Teacher and Librarian Partnering to Integrate Computer Technology in the Classroom

Susan E. Gibson

Department of Elementary Education, University of Alberta, Canada

This article examines the role of computer technology in developing information literacy skills in elementary and secondary classrooms. Four essential stages of the research process are highlighted, including choosing a topic, accessing information, thinking critically about information, and presenting research findings. For each of these stages, the opportunities afforded through the use of computer technology are explored, as are some concerns arising from computer use. Suggestions for increasing the benefits of computer technology for both teachers and librarians are provided. By planning together and supporting each other, teachers and librarians can more effectively assist students to use computer technology beneficially for enhancing the research process and learning important information literacy skills.

Questions of how, when, and where to integrate computer technology in schooling are receiving a great deal of attention in educational research. Some studies in this area highlight the benefits of computer use for both teaching and learning, whereas others caution that computers should not be looked on as a panacea as more concerns with their use emerge.

The most frequent instructional uses of computers have traditionally been for word processing, game playing, and performing drill and practice exercises (King, 1994/95; Woodrow, 1991). Teachers are being encouraged to look beyond this limited view of technological use to applications that can maximize the benefits for the children and for themselves. Programs that challenge children to design, create, and collaborate, rather than play, offer the greatest potential for overcoming some of the concerns with their use (Dwyer, Ringstaff, & Sandholtz, 1991).

More beneficial use of computers can also be promoted by viewing them as tools to assist students in the research process. Developing well-honed research skills that promote effective use of information and enhance problem-solving and decision-making are broad goals that permeate the curricula in Canadian schools. Kuhlthau (1995) notes that in today’s information age there is an increasing need to teach students how to use information effectively to promote information literacy: “Neglect of the process leaves students without the essential holistic concepts for transferring learning to real-life situations” (p. 2).
This article examines what is known about the computer as a research tool, both in terms of the possibilities and the cautions related to students’ learning. Suggestions for enhancing the use of the computer as a tool for promoting research and information literacy skills in the regular classroom program are provided.

The Computer as Research Tool
Webster’s dictionary (1990) defines research as “diligent inquiry or examination in seeking facts or principles; to search again; to examine anew.” These ways of thinking about research highlight some of the critical features that teachers and librarians hope to see in student-conducted research. The latter, in particular, calls for a personalizing of the research findings in some way. Here the student should be attempting to rethink a particular issue or problem being investigated from a personal perspective based on the data collected.

Other aspects of the research process that are not articulated in this definition, but are nevertheless important to the research process, are the information literacy skills of generating and exploring ideas for research, accessing information, thinking critically about that information, and articulating the results of the research. Each of these skill areas is examined individually in terms of how computer technology has been found to both encourage and hinder the development of the skill. Provided also are ideas for enhancing the possibilities of and for addressing the concerns about the computer as a research tool.

Computer Support for Generating and Exploring Ideas
The first step in any research process is to decide on what is to be researched. Kuhlthau (1995) cautions that this stage, which she refers to as initialization, can be difficult for students as they try to figure out the task. One way of alleviating their anxiety is to give students choice in the specific topics for investigation rather than assigning them (Garland, 1995).

A good starting point, therefore, is with the child’s own curiosity and interest. The computer can encourage curiosity by providing the ability to explore broadly or deeply into areas of personal interest. Studies have found repeatedly that children generally become more motivated to explore their own ideas further using the computer (Morden, 1994). The visual stimulation and opportunities to “get in and move around” encourage such exploration (Gibson & Hart, 1996). The computer’s nonlinear interface allows for quick and easy access to a wide variety of potential research areas and allows for self-paced, free exploration. Because students are able to determine more of the direction for their learning, this in turn creates a feeling of independence and promotes creativity (Peck & Dorricon, 1994). The fact that the computer is seen as a real-life tool that will be part of their future work also lends
authenticity to the children's explorations and makes their work more personally relevant (Held, Newsom, & Peiffer, 1991; Means & Olson, 1994).

However, although computers have been touted as an effective tool for facilitating research, critics question what constitutes computer research and how that research is being carried out. Research that is a form of "guided discovery," with the teacher and librarian acting as facilitators, is quite different from research that is solely "free exploration" (Ragsdale, 1991). Too much time spent solely on exploration can make it difficult for some children to focus, resulting in lost time "mucking around" and "just playing" (Gibson & Hart, 1996). The abundance of things to access on the computer can result in children spending a great deal of time off task.

Although many children share the excitement about computers, not all children are equally motivated to use them. Gender differences in students' interest in and willingness to use the computer are beginning to surface (Gibson & Hart, 1996). Further, Fisher, Wilmore, and Howell (1994) have found that student power relations change while they are using the computer, and disagreement and conflict increase in intensity. Children still need to be taught how to apply cooperative learning strategies to their work with the technology (Held et al., 1991). Otherwise, increased competitiveness over the control of the computer can result and more reticent students can be pushed aside.

Concerns such as these necessitate that some clear ground rules be set for the use of the computer. Discussions about working cooperatively and sharing the computers equitably would be an important first step. Close monitoring of this sharing of equipment would have to be undertaken to ensure that everyone is getting hands-on access. One-on-one time spent with reluctant users, in which the student discusses some of his or her concerns with a sympathetic adult, may help to alleviate some of the reluctance.

Initially, time needs to be set aside for students to generate and explore different ideas and to familiarize themselves with what the programs, websites or databases they are using have to offer. Here is where the assistance of a knowledgeable librarian would be invaluable. Once a list of possible research topics has been generated by the class, the librarian could be asked to demonstrate some of the available computer resources for the class using a projection screen or a Smartboard display board. Specific Internet websites, where applicable, could also be brought to the students' attention during this demonstration time. While the students are exploring on their own, the librarian and teacher could work together to assist students in their initial searches.

Garland (1995) found that students' feelings of satisfaction with the research process were stronger if they understood the goals of the project, how they were to accomplish the task, how they were to be evaluated, and saw a connection between the research topic and the course content. It is impera-
tive that the teacher has a clear purpose in mind for the research being undertaken and that the objectives of the exercise are shared with the students so that everyone is clear on what the expectations are. A collaborative planning session between the teacher and the librarian before starting the project would be beneficial for the teacher and librarian to understand their respective roles in the project, to determine what resources would be needed, and to ensure their familiarity with the resources prior to their use by students.

**Computer Support for Accessing Information**

Once the topics to be investigated have been clarified, the next step in the research process is to determine what information needs to be located and what resources are available. This would encompass both the selection and exploration phases of Kuhlthau's (1995) information search process.

Computers have been found to offer benefits for information retrieval to both teachers and students. They offer an efficient way of dealing with the current information explosion by providing a quicker and easier access to extensive and current information. Some benefits of computer use for teachers include increasing their efficiency (Nugent, 1993) and being able to cover larger amounts of material in less time (Schug, 1988). As well, the teachers in Gibson and Hart's study (1996) noted that having immediate access at their fingertips to a wealth of resources made their job much easier. One of their greatest frustrations as teachers before having such access to computer technology was having to search out and order materials well in advance of introducing a particular topic to ensure they were available when needed.

Despite their excitement about the ease of access to resources on the computer, the teachers in Gibson and Hart's study (1996) did have concerns about the insufficient background information they were given about the online resources. They claimed that having a resource person such as the librarian peruse things like video resources and provide annotations about them including the topics they address and their appropriateness for addressing the curriculum and the needs of the children would have been a great benefit. A knowledgeable librarian would also be invaluable for helping the teacher to sort out what programs, websites, or databases might be most useful for addressing a particular topic of study before starting the research. An annotated list of computer resources compiled by the librarian would be invaluable.

The benefits to students of using the computer to retrieve information are also substantial. Students making use of computers become more actively involved in their learning by being able to control the information accessed (Kühne, 1995). Information on the computer is presented in a variety of forms and through a variety of modes that makes it appealing to different learning styles (Wiburg, 1991) and enables individuals to develop their own
unique strengths (Wade, 1995). Computers are more engaging and interesting to use than textbooks (Mitchell-Powell, 1995). By using computers, children are learning the skill of how to manage information rather than to memorize it (Wiburg, 1991). The information gathered from computer tools is seen to be more connected to “real” local, national, and global issues (Wilson & Marsh, 1995). Widening the child’s exposure to such first-hand information provides a less insular view of the world (Morden, 1994).

Concern has been raised, however, that much of the visual stimulation offered by computers is pictorial in nature. Text inserts tend to be short, particularly at the elementary grade levels. As well, in many computer programs, the text inserts are provided in audio format as well so that children need not read to find information. Television has already predisposed children to a preference for more visual, fast-paced stimulation. Increasingly, there is less interest in concentrating on the written word for prolonged periods of time. Teachers have expressed concern that this could eventually result in a lack of motivation to curl up with a good book, if such a disposition is not nurtured (Gibson & Hart, 1996).

Others have expressed concern that because computer programs offer such a wealth of information, children tend to rely on that sole source for their information (Gibson & Hart, 1996). They need to be encouraged to look for other sources of information, including nondigitized ones. The librarian could assemble a number of topic-relevant print resources that students could access, including samples of children’s fiction and nonfiction literature.

Another concern to be aware of is how much of the curriculum computer programs actually include and how much is extra to the curriculum (Fisher et al., 1994). Means and Olson (1994) found that the computer programs they examined “covered a very narrow slice of a subject domain and were often a poor match with curriculum guidelines or teacher preferences” (p. 16). Here the librarian and the teachers need to conduct a critical check of all computer products being considered for purchase by the school, particularly to check the reading level and the programs’ appropriateness for addressing the curriculum.

**Computer Support for Thinking Critically About Information**

Research is not solely about accessing as much information as possible on a topic. Rather, it is about being able to make judgments about the information being collected. This step combines Kuhlthau’s (1995) formulation and collection stages of the research process: “During Formulation students are actively engaged in using information to create meaning that involves thinking, reflecting, interpreting, connecting and extending” (p. 6) and in collection, “the task is to gather information that defines and supports the focus formed” (p. 6).
There are a number of concerns relating to the use of computers and the development of the critical thinking skills essential to this part of the research process. Children tend to accept the computer as an authority. Consequently, they view the information that they are accessing as the truth. They have to be taught to recognize that the information they are accessing represents a particular viewpoint. Therefore, they have to use critical thinking skills conscientiously to make choices when using the computer, just as they would for making judgments about other resource materials. In addition to searching several points of view, Lengel (1987) argues that children need to be taught how to apply the skills of drawing conclusions from computer-generated data, of distinguishing fact from opinion, and of finding meaning in information as they interact with the technology. Without instruction and practice in how to examine critically and make informed choices about the digitized material collected, information gathering can become a mindless exercise in which quantity overrides quality (Ragsdale, 1991). Not only do these skills still need to be carefully taught when using computers, but close monitoring is needed to ensure that students are developing proficiency in their use.

In addition, a number of technoeethical decisions are to be made for which computer users need critical viewing skills (Adams & Hamm, 1988). The Internet is one resource for which ethical decision-making becomes important. Children need to be taught that some information available online is inappropriate and, in some cases, inaccurate, and therefore should not be accessed. A librarian who has knowledge of and skill in the use of the Internet would be helpful to teachers in pinpointing the more suitable sites for student use.

Computer Support for Creating a Product for Presentation

Once the information has been collected and examined, a final stage of the research process involves choosing a format for presenting the findings (Kuhlthau, 1995). Here too computers can be an asset to the research process by enhancing what children are able to produce. Over an eight-year study of classrooms from kindergarten to grade 12, Dwyer (1994) found a 10-15% improvement in achievement scores among regular computer users, as well as 30% gains in student productivity. The more professional quality of the items produced adds to this sense of greater productivity (Means & Olson, 1994). Students can write more, more effectively, and with more fluidity (Dwyer, 1994), as well as improving in spelling, editing, and rewriting (Geiger, 1994). The polished-looking products that children produce using computers provide immediate gratification and build self-confidence in their writing abilities (Held et al., 1991). As well, children have multiple ways of representing what they are discovering and their products can be easily shared with others, both in their own classroom and beyond through communication services like e-mail (Fisher et al., 1994).
There are concerns about computer use in this final stage of the research process, however. For one, the finished look of things produced on the computer can create a psychological resistance to producing more refined work. Students tend to become more hesitant about completing all of the stages of effective writing, in particular the rough draft, when they are presented with a polished product. This can result in undetected spelling errors, particularly of the homonymic type, and grammatical errors. Consequently, when using computers, the prewriting stage of the writing process still needs to be stressed. Students need to be encouraged to reflect on their ideas before they begin writing.

Second, when writing with the assistance of the computer, the limiting view of the computer screen detracts from the students’ ability to read their entire piece for the flow of the argument (Nugent, 1993). Thus teachers claim that they are getting work that is more disjointed and lacking in cohesion (Gibson & Hart, 1996). As well, written research reports that involve primarily cutting and pasting information from computerized resources and websites do little to promote the development of essential synthesis, sequencing, and analytical skills.

To ensure some quality control over the kinds of products being produced, the librarian could help the teacher to locate and learn to use productive software that encourages children to manipulate information in a constructive way and to produce something that showcases their own original ideas.

Conclusion
Kuhlthau (1995) argues that, “In an information age, school student use of information for learning needs to be brought to the center of the instructional program” (p. 7). This article examines the role of the computer as a tool for emphasizing information use in student research. Four stages of the research process, including choosing a topic, accessing information, thinking critically about that information, and presenting findings, are examined. For each of these stages, the opportunities afforded through the use of computer technology are explored. As well, concerns arising from computer use related to each of these stages and suggestions for overcoming them for both teachers and librarians are provided.

The use of computer technology can act as a catalyst for change in the learning environment of the classroom by promoting an atmosphere that is more like that of a workshop (Held et al., 1991). Teachers using computers as research tools in their classrooms can emphasize working together and sharing ideas. Teachers and librarians can model such collaboration. By planning together and supporting each other, they can more effectively assist students to use computer technology both for enhancing the research process and for learning important information literacy skills.
References