

# The Impact of Computer Technology on Art Pedagogy

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## Abstract

This article provides an overview of how technology, especially computer technology, affected art education. When discussing how computer technology impacted contemporary pedagogy of art, four prevailing types of concept were addressed, including student-centered, individualized, multicultural, and interdisciplinary.

*Keywords: Computer Technology, Art Education, Pedagogy*

## 1. Preface

Technology impacts education at every level. From one perspective, technology seems value-neutral; it is the human soul that decides what our world looks like. However, as Stephen Bertman (1998) points out, “technology tends to multiply geometrically, and its cultural influence increases accordingly” (p. 24). The invention of Gutenberg’s movable type is one of the best examples. Marshall McLuhan (1967) points out that the development of printing techniques

brought about a revolutionary change in people's learning styles. The mass production of books made it possible to learn by eyes instead of the traditional method of learning by ears. What is more, the portable book not only expanded the distance of message communication, but also created a possibility for individualized reading and learning through standardization of language, writing style, and fonts. Elizabeth L. Eisenstein (1983) in her book, *The Printing Revolution in Early Modern Europe*, points out that the reproduction of written materials not only brought about a dramatic shift of all forms of learning, but also resulted in the revolution of modern European civilization, including the emergence of the Renaissance, religious reformation, and modern science, and standardization in written languages.

In the realm of art education, the combination of printing techniques and photography not only changed the notion of art creation, but also enhanced the study of art. Photography benefited art education at the turn of the twentieth century in magazine publishing during the arts-and-crafts movement, in the picture study movement of 1899, and in Arthur Wesley Dow's synthetic art education begun in 1899 and continues today in curricula based on the elements and principles of design (Efland, 1990). The development of computer technology in the late twentieth century has had a huge influence at every level of education. Becoming an aggressive user of computer information technologies has become an important qualification for an art teacher.

Jon Wiles and Joseph Bondi (2002) argue that in the new century, programming functions are crucial for curriculum design; they point out that "Not only is knowledge of how technology works (literacy) important, but also how technology can be used to improve communication and the transmission of knowledge" (p. 331). What Wiles and Bondi refer to here includes two dimensions of educational activity. The first is curricular design and the second is pedagogy.

Elliot W. Eisner (1972) points out that just as the curriculum lies at the heart of education, learning activities lie at the heart of the curriculum. Pedagogy is concerned with learning activity; successful learning activities help to achieve the objectives of curricular design. In order to discuss the influence of technology on art pedagogy, I refer to four pairs of conflicting pedagogical ideas in art education and explore

how technology, especially computer technology, contributes to the resolution of the contradictions they embody.

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## 2. From Teacher-centered to Student-centered

Half a century ago, John Dewey (1954) pointed out that the history of American schools has shown a swing of the pendulum between two extremes: one end is external imposition and dictation, and the other end is “free-expression”. Peter Smith (1996) echoes Dewey’s metaphor of the pendulum and applies it to the phenomenon of art education. He claims that during the last four decades of the twentieth century, visual art education in the United States appears to have shifted between art-oriented and child-oriented approaches. Both Dewey’s and Smith’s comments imply a dilemma between teacher-centered and student-centered modes of pedagogy. If this pendulum effect is inevitable, then the difference between teacher-centered and student-centered modes is merely a matter of fashion.

Contemporary educators, such as Kaustuv Roy (2003), have attempted to use Deleuze and Guattari’s metaphor of “rhizome” to reconstruct the traditional relationship between teachers and students. A rhizome, as Roy describes it, “is a lateral proliferation of connection, like the spread of moss, the sudden branching off or joining up of different intensities, flows, and densities to form new assemblies that have no fixed form or outline” (p. 75). The notion of rhizome tries to overthrow the traditional linear and hierarchical relationship of teaching and learning. M. Jayne Fleener (2003) comments that the curriculum-as-rhizome analogy encourages students to pursue “tangents,” discover personal interests and needs, and create their own teachable moments and starting points. This webbed, interactive, and non-linear learning style conforms to the contemporary communication function developed by the Internet and computer technology.

In a lecture titled “Interactive Aesthetics,” Karen Keifer-Boyd (2001a) points out that today’s visual communication design is no longer viewed as either linear or cyclical, but instead it is often experienced as nonlinear. Nonlinear design has multidirectional intersections to lead the viewer to travel within a loop to a place

different from where he or she began or even intended to go. Thus, Keifer-Boyd (2001a) claims: “To develop a curriculum that incorporates creative and critical thinking necessary for design communication in the 21st century, we need to regard knowledge as dynamic and indefinite rather than as definite and fixed” (p. 2). This dynamic curricular design creates a broader space to accommodate nonlinear interaction. The poststructuralist idea of rhizome combines with the development of the Internet and computer technology, enabling a breakthrough in the dilemma between the two extremes of teacher-centered and student-centered modes.

### 3. From Standardized to Individualized

Learning with peers has educational as well as economic significance. Conventional instruction depends on a teacher who arranges appropriate learning content and sequence, drills students on correct performance, and evaluates learning achievements by using standardized tests. However, individualized instruction has always been an ideal based on the educational ideology of cognitive pluralism.

According to Eisner (2002), the roots of cognitive pluralism can be traced back to Aristotle’s tri-part distinction among the ways of knowing—“theoretical, practical, and productive” (p. 80). One of the most influential learning views is Howard Gardner’s (1983) conception of seven intelligences, later expanded to nine (Gardner, 1999). He denied the long-term psychometric tradition which defined human intelligence as a single general or “G” factor. His views have helped educators reconsider the learning opportunities which a school should provide. Eisner points out that one of the potential consequences of cognitive pluralism is the “expansion of educational equity” in the classroom (p. 82). From the perspectives of the nature of intelligence and of the need for equality of learning opportunities, a wider array of curriculum tasks is needed to meet individual needs. Emphasizing individual value judgment has become the prevailing educational principle today in the United States and Taiwan. Olivia Gude (2004) points out that “Postmodern thought embraces the heterogeneous, the local, and the specific. It affirms the choice-making capacity of

individuals” (p. 13).

Computer technology enhances the implementation of this educational ideology. The study of how to use the computer as a teaching aid is decades old. While traditional media such as slide projectors, overhead projectors, televisions and VCRs lack interactive functions, computer-aided instruction is capable of interactivity. Hank Bromley (1998) claims that “computing technologies could support independent action and variety as easily as centralization and standardization” (p. 15). The interactive aspect of the Internet makes the computer completely different from traditional media. Lovejoy (1997) argues that being in cyberspace is closer to reading a book than to watching TV. She explains that the viewer can “now type in text, scan in visuals, and access the Net, placing messages online” (p. 213). The accessible input/output system, the real time feedback, and the multiple information styles together make the computer a powerful interactive medium.

How can we conduct individualized instruction? One approachable technique is through the use of learning centers. Beverley E. Crane (2000) suggests that a learning center should be a collection of materials arranged around stations where students can interact with the materials. Each station provides students with materials for particular tasks (p. 123). Individualized instruction enables students to learn in accordance with their intelligence and interests, and at their own pace. It is the interactive capacity of computer technology that makes individualized instruction possible. WebQuests is one good example. As Tom March (1998), one of the creators of WebQuests, points out, the development of the Internet and the World Wide Web has revolutionized student learning style. Based on its student-centered and active-learning emphases, WebQuests has been developed into a huge instructional source, providing individualized teaching and learning activities for K-12 educators and students.

#### **4. From Mainstream to Multicultural**

In the 1970s some educational historians and philosophers challenged the contents of the curriculum which were taken for granted

in mainstream culture. These scholars based their arguments on critical theory, and questioned the tendency of tacit values resulting in sexism and racism. They examined cultural issues. In the realm of art education, critical theorists criticized the neglect of multicultural resources for the teaching of art. For example, Dennis Earl Fehr (2000) argues that in the U.S. one of the goals of teaching art history is to “create cultural parity with Europe’s educated class. One of its results was to create a European canon, a standard by which to judge non-European art—that is, the remaining 95 or so percent of the world’s art” (p. 115). Many scholars doubt the practicability of critical theory. However, Efland (1990) argues “in view of the fact that art education has a history of identification with the privileged levels of society, such studies are long overdue” (p. 255). Eisner (2002) also claims that “[critical theorists’] views on the ills of education are often exceedingly plausible; they are frequently both trenchant and accurate. What is missing is a positive agenda” (p. 77). Eisner’s argument is not an overstatement. Andra Lucia Nyman (2002) points out that though globalization and multiculturalism have become overwhelming educational goals, there are many challenges that educators still face. Three questions are brought out by Nyman: “How do we meet the individual needs of the child? How do we kindle children’s imagination? How do we help children to learn about their own identities?” (p. 62). Today, this “missing agenda” of multicultural art education can be achieved easier through computer technology. Tom Anderson and Melody K. Milbrandt (2004) point out that “Using the web, student can critically examine issues in their own communities, the nation, and world through cooperative thinking and learning activities” (p. 164). They also use digital artist Bill Viola’s works as example, demonstrating how to design technologically based learning activities and how to conduct discussions on contemporary cultural issues.

Though the evolution of a high-speed, electronic culture began in the United States, it has been largely adopted all over the world. McLuhan foresaw that this new power would “fuse time and space and reconstruct human dialogue on a global scale” (p. 16). Stephen Bertman (1998) echoes McLuhan’s idea of a global village by arguing that “The result is a high-speed, electronically integrated global culture, a synchronous society on a planetary scale” (p. 150). Some scholars

warn us of cultural colonialism in technology and remind us that we must be very careful to think over whose culture controls or dominates the Internet's language, social practices, and economic access and gains (Keifer-Boyd, 2001b, p. 1); however, recent developments lead to an optimistic view. Five years ago Wiles and Bondi (2002) has predicted that non-English speakers would outnumber English speakers on the Internet, and there would be more Chinese users than English users. Thus the cultural colonialism might shift. In fact, more and more Web sites are now produced in multiple languages and translation software are fully developed to translate any Web site to users' own native tongue.

Internet art also has promising prospects. Jon Ippolito (2002) argues that artists outside the mainstream geographic channels, such as artists in Slovenia and Korea, have had remarkable success in making art for the Internet. This development helps artists from all corners of the world to display their works through a worldwide approachable channel and ultimately benefits the accomplishment of multiculturalism.

Multiculturalism has become an important issue in education. The achievement of new communication technology favors this overwhelming trend. Crane (2000) claims that the Internet benefits the study of world culture. He gives an example of students in a fourth grade class in California who now can learn to contrast art and folk music from Mayan, Aztec, and Mexican cultures through the Internet (p. 326). If we believe that the teaching of multiple cultures is a proper choice for art education, we can use computer technology as the vehicle to take us from mainstream to multiculturalism.

## 5. From Discipline-based to Interdisciplinary

In the conventional teacher-as-artist model, art education was conceived as a series of studio activities which were always segregated from critical social issues. In 1957 the Soviets launched the first artificial satellite, Sputnik. This event heavily impacted United States' society and evoked a major movement for curriculum reform, especially in science and mathematics. Efland (1990) noted that there were two

main reactions within the art education community. The first was to emphasize the importance of art for its function as enabling creative problem solving. The second was to emphasize art as a structuralized discipline (p. 237). After a series of initiatives by Manuel Barkan, Elliot Eisner, Harry Broudy, Ralph Smith, and Laura Chapman during the 1970s, the label “discipline-based art education” (DBAE) (consisting of four disciplines: art making, art history, aesthetics, and art criticism) was formally coined in 1984 as the embodiment of this wave of the curriculum reform movement. Smith (1996) claims that historians of the future will see DBAE as one of the most important contributions to twentieth century American art education (p. 214). Nevertheless, he argues that despite DBAE’s attempts to give art the form of an academic subject, “we still await the realization that art might represent something more permanent” (p. 218).

Smith’s argument is sustained by contemporary educational trends. Gude (2004) points out that postmodern visual arts are hybrids of the visual and the conceptual. She argues that “this hybridization is itself a hallmark of many postmodern cultural productions, eschewing the boundaries imposed by outmoded discipline-based structures” (p. 8). Mary Adams (2002) claims that traditional definitions of art and their disciplinary boundaries usually keep teachers and school subjects apart. Thus, she suggests art teachers and elementary classroom teachers should “reconsider their subject area boundaries for a more fluid approach to teaching” (p. 362). Beyond teacher-as-artist and DBAE, we have another choice: interdisciplinary art education, a cross-curricular model.

Crane (2000) lists four benefits of a cross-curricular approach. First, individuals learn best when encountering ideas connected to different disciplines. Second, cross-curricular problem solving provides students with critical thinking and real-life skills they need when they enter the work force. Third, the integrated curriculum with its increased emphasis on the interconnectedness of curricular concepts may enhance student motivation and interest. Fourth, interdisciplinary activities encourage students’ capacity for critical reflection and deep understanding of complex societies. How could computer technology benefit interdisciplinary pedagogy? Wiles and Bondi (2002) claim four decisive skills are required to conduct the interdisciplinary approach:



organizing data, ordering information, comparing data, and contrasting data. These tasks are exactly what the computer, and more specifically the Internet, can perform best, employing the powerful techniques of visual and audio processing, enabling a new era of interdisciplinary art education.

## 6. Conclusion

The impact of computer technology on art pedagogy has become an important topic in art education. In the US, many art educators are engaging in related studies, such as Taylor and Carpenter, Milbrandt and Anderson, Emme, Krug, Gregory, June Julian, Sakatani, Jagodzinski and Keifer-Boyd. Technology has been the focus of several books in art education and journal themes. In Taiwan, a series of educational reforms have been set in motion since the mid 1990s. One significant reform was labeled the “First to Ninth Grade Curriculum Alignment.” The whole structure of the new curriculum emphasizes an interdisciplinary approach, including seven disciplinary domains: language; health and physical education; social studies; arts and humanities; mathematics; science and technology; and integrative activities. We can anticipate that new generations of Taiwanese students will be equipped with basic computer competence during their compulsory education just like their counterparts in the United States and other developed countries.

Bertman (1998) uses a brakeless car rolling downhill as an analogy for the effects of technology. He argues that when technology, like the vehicle, acquires its own momentum and accelerates downward, human beings, once the steerers of the car, become only passengers who maintain the illusion of control. Nearly all of us have sensed the disturbances caused by the acceleration of computer technology in many fields. This is also true in the realm of art education.

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