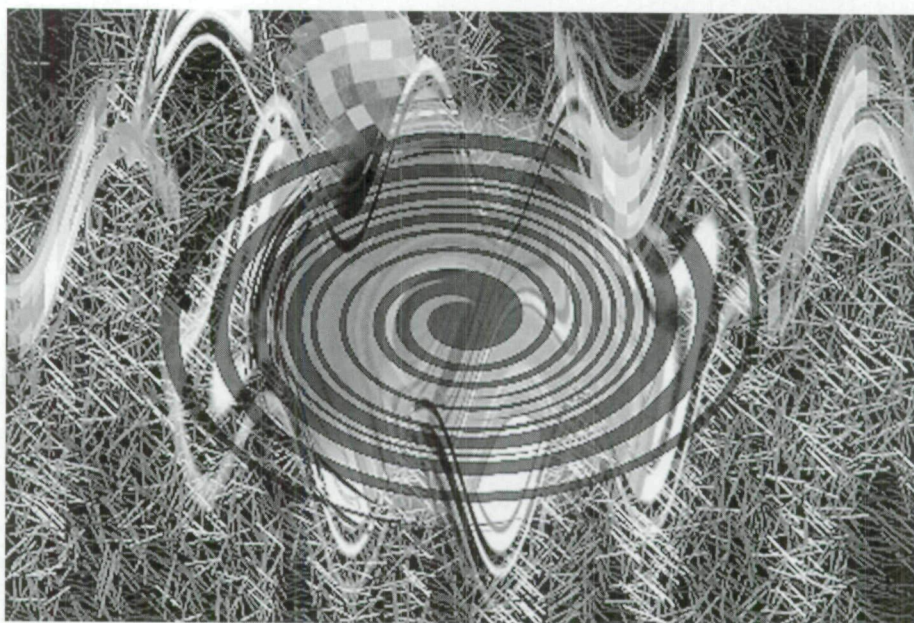


Creativity

in Digital Art Education Teaching Practices



JOANNA BLACK AND KATHY BROWNING

Since the introduction of personal computers, art educators increasingly have adopted new digital technologies into their pedagogy, yet overall that adoption has been a slow process (Black, 2002; Browning, 2006; Degennaro & Mak, 2002-2003; Flood & Bamford, 2007; Gude, 2007; Leonard & Leonard 2006; Lu, 2005; Mayo, 2007). Many teachers remain still infrequent users of technology or avoid using new learning technologies in art classrooms (Degennaro & Mak, 2002-2003; Gregory, 2009). Why is this the case?

Diane Gregory (2009), who has written extensively about technology in art education, perceives that technology usage has decreased in the last decade as art educators contend with restrictive, non-supportive art education policies as a result of the No Child Left Behind Act. Robert Sabol (2010) recently wrote a critique regarding the effects of this act on the field of art education. He presented recent findings of a 21% decrease in funding and a 19% decrease in instruction time for art education, which substantiates Gregory's observations (2010). Additional key factors contributing to art teachers' reluctance to apply technology to their teaching include software difficulties, increasing stress, heavier teaching loads, time constraints, shortage of hardware and software, and lack of teacher support and training (Black, 2002, Browning, 2006; Delacruz, 2004, 2009a, 2009b; Gregory, 2009).

In an ideal world, administrators and policy makers can address such difficulties through writing and implementing supportive art education policies, providing better teacher training and support, decreasing teachers' stress, granting more time to learn about technology usage, lessening teaching loads, and supplying more resources to purchase software and hardware. During the current recession, however, we may not see this occur. Nevertheless, there are ways in which teachers can address these problems in order to effectively integrate technology into the art curriculum. It is recommended that they find technology mentors within their schools and establish creative, student-centered classrooms in which co-learning and collaborative learning takes place between teachers and students on an ongoing basis (Black, 2002, 2006, 2009a; Browning, 2006; Gregory, 2009; Krug, 2004). To integrate technologies, art teachers

above

Figure 1. Vanessa Pavkovic, *Genetically Modified*.
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can plan well, and learn about, use, and immerse themselves in new technologies and networking sites. This requires planning, strategizing, and restructuring. For some teachers, it requires using new pedagogical methods (Gregory, 2009).

Why not just carry on with traditional methods of teaching and learning—with what is tried and true? Why is using technology in our art classrooms so important? Perhaps the answer harkens back, to use Bob Dylan's phrase, to the fact that "*The times they are a changin'*" (1964). Today's students, called "screenagers" by some, are indeed different than even a decade ago (Taylor, 2007), immersing themselves in interactive technologies, becoming creators of digital new media, and socially collaborating on a scale that we have not seen before (Jenkins, 2009; Tapscott, 2009; Taylor, 2007, Wesch, 2007). Along with our students, our world has changed. Art educators like Duncum (2004) argue for a visual culture paradigm reflective of our multimodal "Digital Age." Jagodzinski (2009) argues:

Installation, video, performance art, screen experimentations "beyond" cinema, and especially *the digitalization of the image* all indicate the significance of the inhuman within the processes of creation where signifier and image are in a disjunctive synthesis. It's time that art educators, who earned their reputations within the bounds of modernist studio practices and pre-computer era begin to face the changed landscape; their time has past. (p. 27)

Art educators cannot ignore these emerging modes of literacy (Duncum, 2004; Flood & Bamford, 2007; Stankiewicz, 2004). If we keep along our current path of poorly integrating technology into art classrooms, it is to the detriment of our students. Not embracing technologies within our classrooms can create schisms between our schools and the lived experiences of our youth (Black & Smith, 2006; Boughton, 2005). Not embracing digital technologies can also create schisms between art educators, who have been slow to embrace technologies, and the art world that has been quick to promote, integrate, and exhibit current artists' digital works. Consequently, teachers who ignore new technologies are providing inadequate student preparation for the current art world (Jackson, 1999). Moreover, working in new media develops students' problem-solving skills, visual reasoning skills, and creative thought exploration and expression (Flood & Bamford, 2007).

Further contributing to the aversion to integrating technologies is the argument that computers create antiseptic milieu, are mechanical,

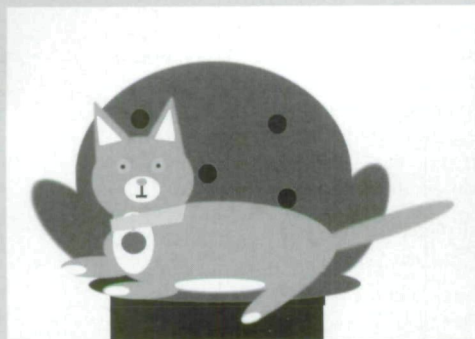
and impede the creative process (Degennaro & Mak, 2002-2003). Even when art teachers employ technology within their classrooms, it is alarming that many use it in ways that do not foster the creative process (Cuban, 2001; Delacruz, 2004; Flood & Bamford, 2007; Jackson, 1999; Taylor, 2007). Gregory (2009) observed the lack of creativity in regard to art teachers' approaches to technology usage:

... art teachers typically use established computer technologies as teaching or presentation tools rather than facilitating student's creative production and thinking, collaborative learning, problem-solving and higher order learning... [Yet art] teachers have the capacity for creative thinking, problem solving, and risk taking... (p. 48)

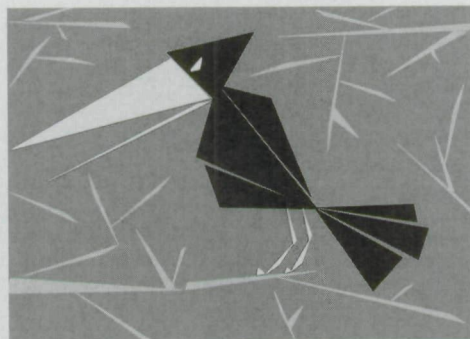
In this article, we postulate that using digital technologies in the 21st-century classrooms does not impede creativity, but instead allows and encourages users to access their creative selves. Crucial to this is the implementation of critical educational strategies and interventions that promote student innovation. The way in which art educators use and integrate technologies into the classroom is crucial to stimulating students' learning, their imaginations, and the creative process. Researchers have indicated that we require a greater number of descriptive studies to promote understanding of successful pedagogical strategies that cultivate higher learning, divergent thought processes, and intellectual inventiveness (Browning, 2006; Jewitt, 2008; Taylor, 2007). In this article, we discuss creativity in visual arts, followed by a description of our research with preservice and in-service teachers in which we have strived to promote teachers' creativity so they will, in turn, use these approaches in their early, middle, and secondary visual art classrooms.

Creativity

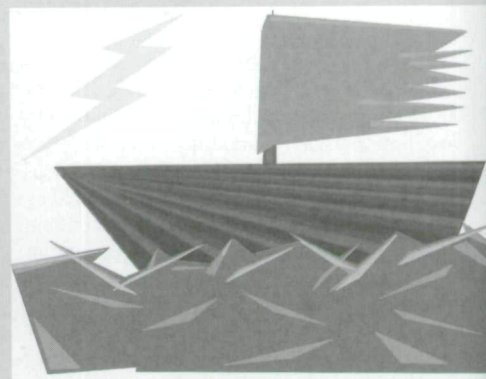
"Creativity involves invention, discovery, curiosity, imagination, experimentation and exploration. During the creative digital process there is a transformation from something known to something not previously known" (Browning, 2008a, p. 213). In digital arts, this involves more than simply learning new software. Crucial to this process is the understanding that, through the act of creation, students express themselves. Just as in traditional arts, in the digital arts "Creativity requires this leap from the known to alternatives but to make it fully the individual must be able to hypothesize, imagine and appreciate the significance of one's transformational activity" (Pickard, 1990, p. 7). An independent, enquiring mind can be developed when one develops creative digital understanding.



left: Lisa LeClair, *Misty*. Image published with permission.



center: Eva Park, *July Bird*. Triangle image published with permission.



right: Sarah Wandziak, *Sea Storm*. Triangle image published with permission.

An important approach to teaching digital arts is recognizing that students need not comprehend all that there is to know about the software. Rather, students can learn the software through the act of creating. Technology, however, should not be the most important part of the learning process; rather, the artmaking process is key. To this end, students can be encouraged to manipulate and play with digital objects and ideas. Psychologist Carl Rogers (1962) describes a condition of creativity to be

the ability to play spontaneously with ideas, colours, shapes, relationships—to juggle elements into impossible juxtapositions, to shape wild hypotheses, to make the given problematic, to express the ridiculous, to translate from one form to another, to transform into improbable equivalents. (p. 68)

Students can develop an appreciation and tolerance for ambiguity. When learning to create and express their ideas with new software, they can improve their patience and appreciate the subtle and larger changes that they learn with graphic effects tools. It takes a while to learn new software. By completing creative digital assignments, students can become skilled at the effects tools while gaining knowledge of ways in which to use the technology creatively. They can combine their past experiences with new ideas, and express themselves while learning new software (Hansen, 1962). Through the process of digital creation, students can build up their self-esteem and may approach digital art education assignments more confidently.

Teachers do not have to know everything about the software; they need only be willing to take a creative approach to technology and learn from their students. If the perspective of the visual arts teacher is “pro-tech” (meaning that they put the technology first), then students may complete mechanical assignments that do not creatively express the self. Most importantly, the creative individual should drive technology, and as students creatively explore art assignments they may learn not only the software, but also express themselves creatively.

Digital realizing can be an abrupt understanding. When using new software, students have technical insights which allow them to make sense of concepts that have resisted traditional understanding. Superimposition, or compositing while juxtaposing ideas, develops postmodern, metaphorical thinking which helps when solving stubborn problems, and can also be encouraged in art education classrooms. Teachers need to allow students the freedom to experiment with software and, when something does not work, try something else. They can spend more time digitally exploring, rather than just completing assignments. “When creating, one tends to strive toward something that will become increasingly specified and realized” (Browning, 2008a, p. 213). Children can be encouraged to look at images and text from a variety of perspectives. Teachers and students are active participants in the teacher/learner environment, and both have to be willing to take risks, which is an important aspect of any creative activity. Students can learn to choose and develop their sense of “digital wonder” while problem solving and creating art (Delacruz, 2009a).

Similar to traditional art, teachers can shape assignments that are open-ended and that encourage problem-solving and student self-expression (Black, 2009a, 2009b; Browning, 2006, 2011; Gregory, 2009). Students may ask, “What do I want to do in the digital art assignment, and how can I go about achieving it?” In the following section, we describe our experiences working with art educators to foster creativity in digital visual arts programs.

Kathy Browning: Preservice Digital Art Education

All areas of the modern teaching curriculum, including visual arts, have an increasing demand to integrate digital technologies. The authors of *The Ontario Curriculum, Grades 1-8: The Arts* (2009) suggest that teachers include digital applications in their visual arts curriculum. The problem is that there is no concrete instruction; the authors of the guideline do not state what technology to use or how teachers are supposed to accomplish the integration of technologies. For this reason, visual art educators have to be drivers for new technologies in their schools to make it happen (Dunn, 1996). Teachers need to be motivated and prepared to use digital technologies creatively.

Despite the importance of using digital technologies, many teachers are not prepared to integrate digital applications in art education. As Greb (1977) realizes,

All teachers tend to teach as they have been taught, and clearly few, if any, have been taught to use new technologies as either art media or teaching tools. Yet few courses are available to increase teachers' familiarity and, therefore, comfort level with computers. And many art teachers who do use technology are self-taught. (p.14)

Many others share Greb's views: research and development of digital visual arts in teacher preparation courses are badly needed (Assey, 1999; Browning, 2006; Coufal & Grandgenett, 1997; Delacruz, 2004; Heise & Grandgenett, 1996; Lebo, 1992; Orr, 2004; Rogers, 1999).

Further, a big gap exists between knowing basic computer skills and using computers for art education. Most of today's students in art education are familiar with the computer; however, as Maddux (2003) observes, “We know that teachers believe they do not have sufficient technical or pedagogical support to help them integrate information technology into their teaching” (p. 45). While there are more courses today to improve preservice teachers' ability to use technology, digital visual arts are not taught sufficiently to help students engage technology creatively. Without formal training, preservice art education teachers must try to find time to get to know software and develop lessons for classrooms on their own. It is the creative use of technology that is missing. As Assey (1999) argues, “Arts specialists not only need continued training in basic computer skills, they need professional development in specific hardware and software related to improving the learning experience in each of the arts disciplines” (p. 13). The creative use of technology in visual arts affects the activities of what teachers can do with their students, including the types of assignments developed. Despite some recent studies (Black, 2009b, Browning, 2006, 2011; Carpenter & Taylor, 2007; Delacruz, 2004) of digital applications in visual arts in different Canadian provinces, there remains a paucity of theoretical research of digital applications in visual arts in schools.

My study entitled *Digital Applications in Elementary Visual Arts: A Case Study in Ontario and Newfoundland Schools* (Browning, 2006) focused on six generalist elementary teachers who use creative digital software applications in their visual arts classes. These teachers were from two different school boards in Southern Ontario and Newfoundland. In *Digital Applications in Intermediate/Senior Visual Arts Education* (Browning, 2011), six teachers in one school district in Newfoundland (three intermediate and three senior visual arts



Katherine Greaves, *Flying High in the Sky*. Cut & Paste image published with permission.



Sarah Wendorf, *Wave Runner*. Cut & Paste image published with permission.

teachers) were interviewed. I also observed classes of all interviewees in both studies. The testimony of the teachers in these studies points to the important role of creative digital applications in visual arts and the importance of teacher training: "Teacher training and technical support in visual arts and digital applications, the type of software used, the attitudes and resourcefulness of teachers, and the support offered by the principal and school play key roles in the teaching and learning of digital applications in elementary visual arts" (Browning, 2006). When students learn to express themselves creatively, they create art rather than just completing an exercise for the sake of the assignment. The technological basics can be taught alongside with artistic theories and principles; when working together, they provide the students with what they need to engage their creativity:

[Teachers] found it helpful to introduce elements and principles of design with a focus on basic shapes, relationship of text to image, cut and paste, and digital photography. What seemed to be wanting in these lessons was the inclusion of process colour theory, masks, re-sizing, and a more thorough knowledge of elements and principles of design (including balance, positive and negative space, and unity), possibly because the teachers lacked training in visual arts and/or the creative use of digital applications. Inclusion of these aspects would support the shift from modernism to postmodernism in schools, particularly the relationship of image to text, superimposition, and multiple ways of viewing and knowing. (Browning, 2006, p. 38)

As a creative artist (Browning, 2008b, 2009; Nisenholt, 2007) and art educator, I know from practice and research the importance of having a creative approach to technology as

it encourages multiple perspectives. Students in my digital visual-arts classes are transformed creatively while learning new software applications and completing their arts assignments. Through the continual process of experimenting and playing with digital effects tools, creative digital art is fostered. By creating digital art, these students become self-motivated and self-directed, while gaining confidence in their digital creative ability and themselves as teachers. Knowledge can be grounded in creative digital applications. As Grabove (1997) stated: "As self-confidence grows, so does the ability to function as self-motivated, self-directed learner" (p. 94). Students in preservice Bachelor of Education courses need to be self-directed learners in order to learn the software while expressing their creative selves. This is a transformative process for these students; as the students feel more comfortable and creative with the software, they become more self-confident.

Students are often intimidated by technology; nevertheless, through creative play they are able to express their ideas while using new software. Zimmerman (1994) addressed similar issues of reflection leading to transformation in preservice art education students and the relationship to self-confidence. Informed by my research in digital photography and art education and my creative approach to technology, students in my digital visual-arts classes engage their creativity while learning new software applications and completing their digital visual arts assignments (examples of students' digital visual-arts assignments are included in this article). Through the continual process of experimenting and playing with digital effects tools, creative digital art is fostered. Students can acquire a creative knowledge base of digital software applications within a visual arts curriculum. Professors of art education courses at the university level can prepare student teachers to teach the traditional methods of visual arts curriculum development, as well as digital visual arts applications, by exposing students to technologies as tools of creativity.

Joanna Black:
In-Service Digital Art Education

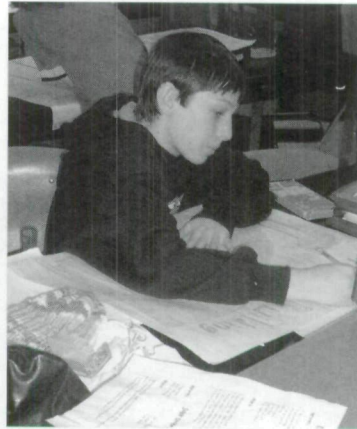
Between 2006 and 2009 I carried out a longitudinal action research study involving in-service teacher training in digital visual arts across the early, middle, and high school levels in a school board located in a central Canadian prairie province. During this time, I examined ways in which teacher training can effectively teach art educators about digital arts. Most university and school board budgets cannot support full-time art and technology consultants, underlining the imperative that art educators learn on their own how to maximize the technology they have in their classrooms. However, there is a rising expectation that visual art educators train their students in digital arts. This was certainly the case within this school board, which had purchased a large number of computers and compatible software. Thus, there was a pressing need within this board to provide training to in-service teachers with little computer experience in this area.

Involved in this study were six schools, three board administrators in visual arts and technology education, six teachers, and close to 500 students. Objectives included examining teachers' processes of learning about digital visual art through ongoing workshops, the practical difficulties encountered, and the successes they experienced. Teachers and students were involved in the research process, and a cyclical process was employed (Denzin & Lincoln, 2000). Typical of the interpretive action research model, I used a repetitive cycle that included researching, observing, reflecting, acting, evaluating, and modifying to research once again over the three-year period (McNiff & Whitehead, 2006). The research was a social, participatory, dialectical process in which those involved collaborated to improve the process of teaching and learning through an ongoing analysis of the workshops and classroom pedagogy. By the end of the study, I found the effectiveness of in-service workshops for teachers and their students were contingent upon fostering the creative process in digital arts education. In short, developing students' creativity was key to the digital art process.

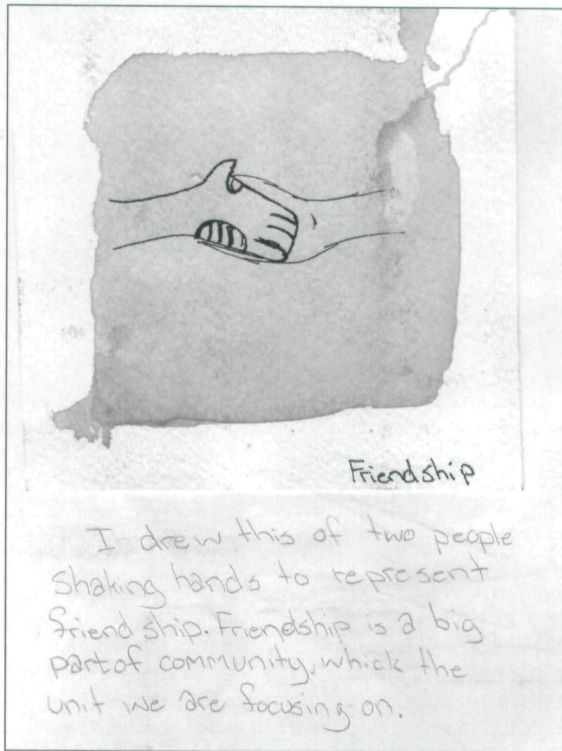
Each year I conducted the research, I worked with the visual arts consultant at the school board to launch a common theme in the schools. Workshops for teachers focused on ways in which to use the technology in relation to this theme. For the first year, the theme was "DigiClosets," wherein students were asked to draw their own bedroom closets complete with contents. Then, working with the software, they animated their closets, giving the sense of motion.

During the second year (2007-2008), the project was redesigned. First, it was based on a broader theme entitled "Capturing Capricious Communities." An open-ended description was given to educators, allowing for diverse interpretations. Students used multimodal educational approaches including traditional, integrated, and digital texts. As a result, each teacher developed the theme differently: In the elementary grades, the teacher focused on environmental community concerns; in middle-school grades, teachers focused on their school communities; and in high school-grades, the teacher focused on the vibrant community in which they live.

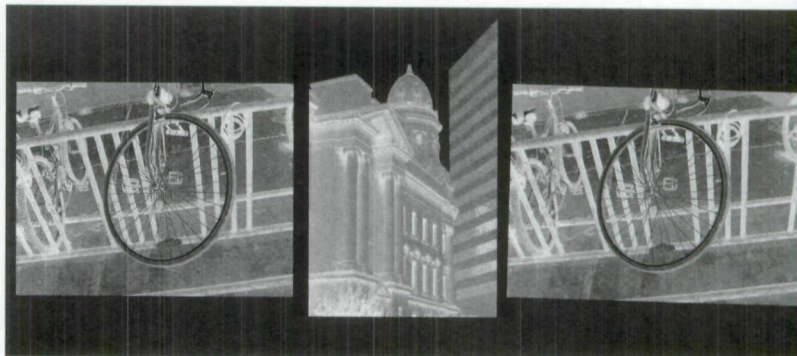
Second, the project was redesigned so that technology was not the driving force; rather, teachers were told to use any computer technology that was available and useful to this project. They were asked what software they wished to use as a focus for the in-service workshops. Participants decided that they wanted video and photography training. Also, unlike the previous year, the workshops had a broader focus. Rather than focus on learning technology,



Grade 8 student working on community project.



Friendship. Created by grade 7 student working on community project. Used with permission of the student artist.



Our City. Image by grade 11 students using digital photographs and video. Used with permission of the student artists.

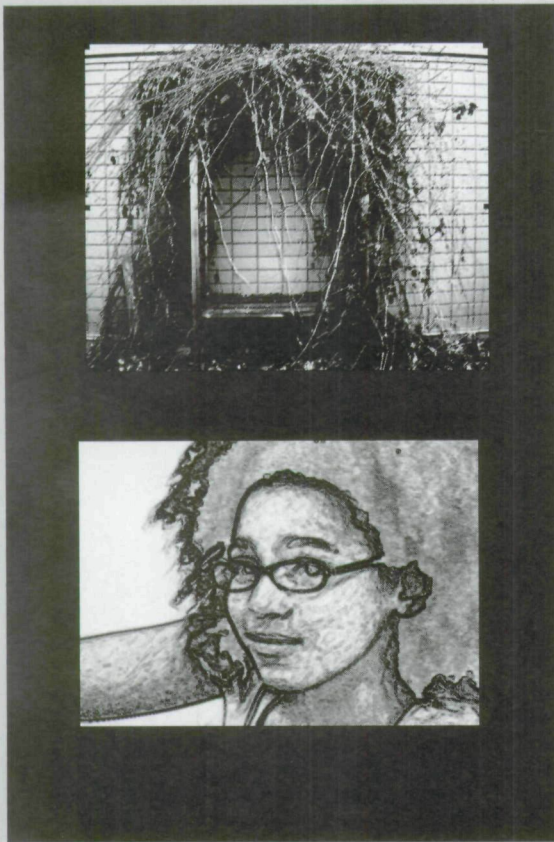


Image of Self: Art Installation. Created by grade 8 student based on theme of memory. Used with permission of the student artist.



Recollections of Travel. Image by grade 8 student using photographic digital compositing. Used with permission of the student artist.

the curriculum also discussed current new media artists, such as Canadian artists John Hartman and Don Gill and their work on community themes. Another part of the workshop centered upon Olivia Gude's theories of postmodern art (2007). We discussed Gude's notions of principles of possibility, including playing, formation of self, deconstructing culture, and reconstructing and constructing social spaces. A final part of the workshop was open discussion on a variety of topics of interest to teachers. One focus was on ways traditional arts could merge effectively with digital arts.

For the final year, participants did not want the approach to in-service training altered. The only change was the theme, which became "Memories in Motion." Like the year before, the theme was broad, the technology was readily available in schools, and the training was based on educators' interests. The foci during workshops were not only on teaching software, but also on current contemporary new-media artists who work with notions of memory, such as Jason Dee and Shaun Wilson. Gude's theories were again discussed, and virtual visits were made to galleries and museums online. Concepts of memory presented to teachers included the personal, societal, collective, and individualized. Teachers decided to deal with the ideas about memory in diverse ways, ranging from students' personal to school collective memories.

Overall, participants stated that the second and third years of the project were a success. Reasons for this were that teachers could interpret the broad themes easily, and these themes offered flexibility through innovative, broad, project-centered, and problem-based curricula. Other research I have done corroborates these research findings. In my study of model Canadian secondary schools (Black, 2009b), I found that art educators not only thrived when they focused on creative art ideas and not technology driving the curricula, but they also flourished when given freedom to shape creative digital arts programs. In previous studies (Black, 2009a), I found that new-media programs thrive when educators are given autonomy. Lastly, in the action research study, students learned the technology based on what was required to creatively develop their art project, so traditional and digital arts flowed together in meaningful ways. In previous case study research about new media, I found traditional visual arts are instrumental and a foundation at the core of the digital art process (Black, Davidson, & Mullen, 2007; Black 2009a; Browning, 2006). Similar to traditional visual arts, the ability to self-express in innovative ways is crucial to successful digital arts pedagogy.

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Creativity in Digital Art Education Teaching Practices

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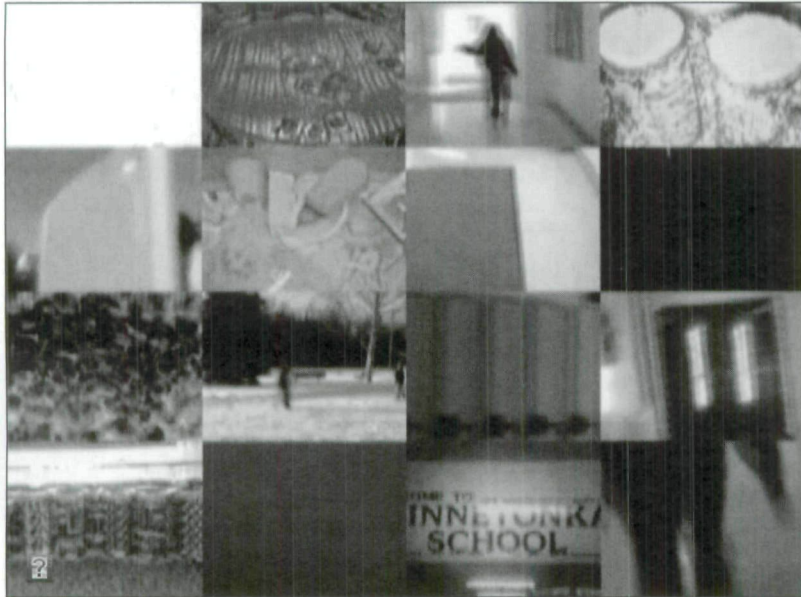


Figure 13. *Digital Quilt Community Project: working with still and moving imagery.* Image by grade 8 students using photographic digital compositing. Used with permission of Collin Zipp, the artist working with the students.

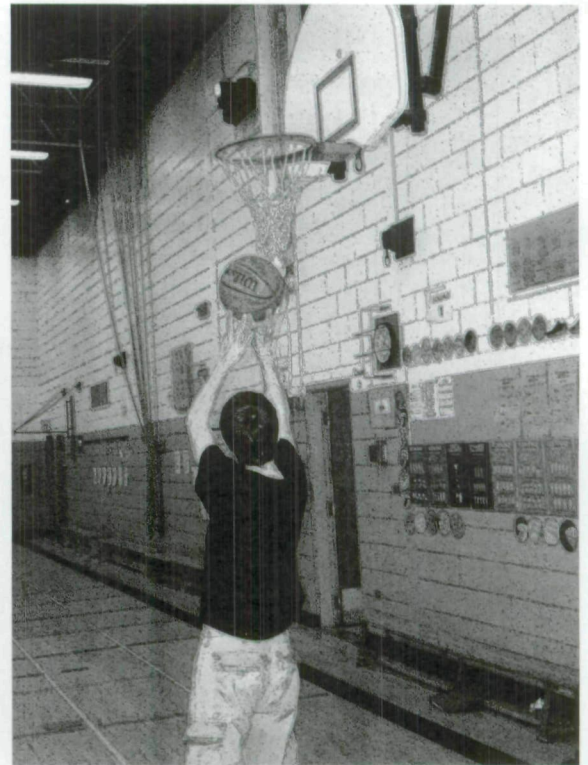


Figure 14. *Personal Explorations of our Community.* Image by grade 8 student using digital photography. Used with permission of the student artist.

Conclusion

We found major obstacles in the effective delivery of digital art for preservice and in-service training within schools. First, consistent with two art education researchers (Gouzouasis, 2001; Jackson, 1999), it was found that technology should not “drive” the preservice and in-service training; rather, teachers should begin with compelling, imaginative, and conceptual ideas. The results indicate that what led to success was the overall pedagogical approach. It is recommended that technology play a secondary role to creative pedagogy enabling the concepts of teaching and learning to drive the art education curriculum. Students achieved success when they learned the technology specifically to enable them to develop their artistic projects in creative, diverse ways. Second, we conclude that allowing autonomy for teachers to creatively shape their curricula in the area of new media leads to greater pedagogical success in virtual classrooms. Finally, we believe that traditional visual arts provide the foundation for digital arts. Like traditional visual arts, fostering students’ creativity is crucial in our digital art classrooms of today.

Technology does not stifle creativity or students’ imaginations; rather, we conclude that art educators can provide students with 21st-century teaching, using their students’ multimodal “digiworlds,” through the teaching of traditional art as the foundation for digital art, and by allowing teachers autonomy to develop effective pedagogical approaches.

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AUTHOR NOTES

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REFERENCES

- Assey, J. (1999). The future of technology in K-12 arts education. *Forum on Technology in Education*. Washington, DC.
- Black, J. (2002). Topsy-turvy teacher-student relationships: An examination of digital multimedia teaching and learning. *Dissertation Abstracts International*, 63, 6.
- Black, J. (2006). Displacing student-teacher equilibrium in virtual learning environments. In J. Weiss, J. Nolan, & P. Trifonas (Eds.), *The international handbook of virtual learning environments: Vol. 1* (pp. 497-524). USA: Kluwer Academic Publishers.
- Black, J., & Smith, K. (2006). Digital reflections: A late January cyberChat about "our gallery of the poetic moving image." In P. Duncum (Ed.), *Visual culture in the art class: Case studies* (pp. 160-171). Reston, VA: National Art Education Association.
- Black, J., Davidson, M., & Mullen, C. (2007). Turning the clock "back to the future:" Some new media approaches to art education. *Canadian Art Teacher*, 6(1), 26-42.
- Black, J. (2009a). Necessity is the mother of invention: Changing power dynamics between teachers and students in wired art classrooms. *Canadian Review of Art Education*, 36, 99-117.
- Black, J. (2009b). Case study research: Three model visual arts new media programs in Canadian secondary schools. *Journal on Education, Informatics and Cybernetics*, 1(3), 1-6.
- Boughton, D. (2005). From fine art to visual culture: Assessment and the changing role of art education. *International Journal of Education through Art*, 1(3) 211-222.
- Browning, K. (2006). Digital applications in elementary visual arts: A case study in Ontario and Newfoundland schools. *Canadian Review of Art Education*, 33(1), 25-41.
- Browning, K. (2008a). Art as transformation. In M. Gardner & U. Kelly (Eds.), *Narrating transformative learning in education* (pp. 211-221). New York, NY: Palgrave Macmillan.
- Browning, K. (2008b). Kathy Browning's digital photography profiled. In F. Blaikie (Ed.), *Canadian art/works: A resource for primary, junior, intermediate, and senior teachers* (pp. 38-40; 127-131). Victoria BC: Canadian Society for Education Through Art.
- Browning, K. (2009). Kathy Browning's digital photography profiled. In J. Butler (Ed.), *The Willisville Mountain Project* (pp. 40-41). Willisville, ON: Willisville Mountain Project Collective.
- Browning, K. (2011). *Digital applications in intermediate/senior visual arts education*. Manuscript in preparation.
- Carpenter, S. B., & Taylor, P. G. (2007). Mediating art education: Digital kids, art, and technology. *Visual Arts Research*, 65, 84-95.
- Coufal, K., & Grandgenett, N. F. (1997). *The community discovered: The search for meaning*. Omaha, NE: Westside Community Schools.
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.
- Degenaro, A., & Mak, B. (2002-2003). A diffusion model for computer art in education. *Journal of Educational Technology Systems*, 31(1), 5-18.
- Delacruz, E. (2004). Teachers' working conditions and the unmet promise of technology. *Studies in Art Education*, 46(1), 6-19.
- Delacruz, E. (2009a). Art education aims in the age of new media: Moving toward global civil society. *Art Education*, 62(5), 13-17.
- Delacruz, E. (2009b). From bricks and mortar to the public sphere in cyberspace: Creating a culture of caring on the digital global commons. *International Journal of Education in the Arts*, 10(5). Retrieved from www.ijea.org/v10n5/v10n5.pdf
- Denzin, L., & Lincoln, Y. (2000). *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.
- Duncum, P. (2004). Visual culture isn't just visual: Multiliteracy, multimodality and meaning. *Studies in Art Education*, 45(3), 252-264.
- Dunn, P. (1996). More integrated interactive technology and art education. *Art Education*, 49(6), 6-11.
- Dylan, B. (1964). *The times they are a-changin'*. (Title track.) [Record]. New York, NY: Columbia Records.
- Flood, A., & Bamford, A. (2007). Manipulation, simulation, stimulation: The role of art education in the digital age. *International Journal of Education through Art*, 3(2), 91-102.
- Grabove, V. (1997). The many faces of transformative learning theory and practice. In P. Cranton (Ed.), *Transformative learning in action: Insights from practice* (pp. 89-96). San Francisco, CA: Jossey-Bass.
- Greb, D. (1997). New technologies in the classroom. In D. C. Gregory (Ed.), *New technologies in art education: Implications for theory, research, and practice* (pp. 13-21). Reston, VA: National Art Education Association.
- Gregory, D. (2009). Boxes with fire: Wisely integrating learning technologies into the art classroom. *Art Education*, 62(3), 47-54.
- Gouzouasis, P. (2001). The role of the arts in new media and Canadian education for the 21st century. *Education Canada*, 41(2), 20-23.
- Gude, O. (2007). Principles of possibility: Considerations for a 21st-century art & culture curriculum. *Art Education*, 60(1), 6-17.
- Hansen, H. L. (1962). The course in creative marketing strategy at Harvard Business School. In J. S. Parnes & H. F. Harding (Eds.), *A sourcebook for creative thinking* (pp. 325-333). New York, NY: Charles Scribner's Sons.
- Heise, D., & Grandgenett, N. F. (1996). Perspectives on the use of Internet in art classroom. *Art Education*, 49(6), 13-18.
- Jackson, T. A. (1999). Ontological shifts in studio art education: Emergent pedagogical models. *Art Journal*, 58(1), 68-73.
- Jagodzinski, J. (2009). Remember just: "Art you 'there' wherever 'you' are?" *Canadian Art Teacher*, 8(1), 26-34.
- Jenkins, H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st Century*. Cambridge, MA: MIT Press.
- Jewitt, C. (2008). Multimodality and literacy in school classrooms. *Review of Research in Education*, 32, 241-267.
- Krug, D. (2004). Editorial: Leadership and research: Reimagining electronic technologies for supporting learning through the visual arts. *Studies in Art Education*, 46(1), 3-5.
- Lebo, M. (1992). *An examination of technology in the art classroom: An annotated bibliography*. (Unpublished doctoral dissertation, Indiana University).
- Leonard, L., & Leonard, P. (2006, Winter). Leadership for technology integration: Computing the reality. *The Alberta Journal of Educational Research*, 52(4), 212-224.
- Lu, Li-Fen. (2005). Preservice art teacher negative attitudes and perceptions of computer-generated art imagery: Recommendations for preservice art education programs. *Visual Arts Research*, 31(1), (Issue 60), 89-102.
- Maddux, C. (2003). Twenty years of research in information technology in education: Assessing our progress. *Computers in Schools*, 20(1/2), 35-48.
- Mayo, S. (2007, May). Implications for art education in the third millennium: Art technology integration. *Art Education*, 60(3), 45-51.
- McNiff, J., & Whitehead, J. (2006). *All you need to know about action research*. London, UK: Sage Publications.
- Nisenholt, M. (2007). Picturing paradox. Profiling artist Kathy Browning's art: Images on icebergs and art educator including digital photography student exemplars. *Canadian Art Teacher*, 6(1).
- Ontario Ministry of Education and Training. (2009). *The Ontario curriculum: The arts, Grades 1-8: The arts*. Toronto: Author.
- Orr, P. (2004). Technology and Art Education: What do we really know about it? *NAEA Advisory*, Spring 2004.
- Pickard, E. (1990). Toward a theory of creative potential. *Journal of Creative Behavior*, 24(1), 1-9.
- Rogers, C. (1962). Toward a theory of creativity. In J. S. Parnes & H. F. Harding (Eds.), *A sourcebook for creative thinking* (pp. 63-73). New York, NY: Charles Scribner's Sons.
- Rogers, P. L. (1999). *Barriers to adopting emerging technologies in education*. Richmond, VA: Virginia Commonwealth University.
- Sabol, R.F. (2010). *Summary of findings from NCLB: A study of its impact upon art education programs*. (Research Report Summary). Retrieved from www.arteducators.org/research/nclb
- Stankiewicz, M. (2004). Commentary: Notions of technology and visual literacy. *Studies in Art Education*, 46(1), 88-91.
- Tapscott, D. (2009). *Grown up digital: How the Net Generation is changing your world*. New York, NY: McGraw-Hill Books.
- Taylor, P. (2007). Mediating art education: Digital kids, art and technology. *Visual Arts Research*, 22(65), 84-95.
- Wesch, M. (Writer and Producer). (2007). *The machine is us/ing us* [Video]. Available from www.youtube.com/watch?v=6gmp4nk0EO
- Zimmerman, E. (1994). Concerns of preservice art teachers and those who prepare them to teach. *Art Education*, 47(5), 59-67.

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