CHAPTER 20

Computer Technologies As Supportive Tools to Enhance Learning in Social Studies

Susan Gibson

Computers have become commonplace tools in most Canadian schools. Both this ready availability and the introduction of information and communication learning outcomes as part of the school curriculum have put increased pressure on teachers to become competent and confident users of computer technology. Alberta's Information and Communication Technology Program of Studies, for example, has three interrelated categories of general learning outcomes for students:

- those intended to develop a foundation of knowledge, skills, and attitudes, including understanding the nature and impact of technology

- those that address specific productivity processes such as composing, organizing, and manipulating information

- those that require the application of these processes through inquiry, decision-making, collaboration, and problem-solving[1]

Alberta teachers are mandated to implement these outcomes into their teaching of all core subjects beginning at the primary level. Teachers have primarily been using computers to develop students' technological skills and competencies, thus addressing the first two outcomes. The third outcome, using technology to support inquiry, decision-making, collaboration, and problem-solving, has been addressed less frequently. This chapter will focus on ideas for implementing this third outcome.

It's About More Than Simply "Using" Computers

According to the research literature, only a small proportion of social studies teachers are regularly integrating computer technologies in their teaching, and few of these could be regarded as promoting advanced learning using information and communication technologies.[2] According to Glenn Kleiman, "Many computers in schools, even up-to-date multimedia computers with high-speed Internet access, are not being used in ways that significantly enhance teaching and learning."[3] The main problem seems to be that teachers still tend to use computers as add-ons to the ways they have traditionally taught. As noted by Howard Gardner, "When the [computers] are plugged in, they are all too often simply used to 'deliver' the same old 'drill-and-kill' content."[4]

The key to best use is not the fact that computers *are* being used, but *how* they are being used. Maisie McAdoo contends:

> The issue of equity now centers not on equality of equipment but on quality of use. The computers are there yes, but what is the real extent of access? How much computer training are teachers getting? And are schools able to raise not just students' level of technical proficiency but also their level of inquiry, as advanced use of technology demands?[5]

Computer use needs to go beyond low-level tasks that require students to demonstrate understanding of how to operate the various technologies with proficiency, to more challenging tasks that encourage more advanced learning using computers as "mindtools." When teaching is transformed through the use of computer technologies and when learning happens in ways that would be difficult or impossible without the use of these technologies, only then have we achieved success.

The Promise of Constructivism

According to Cameron White, the merging of technology and constructivism offers much hope for the future of education.[6] Sharon Adams and Mary Burns concur, saying "constructivism provides a valuable framework for using computers and other technologies in productive, interesting ways."[7]

Constructivism is a theory about how people learn. In connecting constructivist learning principles and pedagogy, Mark Windschitl identifies the following features that characterize teacher and student activity in a constructivist classroom: [8]

- Teachers elicit students' ideas and experiences in relation to key topics, then fashion learning situations that help students elaborate on or restructure their current knowledge.

- Students are given frequent opportunities to engage in complex, meaningful, problem-based activities.

- Teachers provide students with a variety of information resources as well as the tools (technological and conceptual) necessary to mediate learning.

- Students work collaboratively and are given support to engage in task-oriented dialogue with one another.

- Teachers make their own thinking processes explicit to learners and encourage students to do the same through dialogue, writing, drawings, or other representations.

- Students are routinely asked to apply knowledge in diverse and authentic contexts, to explain ideas, interpret texts, predict phenomena, and construct arguments based on evidence, rather than to focus exclusively on the acquisition of predetermined "right answers."

- Teachers encourage students' reflective and autonomous thinking in conjunction with the conditions listed above.

- Teachers employ a variety of assessment strategies to understand how students' ideas are evolving and to give feedback on the processes as well as the products of their thinking.

Chris Dede suggests:

By putting learning in the hands of the students, the 'constructivist' model turns on its head the old style of schooling in which a teacher stands in front of the room and lectures. . . . Classroom environments become places in which students take charge of their own learning.[9]

Cameron White calls for constructivist activities that promote inquiry, that begin with students' prior background knowledge and experience, and that engage learners in creatively applying the resultant new knowledge. These types of learner-centred activities, he argues, can "encourage students to develop problem solving and critical thinking skills, and to apply, analyze, synthesize, and evaluate knowledge, skills, and attitudes."[10]

The challenge for teachers then is to transfer these understandings of constructivist learning principles to the use of computers as teaching and learning tools. According to the research, the most effective uses of computer technologies in schools occur when computers are integrated into teaching and learning in ways that promote problem-solving, collaborative inquiry, creative and higher-level thinking, decision-making, and both the constructing of and the representing of knowledge for an audience.

Computer-Enhanced Constructivist Learning Environments

This section examines some of the ways that computer technology can be used to address the features of the constructivist classroom as identified by Windschitl and as supported by research on effective uses of computers as learning tools. These applications have been synthesized under the following headings:

- student engagement in problem-solving activities

- students revealing and reflecting on their prior and new knowledge through multiple representations

- students learning with a variety of information resources and tools

- students working collaboratively

Student engagement in problem-solving activities

One approach to using the Internet as a tool for teaching and learning in social studies is using WebQuests. WebQuests use problem-based learning to encourage students to apply critical and creative thinking, problem-solving skills, and content knowledge to real-world problems and issues.[11] A WebQuest is a specially designed website that engages students in a task or inquiry to solve a problem or to create something new.[12] Through a WebQuest students can actively explore issues, find answers, and reach moral and ethical decisions about contemporary world problems. Students can also engage in activities that help them look at historical events from a number of different perspectives. While engaging in inquiry through a WebQuest, students are constructing their own personal meaning about the problem under investigation. WebQuests can also enhance students' social skills, as many involve working in cooperative groups or role-playing. Posting the results of the WebQuest online adds to the collaborative nature of

the learning, as students then interact with others beyond the classroom walls.

Usually a WebQuest consists of an introduction, a task, a process, an evaluation tool (usually in the form of a rubric), and a conclusion. The introduction lays out the task or the problem to be investigated. Students are then assigned roles or provided with different perspectives on the issue or problem being investigated. Working either independently or in groups, they explore, analyze, and synthesize the information they access, and then transform it in some way to demonstrate their understanding of the problem. The goal is for students to use the information collected to construct an argument based on evidence. They then share their findings with the class. The teacher acts as facilitator, checking to see that students understand their roles and stay on task. Most of the resources used for the inquiry are other websites that have been vetted by the teacher and linked directly to the WebQuest. Many WebQuests allow direct access to experts, current news sites, and searchable databases.

A WebQuest can be chosen from a series of pre-designed WebQuest collections (see http://webquest.sdsu.edu/ or http://www.kn.pacbell.com/wired/bluewebn/) or the teacher can create one to address a specific topic of study. The latter allows for more active student involvement in deciding what problem to investigate and then designing an interesting and relevant learning experience. The WebQuest can easily be tailored for diverse learning needs in the classroom. Students can be encouraged to try developing their own WebQuests and sharing them with classmates. For a database of sample student-developed WebQuests, visit the ThinkQuest Library at http://www.thinkquest.org.

One example of a pre-designed WebQuest is "Does the Tiger Eat its Cubs: A WebQuest on Children & China," http://www.kn.pacbell.com/wired/China/childquest.html. The question that students investigate is, "What's the truth about how children are treated in orphanages in China?" Students are directed to research a number of perspectives. They are divided into three teams. One team reads international news reports; another reads responses from the Chinese people; the third examines the govern-

ment of China's position as stated in China's One Child Policy. The students then come back together to discuss their findings, the challenge being to reach consensus on the issue. The culminating activity is to write a letter to the government of China expressing what they feel should be done about the situation. A series of other WebQuests about China can be found at http://www.kn.pacbell.com/wired/China/ChinaQuest.html. A WebQuest more appropriate for high school students, entitled "DNA for Dinner?" has students research genetically engineered crops and then develop legislation on this topic and present it to a governing body (see http://www.angelfire.com/ma4/peacew/webquest.htm#Introduction).

A WebQuest is just one structured approach to developing problem-solving skills using the world wide web. Other websites are available that can be used to develop and apply students' critical thinking and problem-solving skills. One such site, "Decisions, Decisions Online," http://ddonline.tomsnyder.com/issues/animaltesting/intro.cfm, engages users in investigating contemporary issues such as the death penalty, cloning, energy and the environment, TV violence, Napster, and animal testing. On the issue of animal testing, students are presented with this question: "Is it acceptable to use animals for human benefit, or should there be stronger laws to protect animals from harm?" Students role-play a decision-maker faced with a critical situation related to the problem, and they are directed to gather and review information, discuss options, and decide upon what action to take. Since this is an American site, Canadian teachers should pre-select the issues that are appropriate in a Canadian context. Finding informational websites with Canadian content on each issue would also be helpful.

Students revealing and reflecting on their prior and new knowledge through multiple representations

Constructivist learning theory argues that new knowledge should be integrated into existing structures in order to be meaningful and remembered. An important beginning point for any new learning is a student's preconceptions about a topic or concept. By helping the student to uncover the ideas and beliefs about a particular topic that she or he is bringing to the learning situation, the teacher is better able to identify where the student's knowledge is inaccurate or incomplete.

One commonly used approach for eliciting students' prior knowledge about a topic is through visual organizers. David Jonassen argues that students show some of their best thinking when they try to represent something graphically.[13] There are now computer-based tools for organizing ideas in visual ways. See, for example, Inspiration, http://www.inspiration.com/, and the more child-friendly version for kindergarten to grade 5, Kidspiration. These tools can be used in the early stages of research to brainstorm ideas and check on students' understandings about a topic or concept. They can also be used to generate and organize ideas for a research project. A concept map can serve as a vehicle for organizing the information collected around key ideas. Concept maps can be reconstructed at any stage of the learning process, thus allowing for inclusion of new knowledge and deletion of inaccurate ideas. The tool allows the learner to convert complex and messy collections of information into meaningful displays.[14] The website Inspiration provides opportunities to create cause-and-effect diagrams that help students see dynamic relationships among events as well as the impact that multiple factors can have on outcomes. Older students can use a more challenging tool such as SmartIdeas™, http://www.smarttech.com/products/smartideas/index.asp.

Ongoing teacher assessment and feedback is a feature of constructivist classrooms. The teacher can use graphic organizers as assessment tools to better understand how students' ideas are evolving as a result of the learning experiences. As well, a teacher can gain access to and provide feedback on students' thinking processes.

Other tools that students can use to represent their learning are multimedia authoring programs such as Hyperstudio, Hypermedia, and PowerPoint, which allow them to create their own interactive

multimedia presentations. With Hyperstudio and Hypermedia they can make use of graphics, video, animation, and sound to meet their differing learning needs. Using these tools, students are able to express their individuality and unique perspectives in their presentations.[15] Students can be highly motivated by using such product-oriented tools to design multi-media presentations.

Students learning with a variety of information resources and tools

A constructivist learning environment has a variety of informational resources and tools that students can use to mediate their learning. Computers can provide this variety of resources, particularly when it comes to supporting students' research in social studies. The technological tools and resources available include educational software, spreadsheets, databases, simulations, and educational games. Tools such as these provide options for learners, as information is presented in a variety of forms (graphs, pictures, text) and through a variety of modalities (auditory, visual). Individuals can further develop their unique strengths by being able to access information through their preferred modality and by having opportunities to represent their learning in a variety of ways. Tools such as the Internet also provide students with quicker and easier access to extensive and current information sources.

There is a fairly extensive collection of educational software available to support the teaching of social studies; however, much of the existing software mainly promotes information retrieval. According to Chris Dede, to prepare children to function in a technology-driven society, teachers must facilitate students' ability to master sophisticated, globally generated knowledge by learning to manage information rather than to memorize it.[16] The better software selections encourage students to organize and analyze the information presented, as well as providing opportunities for them to interact with the content through exploratory environments.

Database software can be an excellent tool for integrating information from a variety of sources and for allowing manipulation and analysis of that information to better understand concepts. Databases can also be used to stimulate higher-level thinking as students are challenged to make predictions, do comparisons, observe trends, generate hypotheses, formulate generalizations, draw conclusions, create alternative solutions to problems, and decide what actions to take based on certain conditions. As well, databases can be effective for helping students to visualize complex historical relationships and to develop an awareness of the personal reality of history. Spreadsheets are another computer-based tool that can be used to store, organize, and analyze data for purposes of problem-solving and decision-making.

Educational games and simulation software are also readily available as sources of information. They can be powerful tools for making abstract content and complex ideas more accessible to learners.[17] As well, these representations and visualizations can help students negotiate concepts and abstractions.[18] As Chris Dede writes, "Utilizing computer modeling as a visualization [can be] a powerful bridge between experience and abstraction."[19] Participatory simulation software can also help students to develop empathy for the subject and to abandon contemporary assumptions and values in order to understand an event as it really was.[20] Providing students with such alternative ways to learn, including both verbal and non-verbal experiences, can be beneficial for students who have mild learning disorders.[21]

The SIM software series, including SimCity, SimTown, and The SIMS, encourages interactivity, critical and creative thinking, and application of learning. In SimCity, for example, the user takes on the role of a city planner and designs a city, providing infrastructure and services, and confronting problems and making decisions about various issues such as resource allocation and planning for disasters. Through this software series, the user is engaged in an imaginary environment that is realistic enough to provide meaningful issues and appropriate consequences, thus lending authenticity to the learning. Other software that has been designed specifically for the educational market and helps to

promote higher-level thinking and decision-making skills is from the Tom Snyder series. Decisions Decisions 5.0 engages students in collaboratively and interactively investigating issues such as prejudice, violence in the media, lying and cheating, and saving the environment.

Students can also access the collections of a number of museums that have been put on the world wide web. Through these sites, they can engage in further authentic tasks and in the processes that historians use, such as analyzing primary documents.[22] Another recommended website that provides artifacts addressing Canadian history, culture, Aboriginal communities, and landscapes is http://collections.ic.gc.ca, Canada's Digital Collection. There is a component to this website that has students submit proposals to create their own web pages about some aspect of Canadian history. Students can be encouraged to take their learning one step further by constructing their own archives and then sharing their findings by publishing them on the web for review by a wider audience. Creating and posting their own archives adds authenticity and relevance to the learning and broadens the role of students by allowing them to become designers and publishers rather than simply users of web-based information.[23]

Virtual field trips are another particularly powerful resource because students can travel through both time and space to places that would otherwise be out of reach. Often these tours provide both images and text describing the particular site being toured. For example, when studying China, students can access interactive sites such as http://www.rims.k12.ca.us/china/, which features the Great Wall of China, the Emperor's Imperial Palace and other royal palaces, the terracotta warriors, Tiananmen Square, views of the cities and the countryside, and other geographical features of the country. These visuals give students important contextual information to help them personalize their study of a country from afar.

Students work collaboratively

A constructivist learning environment encourages collaborative work that engages students in dialogue. Computer technologies can be helpful tools for developing such collaborative skills. Students are fascinated by the possibilities of electronic communication for contacting other students and adults all over the world to exchange ideas about topics of mutual interest. They view information gathered in this fashion as being more connected to "real" local, national, and global issues. In "Changing How and What Children Learn in School with Computer-Based Technologies," Jeremy Roschelle et al. write, "Using technology to promote collaborative activities can enhance the degree to which classrooms are socially active and productive and can encourage classroom conversations that expand students' understanding of the subject."24

Interactive web-based collaborative projects are an excellent way of extending the learning by engaging students in projects with other students and experts from around the world. In a report from Industry Canada on the success of their collaborative project-based GrassRoots program, some of the important features of these projects included placing students in a position of discovering the world and sharing the results of their experiences; encouraging content construction by students; involving students in new roles as active participants, creative interpreters of the world, and experienced collaborators; and providing for a greater range of learning by doing.[25]

Communication tools like email, listservs, bulletin boards, newsgroups, and chat groups build on students' desire to communicate and share their understandings. Online conversations through email can prompt reflection and help students to think about their ideas and how best to articulate those ideas so that they are clear to others. Such conversations also encourage self-checking for understanding and identification of inaccuracies in one's expressed ideas, which can lead to rethinking and reframing of prior ideas. In these ways, email and threaded discussions can "act as a conduit rather than an impediment to conversation."[26]

Online chat allows more than one student to "talk" at the same time. A web opportunity like e-pals allows students to interact with a real audience without the inhibiting factor of peer pressure.[27]

Some researchers contend that gender bias pervades computer technologies and makes computers less friendly for girls; however, electronic participation has been found to counteract male dominance and be more gender equitable.[28] Providing opportunities for collaborative activity through the use of technology has been shown to actually heighten girls' interest in computing.[29] Online interaction has also been found to "free the child with special needs from fear of being stigmatized as well as enabling them to network with other children to share feelings about having a disability."[30]

There are numerous collaborative project opportunities available through the world wide web. One example, The Global Schoolhouse, http://www.gsn.org/, provides opportunities for students to engage with adventurers as they travel around the world. Through daily updates on the web and through conversational discussion boards, students can ask questions of the adventurers and keep in touch with the latest discoveries as the journeys unfold. There are also opportunities to plan an individualized online expedition and to find worldwide partners who may wish to partner up with other classes for an adventure.

Two other examples of websites offering online expeditions can be found at http://www.ctcexpeditions.org/ and http://www.quest- connect.org/. Both of these sites provide opportunities for students to be involved in explorations of different parts of the world and to accompany real people as they engage in those explorations. The real-life explorers post journals, research logs, and photos to authenticate the experiences for the students, and classes can send messages directly to them. Another website, The Electronic United Nations, http://www.simulations.com/, is designed to help classes utilize interactive learning by developing a "classroom country." This classroom country then "interacts" with other classroom countries around the world in a simulated United Nations. The process teaches students many life skills, and empowers both students and teachers. By using such collaborative activities, Chris Dede writes, "Students construct meaning through an exchange of perspectives on shared experiences."[31]

Another possibility, video conferencing, allows for interactive, face-to-face virtual discussions in real time between students and experts from around the world. For example, a connection between an Ontario high school and an Alberta high school with a third link to a provincial minister of the environment recently allowed students and the minister to discuss and debate the Kyoto Protocol.

As students gain first-hand knowledge of other cultures through online learning communities, there is potential for computer technologies to contribute to the development of effective citizens. Such increased exposure to first-hand information has the potential to overcome students' insular views of the world. David Staley refers to these online discussions as "a type of democratic performance."[32] Increased access through the Internet can spread democratic ideals internationally and help to stem the growth of potentially incendiary nationalism by giving students broader exposure to other cultures and providing them with opportunities to compare other cultures to their own.[33]

The Intercultural Email Classroom Connections website, www.iecc.org/, provides a service to help teachers link with partners in other countries and cultures for email classroom project exchanges. A site such as World Links for Development, www.worldbank.org/worldlinks/, sponsored by the World Bank, partners schools in developing countries with schools in developed nations. One project available through this website, entitled Our Human Environment, links several Canadian, South African, and Ugandan schools in online discussion groups and collaborative projects about natural habitats and questions of sustainable development in those countries. According to Wambui Githiora-Updike, "As secondary students in Kampala work online with students in Toronto, an international community of learners is being established—one that may extend beyond their school years. Certainly such sharing of ideas . . . represents a significant step in the building of a global community."[34]

Concerns arising from computer use

While computer technologies are now a reality in schools and there are ways that they can be used to support and enhance teaching and learning, there are also issues around their use that need to be considered by social studies educators. Many of the concerns with computers in schools arise around social and economic issues and particularly the influence that technological innovation is having on social change.[35]

The issue that seems to get the most attention in the educational literature and in the public debate about computers in schools is that of the digital divide—the "haves" and the "have nots." If the presence of technology in the hands of a knowledgeable and skilled teacher can have as many benefits as have been outlined in this chapter, then it goes without saying that the absence of technology in the classroom and school can be detrimental to those who do not have adequate access to computers. Ensuring equal access to all will continue to be a critical issue, especially as the cost for replacing aging computers continues to escalate.

Also related to access is the issue of training teachers to use these technologies. If new technologies are to have the impact on learning that has been argued for in this chapter, then teachers need professional development activities that expose them to these ways of thinking about technology integration. This, too, requires a substantial allocation of funding.

The following are among the social issues with technology use that have been raised in the research literature: loss of personal identity and the extinction of individual self and privacy; increased individual isolation; loss of face-to-face collaboration; loss of community; loss of caring; and the loss of master narratives.[36] In addition, the Internet is still a resource of privilege. According to Wambui Githiora-Updike, more than 80 percent of all websites are written in English, so non-English speakers automatically have diminished access to the benefits of the Internet. At least 60 percent of the Internet's host computers are in the United States. Although many strides have been made in accessing the Internet in the non-English-speaking world, it is clear that the English-speaking world will continue to dominate conversation in cyberspace, a possible deterrent to bringing together those of different "tongues." Solving that challenge will be a great educational task for the twenty-first century.[37]

Marc Belanger notes that since Canada is responsible for only a small portion of the English content on the Internet, we "must create content which reflects its particular Canadian personality if it is to maintain its cultural identity."[38] Belanger also cautions that there is a threat of "potential marginalization of groups such as women, persons with disabilities, seniors and aboriginal peoples"[39] in relation to their level of Internet use. All of these issues are important to consider as the technology invades our private lives more and more. Educators and students alike need to think critically about computer technology and make informed decisions about its appropriate use.

Conclusion

This chapter began with a challenge to all social studies teachers to think beyond the use of computer technologies for low-level tasks to ones that encourage more advanced learning with computers as supportive tools. Such advanced learning would include using computers to support and enhance opportunities to think critically and analytically, to engage students in inquiry centred around real-world problems, to encourage students to work collaboratively, and to create and share innovative products to demonstrate what has been learned. When technology tools such as databases, spreadsheets, multimedia, email, interactive software, and the Internet are used to complete authentic projects requiring students to use information to solve problems, there is greater potential to promote cognitive and social development as well as a positive attitude towards learning. These computer tools also have the power to stimulate the development of intellectual skills such as inquiry, reflection on learning, and learning how to learn. When such tools are used,

the emphasis of the learning is more on student understanding than on "getting the right answers." Technology-enhanced learning experiences such as those discussed above have the greatest potential to enhance students' learning in social studies. Using computers in ways that support constructivist learning principles by actively engaging learners and offering them opportunities to take more control over their learning can make social studies more exciting and relevant for both students and teachers.

Endnotes

1   Alberta Learning, *Information and Communication Technology, Program of Studies* (Edmonton: Author, 2000), http://www.learning.gov.ab.ca/k_12/curriculum/bySubject/cts.

2   Mark Windschitl, "Framing Constructivism in Practice as the Negotiation of Dilemmas: An Analysis of the Conceptual, Pedagogical, Cultural, and Political Challenges Facing Teachers," *Review of Educational Research* 72, no. 2 (2002): 131–175.

3   Glenn Kleiman, "Myths and Realities about Technology in K–12 Schools," in *Digital Classroom: How Technology is Changing the Way We Teach and Learn*, ed. David T. Gordon, (Cambridge, MA: Harvard Education Letter, 2000), 8.

4   Howard Gardner, "Can Technology Exploit Our Many Ways of Knowing?" in *Digital Classroom*, 33.

5   Maisie McAdoo, "The Real Digital Divide: Quality Not Quantity," in *Digital Classroom*, 143–144.

6   Cameron White, "Preservice to the 'Real World': Transforming Social Studies through Technology," in *Technology and Teacher Education Annual* (Charlottesville, VA: Association for the Advancement of Computing in Education, 1997), 290–293.

7   Sharon Adams and Mary Burns, *Connecting Student Learning and Technology* (Austin, TX: Southwest Educational Development Laboratory, 1999), 4.

8   Windschitl, "Framing Constructivism in Practice," 137.

9   Chris Dede, "A New Century Demands New Ways of Learning," in *Digital Classroom*, 171–174.

10 White, "Preservice to the 'Real World'," 2.

11 Barbara B. Levin, *Energizing Teacher Education and Professional Development with Problem-based Learning* (Alexandria, VA: Association for Supervision and Curriculum Development, 2001).

12 Bernie Dodge, "Active Learning on the Web (K–12 Version)" (presentation, Faculty of La Jolla Country Day School, La Jolla, CA, August 20, 1996), http://edweb.sdsu.edu/people/bdodge/active/ActiveLearningk-12.html.

13 David Jonassen, ed., *Handbook of Research for Educational Communications and Technology: A Project of the Association for Educational Communications and Technology* (New York: Macmillan Library Reference, 1996).

14 Jamie McKenzie, "A Picture is Worth . . . A Thousand Words: Graphical Organizers as Thinking Technology", *FNO.org* 7, no. 2, (October 1997), http://optin.iserver.net/fromnow/oct97/picture.html.

15 Martha Boethel and Victoria Dimock, *Constructing Knowledge with Technology: A Review of the Literature* (Austin, TX: Southwest Educational Development Laboratory, 1999).

16 Chris Dede, ed., *ASCD 1998 Yearbook on Learning With Technology* (Alexandria, VA: Association for Supervision and Curriculum Development, 1998).

17 John Schaeter and Cheryl Fagnano, "Does Computer Technology Improve Student Learning and Achievement? How, When, and Under What Conditions?" *Journal of Educational Computing Research* 20, no. 4 (1999): 329–343.

18 Shelley Goldman, Karen Cole, and Christina Syer, "The Technology/Content Dilemma" (paper, Secretary's Conference on Educational Technology 1999: Evaluating the Effectiveness of Technology, Washington, DC, July 12–13, 1999), 8.

19 Dede, "A New Century," 172.

20 David J. Staley, "Technology, Authentic Performance, and History Education," *International Journal of Social Education* 15, no. 1 (2000): 9.

21 Margie K. Shields and Richard E. Behrmann, "Children and Computer Technology: Analysis and Recommendations," *Future of Children* 10, no. 2 (Fall/Winter 2000), 4–30.

22 Randy Bass and Roy Rosenzweig, "Rewriting the History and Social Studies Classroom: Needs, Frameworks, Dangers, and Proposals," *Journal of Education* 181, no. 3 (1999): 41–61.

23 Staley, "Technology, Authentic Performance."

24 Jeremy M. Roschelle et al, "Changing How and What Children Learn in School with Computer-based Technologies," *Future of Children* 10, 80.

25 TeleLearning Network, *Canada's SchoolNet GrassRoots Program, A Study of Grassroots Projects: Online Project-based Collaborative Learning* (Ottawa: Industry Canada, School-Net, 2002), http://www.schoolnet.ca/alasource/e/resources/toolkit/tele/index.asp

26 G.A. Richards, "Why Use Computer Technology?" *English Journal* 90, no. 2 (November, 2000): 39.

27 Ibid., 38–41.

28 Eleanor Linn, "Gender Equity and Computer Technology," *Equity Coalition for Race, Gender, and National Origin* 5 (Fall 1999): 14–17.

29 Debra Butler, "Gender, Girls, and Computer Technology: What's the Status Now?" *Clearing House* 73, no. 4 (March/April, 2000): 225–229.

30 *Shields and Behrman*, "Children and Computer Technology," 13.

31 Dede, "A New Century," 172.

32 Staley, "Technology, Authentic Performance," 11.

33 Wambui Githiora-Updike, "The Global Schoolhouse," in *Digital Classroom*, 63.

34 Ibid.

35 Michael Bersen, "Rethinking Research and Pedagogy in the Social Studies: The Creation of Caring Connections Through Technology and Advocacy," *Theory and Research in Social Education* 28, no. 1 (2000): 121–131.

36 See Michael Bersen, John Lee, and Daniel Stuckart, "Promise and Practice of Computer Technologies in the Social Studies: A Critical Analysis," in *Critical Issues in Social Studies Research for the 21st Century,* ed. W.B. Stanley (Greenwich, CT: Information Age Publishing, 2001), 209–229; and Patrick Fitzsimons, "Changing Conceptions of Globalization: Changing Conceptions of Education," *Educational Theory* 50, no. 4 (2000): 505–520.

37 Githiora-Updike, "The Global Schoolhouse," 66.

38 Marc Belanger with TeleLearning Network, *The Social Impacts of Information and Communications Technologies* (Ottawa: Industry Canada, SchoolNet, September 13, 1999), 2.

39 Ibid., 1.