Journal of
EDUCATIONAL
MULTIMEDIA
and
HYPERMEDIA

ASSOCIATION FOR THE ADVANCEMENT OF COMPUTING IN EDUCATION
Articles

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The Journal of Educational Multimedia and Hypermedia (ISSN 1055-8896) is published quarterly by the Association for the Advancement of Computing in Education (AACE), an international, educational, nonprofit organization. Annual US membership/subscription rates: $95 individuals; $140 schools, libraries, and other institutions. Annual non-US membership/subscription rates, add: $15 per journal for postage. US funds/bank. International Money Order, VISA, MC, AMEX, or Discover.
Publisher: AACE, PO Box 3728, Norfolk, VA 23514-3728, USA, 757.623.7588 Fax: (703) 997-8760; E-mail: info@aace.org Copyright 2005 AACE website: http://www.aace.org
Computer Hypertextual "Uncovering" in Art Education

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Teaching for understanding is a traditional goal in education that is enhanced through what curriculum theorists Wiggins and McTighe (1998) called "uncovering." In this article the authors describe the ways that interactive computer technology—hypertext—facilitates this act of "uncovering" as students try out ideas, formulate questions, and rethink previous knowledge to reveal personal connections and associations among complex, abstract, and counterintuitive ideas. Using examples from high school and university graduate and undergraduate art education classes, the authors reveal ways that hypertextual uncovering transforms the traditional "hands-on" practice of teaching and learning in art to a "minds-on" approach that involves explanation, interpretation, application, perspective, empathy, and self-knowledge.

"Understanding" through such hands-on activities as artmaking and critique has been a traditional goal in art education for many years. Teachers demonstrate and teach artmaking techniques or media following a discussion of a work of art and the artist responsible for its creation. Students then try out this newly acquired information by making something with their hands and the materials available to them. Aesthetics, criticism, and art history—the other aspects of the art world—are taught through research and
course readings that are then discussed and “tried-out” through practical “hands-on” activities. Such activities may include formal class discussion, critique, and individual and group work. The goal of these “hands-on” activities is student understanding attained through practical application. The hope is that as students practically apply new knowledge and information they will try out possible solutions, formulate questions, and rethink previous knowledge to reveal personal connections and associations among complex, abstract, and counterintuitive ideas. Assessing, evaluating, and/or charting this process is a constant and continual challenge for art educators. Our students learn in idiosyncratic ways and no matter how many choices of hands-on activities are presented or are available in the classroom, not everyone will respond or understand in authentic ways. Not everyone will make personal connections and associations through hands-on projects. And even if they do, how do we know? How do our students know? How can we more directly involve our students in understanding beyond the art curriculum that which they begin to know in the art classroom?

UNCOVERING IN ART EDUCATION

Education curriculum theorists Grant Wiggins and Jay McTighe (1998) pointed to the aforementioned understanding process as “uncovering.” It could be said that such uncovering is at the heart of the study and making of art. Aesthetician Arthur Danto (1992) looked at art history as a series of erasures of the rules of what could be art, rather than viewing the field as a series of advances or responses to past movements. “And that means that to understand [a work of art] requires reconstruction of the historical and critical perception which motivated it” (p. 47). The context in which the art was made and the context in which we view it affect our artistic interpretation. Such contextual recognition requires us to move past superficial and/or first impressions toward a more sophisticated process of research and thinking through active uncovering.

The idea of uncovering also refers to archeology and the notion that meaning is hidden, buried, and overlooked. That is, researchers and critics uncover meaning embedded within artifacts, material and visual culture, and works of art. Further, some theorists use the metaphor of “layers of meaning,” to describe the relative complexity and density of information related to a particular work of art. Artists also consider layered meaning and the act of uncovering content in and through the works of art they produce. For example, contemporary artist Flo Yv Wong’s *The Baby Jack Rice Story* (1993-1996) documents the story of her husband, Ed Wong, and his childhood experiences living and growing up in the segregated South. In this work, Wong’s silkscreened photographic images of Chinese and African Americans, rice sacks, and textual phrases sewn in black thread are like “layers of meaning” that the viewer must “read and decode” (Carpenter, 2001, p. 19).

Although reading and decoding works of art and text through a process of uncovering is much like searching for buried treasure, the goal of such a process is not to find the one gold chest of true meaning. The goal is the process of recognizing the value of each shovel-full or layer of ideas, their colors, their inferences, and their connections along the way. A hands-on approach to uncovering often muddies the process by simply piling each uncovered layer higher and deeper in an unrecognizable mound. What is needed is an approach that simultaneously encourages uncovering and also provides a means for tracking and capturing the layers of the process. In so doing, layers of meaning are made available for further scrutiny, comparison, connection, reorganization, and association. We see such a learning activity as a “minds-on” approach to meaning making that can be facilitated through hypertextual/interactive computer technology.

UNCOVERING IN AND THROUGH COMPUTER HYPERTEXT

A minds-on approach to understanding through uncovering is not procedural or didactic. It is a highly personal process. Some minds sift slowly and carefully, others blast through several layers at a time, and some dismantle and reconstruct layers simultaneously. Still others randomly and methodically order the uncovering process. It is our contention that the recognition of such varied and pluralist thought processes can be best constructed and viewed through interactive computer hypertext. The notion of hypertext began in 1945 with Vannevar Bush’s * Atlantic Monthly* article entitled “As We May Think.” Working with the scientific community to continue their great strides in research and discovery after World War II was over, Bush proposed a mechanically linked information-retrieval machine, called a “memex.” Twenty years later, Theodor Nelson coined the term “hypertext” and explained it as text that branches and allows choices “connected by links which offer the reader (and creator) different pathways” using the computer (Landow, 1992, p. 4).

Computer hypertext, according to Michael Joyce (1995), “embodies information and communications, artistic and affective constructs, and conceptual abstractions alike into symbolic structures made visible on a computer controlled display. These symbolic structures can then be recombined and
manipulated by anyone having access to them" (p. 19). "Equally important, hypertext permits another glance, a re-visions of aspects of our past and present" (Landow, 1992, p. 202). By placing such a re-visions of knowledge in the control of students rather than teachers, Jonassen, Howland, Moore, and Marra (1999) argued that "educators should think of hypermedia primarily as an environment to construct personal knowledge and learn with, not a form of instruction to learn from (pp. 169-170). In other words, through the construction and reconstruction of computer hypertexts, the act of uncovering becomes a visible and accessible process for students.

Computer hypertext can be created through a variety of interactive linking environments including web pages constructed for the World Wide Web (WWW or Web), presentation software such as PowerPoint and Keynote, and concept mapping software such as Inspiration. "Virtually any content in any subject has potential to be documented in a hypermedia product" (Lockard & Abrams, 2001, p. 239). For the purposes of this discussion, we refer to two hypertext software applications and environments—Storyspace and Tinderbox. While originally designed as literature authoring and organizational tools, we use both Storyspace and Tinderbox more as learning tools (Alessi & Trollip, 2001). Storyspace and Tinderbox hypertexts are constructed of writing spaces—known as lexis or nodes—that can contain text, images, video, and sound. These spaces, as well as specific areas within the spaces, can be linked to other spaces, files, and/or Web sites. Many, few, or one space can be opened at a time, providing a way to visually uncover and compare links, ideas, and ways of thinking. We have chosen to use these two software applications as they offer ways for our students to map their thinking and ultimate learning process through a variety of views—the chart view, the outline view, and the map view. The map view is a graphic representation of the web depicted as writing spaces in the form of boxes and links represented by arrows. A reader or writer of a Storyspace or Tinderbox web can see, access, and comment directly on any or all areas in each of these views. Storyspace or Tinderbox readers create their own paths throughout the web by choosing the order in which they read and add comments, notes, images, and video. This adaptable hypertext characteristic acts as a compelling device—challenging the reader to change the structure of the original web and thereby make it more than it was before they encountered it.

In this article, we use examples from high school and university graduate and undergraduate art education classes to reveal ways that hypertext uncovering transforms the traditional "hands-on" practice of teaching and learning in art to a "minds-on" approach that involves explanation, interpretation, application, perspective, empathy, and self-knowledge. For example, we tell the story of Nathan, a high school senior whose Advanced Placement Portfolio became an exploration of Existentialism as a result of his hypertext uncovering of the work of artist Magritte, Grendel, and the pop band "Sunny Day Real Estate" (see Figure 1). We share the hypertext uncovering process devised for and challenged through an art criticism class, discuss the benefits and pitfalls of hypertext templates, and the contradictory nature of communal and collaborative hypertextual experiences (see Figures 2, 3, & 4). Finally, we share a theoretical and textual approach to uncovering theory and practice through the experiences of graduate students as they use hypertext to critically synthesize and respond to dense and difficult curriculum and learning theories (see Figures 5, 6, & 7).

**High school hypertextual uncovering.** While a senior in high school, Nathan took part in a study that involved 170 high school art students who, over the course of two years, based their art class work and experiences in hypertextual webs created on the computer (Taylor, 1999). Nathan’s Advanced Placement Studio Art class used the hypertextual process to “uncover” common threads or links in their art and research to later formulate a concentration area for their Advanced Placement portfolio.

The College Board’s Advanced Placement (AP) Program offers students the opportunity to do college level work while in high school. Students may take chemistry, English, biology, government, music theory, foreign language, calculus, computer science, economics, art history, and studio art. They are evaluated nationally through testing that is assessed by a team of expert readers (College Board, 1995). The resulting scores provide means for colleges to grant credit, advanced placement, or both. Many high schools also offer incentives for students and teachers to participate in the Advanced Placement program, such as weighted credits, special seals on their diplomas, additional planning time, and recertification points through training workshops.

The College Board’s AP Studio Art Portfolio consists of works of art created by students who follow specific AP guidelines. There are three required sections: (a) quality, which reflects the development of a sense of excellence in art, (b) concentration, which demonstrates an in-depth, personal commitment to a particular artistic concern; and (c) breadth, which reveals a variety of experiences in using the formal, technical, and expressive means available to an artist. The AP students participating in this study focused their hypertextual experiences on the second section of the portfolio, the concentration.
A concentration is a body of related works based on an individual's interest in a particular idea expressed visually. It focuses on a process of investigation, growth, and discovery. It is not a variety of works produced as solutions to class projects, or a collection of works with differing intents... In this section, you are asked to show, in depth, your personal commitment to a specific visual idea or mode of working. You are to present an aspect of your work or a specific project in which you have invested considerable time, effort, and thought. In this section, the evaluators are interested not only in the work you present, but also in visual evidence that you have thought out and pursued a particular project or way of working; the work should show the evolution of an idea or a process of investigation. (College Board, 1995)

Following a week of practice transferring paper webs and concept maps into the computer, creating links, and working with other students, Nathan began creating his own Storyspace™ web. At the end of one semester, his hypertext computer web consisted of 67 lexia with 80 links connecting his study of artists and their work, his own art work and journals, music, video, and literature. He titled his web file “Nathan's Fantastic Web Journey.” He used no specific pattern for organizing his web. He simply created his writing spaces and placed them wherever they would fit on the computer screen. The first view of his web exhibits spaces that contain his own art works, groups of his works, specific artists or styles, and one space that held 13 other spaces dealing with his study of the novel Grendel. Links from this space included a connection of the words “looking in” with two of Nathan's works of art, both entitled Refactor. One work was a computer generated self-portrait that Nathan created using the video camera and the computer software Adobe Photoshop™. Nathan created another work based on this computer image using oil paint and a palette knife. Nathan explained, “The existential theory asserts that human beings can observe their lives from a distance as if they are outside of a house, looking in through a window” (Nathan, Storyspace™ web, 1997). The stylized image is reduced to blocks or windows of black and white. Nathan was in essence “extracting sophisticated ideas” (Wiggins & McTighe, 1998, p. 21) as he worked to understand or “uncover” his study of Sartre and link this information to his own art. He was taking a “minds-on” approach to his study as he created yet another link from the words “he cannot” in the original Gardner space to his work entitled Nine. Nathan created this abstract painting over a text passage in Gardner's book to reveal empathy for the character, “The sparse lines reflect Grendel’s feelings of alienation and emptiness. The passage from Chapter Nine of Grendel explains the coming of winter, a pure white season. But, Grendel’s world is not pure. It is full of the blood of his enemies” (Nathan, Storyspace™ web, 1997, Figure 1).

Figure 1. Nathan used hypertext to “uncover” his Advanced Placement concentration topic.

The words “sparse lines” were linked to a video clip from the band Sunny Day Real Estate’s song “In Circles.” Two links from the words “alienation and emptiness” were connected to a painting Nathan created of the band’s lead singer Jeremy Enick and to a fantasy portrait of the Beowulf character, Grendel. This space was linked back to the original Gardner space. Another lexia within the Grendel space contained portions of the song lyrics that included “The rain was there to wash away my tears. I wanted to be them, but instead I destroyed myself. Things fade. Alternatives exclude” (Nathan, Storyspace™ web, 1997).

Assessment of this project began with an evaluation of the degree to which Nathan and his classmates answered specific questions and added specific required information in their hypertext webs. However, as the students took more ownership of their hypertextual constructions, the webs were not so easily uniformly evaluated. It became clear that the learning
and discovery experience of each student, although made evident in the varied notes and links in the webs, was actually quite idiosyncratic. We began looking more towards student learning sensibilities in our assessment of the experience.

For example, upon Nathan's return from a school trip to Washington, DC, he rushed into art class with notes, pamphlets, and numerous ideas for works that he would like to create and spaces that he would like to add to his Storyspace™ web. Even in what Nathan considered to be his break from school and schooling, he appeared to be constantly thinking in intertextual ways. He was continuing his hypertextual experiences by sharing his thoughts and connections with the other students who went along with him to the museum. And, he anxiously returned to the art class with important information to add to his Storyspace™ web. This is the kind of student all teachers dream of having, Nathan wanted to see and learn about more art than we had studied in the art class. He was driven to use his free time on the field trip to do this when many of his classmates were lunching at the Hard Rock Cafe. He wanted to share his thoughts and ideas about the art through his own evolving perspective. Nathan said that he really didn't even think about it. He just did it. It was part of him and the way that he wanted to be now. In other words, his self-knowledge had changed. And one way that he could describe this way of thinking or way of being was through his Storyspace™ web. Throughout Nathan's web we see a constant reference and connection with existentialist theory. The ways that Nathan is able to connect his research of minimalist and sensory artists with the philosophies of Sartre and Camus is quite extraordinary for a high school student. The point is that Nathan did this "uncovering" from his point of view with and through his hypertextual experiences. It was his web-making in the computer that illustrated and encouraged this kind of reflective, intertextual, and connective way of thinking.

**Uncovering Art through Hypertextual Criticism.** According to art criticism theorist Terry Barrett (1994), "Good criticism is careful and engaging argumentation that furthers dialogue about art and life" (p. xii). As any museum docent will attest, the goal of "talking about art" is to look longer and more deeply attempt to "uncover" the meaning of a work of art as well as the way it means. Art criticism theory and models are many and diverse. While these all together however is the basic premise that art is worthy not only of writing, discourse, and engagement, but that its existence depends upon a "minds-on" approach to it.

The primary goal for the university art criticism courses that we teach is to promote and provoke "minds-on" ways of engaging with works of art. As the courses are directed primarily toward future art teachers, we work hard to engage our students in criticism approaches that are relevant to their contemporary lives in hopes that they will continually strive towards this end with their own future K-12 students. In other words, we premise our teaching of these classes on the idea that good art criticism results from many varied and pluralist voices, theories, and models.

To further our goals, we use computer hypertext for discussion, lecture, and individual and group criticism activities. Typically students learn the software by working together in the computer lab. Approximately one half of the class takes place in the lab so that any questions or issues relating to the software or hardware may be directly addressed for everyone. The lab is open 24 hours a day for students to continue their work. Because the software is so easy to use, we have rarely had any problems with its application. In addition, as our students often work together, they help each other with any computer specific issues. One example involved our students in uncovering artist Joseph Norman's *Bring Me The Head of Franz Kafka,* 1996 lithograph (Figure 2). Students applied their understanding of artistic style and medium through their hypertextual discussions of the artist's use of such formal structures as repetition in the highly stylized and elaborate lithographic printing process. They contemplated the subject matter of the work—elaborately constructed fish heads and created spaces where they employed semiotics theory, they uncovered Marxist theoretical implications. Norman's intense interest in Franz Kafka's *Metamorphosis,* where the main character Gregor Samsa transmogrified into a horrible insect inspired him to create a work that represented one of the most heinous acts in U.S. history—the death of Emmett Till (Taylor, 2002). In 1955, 14 year old Emmett Till was brutally tortured, lynched, and mutilated in Money, Mississippi as a result of a racist act that horrified both blacks and whites in this country. Norman created gorgeous yet monstrous fish heads to represent the metamorphosis of Till from young black Chicago boy to civil rights martyr and that of his body from smooth, sleek, and youthful to battered unrecognizable mass. A few of the students were able to comment and share their personal revelations as a result of this critical inquiry in their computer hypertext. They created self-reflective spaces as well as links within spaces to reveal many intricate connections between the varied criticism approaches they used when looking at this work. For example, they created a space to explain how a feminist criticism model of Norman's work could reveal fragility and vulnerability of society.
Figure 2. One hypercriticism example involved our students in communally responding to artist Joseph Norman’s Bring Me The Head of Franz Kafka, 1996 lithograph.

Unfortunately time and technology did not allow many students to work on the communal criticism hypertext at the same time. Most of the students created their spaces separately and then simply took turns adding their information and links. Time to read and follow each and every space and link before adding their own, was often not possible. And, often as students read other’s spaces, they felt that their information should be changed. In retrospect, such rethinking and reconstruction of a communal criticism hypertext is more akin to an uncovering approach to art criticism regardless of the final product. As Wiggins and McTighe (1998) explained, understanding “requires multiple lines of research and discussion; uncovers rather than covers up the subject’s controversies; serves as discussion starters, problem posers, rather than leads toward ‘the’ answer the teacher wants” (p. 30).

Despite the teacher-directed nature of templates, we find that our students need some didactic form to get them started in the hypertextual criticism process. For example, we use an art response template that is designed like a wheel with the work of art in the center and radiating links, like spokes to spaces on one side that deal with the context of the artist and the other side dealing with the student’s life (Figure 3). Another template example features spaces for the student’s choice of art linked to various criticism models. And still another template suggests critical activities such as debates, role-playing, interviews, and ranking. Typically, students begin by simply answering the questions and adding images and other required information in these spaces. However, as they become more comfortable with the process and more importantly, as they realize that the assignment is not evaluated according to their prosaic responses, they begin adding and changing the spaces in these templates. Much to our delight, the templates become unrecognizable in the process (Figure 4).

Figure 3. Our art response template is designed like a wheel with the work of art in the center and radiating links, like spokes to spaces on one side that deal with the context of the artist and the other side dealing with the student’s life.

One hypertextual criticism activity that we find especially successful is what we call “hypertag” (Figure 4). Students work in teams on a single hypertext file by taking turns adding information, linking, and commenting upon each other’s additions to the web. As the files can be saved individually along the way, the students are free to change and alter any and all information at any time. It can be a very empowering and freeing experience as well as frightening. “Real knowledge involves using learning in new ways” (Wiggins & McTighe 1998, p. 40). Students playing hypertag find...
that often those ways are contradictory to each other and to the teacher. The point to the experience is that the students reveal to us that they understand the art criticism process and its many varied and pluralist forms. The do this through personal explanations and interpretations supported and justified by their understanding of criticism theories. Through comments, debate, and application, they reveal to us the ways their perspective involves critical views of not only the art and study but of themselves. Most importantly, the hypertext experience encourages them to uncover their own empathic abilities to find value in another’s ideas and experiences (Figure 4).

Figure 4. One hypertextual criticism activity that we find especially successful is what we call “hypertags.”

Assessment of these projects also begins with the completion of the notes and links prescribed in the criticism template. However, as the primary goal of the project is to provoke students to move beyond the prescribed template, we require students to self-assess and assess the work of their fellow students several times throughout the semester. As we believe strongly that assessment should contribute to the learning process, in so doing our students are encouraged to change and/or add more information and thinking to their webs. We monitor this change and growth through comparisons of the various stages of web construction and by requiring the students to color-code additions by date.

Graduate students use hypertext to uncover theory. Teaching or leading graduate students through dense and often difficult theory is rewarding, exciting and yet, filled with constant concern. Are they getting it? Do they understand the ways that such critical theories as liberatory learning apply to their own future teaching and research? Can we be certain through mere class discussion or our students’ final research papers, that this new knowledge is becoming their own?

Begun as a way to demonstrate the fact that interactive computer technology can simply be a part of every class we teach, we require students in our graduate classes to use computer hypertext applications to synopsize, chart, and respond to all of the readings and discussions required in the class. In the process they see for themselves “what is worth understanding and what needs further exploration and understanding from further activities and readings” (Wiggins & McTighe 1998, p. 19). As in the criticism classes, these students typically spend one half of their class time in the computer lab learning and working with the software.

The graduate students especially like the hypertext software Tinderbox because of its capacity to create background adornments and images (Figure 3). For example, one student took a very graphic approach to organizing her thoughts and responses to the readings by creating colorful titled adornments. She color-coded her notes to represent each reading as well as spaces for her personal ideas and teaching plans. She used the linking tool to illustrate her perceived connections between the different theories and explained these connections through link titles. This student used her hypertext to outline the theories and to chart or uncover her ideas about them by linking together notes containing explanations and synopses (Figure 6).

Usually, I would just read the material and wait until the class discussion and hope that I get it. But now since I am using the computer hypertext, I read differently—sometimes several times—so that I can make notes and connections between what I am reading to what I have read before or to my teaching so that I can see it and understand it better (graduate student, personal communication October 7, 2003).
students in organizing their own research and writing. Students typically begin creating their hypertexts in a similar way to writing on index cards or underlining, highlighting or making notes in their books. However, unlike their stacks of books and pieces of paper on their desks and tables, their hypertexts become manageable spaces where they can see and compare their notes, synopses, and ideas simultaneously on the computer screen (Figure 7). For example, one student compared the dense and often difficult writings of critical education theorist Henry Giroux to the gentle and empowering words of liberatory education theorists Paulo Freire and Myles Horton. With a click of the mouse, she opened spaces in her hypertext that contained her synopses and notes from these authors’ books. Through comparison, explanation, and interpretation, this student began rethinking her thesis research that originally began as a simple bookmaking art project. On the computer screen she began to understand that Giroux’s severity actually mimicked Freire and Horton’s tender prodding. It all became very personal to her. In other words, her hypertext uncovering was a self-revealing process that caused her to empathize more with her future students. As a result she rethought her simple bookmaking project and transformed it into a more expansive and meaningful study of cultural identity and race. Using her mentor, artist Beverly Buchanan’s slave house sculptures, this student worked with a southern elementary after-school program to study and create books that represented and re-presented their perceptions of cultural, racial, and economic identity. Her thesis project evolved into a more minds-on approach, linking theory to practice while uncovering her own ideas and concerns in the hypertextual process.

Figure 5. Students in our graduate classes use computer hypertext applications to synthesize, chart, and respond to all of the readings and discussions required in the class.

Figure 6. Students used her hypertext to outline the theories and to chart or uncover her ideas about them by linking together notes containing explanations and synopses.

In addition to inspiring the students to read more closely, using hypertext to uncover theoretical readings in the graduate classes also assists the

Figure 7. The hypertexts become manageable spaces where students can see and compare their notes, synopses, and ideas simultaneously.
It is important to note that some of our students come to class with very little computer expertise or experience. In fact, most students who have little computer experience take our classes to become more proficient and comfortable with using the computer in their future teaching and learning. On the other hand, many more of our students have a great deal of computer experience and easily acquire the skills needed to use hypertext software. We typically find that students thrive on working together. Once they discover a new way of working, they eagerly share it with the class. We believe that much of the success of our classes is due to a communal approach to learning in and through the hypertext applications we present for our students. In addition to a communal motivational approach, our students are thrilled with the possibilities that working in a hypertextual environment has for their future research and/or teaching. They use their webs as presentation tools. They are easily able to copy and paste information from their hypertexts into formal papers. And they report that the ease with which hypertext allows them to change, correct, and rearrange, greatly assists them in organizing their thesis research.

**HYPERTEXT AND LEARNING**

Writing extensively on the use of hypertext in literary composition, George Landow (1992) of Brown University viewed hypertext as a means for elucidating multiple possibilities:

One of the most interesting and exciting things about hypertext appears in the way it offers us a means of looking a short way into one or more possible futures. Equally important, it permits another glance, a re-vision of aspects of our past and present, because even a brief experience of reading and writing in a hypertext environment denaturalizes and demystifies the culture of the printed book. The strangeness, the newness, and the difference of hypertext permits us, however transiently, and however ineffectively, to de-center many of our culture’s assumptions about reading, writing, authorship, and creativity. (p. 202)

Similarly, using hypertext to explore a work of art, reading, or the process of creating an art concentration may serve to demystify or at the very least engage an inclusive and collaborative interpretation experience through discourse, activity, and the production of meaning. A first look at a Storyspace™ or Tinderbox™ map view of a hypertext is often daunting if not a little dizzying. Some may even say that hypertext is so complex that it reminds them of a scattered and cluttered room. The very messy, complex nature of hypertext may in fact be the key to its use as a successful educational approach in art education.

Caine and Caine (1997) stated, “We are meant to learn from naturally complex and ‘messy’ experiences” (p. 11). This idea seems similar to an ill-structured domain of knowledge as suggested by Feltovich, Spiro, and Coulson (1993). Spiro noted, “As content increases in complexity and ill-structuredness, increasingly greater amounts of important information are lost with [traditional] linear approaches” (Spiro & Jheong cited in Maddux, Johnson, & Willis, 2001, p. 156). In addition to the belief that our minds rarely function in orderly patterns or fashions, deep and inventive thinking is often divergent and sinewy and results from seemingly inextricable conflicts, obstacles, and problems. Classroom experiences that promote complication and ambiguity are more likely to inspire meaningful and relevant ways of knowing than those art education practices that are linear or compartmentalized.

According to Arthur Efland (2002), some textbook writers and lecturers make the mistake of “artificially neatening” domains for the purpose of simplifying the learning that is to take place. For example, “When instruction misrepresents the level of ambiguity that may be characteristic of a work or art, its possible meanings are lost to the learner” (p. 11). Similarly, artmaking is rarely a neat or linear experience. “By placing an artist within a tradition of artmaking, teachers help students realize that ‘art comes from art’—that all artists depend upon models and prior artmaking” (Walker, 2001, p. 97). Artists either learn or are taught to embrace obstacles and challenges and to welcome mistakes as possibilities for expression or inventiveness. We believe that studying and learning about art and artmaking should echo this ill-structured, complex, and ambiguous process. Whether through an instructional, reflective, or interpretive perspective, the use of computer hypertext may serve as a model for the kinds of divergent and inventive thinking integral to the study and making of art. Interactive computer hypertext is one way of seeing while exploring, of witnessing while performing, of correcting while blundering, and uncovering.

Hypertext is before anything else a visual form. Hypertext embodies information and communications, artistic and affective constructs, and conceptual abstractions alike into symbolic structures made visible on a computer-controlled display. Hypertext offers readers/viewers the ability to alter the original text [art] through their choices—shifting the way humans think. (Joyce, 1995, pp. 19-22)
Our students’ hypertextual constructions become vantage points from which they not only view but also participate in their learning, understanding, and ultimate uncovering. Unlike a linear approach to learning, hypertextual experiences provoke an increase in complexity and ill-structuredness called for in Spiro and Jehng’s (1990) cognitive flexibility theory. This theory focuses on “the ability to spontaneously restructure one’s knowledge in many ways in adaptive response to radically changing situational demands” (p. 165). When discussing the application of computer technology to this theory, Spiro, Feltovich, and Coulson (n.d.) cautioned that only hypertext-based systems that themselves possess characteristics of flexibility are capable of promoting advanced ways of knowing and learning. Similarly, Alessi and Trollip (2001) called for computer “mindtools” that encourage “collaboration, active and constructive learning, and are used in authentic learning contexts” (p. 309). Jonassen (2000) considered mindtools to be any software that enhances critical thinking, amplifies cognitive functioning, assists in reorganization of knowledge, is generalizable for use in a variety of situations, and is learner controlled” (cited in Alessi & Trollip, p. 308). In a hypertextual analytical process of reading and uncovering we and our students are forced to “think about the content in a concrete and complete fashion. Without such clarity, it is impossible to draw the relationships between all the parts” (Alessi & Trollip, p. 309).

Our interest in the power of hypertext, and our desire to encourage change comes from our belief that if encouraged to think hypertextually, contemplation, reflection, reading, and writing become important, liberating experiences for teachers and students of art. In a 1995-1997 study involving approximately 250 art students in one American high school, the use of interactive computer hypertext provided a model for liberatory learning in art education (Taylor, 1999). From the facilitation of assessment in the form of exam projects to Advanced Placement concentration development and process-folios, the most liberatory aspect of the hypertext-based art education was that the “self” of the students became important and central to their study for the first time.

In other words, the students involved in this study began to see how they could understand and relate their experiences to their “selves,” their lives, their hopes, and their dreams. And in the process, they began to see that they had the power to not only direct their study in the classroom, but to direct and challenge their own plans for the future. The students involved in this study liberated themselves through the connective and intertextual ways of knowing possible through their hypertextual experience. (Taylor, p. 284)

While computer technology is increasing and improving at a rapid pace, Alessi and Trollip (2001) observe that “software that promotes truly active learning is still the exception” (p. x). What this means is that it is up to teachers, school and district administrators, and curriculum coordinators to take charge in the design and implementation of curriculum that promotes active student learning through the use of existing computer technology. If the machines and software are not able to perform these changes then it is the responsibility of dedicated, motivated educators to put into action the myriad of ideas that race through their minds daily.2

Educators must put their ideas for improving educational experiences into motion. What we are advocating for art education is entirely different from simply turning on the computer to make art or create a web page. We are talking about the manipulation and exploration of ideas and the possibilities for learning that arise when students are encouraged to uncover meaningful connections and see simultaneous, multiple responses to a single question, task, problem, example of visual culture, or work of art.

**CONCLUSION**

The implementation of interactive computer hypertext in art and art education has been presented and described in this article as a more effective and meaningful approach to the study of art than historically traditional hands-on methodologies. The implication here is that along with new technologies come new and relevant ways of knowing and understanding.

First, throughout these experiences we find that multiple and interconnected thinking is not only made possible as a result of working in a hypertextual environment, it is provoked, challenged, and therefore simply becomes a way of knowing (Carpenter & Taylor, 2003). Second, it could be said that hypertext mimics the associative way that the mind works—much like the way we wander from the point in a conversation. But unlike mind wanderings that take us places from where we sometimes cannot find our way back or understand how we got there, computer hypertext provides us with both a visible and tractable representation that we can sift through to “uncover” many ways or paths to understanding. Third, understanding through such uncovering is a personal process and journey that is multidimensional and diverse. Fourth, we believe that allowing for and encouraging multiple ways of understanding is crucial to education and interactive computer hypertext is one way of both promoting and provoking this thoughtful and personally relevant minds-on approach.
References


Notes

1 Vannevar Bush was then the Director of the National Office of Scientific Research and Development in Washington, D.C.

2 In this study we used hypertext to facilitate our interpretation of art. In Taylor’s (1999) study, students used hypertext for assessment, to assist them in developing Advanced Placement portfolio concentration areas, as process-folios of their own artmaking, and for communal interpretation activities involving music videos. Because we believe that the possibilities for using this way of working, thinking, and knowing in art education are limitless, and that art teachers are intrinsically inventive in their practices, we deliberately do not prescribe specific strategies here.