[21]

On a recent trip to Russia, I had an opportunity to be thankful that I am visually literate. In today's multicultural, multilingual society, being able to read and understand images is of the greatest importance. Negotiating automobile traffic, finding a restroom, all these actions require visual literacy skills. While technology makes our world more easily negotiable, art makes it understandable. An education that balances artistic strategies with other forms of teaching and learning in every subject is crucial to the future success of our students in life and work.

Artists and art educators need to embrace technology as the chief means of communicating our ideas, reaching a broader student base and justifying our existence in the

[17] Cheryl M. Hamilton, "Chapter 6: Using Artistic Strategies," in *Creating Meaning through Art: Teacher as Choice Maker*, Judith Simpson et al. (Upper Saddle River, NJ: Merrill Prentice Hall, 1998), 208.

[18] IBID., 211.
[19] IBID.
[20] IBID
[21] Sally Smith, *The Power of the Arts* (Baltimore: Paul H. Brookes, 2001), 20.

curriculum. As I was preparing this paper, I came across an interesting web article on a computer-based studio art school. Distance learning has been a reality for many institutions for over one hundred years. Most of us are familiar with correspondence schools. Computer technology has made it possible for distance learning to be accomplished at the click of a mouse, with lightening speed, within a much broader geographic area, with academic programs spanning a wide variety of subjects, even studio art. I know many of us, me included, find it difficult to imagine a quality studio art education completed completely online, but it is being done with success at the Studio Art School in Edinburgh Scotland and more recently in the United States at the Savannah College of Art and Design. It is even being done at the K-12 level for home schooled children in Florida.

The nationally accredited Studio Art School[22] is the brainchild of artist teachers seeking to provide a quality art education to students unable to attend traditional classroom-based art classes for a variety of reasons, from cost, to scheduling time to attend traditional classes, to geographic constraints. Through the school's web site, students have unlimited access to their instructors and advisors, can download curriculum materials and upload images of their work in progress for critique and assistance. In many ways this on-line program is more cost effective than a traditional studio course. Students do not have to compete with their peers for the instructor's time and attention; they have a photographic record of every stage of their work, and are encouraged to work at their own pace. On the down side, they do not have the face-to-face advantage of a group critique with their peers, or the space and specialized equipment traditional students have access to. Thus, the courses offered are ones that do not require specialized studio equipment.

Getting the program up and running took a lot of time and effort. The curriculum already in place was inadequate for the needs of e-learning students. The instructors had to design an art curriculum whereby technology could be used to facilitate the acquisition of traditional skills without compromising the quality of the learning experience. The greatest concern was how to effectively teach traditional studio skills within a non-traditional format. Distance learning students need to receive the same course content as traditional, classroom-based students despite the lack of specialized studio facilities. Rather than altering the curriculum, it had to be

[22] Michael Stewart, "Teaching Art at a Distance," *elearnmag.org*, December 29, 2006, http://www.elearnmag.org/subpage.cfm?section=case_studies&article=39-1 - 37k

completely reworked. For example, students can access visual demonstrations by the instructors. These demonstrations are conducted in work spaces similar to what the student will have access to, a kitchen table for instance.

Each lesson is presented with step-by-step instructions and demonstration. Language barriers are overcome through a partnership with Net languages, a language school based in Barcelona, Spain offering English language and IELTS preparation courses on-line. While e-learning in the studio arts is limited to processes that do not involve a lot of specialized equipment and materials, it does provide basic art instruction to students in rural populations, jobs, and personal circumstances and obligations that prevent them from attending a traditional art school.

One of the biggest criticisms of on-line learning is the ease with which students can cheat; submit unoriginal work. The Studio Art School feels that the chances of this happening with a studio art course are very slim, particularly as students must submit images of their work in each stage of progress for critique and feedback from their instructor. It would be very difficult to cheat under these circumstances. Thus authenticity is higher, incidences of deception and fraud almost impossible.

The Florida Virtual School, an accredited on-line, public, virtual school, provides on-line art classes for students in grades six through twelve. The student population consists of home-schooled, rural, special needs, children of parents in traveling professions (circus) and children who do not have art programs in their schools. Lessons, examples, and web site resources are posted on the internet. Students create their own schedules selecting times that are most productive for them. They complete skill building activities, scan and e-mail, fax or mail their work to the instructor, who then uses a rubric to check for understanding and acquisition of the new skill. Instructors are available via e-mail, phone or instant messaging. Monthly contact is made with parents and students on progress. For student-student interaction, occasionally students are invited to take part in a virtual chalkboard demonstration lesson. Through conference calls students can interact with one another and discuss their drawings, creating the shared learning experiences common to the traditional classroom.[23]

[23] Polly Werner, "Teaching Art Online is Virtually Possible!" *SchoolArts Magazine* 106, no. 7 (March 2007), under "Technology," http://www.davisart.com/Portal/SchoolArts/articles/TechArtOnline307.pdf (accessed May 23, 2007)

How Does Technology Benefit from Art?

"Logical and precise, left-brain thinking gave us the Information Age. Now comes the Conceptual Age – ruled by artistry, empathy, and emotion."[24] Typically professional success has been associated with left-brain, logical thinking; the ability to understand and apply theoretical and analytical knowledge to life/work situations. However the world has changed. Technological advances have made even small towns more "global." "The future no longer belongs to people who can reason with computer-like logic, speed and precision." [25] The logical left-brain thinking that makes for success in school and on standardized tests is no longer sufficient for success in life/work.

The abilities that matter most today are those associated with right-brain thinking: "artistry, empathy, seeing the big picture and pursuing the transcendent."[26] These characteristics comprise what Daniel Pink (2007)[27] refers to as the Conceptual Age. He gives three reasons for this shift from the informational to the conceptual: the outsourcing of routine, left-brain tasks to Asian countries, which is lower in cost than hiring people on-site to do this work; automation--we have reached a point where computers and machinery can now do our left-brain tasks for us—computers work better, faster, longer and more accurately-- even legal services can be obtained cheaply on-line, writing a will, even obtaining a divorce; and abundance – the information age has provided us with a wealthy economy and an abundance of material goods unimaginable fifty years ago. For example in the US there are more automobiles than there are licensed drivers.

Pink (2007) goes on to say that the abundance created by the Information Age has left us feeling spiritually, emotionally and aesthetically unfulfilled. "A quest for meaning and purpose have become an integral part of everyday life"[28] and this quest is directly linked to right-brain thinking.

Meditation, music, art, concern for the environment, fung shui, aromatherapy, all involve right brain, empathetic, aesthetic and transcendent thinking and feeling.

[24] Daniel H. Pink, "Revenge of the Right Brain," *Wired* 13, no. 2 (February 2005), under "Features," http://www.wired.com/wired/archive/13.02/brain.html (accessed May 22, 2007), 1.
[25] IBID.
[26] IBID., 2.
[27] IBID., 3.
[28] IBID., 3.

> We progressed from a society of farmers to a society of factory workers to a society of knowledge workers. And now we're progressing yet again – to a society of creators and empathizers, pattern recognizers, and meaning makers.
>
> Logical, linear, analytic thinking remains indispensable. But it's no longer enough. To flourish in this age, we'll need to supplement our well-developed high tech abilities with aptitudes that are "high concept" and "high touch." High concept involves the ability to create artistic and emotional beauty, to detect patterns and opportunities, to craft a satisfying narrative, and to come up with inventions the world didn't know it was missing. High touch involves the capacity to empathize, to understand the subtleties of human interaction, to find joy in one's self and to elicit it in others, and to stretch beyond the quotidian in pursuit of purpose and meaning.[29]

This is what a quality art education can do for our children and our future. This is why art is important and we need to fight to keep an equal balance between the arts and sciences in the curriculum. At the University of North Carolina at Charlotte a task force is currently considering the possibility of developing a doctoral program in the humanities and technology and or a Center or Institute in the Humanities and Technologies. The purpose of such a program would be to study the impact of technology on the human condition, in particular as it concerns the cognitive, social, ethical, cultural and artistic practices and representations.

Conclusion

In addition to helping us cope with the abundance that left-brain logical thinking has bequeathed us through the Information Age, technology needs art to keep us humane. I recently read a newspaper article about the art collection amassed by Microsoft. Collecting, renting and purchasing art has been on the agenda of many large corporations for the last twenty years. Microsoft employs a professional curator to make purchases and maintain the collection. Former curator Michael Klein was interviewed and asked why Microsoft began collecting art. He responded, "Because they can. And they should. They are involved in culture. Technology is culture. And the art informs the culture."[30] Art also helps make an industrial environment more humane and inviting.

In an age of cloning, genetic engineering, robotics and nanotechnology, we need the humanness of the arts and humanities to keep us grounded. The very fate of the human race lies

[29] IBID., 3.
[30] Jessica Mintz,"Where the office meets the museum: Microsoft's growing collection reflects its corporate culture,"*Charlote Observer,* June 9, 2007.

with right-brain thinking. Imagine the creation of machines that can think for themselves and never get fatigued. How long would it take for those machines to be permitted to make their own decisions without human oversight? How would humans maintain control? Sure Hollywood movies (*The Terminator, I, Robot, The Matrix)* have taken on these themes with regularity, but a lot of it is based in fact. Nuclear technology is an excellent case in point, the scientists that developed the atomic bomb stood behind their discoveries and decisions; however the realty of the aftermath in human suffering was a terrible price to pay. Physicist Freeman Dyson said, "The reason that it was dropped was just that nobody had the courage or the foresight to say no."[31] We need empathetic right-brain thinking to balance left-brain reasoning. The power engendered within a person who has the intelligence to create such life altering technology is often dangerously seductive. "A technical arrogance overcomes people when they see what they can do with their minds." (Freeman Dyson cited in Bill Joy).[32]

Teachers must provide our children with a balanced education that gives equal importance to the two cultures dominating our world. This balanced connection accomplishes three goals: to further advance and enhance quality of life, to cultivate humane and ethical behaviors and to initiate global dialogue on issues that matter among people from diverse cultures, languages, countries and ethnicities. In this way we secure for ourselves a future in which our imaginations are unbounded and creativity translates into a well thought out and carefully planned reality that ensures the health and happiness of future generations.

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[31] Bill Joy, "Why the Future Doesn't Need Us," *Wired* 8, no. 4 (April 2000), http://www.wired.com/wired/archive/8.04/joy_pr.html (accessed May 23, 2007), 12.
[32] IBID., 13.

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