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A multimedia paradigm of engaged learning: An intergenerational approach

Kymberli Fahlbeck Mulford

A MULTIMEDIA PARADIGM
OF ENGAGED LEARNING:
AN INTERGENERATIONAL APPROACH

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education: Instructional Technology Option

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by

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Dr. Rowena Santiago, Second Reader

ABSTRACT

Engaged learning grew out of the theories of constructivism, active learning and experiential learning on the brink of the Information Age. Using this model, elementary students in this project authored multimedia biographies for senior citizens, transferred the biographies to videotape, and presented them to the seniors at the end of the year. Two existing curricular units, local history and biography, were modified to incorporate elements of constructivism, scaffolded instruction, and teaming. This project, which lasted one year, incorporated ongoing alternative and authentic assessment. Descriptions of both resource management and technology utilization are included due to the creative nature in which they were employed.

ACKNOWLEDGMENTS

I have benefited enormously from a large group of influential educators with whom I have worked in Schaumburg Community Consolidated School District 54.

Dr. Bernard Lucier, my principal at Elizabeth Blackwell Elementary, provided encouragement and support for the partnership, allowing me the freedom and confidence to accomplish much of the behind-the-scenes and liaison work alone as it presented itself. Director of Learning Technologies Mary Moffitt, a truly visionary educational leader, created the atmosphere that allowed and encouraged teachers to embrace engaged learning and instructional technology. My colleague Brian Eldredge, then a Learning Technologies Facilitator, personally committed over a hundred professional hours to facilitating, teaching and co-teaching, troubleshooting and fine-tuning technology pieces; the Benchmark-Blackwell project would not have been completed had he not stepped in countless times with extra preparations or timely rescues.

The three classroom teachers, Mrs. Bev Thompson, Mrs. Carlotta Lencioni, and Mrs. Debbie Davis, who agreed to embark upon this project with me had little knowledge then as to how massive and all-encompassing the endeavor would become. Their interest in trying something new, their willingness to re-examine their teaching methods to an extent, and ultimately, their dedication to seeing the project through to the end, spoke volumes of their commitment to their profession and to their students.

One of the essential elements in the success of this particular project was the commitment by a number of stakeholders in the community. Adults vested in this project

joining seniors and students included people from a number of elements of the community.

At *The Benchmark*, Executive Director Nancy McCaffrey and Social Workers Stacy Shores, Kimberly Pepsnik, and Marie Anderson dedicated many hours to the Benchmark-Blackwell project. They ensured that the project goals were valid, warmly welcomed our very impressionable students into their facility, and saw to it that their residents' best interests were honored.

Certainly a discussion of the people involved in this project must include the 32 senior citizens themselves, who volunteered to participate in the project and had to meet a number of criteria in order to receive the final biography production. All of the seniors who volunteered showed a remarkable willingness to invest considerable time and effort in writing letters, sharing their experiences, and welcoming students and parents into their apartments.

My appreciation also goes to the parents of the students at Blackwell. Some involved themselves early in the project, and some paced themselves throughout different portions of it. Regardless of the amount of time invested by individuals, the end result could not have been accomplished without all of them. Throughout the project, parents continually recognized and appreciated the magnitude of this undertaking, and offered help on a consistent basis. They often thought of innovative and simple ways to help, always saving virtually hours of teacher time.

Though I have traveled thousands of miles away from the university and attempted to complete this degree several times remotely over the past seven years, one person has continued to believe in this possibility. Dr. Susan Cooper inspired me years ago with her passion for teaching and technology. Her unflagging faith in me has ultimately resulted in the completion of this project. Once just my favorite professor, then a committed first reader and graduate advisor, and now a trusted friend and mentor, she has influenced my life forever.

My thanks also go to Dr. Rowena Santiago, my second reader, whose lessons on screen design and programming had a deep effect on my teaching today. Many of my students today have benefited from the theories she taught me years ago.

A special thanks goes to my sister Heather Langlois, my dearest confidante and most dedicated editor. I would also like to thank my parents, Richard Fahlbeck, Sandi Fahlbeck, and Sunny Friendly, whose emotional and financial support started me on the road to higher learning. Their examples have taught me how to bring compassion, creativity, and enthusiasm into my teaching and writing.

Most of all, this project is dedicated with love to my family, my support and strength. Ten years ago, my relationship with my husband Bruce and this degree were both in their infancy. My husband's quiet strength, patience, and personal sacrifice enabled me to complete this degree. My son Alexander's passion to learn is a constant challenge to those around him to look at things in a new light. The lessons he taught me over the past few years served me well throughout this project, which has spanned the

better part of his young life. And, to the one yet to come, I give a special thank you for insisting on the breaks that we both needed.

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TERMINOLOGY

ADIE: a four-step cycle which makes up the structure of a curriculum development process, consisting of 1) analyze, 2) design, 3) implement, and 4) evaluate (Wiles & Bondi, 1989).

Accommodation: under Piaget's theory of learning, refers to the modification of an individual's behavior and cognitive understanding of the world in response to a changing environment and the introduction of new phenomena. Accommodation is the opposite of "assimilation" (Shafritz, Koeppe & Soper, 1988).

Accountability: the extent to which one is responsible to a higher authority – legal or organizational – for one's actions in society or within one's particular organizational position; to be answerable for how authority has been exercised and responsibilities discharged. In education, accountability by the system may be required by students, parents, administrators, school boards, or public funding agencies, including taxpayers. Professional reaction to accountability measures is often negative due to a perceived infringement upon professional autonomy (Shafritz, Koeppe & Soper, 1988).

Achievement test: an examination that measures the extent to which a person has acquired certain information or mastered certain skills, usually as a result of specific instruction (Shafritz, Koeppe & Soper, 1988).

Activity learning: any learning process in which the student must do something other than sit and listen; for example, conduct an experiment, make a model or research facts (Shafritz, Koeppe & Soper, 1988).

Affective domain: one of the three critical learning areas described by Benjamin Bloom in Bloom's Taxonomy. The affective domain refers to emotions, feelings, values and attitudes. The other areas are the cognitive domain and the psychomotor domain (Shafritz, Koeppe & Soper, 1988).

Alternative assessment: a form of assessment other than the true/false, multiple-choice, matching, and fill-in-the-blank responses that are often associated with standardized tests. Performance-based assessment, authentic assessment, and portfolio assessment are forms of alternative assessment (Ivers & Barron, 1998).

Animation (or animated graphics): moving diagrams or cartoons. Often found in computer-based courseware, animated graphics take up far less disk space than video images (A. Freedman, 1998).

Artifacts: authentic examples of school improvement efforts and classroom instruction as captured in lesson plans, teacher-authored materials, student products, school policies, newsletters, etc.

Arrow tool: in Roger Wagner's *HyperStudio* program, one of a series of tools available from a tear-off palette. The arrow is the tool required for most editing processes, such as accessing textbox formatting or moving graphics to another location on the card.

Assimilation: under Piaget's theory of learning, this occurs when new information is taken in and integrated within the framework of already existing knowledge. The basic conceptual structure remains unchanged, i.e., the old "assimilates" the new. This is the opposite of "accommodation" (Shafritz, Koeppe & Soper, 1988).

Authentic assessment: a method of evaluating a student's performance based on observations, performance tests, interviews, exhibitions, or portfolios. The context, purpose, audience, and constraints of the task must connect to real-world situations and problems (Ivers & Barron, 1998).

Authoring system (or package): a computer program for constructing (authoring) multimedia presentations (Kanning, 1994).

Background: the base, or backdrop, color on screen (A. Freedman, 1998).

Back up: to make a copy of important data onto a different storage medium for safety (A. Freedman, 1998).

Backup: an extra copy of information stored on a disk or server. For example, if the program or other data stored on the first disk is damaged, it is still available on the backup copy (Hirschbuhl & Bishop, 1998). Additional resources or duplicate copies of data on different storage media for emergency purposes (A. Freedman, 1998).

Behaviorism: the school of psychology that holds that only overt behavior is the proper subject matter for the entire discipline. Behaviorists suggest that psychology should avoid introspection but rather concentrate on analyzing human behavior in the same manner that animals are objectively studied. According to the foremost exponent of behaviorism, B.F. Skinner, "Behaviorism is not the science of human behavior, it is the philosophy of that science" (Shafritz, Koeppe & Soper, 1988).

Benchmark-Blackwell project: the name given to the partnership between the senior citizens residing at *The Benchmark* (the retirement community) and the students at Elizabeth Blackwell Elementary School.

Best Practice: an expression borrowed from the professions of medicine and law, where "good practice" or "best practice" are everyday phrases used to describe solid, reputable, state-of-the-art work in a field. If a practitioner is following "best practice" standards, he or she is aware of current research and consistently offers clients the full benefits of the latest knowledge, technology, and procedures. The term 'best practice" is a shorthand emblem of serious, thoughtful, informed, responsible, state-of-the-art teaching (Zemelman, Daniels & Hyde, 1993).

Biography: an account, usually written, of the life of a person.

Bitmapped Image (.bmp): a computer image that consists of individual dots or picture elements (pixels) (Ivers & Barron, 1998).

Branch: to move from one location of a program to another. For example, if a button initiates a video file, it is said to branch to video (Ivers & Barron, 1998).

Branching programming: a format of programmed instruction in which the sequence of the presentation of the frames depends on the responses selected by the learner (Heinich, Molenda & Russell, 1993).

Browse tool: in Roger Wagner's *HyperStudio* program, one of a series of tools available from a tear-off palette. The browse tool, also commonly referred to as "the hand" because of the icon representing it, is the tool required for typing into a text box, and is the primary navigation tool for "browsing" the stack.

Bug: an error in a computer program that causes the computer to malfunction (Hirschbuhl & Bishop, 1998).

Button: a simulated button on screen that is "pushed" by clicking it with the mouse (A. Freedman, 1998). An object or area of the screen used to initiate an action, such as a branch to another card (Ivers & Barron, 1998).

Byte: the sequence of bits that represents any alphanumerical character or a number between 0 and 255. Each byte has 8 bits (Hirschbuhl & Bishop, 1998).

CAI: Computer-Assisted Instruction or Computer-Aided Instruction. An educational use of computers that usually entails using computer programs which drill, tutor, simulate, or teach problem-solving skills (Hirschbuhl & Bishop, 1998).

CD-ROM: a compact disc with read-only memory (ROM). CD-ROMs provide immense storage capacity, which is required by programs with memory-intensive features like digitized sound, graphics, and video. Use of CD-ROM discs with a computer requires a CD-ROM reader, sometimes called a CD-ROM drive or player (Kanning, 1994).

CPU: Central Processing Unit. The "brain" of the computer consisting of a large integrated circuit that performs the computations within a computer. CPUs are often designated by a number, such as 6502, 8080, 68000, and so on (Hirschbuhl & Bishop, 1998).

Camcorder: a combination of "camera" and "recorder." This hand-held video camera/recorder creates tapes, some of which can be played in a VCR (Kanning, 1994).

Capture: the process of collecting and saving text or image data (Ivers & Barron, 1998).

Card: the basic unit of HyperCard and HyperStudio, equivalent to one screen of information (Ivers & Barron, 1998).

Clip art: computer graphics created by professional artists that may be obtained for selected incorporation into documents (Geisert & Futrell, 1995).

Cognitive domain: one of the major behavioral areas described by Benjamin Bloom in his taxonomy of learning objectives; the cognitive domain deals primarily with intellectual skills such as problem-solving, memory, reasoning, comprehension, recall and judgment. The other areas are the affective domain and the psychomotor domain (Shafritz, Koeppe & Soper, 1988).

Cognitive strategies learning: acquisition of thinking patterns and approaches that govern subsequent learning and problem-solving behaviors (Geisert & Futrell, 1995).

Computer literacy: term used to refer to a person's capacity to intelligently use computers. May also be used to refer to programs in schools designed to help acquire this capacity (Hirschbuhl & Bishop, 1998).

Constructivism: the belief that learning takes place through the construction of knowledge (Ivers & Barron, 1998).

Control key: a special key on the keyboard, usually labelled [CTRL]. This key, when held down, changes the actions of other character keys (Geisert & Futrell, 1995).

Cooperative learning: an instructional method by which students cooperate in small teams to learn material that is initially presented by the teacher. The students take responsibility for their own learning, their teammates' learning, and for classroom management by checking and monitoring, helping one another with problems and encouraging one another to achieve (Shafritz, Koeppe & Soper, 1988).

Cove: a site-specific term at Blackwell School, referring to an open area of approximately 13' x 19' into which four classroom doors open. From the cove areas outside of these classrooms, the main hallways are accessed. The coves were wired with more Internet drop sites than each classroom, making them an ideal location in which to pull desktop computers on carts, thereby creating temporary mini-labs for special projects.

Copy: to make a duplicate of a block of text or graphics to add to another location (A. Freedman, 1998).

Crash: a malfunction of a computer's software or hardware that prevents the computer from functioning (Hirschbuhl & Bishop, 1998).

Cursor: The prompting symbol usually displayed as a blinking white square or underline on the monitor that shows where the next character will appear (Hirschbuhl & Bishop, 1998).

Cut: to remove a block of text or graphics to another location (A. Freedman, 1998).

Database: any electronically-stored collection of data (A. Freedman, 1998).

Debug: to correct a problem in hardware or software. Debugging software is finding the errors in the program logic. Debugging hardware is finding the errors in circuit design (A. Freedman, 1998). The process of correcting problems (code, grammar, spelling, etc.) in a program (Ivers & Barron, 1998).

Default: the current setting or action taken by hardware or software if the user has not specified otherwise (A. Freedman, 1998).

Dialog box: a small, onscreen window displayed in response to some request. It provides the options currently available to the user (A. Freedman, 1998).

Digital camera: a video or still camera that records images in digital form. Unlike traditional analog cameras that convert light intensities into infinitely variable signals, digital cameras convert light intensities into discrete numbers for storage on a medium, such as a hard disk or flash disk. As with all digital devices, there is a fixed, maximum resolution and number of colors that can be represented (A. Freedman, 1998).

Digitize: to convert an image or signal into digital code by scanning, tracing on a graphics tablet or using an analog to digital conversion device (A. Freedman, 1998).

Discovery learning: a teaching method whereby students are presented with ambiguous materials and are given the opportunity to organize them conceptually or draw their own conclusions about the materials; also known as "inductive learning" (Shafritz, Koeppe & Soper, 1988).

Disk: a direct access storage device (A. Freedman, 1998).

Download: to receive a file transmitted over a network (A. Freedman, 1998).

Drag: to move an object on screen in which its complete movement is visible from starting location to destination. The movement may be activated with a stylus, mouse or keyboard keys. To drag an object with the mouse, point to it. Press the mouse button and hold the button down while moving the mouse. When the object is at its new location, release the mouse button (A. Freedman, 1998).

Drill and practice: a type of software in which the computer engages the learner in a sequence of exercises characterized by response elicitation and evaluation (Geisert & Futrell, 1995).

Educational technology: a complex, integrated process involving people, procedures, ideas, devices, and organization for analyzing problems, and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning. In educational technology, the solutions to the problems take the form of all of the "Learning Resources" that are designed and/or selected as messages, people, materials, devices, techniques, and settings (Association for Educational Communications and Technology, 1977, in Knirk & Gustafson, 1986).

Emerging technologies: The term emerging technologies is preferred over the commonly used terms, *computers* or *technology*. The term emerging technologies denotes that there are several different types of technology, and all are evolving into something different, more powerful, more useful than the previous versions (Burrus, 1993).

Engaged Learning: a learning theory based on the fundamental idea that students must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks; a conceptual framework for technology-based learning and teaching (Kearsley & Schneiderman, 1998). Jones, Valdez, Nowakowski & Rasmussen (1995) identified 26 indicators of engaged learning.

File server: a high-speed computer in a LAN that stores the programs and data files shared by users on the network. Also called a network server, it acts like a remote disk drive (A. Freedman, 1998).

Fill pattern: a color, shade or pattern used to fill an area of an image (A. Freedman, 1998).

Floppy disk: a reusable magnetic storage medium (A. Freedman, 1998).

Flowchart: a graphical representation of the sequence of operations in an information system or program (A. Freedman, 1998).

Folder: in Macintosh and Windows 95, a simulated file folder that holds data, applications and other folders. A folder is the same as a DOS or Windows 3.1 directory, and a folder within a folder (subfolder) is the same as a DOS or Windows 3.1 subdirectory. Folders were popularized on the Mac and later adapted to UNIX and Windows (A. Freedman, 1998).

Font: a set of type characters of a particular typeface design and size. Often, each typeface (Times New Roman, Helvetica, Arial, etc.) is made available in four variations: normal weight, bold, italic, and bold italic (A. Freedman, 1998).

Formative assessment or evaluation: assessing a product during its developmental stage, as opposed to summative evaluation which is done only after the product is complete (Shafritz, Koeppe & Soper, 1988).

Goal: a non-quantified, long-range, visionary statement of intent. In contrast, an objective is a measurable statement of commitment to attempt to achieve a specific result. Educators are concerned both with goals that relate to changes in learners and goals that relate to changes in the institution (Shafritz, Koeppe & Soper, 1988).

Graphics: visual material such as pictorial images, designs, or graphs displayed on a screen or as a hard copy (Geisert & Futrell, 1995).

Hard drive (or hard disk): the primary computer storage medium, which is made of one or more glass platters, coated with ferromagnetic material. Most hard disks are fixed disks, which are permanently sealed in the drive (A. Freedman, 1998).

Heterogeneous grouping: grouping students (or allowing them to group themselves) in such a manner that age or ability or other criteria (sex, race, interests) are wholly mixed. Such variability in groups is conducive to more effective learning and is more representative of the types of groups found in the "real world" and modern workplace (Goodlad & Anderson, 1987).

Home Stack: a special card that acts as an index to other cards in HyperStudio (Ivers & Barron, 1998).

Homogeneous grouping: grouping students in a manner that focuses on a similarity in order to achieve more effective learning. Many educators believe that applying the term "homogeneous" to students is a dangerous misperception, as this is often done on the basis of a single criterion (usually age or ability) and that the resulting groupings are neither homogeneous (when judged by other criterion) nor effective for learning (Anderson & Goodlad, 1987).

Hub: a central connecting device in a network that joins communication lines together in a star configuration (A. Freedman, 1998).

HyperCard: an authoring system and information organizer developed by Apple, used to create "stacks" of information to be shared with others (Kanning, 1994). Using visual tools, users build "stacks" of "cards" that hold data, text, graphics, sound and video with hypertext links between them (A. Freedman, 1998).

Hypermedia: (1) the software and hardware configurations which allow video, graphics, and sound to be linked to text in important and meaningful ways (Hasselbring, Goin, & Wissick, 1989); (2) the use of data, text, graphics, video and voice as elements in a hypertext system. All the various forms of information are linked together so that a user can easily move from one to another (A. Freedman, 1998).

Hypermedia program: a software program that provides seamless access to text, graphics, audio, and video through multiple connected pathways (Ivers & Barron, 1998).

HyperStudio: a hypermedia development program for Windows and Macintosh computers, developed by Roger Wagner Publishing, Inc. (Ivers & Barron, 1998).

Icon: a small, pictorial, onscreen representation of an application, data file, system resource, or function in a graphical interface (A. Freedman, 1998).

Image: a picture or graphic (A. Freedman, 1998).

Information-processing theory: cognitive theory of learning that describes the processing, storage, and retrieval of knowledge from the mind (Shafritz, Koeppe & Soper, 1988).

Input: to enter data into the computer (A. Freedman, 1998).

Inservice: term used mainly in the public sector to refer to job-related instruction and educational experiences made available to employees during regular work hours. Some programs, especially those offering college credit, are available to the employee only on his or her own time. Inservice training is directed at those who are already basically qualified and employed by school systems (Shafritz, Koeppe & Soper, 1988).

Inspiration: an educational software title. Used in conjunction with a computer projector, teachers can use spontaneous responses from students in classroom discussions to "map" thoughts on a graphic organizer. This organizer serves as a reference tool for students as the teacher then demonstrates different ways to organize these thoughts into an outline or first draft.

Instruction: (1) the activities dealing directly with the teaching of students and/or improving the quality of teaching; (2) the act of informing or the act of stimulating thinking (Shafritz, Koeppe & Soper, 1988).

Instructional Coordinator: in Schaumburg Community Consolidated School District 54, one of a team of administrators operating as internal consultants on the subject of curriculum and "best practice." Each Instructional Coordinator is assigned to two to three school sites, where his or her primary focus is to be in classrooms with regular classroom teachers co-teaching lessons. Responsibilities include facilitating, presenting, coaching, consulting, and providing direction within the framework of district standards and outcomes. Instructional Coordinators, Learning Technologies Facilitators, and Gifted Education Resource Teachers each play an important role as a part of a team that works closely with site principals and school leadership teams.

Instructional technology: In its more familiar sense, it means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard. The second definition goes beyond any particular medium or device. In this sense, instructional technology is more than the sum of its parts. It is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction. The widespread acceptance and application of this broad definition belongs to the future (Knirk & Gustafson, 1986).

Integrated Learning System (ILS): a computer system that provides individualized tutorial instruction in academic subjects (Kanning, 1994).

Integration: the process of combining subject-matter content from various subject-matter areas into one unified course, project, or unit; e.g., interrelating the teaching of history, geography, science, art, music, and English language arts with the study of the Westward Movement (Shafritz, Koeppe & Soper, 1988).

Interactive: (1) a computer interface in which the user's responses and choices direct the computer's presentation (Kanning, 1994). (2) Back and forth dialog between the user and the computer (A. Freedman, 1998).

Interface: the connection and interaction between hardware, software, and the user. Users "talk" to the software. The software "talks" to the hardware and other software. Hardware "talks" to other hardware. All of this is interfacing (A. Freedman, 1998).

Intergenerational: involving people of different generations, as in an organized activity or project that involves people from more than one generation (Frego, 1995).

Internet: a worldwide computer network connecting individuals, organizations, and other computer networks to information services and electronic mail (Kanning, 1994).

Jack: a receptacle into which a plug is inserted (A. Freedman, 1998).

Jigsaw: a method of cooperative group learning that assigns each of its members a particular learning task. Team members meet with members of other groups to form "expert groups" to discuss and research their topic. Following research and discussion, the students return to their own teams and take turns teaching their teammates about their topic (Ivers & Barron, 1998).

Joint Photographic Experts Group (.jpeg): (Joint Photographic Experts Group) A standard for compressing images (A. Freedman, 1998).

Justify: to shift the contents of a field to the right or left margin (A. Freedman, 1998).

LAN: see local area network

Landscape: a printing orientation that prints data across the wider side of the form, the opposite of portrait (A. Freedman, 1998).

Laserdisc (or videodisc): a disc on which video information is stored digitally, much as audio sound is stored on popular music CD-ROMs; it is read with a laser beam (Kanning, 1994).

Learning: generally, any behavior change occurring because of interaction with the environment (Shafritz, Koeppe & Soper, 1988).

Learning standards: In Illinois and in this M.A. project, a reference to the 1997 Illinois State Learning Standards (see References in this project).

Learning Technologies Facilitator: in Schaumburg Community Consolidated School District 54, one of a team of teachers operating as internal consultants on the subjects of learning technologies, curriculum, and "best practice." Each Learning Technologies Facilitator is assigned to two to three school sites, where his or her primary focus is to be in classrooms with regular classroom teachers co-teaching lessons. Responsibilities include facilitating, presenting, coaching, consulting, and providing direction within the framework of district standards and outcomes and the *School District 54 Information & Communication Technologies Plan.* Learning Technologies Facilitators, Instructional Coordinators, and Gifted Education Resource Teachers each play an important role as a part of a team that works closely with site principals and school leadership teams.

Learning theory: (1) psychological explanations for how learning takes place; (2) the systematic study of the learning process; (3) one of several popular frameworks to explain the acquisition of new knowledge or behaviors, such as classical or operant conditioning (Shafritz, Koeppe & Soper, 1988).

Learning together: a method of cooperative group learning that incorporates heterogeneous student groups that work on a single assignment and receive rewards based on their group project (Ivers & Barron, 1998).

Legibility: a critical issue in screen design, particularly when the intended audience is over 50 years of age. Use of large, standard fonts is necessary. Research has indicated that black text on a yellow background is the most legible, followed by green, red, or blue text on a white background. Next was white text on a blue background, and then black text on white background, followed by yellow text on a black background (Heinich, Molenda & Russell, 1993). However, in designing screens for senior citizens, students in the Benchmark-Blackwell project found that red text was very difficult for seniors to read, regardless of the background. Most seniors indicated that black or blue text on a white background was the easiest on their eyes.

Library Media Center: in Schaumburg Community Consolidated School District 54, a centrally located group of rooms at each school site which house a children's library, the site's audiovisual and software collection, the site's networked server, any number of computers and site-purchased peripheral technologies, and an electronic searchable catalog of the holdings.

Library Media Teacher: in Schaumburg Community Consolidated School District 54, a teacher who has a working knowledge of library-media resources, instructional computing practices, K-6 curricula, and children's literature. The Library Media Teacher (LMT) is an instructor and facilitator who supports the teaching staff in applying the building's print, media, and technology resources to the instructional program. The library media teacher provides a 45-minute plan time every other week for classroom teachers, working with their students on projects in the Library Media Center that complement the classroom curriculum.

Linear programming: a format of programmed instruction in which the frames are arranged in a fixed, linear sequence (Heinich, Molenda & Russell, 1993).

Link: a connection from one place or medium to another. For example, buttons contain the linking information between cards (Ivers & Barron, 1998).

Liquid crystal display (LCD): (1) a display technology used in small battery-powered electronic devices and laptop computer screens (Kanning, 1994); (2) a projector that accepts computer output and displays it on a see-through liquid crystal screen that is placed on top of an overhead projector (A. Freedman, 1998); (3) one of several projectors, not panels, that use liquid crystal technology and emerged in the late 1990s. These units are connected to Macintosh or Windows computers by specialized cables, and project from the center of the room onto a standard white screen.

Local area network (LAN): a communications network that serves users within a confined geographical area. It is made up of servers, workstations, a network operating system and a communications link (A. Freedman, 1998). In this project, the LAN consisted of a BayNetworks Router with 56k direct Internet access and Cabletron hubs connected by Lucent Cat 5 Plenum cabling.

Local history: the history of one's community, town, or village, perhaps even before the days that it was officially recorded. Depending on the age and size of the community, there may be a great variance in the number and quality of publications available. Students in heavily populated urban areas will perhaps find themselves relying on anthologies from an actual historical society, whereas students from younger and smaller communities may in fact rely heavily upon the oral histories of senior citizens. By recording the life accounts of such early residents, students may actually contribute to the collection of local history.

Main menu: often referred to as a home card by Macintosh users, a single card that appears quite early in the stack (often right after the title card) which serves as a linking point by clicking on buttons from which the user can get to other cards or areas of the stack (Cochran & Staats, 1997).

Menu: an onscreen list of available functions that can be performed at a given time (A. Freedman, 1998).

Multiage: a mixed-age group of children that stays with the same teacher for several years. The children are randomly selected and balanced by age, ability, and gender. This grouping, made deliberately for the benefit of the children, not for reasons of economics, curriculum, or convenience, comprises much more than school classmates, evolving instead into a true family of learners (Stone, 1996). Author's note: Multiage classes were fairly new to Schaumburg District 54, although the multiage class at Blackwell School was one of several in Schaumburg District 54 in its second year.

Multimedia: disseminating information in more than one form. Includes the use of text, audio, graphics, animated graphics, and full-motion video (A. Freedman, 1998).

Network: an arrangement of objects that are interconnected. Used interchangeably with the term "LAN" (A. Freedman, 1998).

Objects: in hypermedia, generally refers to elements that are placed on the screen such as buttons, fields, and graphics. Objects are components that can be manipulated and can contain links to other objects (Ivers & Barron, 1998).

Oral history: a record of historical events that is obtained via first-hand interviews with persons usually of some prominence (Shafritz, Koeppe & Soper, 1988).

Overhead projector: a teaching tool that is used to project images from a sheet of transparent plastic onto a screen (Shafritz, Koeppe & Soper, 1988).

Paint tool: in computer graphics, the tool controlled by the mouse to simulate a paintbrush on screen (A. Freedman, 1998).

Palette: in computer graphics, the total range of colors that can be used for display. May also refer to the collection of tools available to the user (A. Freedman, 1998).

Paste: to place a block of text or graphics to another location; used in conjunction with the "copy" or "cut" commands (A. Freedman, 1998).

Patch cord: an electrical wire used to connect two pieces of sound (or video) equipment so that electrical impulses can be transferred between the two units to make a recording (Heinich, Molenda & Russell, 1993).

Performance-based assessment: an assessment method whereby teachers evaluate a student's skill by asking the student to create an answer or product that demonstrates his or her knowledge or skills (Ivers & Barron, 1998).

Peripheral: any hardware device connected to a computer, such as a monitor, keyboard, printer, plotter, disk or tape drive, graphics tablet, scanner, joy stick, paddle and mouse (A. Freedman, 1998).

Pixel: (PIX [picture] Element) The smallest element on a video display screen. A screen is broken up into thousands of tiny dots, and a pixel is one or more of the dots that are treated as a unit (A. Freedman, 1998).

Pod: a site-specific term at Blackwell School, referring to an open area of approximately 19' x 33' connected to the Library Media Center. During the site's renovation the summer prior to this project, this particular room was fashioned out of an odd obtuse triangular space in the center of the building. In keeping with the open construction of the Library Media Center, it was fitted with many windows that give it a sort of "fishbowl" feeling. However, it was wired with 30 Internet drop sites, making it an ideal location in which to create a temporary mini-lab for special projects.

Popup: a type of menu called for and displayed on top of the existing text or image. When the item is selected, the menu disappears and the screen is restored (A. Freedman, 1998).

Portfolio: a collection of student achievements that is used to demonstrate past accomplishments and future potential (Shafritz, Koeppe & Soper, 1988). Author's note: in recent years "electronic portfolios" have evolved, these being digitized records of a student's "best work" stored permanently on disk and/or videotape.

Portrait: an orientation in which the data is printed across the narrow side of the form, opposite of landscape (A. Freedman, 1998).

Principal: a staff member who functions as the administrative head of a school (Shafritz, Koeppe & Soper, 1988).

QuickTime: an extension of the computer's operating system that adds the capability to handle information that moves or changes over time, such as sound or video (Kanning, 1994).

Random Access (RAM): a group of memory chips that function as the computer's primary workspace (A. Freedman, 1998).

Read Only Memory (ROM): a memory chip that permanently stores instructions and data (A. Freedman, 1998).

RealAudio: the most popular streaming audio technology (A. Freedman, 1998).

Realia: actual, real things that teachers may set up in one part of the classroom, often that students can touch or manipulate, to enrich their understanding of a topic or theme with which they may not be familiar. For example, a class studying the ocean may be provided (or may contribute to) a collection of seashells, sand dollars, actual sand and pebbles from the beach, etc. Students writing biographies of senior citizens may be interested in actual photographs of the seniors in childhood, diaries or letters from the individual's past, toys, treasures or keepsakes from long ago.

Resolution: the degree of sharpness of a displayed or printed character or image (A. Freedman, 1998).

Rubric: a scoring tool that lists the criteria for a piece of work and articulates gradations of quality for each criterion, from excellent to poor (Goodrich, 1997).

Rule of thirds: cultural-specific information that helps designers place the most relevant information on a computer screen (or any other two-dimensional surface) in the best location. Research on eye movements of people looking at still photographs indicates that Americans tend to look first at the upper-left-hand portion of a picture, and also that they more often look at the left side of a picture before looking at the right side (Heinich, Molenda & Russell, 1993).

Sampling: in digitizing operations, the frequency with which samples are taken and converted into digital form. The higher the sampling rate, the closer real-world objects are represented in digital form (A. Freedman, 1998).

Save: to copy the document, record or image being worked on onto a a storage medium. Saving updates the file by writing the data that currently resides in memory (RAM) onto disk or tape. Most applications prompt the user to save upon exiting (A. Freedman, 1998).

Save as: A command in the File menu of most applications that lets the user give the file a different name and/or put it in a different location (A. Freedman, 1998).

Scaffolded instruction: based on a construction metaphor, the process of providing specific, yet extensive and ample support to learners at early stages and gradually withdrawing the amount of broader supports required until only the most specific assistance remains. Vygotsky (1978) maintained that learners will eventually perform the task entirely on their own (Ormrod, 1998).

Scanner: a peripheral hardware device that works much the same way as a photocopier. A static image is placed on the glass plate in the scanner. The image is then exposed to a strong light source and reflected onto a light-sensitive screen. This image is then converted to a digital map, and sent to the computer for processing, storage, and use in a variety of media applications (Brigham, Hendricks, Kutcka & Schuette, 1994).

Screen: the display area of a video terminal or monitor (A. Freedman, 1998).

Scroll: to continuously move forward, backward or sideways through the text and images on screen or within a window. Scrolling implies continuous and smooth movement, a line, character, or pixel at a time, as if the data were on a paper scroll being rolled behind the screen (A. Freedman, 1998).

Scroll bar: a horizontal or vertical bar that contains a box that looks like an elevator in a shaft. The bar is clicked to scroll the screen in the corresponding direction, or the box is clicked and then dragged to the desired location (A. Freedman, 1998).

Senior citizen: an elderly person, especially one who is retired.

Server: a computer in a network shared by multiple users (A. Freedman, 1998). In this project, the server located at Blackwell School had a speed of 180 Mhz, with a 4 gig hard drive, and 64 MB RAM.

Sharp projection unit: in Schaumburg Community Consolidated School District 54, the term used to refer to a computer peripheral, a projector that connects to the back of most IBM or Macintosh computers. This device projects whatever is on the monitor screen onto the wall screen for viewing by audiences of more than a few people.

Social worker: a professional who performs services in assisting the prevention of, or solution to, the personal, social, and emotional problems of individuals, which involve family and community relationships (Shafritz, Koeppe & Soper, 1988). Author's note: the social workers involved in this project were in fact employed by the retirement community, not the school district.

Software: instruction for the computer. A series of instructions that performs a particular task is called a program (A. Freedman, 1998).

Spreadsheet: software that simulates a paper spreadsheet, or worksheet, in which columns of numbers are summed for budgets and plans (A. Freedman, 1989). Author's note: In the Benchmark-Blackwell project, a textual spreadsheet was employed rather than a table. The appeal of the spreadsheet was not the calculation capability but the feature that allows sorting of data (student and senior names) and color-coding of cells (student and parent names).

Stack: a group of cards in the same HyperCard or HyperStudio file, usually based on the same theme (Ivers & Barron, 1998).

Storyboard: a visual representation of what will be placed on a computer screen. In addition, storyboards contain information that assist the programmer and the production specialists in the development of media components (Ivers & Barron, 1998).

Summative assessment or evaluation: assessment of the outcome of a project, or evaluation of the end-product of a unit, rather than providing ongoing assessment throughout the study (Shafritz, Koeppe & Soper, 1988).

Tech Support: (1) technical assistance from the hardware manufacturer or software publisher (A. Freedman, 1998). (2) staff employed by a school district to provide technical assistance. This may include troubleshooting, a help desk and/or phone line, and computer and peripheral maintenance. This staff may also perform software installation and monitor licensing. In districts where a local area network is in place, this staff may also monitor network, hardware and software compatibility.

Technology: (1) a process: the systematic application of scientific or other organized knowledge to practical tasks; the process of devising reliable and repeatable solutions to tasks. (2) a product: the hardware and software that result from the application of technological processes. (3) a mix of process and product: used in instances where (a) the context refers to the combination of technological processes and resultant products or (b) process is inseparable from product (Heinich, Molenda & Russell, 1993).

Technology of instruction: a teaching/learning pattern designed to provide reliable, effective instruction to each learner through application of the scientific principles of human learning (Heinich, Molenda & Russell, 1993).

Text box: an onscreen rectangular frame into which the user types text. Text boxes are used to add text in a drawing or paint program (A. Freedman, 1989).

Theory of Multiple Intelligences: a theory proposing that there are multiple ways of knowing, suggesting that people possess several different intelligences (musical, linguistic, etc.) (Gardner, 1983).

Toolbox or tool palette: a collection of buttons grouped together on the screen that provides a quick way to select the functions available in the program, typically found in a graphics program (A. Freedman, 1998).

Transition: visual effects, such as dissolves or wipes, that take place as a program moves from one image or screen of information to the next (Ivers & Barron, 1998).

Undo: to reverse the last editing operation that has taken place. For example, if a segment of text has been deleted or changed, performing an "undo" will restore the original text. Programs may have several levels of undo (A. Freedman, 1998).

Upload: to send a file transmitted over a network (A. Freedman, 1998).

User-friendly: a system that is easy to learn and easy to use. This term has been so abused that many vendors are reluctant to use it (A. Freedman, 1998).

VHS tape: a VCR format introduced by JVC in 1976 to compare to Sony's Beta format. VHS has become the standard for home and industry, and Beta is now obsolete. SVHS is a subsequent format that improves resolution (A. Freedman, 1998).

Video: an audio/visual playback and recording technology used in TV. It also refers to computer screens and terminals. However, there is only one TV/video standard in the U.S., but there are dozens of computer/video display standards (A. Freedman, 1998).

Videocamera or videorecorder: a camera that takes continuous pictures and generates a signal for display or recording. It captures images by breaking down the image into a series of lines (A. Freedman, 1998).

Videocassette or videotape: a magnetic tape used for recording full-animation video images. The most widely used videotape format is the ½" wide VHS cassette. VHS has all but obsoleted earlier videotape formats for home and commercial use (A. Freedman, 1998).

Video cassette recorder (VCR): a videotape recording and playback machine. The most common format is VHS (A. Freedman, 1998).

Video transfers: in the Benchmark-Blackwell project, the process of electronically transferring each student-created *HyperStudio* stack onto a videotape so that each senior citizen could access and re-access the final work, his or her own multimedia biography. This was accomplished by running audio and video cables out of the back of a computer and into the back of a standard VCR. On a cue, a person (in this case, parent volunteers) would manually go through each screen of the stack, scrolling slowly through text boxes and waiting until sound clips had finished playing. The resulting videotape sacrificed interactivity but contained all other elements of the original *HyperStudio* stack, and could be played on a standard VCR, equipment to which all seniors had access.

WAV: The native digital audio format used in Windows. WAV files use the .WAV extension and allow different sound qualities to be recorded. Either 8-bit or 16-bit samples can be taken at rates of 11025 Hz, 22050 Hz and 44100 Hz. The highest quality (16-bit samples at 44100 Hz) uses 88KB of storage per second. (Techweb Technology Encyclopedia . [Online] Available: http://www.techweb.com)

Window: a scrollable viewing area on a screen. Windows are generally rectangular (A. Freedman, 1998).

Windows: the most widely used operating system. Developed by Microsoft, Windows provides a graphical user interface (GUI) and master control program for running applications in desktop PCs and servers. Windows is also an environment. Microsfot has developed standard interfaces for interoperability that provide complete software architecture for the enterprise. The Windows operating system comes in three flavors: Windows 3.x, Windows 95 and Windows NT (A. Freedman, 1998). Author's note: Windows 95 was the most current version at the time of this project, although the school district was upgrading to Windows 98 at the time of this writing.

Word processing: the creation of text documents (A. Freedman, 1998).

Word wrap or text wrap: a word processing feature that moves words to the next line automatically as the user types, based on the current right margin setting (A. Freedman, 1998).

ZIP drive: a popular 3.5" removable disk drive from Iomega Corporation, Roy, UT. It uses design concepts from Iomega's Bernoulli technology as well as hard disks to provide 100MB removable cartridges that cost about $15 (A. Freedman, 1998).

ZIP disk: the 3.5" disk itself. One ZIP disk holds the equivalent of 100 ordinary 3.5" disks. Author's note: this type of disk is particularly helpful when moving large files from one computer to another that is not part of a network, such as from a school district computer to one's home computer.

CHAPTER I: INTRODUCTION

When asked to identify a favorite subject in school, it is a rare child who will name history. Indeed, among elementary children, the subject of history seems to have a decidedly negative connotation, conjuring up images of old musty libraries, uninteresting and unrelated details, and faded artifacts. Children may have picked up this negative from our youth-oriented society, or from older siblings groaning about "boring history lessons." In any case, history is not a popular topic among schoolchildren.

One educator related this to the local history curriculum in this author's district, then long overdue for an update. "The curriculum is too abstract for the child who is targeted to learn it. It has no authenticity. They *live* in Schaumburg! They think they know everything there is to know about it already, so it has no appeal. Only by bringing in the human element, like in the interview process, can you authenticate the curriculum" (Bingham, M. L., personal correspondence, April 16, 1999).

In fact, according to Michaelson & Mullins (1998), one of the greatest challenges to social studies teachers today is the task of making both historical materials and contemporary societal issues engaging to the student audience. "Traditional" history lessons focused on the teacher as the dispenser of information and knowledge, with the students as consumers and absorbers, or some might say the regurgitators and forgetters of information.

After 225 years of variations of this model, it appears that within the last ten years there has been a dramatic movement in favor of the teacher moving to another spot in the classroom. "Not the sage on the stage, but the guide on the side," is an oft-quoted phrase in the campaign to usher teachers away from their desks, high stools and lecterns. Indeed, one of the best indicators of favored teaching practices in this author's school district is that the teacher (facilitator) is hard to locate in the classroom, as he or she is presumably seated with one or more students in a mini-lesson, conference, or co-learning situation.

This author wanted to instill current theory into old curriculum, turning a subject based on traditional methodology into a constructive unit. Two existing curricular units, local history and biography, were modified to incorporate elements of constructivism, scaffolded instruction, and teaming. The resulting project, which lasted one school year, was designed to incorporate a variety of ongoing alternative and authentic assessments.

This project focuses on the integration of history and language, teaching social studies through the lens of local history and living people. In Schaumburg, Illinois, the life histories of 33 senior citizens at *The Benchmark,* a local retirement community were documented by 74 third and fourth grade students at Elizabeth Blackwell Elementary School. This yearlong endeavor, hereafter referred to as the Benchmark-Blackwell project, utilized the engaged learning model, which is only one of many vehicles available to teachers today. This model offers several indicators of successful integration of technology into the constructivist classroom and champions active and experiential learning using technology as one of many tools. Constructivist theory supports learning in a social context (Heinich, Molenda & Russell, 1993; DeLay, 1996; Lehrer, 1994).

Constructivist learning aided by technology, in this case according to the engaged learning model, is an effective way for students to learn, provided that authentic assessment is an ongoing and integral part of the process.

Technology in the classroom, when viewed by the teacher as an "add-on" to the curriculum – or just as horrifying, as the center of the curriculum – is an expensive mistake, robbing the teacher and students of valuable time and resources. Similarly, technology in the classroom that is foisted upon teachers by districts that fail to plan adequately for ongoing staff development, accessibility and technical support fails any measure of cost-effectiveness, again stealing time and resources from the classroom. This author has had the good fortune of employment by a school district that has an extensive planning process for the integration of technology and curriculum, a district that has laid the groundwork for careful implementation of these plans. Utilizing all the personnel available as consultative resources, this author was able to glean support for a project that focused not on textbooks and worksheets in the classroom, but on real people outside of the school walls. Employing creative management of the hardware and software available, this author was able to provide adequate computer time to all students involved in the project.

Most students find projects involving technology to be appealing, but "fun" by itself is not a criterion for a worthwhile learning experience. In addition to motivating students, the use of technology should enable students to do something *better* – access more information than traditional methods, make something more professional looking, make something of use to someone else. In this project, technology accomplished all of those things, and therefore, had an intrinsic purpose other than providing glitz.

CHAPTER II: LITERATURE REVIEW

Overview

The traditional method of learning social studies, or more specifically history, is synonymous with boredom. Even the entertainment world has capitalized on the image of history teachers as outdated relics, droning endlessly in lecture to catatonic students, assigning end-of-chapter questions in heavy textbooks, and quizzing students orally on disjointed dates and names and locations. Jarolimek and Walsh (1974) wrote about the teaching of social studies, stating, "In its worst form it was and is often caricatured to represent all of the unfortunate practices associated with lecture-textbook teaching – reading, reciting, memorizing, answering questions."

Thankfully, social studies pedagogy, like nearly every other subject taught in the elementary school today, has evolved beyond the application of knowledge and into an approach that incorporates understanding relationships, building social skills, transmitting values, interrelating community, and making decisions. Largely due to the impact of technology on our society, and to current application of learning theory, today's students are not expected to acquire memory banks full of facts and "knowledge;" instead they are challenged to use knowledge to make decisions (Kaltsounis, 1987). They are encouraged to use collections of facts and opinions to create new knowledge (Steffey & Hood, 1994). They are expected to be able to use technology to manipulate, categorize, sort, organize, convey, and communicate knowledge (Illinois State Board of Education, 1997; National Council for the Social Studies, 1994).

What caused these changes in pedagogy? How has learning theory impacted our current practices? What role has technology played in this evolution, and how can we employ it in the future to our best advantage? What else does the literature offer towards successes and best practices in social studies? The purpose of this literature review is to examine the history of learning theory in education, discuss the evolution of social studies as a curricular area, and consider the changes wrought by the Information and Communication Age technologies on the classroom. The confluence of these effects has resulted in a ideal setting for the development of engaged learning activities, an approach which will be defined in this literature review and illustrated in the project review.

A Historical Perspective of Learning Theory in America: Setting the Stage for Behaviorism vs. Constructivism

In its early history, education was based in behaviorist theory. Later, cognitive theories emerged with information processing, and recently, the trend has turned toward constructivist practice (Hannafin, Hannafin, Land & Oliver, 1997, p. 104). To fully understand the reasons for the current clamor for systemic change in instructional methods, especially as they relate to technology, the pedagogical shifts in the last century must be considered as outcomes of both educational psychology and political history. These external forces have influenced not only education and technology, but also the very definitions of words such as *learning*, *teaching*, and *assessment* of both.

The concept of education as an application of knowledge *to* a person dates back to the American Industrial Revolution. At that time, the pressure on the schools was to prepare our country's agricultural workers for factory jobs. The resulting school system catered to the mass production mentality, churning out students who were ready to face the demands of our nation's new economy. As assembly line work flourished, society needed workers with a minimum of education who could tolerate repetitive tasks (Reigeluth & Garfinkle, 1994, p. 7). According to Vollmer (1994), in 1893 the Committee of Ten, a group of Ivy League College presidents, held meetings for the purpose of reshaping the American public school system. Their "new system" would, they believed:

> identify and select those young men of proper family background and high intelligence to prepare them for higher education so that they can take their proper place as the leaders of American society, and to sort out all of the rest so that they can assume their rightful roles in the fields, the factories, the mills, and the shops of America (Vollmer, 1994).

In 1910, John Dewey advocated "progressive education – education designed to link purpose and structure," which "... placed students in the role of developing rather than receiving knowledge" (Lehrer, 1994, p. 227). According to Perkins (1986), this was an idea that came before its time, because "the metaphor of learning in schools is often one of knowledge transmission rather than knowledge construction" (cited in Lehrer, 1994, p. 224). Reformers of Dewey's time attempted to replace the importance of personal knowledge acquisition in education with a focus on personal duty to society, and to make schools responsible for instilling that sense of duty (Church, 1976, p. 268). This thinking was a logical outgrowth of the period of American history that saw tremendous urbanization of the burgeoning immigrant population and a simultaneous merging of small businesses into vast corporations. Dewey wrote, "Education is vital to the proper development of a reformed and conflict-free community," and these words quite simply define the main thrust of the writings of the progressive education movement that dominated educational theory for forty years (Church, 1976, p. 261).

Under tremendous pressure to adjust to the new industrial reality in the first half of this century, American education found a powerful organizing metaphor in the factories. Corporate style boards of education were created, and financial considerations came to be synonymous with educational considerations. Administrators, especially superintendents, were charged with the dual responsibilities of increasing efficiency while raising educational standards. Teacher discretion and autonomy were reduced.

As for the students, they were treated as raw materials, moving along an assembly line at the sound of a bell. They were grouped according to age. They were all expected to graduate. They were sequestered from their real world in classrooms where a tolerance for routine work was cultivated. Everything was standardized, and standardized testing swept the nation's schools (Vollmer, 1994). However, some maintain that our schools have not changed even to this day.

> Two things educators know for certain are that different children learn at different rates, and different children have different learning needs... Yet our... system presents a fixed amount of content to a group of students in a fixed amount of time. So it is like a race to see who receives the A's and who flunks out. Our current system is not designed for learning; it is designed for selection (Reigeluth, 1994, p. 7).

In the post-war era of the 1950s, James B. Conant, Chairman of the American Council of Education claimed that "American education should serve two main purposes:

1) to identify the intellectual elite, and 2) insure that the intellectually elite were well-prepared for positions of political and technological power" (Church, 1976, p. 408). The American public school system, with its interest in attainment of national standards and testing, sought to "cull out" those members of society best fit to enter college, or at least hold desirable skilled occupations. The remaining group of students was estimated to be at about 60%, and vocational education was seen as the only viable option for these students (Cremin, 1961).

During this time, educational research focused on teaching as communication of pre-existing knowledge, or stimulus design. According to Heinich, Molenda & Russell (1993, p. 13), three themes dominated the research about educational forms of media (one form of stimulus), which had come into its own during World War II:

1) proving media can teach,
2) improving the effectiveness of media through evaluation techniques, and
3) developing better practices for using media in the classroom.

While these studies were valuable and formed much of the basis for our knowledge of instructional design and media use, they did not focus on the learning process but on the application of a knowledge-conveying tool. The focus shifted to the actual process of *how* learning takes place during the mid-1950s, a period characterized by the work of two pioneer psychologists whose views were quite different, B. F. Skinner and Jean Piaget. The work of Skinner and Piaget are discussed in turn in the next sections of this literature review.

Associationists: An Examination of Early Behaviorist Learning Theories

The set of learning theories referred to as behaviorism is a set of principles "in which learning and behavior are described and explained in terms of stimulus-response relationships" (Ormrod, 1998, p. G-1). The major early contributors to this form of educational psychology are E.L. Thorndike, Ivan Pavlov, and the aforementioned B. F. Skinner.

In 1898, publication of a paper called "Animal Intelligence" launched Thorndike into the forefront of the field of educational psychology. Thorndike viewed learning as purely a trial-and-error experience, and believed that it was merely a series of connections made by stimulus and response (S-R). Thorndike proposed that animals and humans, particularly children, learn in the same way, somewhat like mechanical robots (Sprinthall, Sprinthall & Oja, 1998). Thorndike was the first to associate the importance of motivation in learning, particularly extrinsic rewards as motivation.

Ivan Pavlov was a Russian physiologist who won the Nobel Prize in medicine in 1904 for his work on the digestive activity of dogs. He became famous for his happenstance observations of the patterns of his dogs' salivation (Sprinthall, Sprinthall & Oja, 1998, p. 235). Pavlov noticed that his dogs began to salivate as soon as they heard lab assistants coming down the hall, even though the stimulus (meat) was not close enough that the dogs could have smelled it. This sparked Pavlov's curiosity about whether or not the dogs could be conditioned to salivate as a response to a new stimulus. He substituted a flashing light (new neutral stimulus) for the sound of the assistants approaching, and presented the meat (unconditioned stimulus). After several repetitions, he flashed the light without presenting the meat, and the dogs salivated in (a conditioned) response to (the new conditioned stimulus) the flashing light (Pavlov, 1960). This process, of pairing an unconditioned stimulus with a neutral stimulus to elicit a certain response after a series of repetitions, is now called "classical conditioning" (Sprinthall, Sprinthall & Oja, 1998).

The Advent of Behaviorism

Operant conditioning, developed by B. F. Skinner, was based on the idea of "reinforcement theory," that students could, by the use of external stimuli, be "trained" to do or "conditioned" to learn just about anything that a teacher wished (Skinner, 1938). All of the "responses" that cannot be classified as reflexes (which Pavlov called "respondents") were categorized as "operants." Operants are spontaneous responses, unassociated with the original stimulus; we now know these as voluntary behaviors. "The consequences of operant behavior, however, can be observed, even though the stimulus is not known. In operant conditioning, reinforcement is contingent on the operant first being emitted. Skinner based most of his work using rats in an "experimental chamber," which despite Skinner's best efforts, became known as the "Skinner box" (Skinner, 1989). When the rat chanced to press a lever, this was the first step which Skinner termed the "emitting of the free operant." In response to the lever being pressed (the second step), the rat was given a pellet of food, or the "reinforcing stimulus was presented." The third step was that it was fairly predictable that the rat would press the lever again, or "the probability of the response occurring again has increased" (Skinner, 1974, p. 62).

Both classical conditioning identified by Pavlov and operant conditioning identified by Skinner involve both a stimulus and a response. However, operant conditioning differs from classical conditioning in two important ways. The first involves the order of the stimulus and response; in Pavlov's dogs, the stimulus was presented first, but with Skinner's rats, it was presented *after* the response. "In classical conditioning, a response occurs as a result of a particular stimulus; in other words, the stimulus elicits the response… But in operant conditioning, the response is usually a voluntary one: the individual can control whether it occurs" (Skinner, 1974, p. 68). In operant conditioning the three conditions that must occur are that the subject must make a response, the stimulus must follow the response, and the stimulus must be presented only when the correct response is given (Skinner, 1974, p. 54). With the publication of Skinner's reinforcement theory, "learning research started to shift from stimulus design … to learner response to stimuli. Skinner's work demonstrated that behavior of an organism could be shaped by … rewarding the desired responses to the environment…" (Heinich, Molenda & Russell, 1993, p. 13).

Skinner believed that learning should be "shaped" by programs of stimuli (material for students to learn) and consequences (positive reinforcers). Drawing on observations of his own daughter's schooling in the late 1940s, Skinner became convinced that instructional weaknesses such as negative consequences, poorly organized lessons and books, and long intervals between student work and teacher feedback could be eliminated (Skinner, 1989). He believed that the principles of operant conditioning could be applied directly to teaching: "(1) be clear about what is to be taught, (2) teach first things first, (3) allow students to learn at their own rate, and (4) program the subject matter" (Biehler & Snowman, 1997, p. 283).

A few years earlier, S. Pressey had invented a "teaching machine" that was a device "that presented learners with questions, required them to respond, and then allowed the subject to get feedback by turning a knob or opening a slot to reveal the answer. Nothing much came of Pressey's ideas, however, until Skinner... and others began to tout teaching machines as practical alternatives to traditional schooling" (Good & Brophy, 1995, p. 163).

Skinner applied his principles of reinforcement theory to the learning process. Instruction was broken into a series of small steps in a predetermined sequence requiring certain responses, which were then repeated to mastery and positively reinforced. "Skinner believed strongly that the instructor must control the learning process" (Schlechter, 1991, p. 6). Thus the teacher controlled content and delivery, and only the student's "mastery" or memorization of the required elements affected the speed of material coverage. "The result was the emergence of programmed instruction, a technique of leading a learner through a series of instructional steps to a desired level of performance. Unlike earlier learning research, Skinner's work led directly to improved instructional design" (Heinich, Molenda & Russell, 1993, p. 13).

According to Skinner, the machine that he developed to implement this programmed instruction was "a mechanical anticipation of the computer" (1989, p. 92). These machines were very simple mechanical devices, with "programs" being inserted to show the first sentence or question "framed" in the viewing window. Some of the "programmed instruction" was designed in a book format. In today's classroom, it is rare to find a book format based on programmed instruction, and computers have indeed replaced Skinner machines. However, some of the terminology has survived into CAI (computer-assisted instruction), including the words "program" and "frame" (Biehler & Snowman, 1997, p. 284). It is worth noting here that one major departure from Skinner's theory devised by Crowder in 1962 involved the use of a branching sequence, used primarily at the time for remedial subsequences (Schlechter, 1991, p. 7). Some years later, the branching sequence would be developed further by authors of hypermedia to provide students with true nonlinear options.

One long-lived example of unfettered programmed instruction, a commercial application of a program that is universally recognized by baby-boomers, is the *SRA* reading program, often employed by teachers in the 1960s as an "enrichment activity" for those students who finished work before their peers. Pure behaviorism, or the simple stimulus-response sequences, translated easily into CAI for the elementary schools. When the first computers hit the classroom in the late 1970s, teachers were comfortable with behaviorist sequences, and the drill-and-practice programs that accompanied the first computers were received with much enthusiasm. Most importantly, however, "psychologists, in particularly educational psychologists, saw reinforcement theory and programmed instruction as a cure for many of the ills of education" (Heinich, Molenda & Russell, 1993, p. 13).

Social learning theory grew out of behaviorism, and can be viewed as the alternative view to associationist theories. Social learning theory attributes changes in behavior to observation and imitation of others, downplaying the role of reinforcement. Because the primary element in this process is the observation of others, it has also come to be known as "observational learning" (Biehler & Snowman, 1997, p. 294), but it is now most commonly referred to as social cognitive theory (Ormrod, 1991, p. 207).

Neal E. Miller and John Dollard, authors of one of the first books on this theory, *Social Learning and Imitation*, suggested that children could observe and match desirable behavior in another person, and thus receive their own spontaneous reinforcement from an external source after achieving the behavior themselves (Biehler and Snowman, 1991). Albert Bandura, who eventually became the leading voice for the social cognitive theory, agreed with Miller and Dollard's premise that imitation was a significant part of the learning process. However, as a result of his experiments on the effects of aggression in children's play, Bandura believed that observation, rather than imitation, was sufficient for learning, and that the reward was often inconsequential to the learner (Biehler and Snowman, 1991). Today, it is possible to see this in schools when children use authoring software; when students are allowed to move around and view each other's work in progress, they often observe a process or series of steps used to achieve an effect.

Occasionally these same students will return to their computer and attempt to replicate the process immediately, but often the steps are mentally recorded and reserved for later application.

Purists of behaviorism maintain that learning takes place without "covert mental activities" such as imitation of models, delayed imitation, and vicarious learning. However, behaviorists who study human learning in social contexts incorporate these cognitive mediations. Imitation of models refers to the ability of humans to behave appropriately in new social situations, mostly by observing others without any deliberate cueing or behavioral shaping (Good & Brophy, 1995). Delayed imitation refers to the ability to recall and imitate behaviors observed in others long before. Vicarious learning refers to learning that occurs, not only as a result of imitation of others, but also by putting ourselves in their place and identifying with their thought and emotions. The significance of this cognitive mediation is that behaviorism had to be broadened to acknowledge and include emotion and thoughts, or cognition (Biehler & Snowman, 1997).

Critics of Behaviorist Learning Theories

Roblyer contends that "education's popular magazines and scholarly journals" originally referred to behavioral theory "variously… as objectivist, empiricist, or rational" and later as "directed … and (alternately) teacher-directed" (1996, p. 13). Teaching practices of this nature have recently come under fire. Statements such as "there is strong evidence that traditional models of learning, traditional definitions of technology effectiveness, and traditional models of cost effectiveness of technology don't work," (Jones, Valdez, Nowakowski & Rasmussen, 1995, p. 2) pepper the current literature, and teaching magazines have made common the terminology of theories alternative to behaviorism.

A teaching machine of any sort, Skinner's or the most powerful computer on the market today, is only useful if the program that it runs is well designed. Skinner's theories apply to the learner's ability to acquire and recall basic facts, and this function is the subject of great controversy in education today. The Information and Communication Age, coupled with the downward trend in costs of personal computers, has raised new questions regarding students' need to use rote memorization techniques, acquire large amounts of unconnected and seemingly irrelevant information, and parrot that information back in order to receive rewards. In general, the theories of behaviorism focus on the effects of external forces and relate specifically to drill-and-practice applications, which are considered to be effective in an increasingly select number of educational settings. "Drill-and-practice programs are still primarily used to instruct low-ability students. These types of programs appear to provide low-ability students with needed additional structure of and practice with the instructional materials" (Becker & Sterling, as cited in Schlechter, 1991, p. 10). It is interesting to note that the reward in the SRA reading kits was being able to use the colored pencils to color in the progress chart, something that would appeal to few of today's students. It is also worth noting that these kits, if they still exist in a school, are found on storeroom shelves in the resource center, and the people who most frequently check them out are those who work with students in remedial reading settings. In light of other learning theories, behaviorist theory alone is viewed as applicable to very select settings.

Pure behaviorist learning does still exist in the schools today, however, and in a most unpredictable location -- in the most progressive schools, with the most sophisticated technologies and the best intentions of educators that are proponents of higher-level thinking, where drill-and-practice software has been banned. Students often learn to navigate through complex multimedia programs in a trial-and-error manner. Even when techniques have been demonstrated, some students find it easiest to learn by "clicking around," sometimes successfully, and other times not. This activity, a basic response-stimulus process, is repeated until the student author achieves the desired effect on the screen.

E. C. Tolman was "essentially a behaviorist, but a behaviorist with a decided difference" (Sprinthall, Sprinthall, & Oja, 1998, p. 303) and his beliefs are particularly interesting in light of the situation described above. Tolman believed that maze learning was not possible unless the organism internalized a cognitive map, an internal representation of the environment. He further believed that maze learning was not a "mere collection of tiny S-R connections" (Sprinthall, Sprinthall, & Oja, 1998, p. 303). It is interesting to note that, as students "click through" the "maze" of screens and dialogue boxes in computer programs, the language used is geographical in nature -- a collection of "go here" and "get out of this" and "where is...?" even when students have no prior experience with computers and have not been instructed using these terms.

Concluding Remarks

Behaviorism, which Simmons writes, "views education as a matter of applying appropriate *external* methods and techniques (as stimuli) to evoke the appropriate response: e.g., socially acceptable behavior, recall of information, skill acquisition, etc.," and learning is defined by behavior theorists as nothing more than the acquisition of new behavior. Behaviorists focus on observable behaviors. Behavior is essentially an element of a sequence of occurrences: 1) antecedent (an event before the behavior), 2) behavior, and 3) consequence (an event resulting from the behavior. This leads to a problem for instructional design for higher level skills, because "behaviorists refuse to speculate on what goes on internally when learning takes place" and "are reluctant to make inferences about how learners process information" (Heinich, Molenda & Russell, 1993, p. 14).

An Examination of Cognitive Learning Theories

Rather than seeing learning as an overt behavioral response, cognitive psychologists are concerned with the mental processes individuals use in responding to their environment. Cognitive psychologists believe that it is possible to study thought processes (nonobservable behaviors) in a scientific manner. "The cognitive correlation comes from the belief that students need to develop an understanding of the underlying concepts associated with any task, and that this understanding is developed by allowing the students to interact actively with the environment" (Schlechter, 1991, p. 7). Jean Piaget's theories of cognitive development, particularly of the development of logical thinking, are among the best known. Piaget is also credited with creation of the model describing how learners gather and organize information (Woolfolk, 1995).

Three key concepts of the learning process described in Piaget's work are schemata, assimilation, and accommodation. Schemata are the mental structures by which individuals organize their perceived environment. These adapt or change during learning, and are used to identify, process, and store incoming information. Schemata can be thought of as categories used to classify experiences. According to Piaget's theory "adult learners have a greater number, more elaborate schemata than children" (Piaget, 1977, p. 55). Assimilation is the process by which a learner integrates new information and experiences into existing schemata, and accommodation is the process of modifying existing schemata or creating new ones when information won't fit into the existing ones (Piaget, 1977).

The learning process described by Piaget occurs infinitely across a span of developmental stages in life. Piaget's identification of these stages, or levels of "mental maturity," formed the basis for the body of literature known today as developmental psychology. Piaget was convinced that the thought processes of small children differed in very basic ways from the thought processes of adults. For fifty years, he concentrated on the study of cognitive development, and concluded that human thought patterns evolve gradually through four sequential stages (Piaget, 1977).

Piaget called the first stage, which spanned from birth to two years, the sensorimotor stage. An infant in this stage is basically unable to move around independently, and therefore learning occurs through exploration of the five senses and body movement. When the child learns to crawl and walk, patterns of behavior and thought are formed and reformed at a greatly increased rate as the child explores the world (Piaget & Inhelder, 1969). The second stage spans from ages two to seven, and Piaget termed this the preoperational stage. In the first part of this stage, the toddler is highly egocentric and can understand only intuitively, applying reasoning only to specific circumstances without generalizing to other situations (Piaget & Inhelder, 1969). During the second phase of the preoperational stage, social interaction and less egocentric behavior occur, as the child becomes increasingly involved with peers (Piaget, 1965). From about age seven to eleven, Piaget believed that children were in the concrete operational stage with limited logic appearing, and from age eleven to adulthood, adolescent learning is in the formal operational stage with logic applying to both concrete and abstract situations (Piaget, 1965).

The elementary school student, the subject of this particular project, is in the concrete operational stage for the majority of the time, according to these age ranges. According to Ormrod, the distinctive features of this stage include an ability to distinguish between reality and fantasy, an ability to accept that thoughts and feelings are not characteristics of inanimate objects, the ability to differentiate one's own perspective from others', and the ability to reason about change and its effects (1998, p. 49). The latter two features of this stage were important in this project, in that Blackwell Elementary School students had to consider the important life events and decisions made by their biography subjects. It was evident that these abilities were in various stages of development, and that this was truly a challenge for some students.

Information Processing Theory

An alternative perspective to the gradual cognitive development described by Piaget is that of information processing theory, which purports that cognitive development is more gradual and continuous (Ormrod, 1998). Theorists of information processing are concerned with "the micro level of investigations of the processes involved in learning and memory" (Good & Brophy, 1995, p. 203).

Up until the 1930s, much of the research done on memory had involved animals in isolated situations, and had concentrated on the "association" of stimuli with responses; these researchers later came to be known as the associationists. Hermann Ebbinghaus was one of the few scientists of this time to focus on learning and memory in humans, with particular regard to "pure" memory "uncontaminated by previous learning, so he avoided connected discourse and used nonsense syllables… free of associations to prior learning" (Good & Brophy, 1995, p. 204).

Information processing theory resulted from many psychologists' disenchantment with the isolated conditions of behaviorist experiments using laboratory animals, and from wartime experiences of psychologists as trainers of large numbers of soldiers, wartime experiences with communications research, and development of the field of computer science. In fact, information processing theory is based loosely on the metaphor of the brain as a computer (Sprinthall, Sprinthall & Oja, 1998). Most explanations of the theory even include a diagram which is amazingly similar to a flowchart of how information enters the brain, is processed, stored in short or long term memory, and then can be accessed or retrieved later.

Information processing theory is based on three major assumptions relevant to this project. The first assumption is that information is processed in steps or stages. Information in this model is also referred to as environmental stimuli or input. Information enters the brain through the area called the sensory register, named so because it is believed to store knowledge encrypted in the same manner that the senses perceive it. The information stays in the sensory register for a "virtual videotape" of about three seconds, which is the amount of time the brain needs to decide if it warrants further attention. The sensory register is the device that screens out background noise, allowing the reader to attend to letters on a page, but allows the ringing of a bell to interrupt. (Biehler & Snowman, 1997; Sprinthall, Sprinthall & Oja, 1998) It is also the area of the brain that allows distracted students to recall the question posed to them, such as, "Would you read the next sentence, please, John?" from their echoic memory. The echoic memory records acoustics or aural information; visual information is briefly held in iconic memory. "Other sensory memories may also exist, such as touch, taste, and smell, but the evidence regarding sight and sound is now more direct" (Sprinthall, Sprinthall & Oja, 1998, p. 306).

The second assumption of the information processing theory is that there are limits on how much information learners can process at each step. If the learner recognizes and attends to one of the items in iconic or echoic memory within the sensory register, such as the letters on the page, it will be processed and stored in short-term memory, while the background noises will be discarded (Biehler & Snowman, 1997). The short-term memory can hold only five to nine separate items for a period between a few seconds to a whole minute. Items can be "chunked" to lengthen this time, but most of the time people employ other resources to transfer the information into long-term memory (Sprinthall, Sprinthall & Oja, 1998).

This leads to the third assumption of the information processing theory, which is that the information processing system found in human learners is interactive. Information that already exists in the long-term memory influences perception and attention, and that perception and attention can also influence what information then enters the long-term memory (Biehler & Snowman, 1997).

Some of the most valuable contributions made to education by information processing theorists have been in the identification of factors affecting the ability of a learner to transfer information from the short-term memory to long-term memory. In 1979, John Bransford identified four interactive general factors that affect the learning process. The first two concern the learner, and are the learner characteristics (prior knowledge, attitudes, motives and cognitive style) and the learner activities (the methods used by students to help them remember such as note-taking or visual imagery). The last two factors concern the learning environment, and are the learning material (long or short textual materials, visual materials, realia, or multimedia) and the nature of the criterion (demonstration of competency, such as tests or performance-based assessments) (Bransford, 1979).

Rehearsal of information, re-organization of information, and association of new information to information already in long-term memory are some of the most common methods used by learners to help them store information effectively (Biehler and Snowman, 1991).

According to Sprinthall, Sprinthall & Oja (1998), research is currently underway into the possibility that humans may have at least two long-term memory systems. The first is supposed by researchers to be "declarative memory" consisting of facts such as names and dates and faces. Subsets of this are the "episodic declarative memory," consisting of personal experiences and "semantic memory," which consists of our language and general information (Sprinthall, Sprinthall & Oja, 1998, p. 308). Current research may shed some light on the reasons that parts of this memory system seem to decline before others.

This concept was observed by this author in the course of the Benchmark-Blackwell project. The Blackwell Elementary School principal shared the fact that that his own mother's recall abilities were puzzling to him; she could not recall what she had for breakfast, but she could recall very elaborate details of everyday events from his childhood. Similarly, students participating in this project found it odd that some senior citizens had to be reminded of the interview dates several times by the retirement community staff, yet the same seniors recalled the most minute details of their family celebrations before the Depression.

The second long-term memory system is believed to be "procedural memory," consisting of "traces of motor skills typically learned through repetitive practice and/or conditioning" (Sprinthall, Sprinthall & Oja, 1998, p. 309). This memory system appears to remain intact throughout life; riding a bike, playing the piano, tying shoes, and driving a car are motor skills that are able to be reproduced by the very elderly, although their physical limitations may not make all of these activities easy or safe.

Brain research has led to the belief that rules and strategies for learning, organized on networks of relationships and ideas called schemata, are also stored in the semantic memory (Good & Brophy, 1995, p. 208). A schema (singular of schemata) is "domain-specific" which means that it is based on one single theme. According to Good & Brophy, information processing theorists believe that learning requires *active* processing, storage and retrieval of knowledge, but more importantly, teaching requires that teachers *actively* help learners to develop information processing skills and help them apply those skills to curriculum (1995, p. 203). Helping students access these schemata, either for storage of new information or for retrieval of existing knowledge appears, then, to be at the heart of the teaching process.

Research has identified many different ways to help learners retrieve stored information. Robert S. Wyer and Thomas K. Srull identified three stages of long-term memory retrieval in 1989. First, the learner has to identify which "storage bin" in memory, then look for the schema, and then look for the item. Second, the most recently used schema will be at the top of the storage bin, thus making it easier to find and use later. The third stage identified by Wyer and Srull is of the most importance to educators, that being that learners with well-organized, integrated, and coherent schema will first recall unusual or unique information about that topic before recalling the more mundane information. After interviewing his senior citizen partner for the first time, one Blackwell Elementary School student sought out his teacher and exclaimed "He used to hunt skunks when he was growing up on the farm!" and then, almost in passing, mentioned that the man had been president of a local college for twenty years.

According to this research, among the most effective methods that are successful in facilitating retrieval of information are building an organized knowledge base, relating new material to an existing knowledge base, and understanding new information. These three formed the basis for Blackwell Elementary School students' processing of historical information in this project. Students began their study by listing the facts that they knew about the elderly, and about the periods in history that they must have lived through. Books from the library and a large collection of black-and-white photographs were made available for browsing in all classrooms. Students were invited to share their new knowledge and their questions through discussions or in journals. A good number of classroom discussions and even a few dinner table discussions were reported, and the students found these discussions to be helpful in clarifying things they didn't understand.

Parents and teachers found that the books, photographs and discussions were good motivators to further study of particular relevant topics in the seniors' biographies.

Concluding Remarks

In conclusion, information processing theory developed as a favorite method of education research because the ideas and concerns it borrowed from other disciplines gave psychologists an organized way to examine what behaviorism left out – the characteristics of the student. Furthermore, though aspects of many learning theories overlap and can actually be found within other theories, "information processing theorists tend to be constructivists, emphasizing the cognitive structures built by learners themselves rather than the ways that subject matter has been structured in the underlying academic disciplines" (Good & Brophy, 1995, p. 203).

In 1994, George Semb and John Ellis reviewed fifty-six research articles on learning theory and retention of school subjects. "Their findings were very consistent with information processing principles" and specifically relevant to this project, "less forgetting occurred in classes where students were more actively involved in learning... as in a ... field trip..." (Biehler & Snowman, 1997, p. 329).

Regardless, then of the label applied to the approach, while behaviorists tend to stress external control over a learner's behavior, cognitivists stress internal or learner control over mental processes. According to Heinich, Molenda & Russell (1993), this difference in viewpoint influences how instructional media are designed and used. Material designed according to behaviorist theory carefully screens out any material not directly related to the behavioral or performance objectives; this type of material is particularly successful in teaching basic skills and basic knowledge, often associated with drill-and-practice. Material based on cognitive theory, on the other hand, is less structured, lets learners control the learning process, and promotes information exchange among the learners. For this reason, learning activities that call for problem-solving, creative behavior, or cooperative activity are more appropriate to the cognitive instructional approach.

Constructivism

Some cognitive psychologists assert that the process of learning occurs through the construction of knowledge, that "people learn by actively constructing knowledge, weighing new information against their previous understanding, thinking about and working through discrepancies (on their own and with others), and coming to a new understanding" (Association for Supervision and Curriculum Development, 1992). This belief in the process of building new knowledge in social contexts has come to be known as constructivism.

The most succinct definition of the philosophy of learning known as constructivism proposes that learners need to build their own understanding of new ideas. The term "construct" as it applies to education, and specifically science, has its roots in psychology, where a "construct" is something dimensional, an attribute of people that varies in degree from one person to another, and is "created or synthesized from available

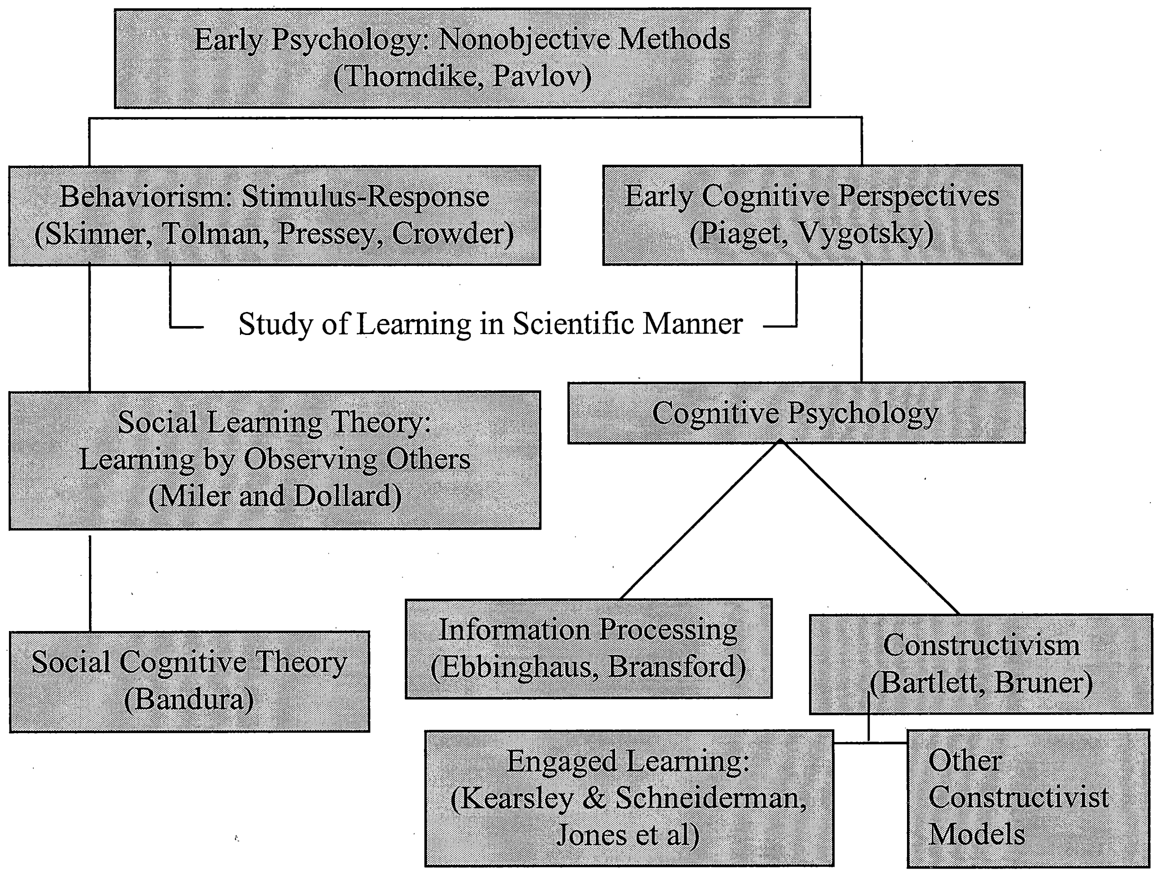


Figure 1 Evolution of Learning Theories
Adapted from Biehler & Snowman (1997)

information and refined" (Shafritz, Koeppe & Soper, 1988). Roblyer points out that "while constructivism itself seems to defy a strict definition, there are some instructional characteristics that are commonly attributed to the influence of constructivist theories" (1996, p. 13). Freedman states that "three constructs emerge from the literature regarding constructivism and have implications for the learning environment. They are (1) learning is an active process, (2) the learner has prior knowledge, and (3) the learner takes responsibility for his own learning" (1998, p. 1).

Research done by Sir Frederick Bartlett in 1932 set the stage for what was one day to become the constructivist approach (Good & Brophy, 1995). In Bartlett's work, learners attempted to rewrite brief stories that they had previously read, with various time lapses between the reading and writing sessions. Based on the conclusions of earlier studies by associationist researchers, Bartlett might have predicted that the readers would forget a good deal, based on the length (200-500 words) and the short practice times (two readings only). Two surprising findings came of this study. First, memory of these stories was very good, especially when compared to the low retention rate expected for meaningless and nonsensical material of equal length. Second, the nature of the inaccuracies that did occur was peculiar; learners omitted meaningless information, and often inaccurately recalled information that was outside of their cultural norms, such as changing a seal hunt to a fishing trip. Based on these experiments, Bartlett inferred that learners strive to make meaning "when we read stories, seeking to understand them by connecting them to existing cognitive structures… We construct a meaning that is plausible and consistent, although it might not be the same meaning intended by the author" (Good & Brophy, 1995, p. 205).

Furthermore, Bartlett found that when additional information is gained about the unfamiliar elements at a later time, learners are sometimes able to reconstruct the story correctly. Further research has supported these findings, and indicates that providing elaboration about unfamiliar elements before reading is more effective than afterwards. (diSibio, 1982 and Spiro, 1977 as cited in Good & Brophy, 1995, p. 206). A common classroom application of this has been in place for years, that of the teacher reviewing unfamiliar vocabulary contained in a story before assigning the reading. As students in this project were reading letters from seniors, it was impractical to employ the strategy of previewing vocabulary. However, much of the time, the students needed adult help in deciphering cursive handwriting or "big words," so assistance with comprehension was provided as needed.

"Constructivist principles emphasize student reflection, inquiry, and higher order thinking skills. Student reflection, or metacognition, is integral to successful learning, whereas passiveness, low self-esteem, complex learning tasks, inexperience, and low comprehension can be detrimental to learning" (Osman and Hannafin, 1992, p. 96). DeLay (1996, p. 77) contends that according to constructivist theory, students endeavor to understand an event, adjusting it to coincide with their previous understanding of their world. Constructivism is based on the theory that knowledge is a construction erected by the individual to "fit" with his or her experience of the world, and social constructions and personal interpretation influence that interpretation of experience. Thus it is not surprising that constructivist theory has also been referred to in the educational journals as "interpretivist" (Roblyer, 1996).

Vygotsky's Scaffolded Instruction

The work of one such constructivist psychologist, Lev Vygotsky, was performed in Russia during the 1920s and 1930s. However, Vygotsky died prematurely from tuberculosis in 1934 (Biehler and Snowman, 1991, p. 69), and his work was banned in the Soviet Union during the Stalin era due to his belief in higher-order cognitive processes being superior to memorization (Sprinthall, Sprinthall & Oja, p. 132). His research was not translated into English until forty years later; thus his work was not "fully appreciated by Western psychologists" until then (Ormrod, 1998, p. 67). Vygotsky's writings differed from Piaget's in many ways, despite the fact that both studied the cognitive development of young children: Piaget depicted learning as primarily a solitary activity, while Vygotsky viewed the construction of knowledge as a largely social process (Vygotsky, 1978). Vygotsky maintained that the types of learning elements we employ, such as facts, ideas, formulas, resolution methods, and mental positions, are built upon the types of interpersonal exchanges that are common to our society.

Vygotsky's "zone theory" assumes that readiness for learning about a topic depends much more on prior knowledge about the topic than on the maturity of their cognitive structure (Vygotsky, 1978). The zone theory also suggests that the distance between one's present developmental level and the level of future development, the "zone of proximal development," contains an ideal point at which instruction should be aimed, that being just above the present developmental level (Vygotsky, 1978). Students with wider zones who are instructed at this ideal point will experience greater cognitive development than those with narrower zones (Vygotsky, 1978).

A final element of Vygotsky's work that is worth noting here is the process which has now come to be known as "scaffolding." While some educational psychologists credit Jerome Bruner with introducing this term in 1970 (Biehler and Snowman, 1997, p. 149; Sprinthall, Sprinthall & Oja, 1998, p. 389), others credit Vygotsky (Good & Brophy, 1995, p. 195; Ormrod, 1998, p. 66). The concept was clearly described in Vygotsky's *Mind in Society*, which was translated forty-four years after his death. Ormrod describes the term best in the following metaphor:

> Think about how scaffolding is used in the construction industry... A builder will sometimes construct an external structure – a *scaffold* – (that) provides support for the workers... until the building itself is strong enough to support them. As the building gains stability, the scaffold becomes less necessary and is gradually removed. In much the same way, an adult guiding a child through a new task may also provide an initial scaffold to support the child's early efforts... Adult guidance is gradually phased out... Children eventually perform the task on their own (1998, p. 67)

Scaffolded instruction and a clumsier term, "just-in-time" instruction are frequently used in educational journals today, usually in reference to the currently preferred method of teaching computer skills or multimedia programs. (Bingham, 1998; Brigham, 1994; Reigeluth & Squire, 1998; Zemelman, Daniels & Hyde, 1993)

The emphasis in the project is placed on the subject, on the curriculum, or on the instructional objectives, rather than on the technical programming aspects. Students are introduced to programming technique as needed, rather than teaching programming or authoring skills to mastery level before introducing curricular projects to the students. In this particular project, students learned to use *HyperStudio* through scaffolded instruction. Similarly, letter writing and interviewing skills were introduced when they were needed, and adult support diminished as student proficiency became evident.

Bruner's Discovery Learning

Jerome Bruner is another leading educational psychologist whose work contributed to the contemporary view of constructivism and has particular relevance to this project. Bruner believes that effective teaching starts with relating to the learner's existing ideas on the subject. As the educational process advances, it improves the relationships between separate ways of illustrating the pre-conceived ideas on the topic, expending them to new areas of understanding about the subject (Bruner, 1983).

A widely used extension of this theory in classrooms today is commonly known as the "K-W-L." In this activity, the teacher introduces a new topic and then facilitates a group discussion, organizing student input into two of three columns labeled "what we Know," "what we Want to know," and "what we Learned." The first two columns serve as a springboard to further investigation, and the third column serves as a place to record new knowledge throughout the study. One of the advantages of doing an activity like the K-W-L is that a few students with very specific or extensive knowledge of the topic are motivated to share their information in the discussion, thus providing all students in the classroom with a broader "background" of the topic. This activity was in fact employed in multiple ways throughout the Benchmark-Blackwell project.

More importantly, Bruner's theory emphasizes that learners should comprehend the framework of a subject matter, instead of being required to learn names, dates, locations, patterns, and codes as unrelated pieces. The students should understand how to be resourceful – how to find the information they need on the subject (Bruner, 1983).

Bruner's belief is that understanding of structure is critical to developing good problem solving skills and transfer of skills, and guided discovery methods "stimulate curiosity and help develop generalized learning-to-learn strategies useful for discovering knowledge in other situations" (Bruner, 1983, p. 74). An application of this theory in this particular project can be illustrated by the percentage of time devoted to developing students' knowledge acquiring skills, helping them discover that they already possessed skills necessary for tracking down missing information, and "un-teaching" their "learned helplessness." Students are accustomed to having "all the pieces of the puzzle" presented to them in learning, and they seemed surprised that careless questioning techniques and the combined memory and energy limitations of their senior citizen subjects sometimes produced fragmented answers. Some of the students spent weeks complaining about fragmented information before they explored solutions which were obvious to adults, such as writing another letter, arranging a second visit, or making a phone call. Yet it was this information gleaned that the students found to be the greatest source of pride, for they had discovered it *on their own*.

Current articles on educational theory and instructional design contain a number of emerging learning theories which will be reviewed briefly in the next section of this literature review. However, "pure" constructivist theory is still prevalent in current literature. Mayer's theory of designing instruction for constructivist learning (Mayer, 1989; Mayer & Anderson, 1992; Mayer & Sims, 1994) entails "selecting relevant information, organizing it, and integrating it with existing knowledge" and identifying "instructional methods for helping learners to engage in each of those learning processes" (Reigeluth & Squire, 1998, p. 43). David Jonassen's outline of constructivist learning environments (Jonassen, 1996; Jonassen, Carr & Yueh, 1998) delves into the rationale behind the constructivist theory and gives specific suggestions to teacher and instructional designers about how to create a constructivist learning environment (Reigeluth & Squire, 1998). As Reigeluth & Squire have found, a new paradigm is required, one which should contain elements of constructivism but must be somewhat eclectic in nature, drawing on the best aspects of many current practices.

Concluding Remarks

The educational pendulum swung far from the view of learning as an isolated set of responses to stimuli, toward a view of learning as a complex and individual-specific set of interactive thought processes in which students continually build their own connections. Accordingly, classroom practice should have followed theory, and in some cases it has. However, there are still plenty of "traditional" classrooms still focusing on the teacher as the dispenser of information and knowledge, with the students as consumers and absorbers of information (Zemelman, Daniels & Hyde, 1993).

Despite the ever-swinging pendulum, educational methods in America have managed few significant changes – until very recently, when current publications on brain-based learning have favored a major alteration in the teacher's role. According to the basic tenets of this pervasive movement, teachers become facilitators to student-directed learning, guiding and questioning ever-shifting groups of students constructing their own meanings for new knowledge (Stone, 1996; Zemelman, Daniels & Hyde, 1993).

Current Thinking:
The New Paradigm of Learning Theories

Reigeluth & Squire (1998) compared twenty-one current theories in educational journals, and suggested that the time is right for a new paradigm.

> "The old paradigm focused on relatively few kinds of learning. But needs for human learning and development have expanded to the point where the new paradigm must offer guidelines for fostering emotional, attitudinal, social, ethical, and even spiritual development in the affective domain, as well as deep understandings, complex cognitive tasks, higher-order thinking skills, and metacognitive strategies in the cognitive domain" (p. 41).

Eclecticism has long been valued by practicing educators, who greet each new swing of the learning theory pendulum, knowing that, like the weather in Chicago, "If you wait a minute, it will change." Revisions – in physical locations, educational resources, political structure, curriculum content procedures, and goals – are simply the result of revisions in the personnel in charge of those aspects of the educational agenda (Wu, 1998, p. 16). More often than not, Allen (as cited in Wu, 1998) portends, "Too often teachers go off and get inservice education as individuals and then come back to school environments in which what they have learned is either viewed with hostility or judged irrelevant" (p. 23).

A New Paradigm: "Learning-Focused"

The new paradigm of instruction, a subsuming theory which Reigeluth & Squire have labeled "Learning-Focused," values the diversity of current theories, and allows educators to "choose the instructional theory that best addresses the needs of an instructional situation" (1998, p. 41). Wiske and other researchers (as cited in Harrington-Leuker, 1997) agree, suggesting that schools should:

> "support the kinds of changes that many school reformers have been urging for the last decade. Generally… these reforms reflect constructivist theories of learning, which urge schools to distinguish between instruction that emphasizes the transmission of information and instruction that is designed to support students' efforts to construct their own understanding" (p. 2).

While the purpose of Reigeluth and Squire's study was to demonstrate the need for a new eclectic paradigm, their categorization of the current theories is particularly helpful. They found that the twenty-one emerging theories they examined fell into seven broad categories (1998, p. 42):

Understanding
Community of learners
Higher-order thinking skills
The psychomotor domain
The affective domain
Diversity of others (categories of one)
Problem-based learning

The category of *Understanding* theories contains approaches that value deep understandings over rote knowledge, higher-order thinking skills over acquisition of basic facts, and active thinking about learning as opposed to isolated learning of information. In this category, the "teaching for understanding" theory promoted by Perkins and Unger (1994) lists four components: generative topics, clear goals, performances of understanding and ongoing assessment. They define "generative" as "containing a rich array of genuinely meaningful connections to students' lives" and "central to an understanding of the discipline" (p. 8).

Among others, Howard Gardner's theory of multiple intelligences is also contained in Reigeluth & Squire's category of theories for *Understanding*. In 1985, Gardner described seven categories (linguistic, logical-mathematical, spatial, kinesthetic, musical, interpersonal, and intrapersonal) of intelligence, debunking the previous notion that learners have a single fixed intelligence (Armstrong, 1994, p. 2). Twelve years later, Gardner accepted brain research evidence of an eighth intelligence (naturalistic) and a possible ninth intelligence (existential) pending further research (Checkley, 1997, p. 9). These intelligences, defined by Gardner himself as "the human ability to solve problems or to make something that is valued in one or more cultures" (Checkley, 1997, p. 8), can be used with modes of expression to foster deeper understandings. Gardner believes that his theory blended with a curriculum emphasizing comprehension is a very energetic endeavor (Checkley, 1997, p. 11). Despite a warm reception from educational theorists and widespread acceptance by practicing educators of the existence of the multiple intelligences, Reigeluth & Squire point out that, "to base an entire curriculum on this theory... would be difficult to achieve" (Reigeluth & Squire, 1998, p. 42). Rather, an eclectic approach, which carefully incorporates this theory with important learning structured throughout the planning and content of the project, is what Gardner intended (Levin, 1994).

The *Community Of Learners* category is based on the concept that groups of learners "occur naturally throughout society in both formal and informal situations" (Reigeluth & Squire, 1998, p. 43). Socially constructed knowledge by learners situated in authentic contexts form the basis for these theories. According to Ivers & Barron (1998), there has recently been a renewed interest in cooperative learning (Slavin, 1990), perhaps the most renowned approach to learning in a social context. "The entire constructivist tradition is predicated on the idea of student autonomy," (Kohn, 1998, p. 258) in which students can experience some sense of control over their learning, and yet many models of cooperative learning allow for little student control over learning.

The *Affective Domain* theories, another category identified by Reigeluth & Squire, focuses on "fostering personal, emotional, attitudinal, social, or spiritual development. Recent attention given to 'Emotional Intelligence' illustrates how instruction in the affective domain is becoming increasingly important" (Reigeluth & Squire, 1998, p. 45).

Another category defined by Reigeluth & Squire is *Problem-Based Learning*, which is "predicated on the assumptions of constructivist learning theory… (and) places the learner in an active, problem-solving role" (Reigeluth & Squire, 1998, p. 43). This category of theories contains environments in which collaborative, authentic, scaffolded learning occurs as students work to construct a viable solution to a real-world complex problem. An important distinction between this and other similar approaches is that the study is centered on one central question, agreed upon democratically by the group beforehand. Of particular note is the theory named Flexible Adaptive Instructional

Designs, co-authored by John Bransford (information processing researcher) and others, which makes heavy use of the term "scaffolding" (Schwartz, Lin, Brophy & Bransford, as cited in Reigeluth & Squire, 1998). This approach could have easily been applied to the Benchmark-Blackwell project, and was actually considered by the teachers involved. However, eclectic approaches can become muddled when *too many* elements are incorporated. The implications of this theory were abandoned in favor of the engaged learning theory, which will be discussed in the next section.

The *Psychomotor* theories focus on formal training of physical skills, such as the learning of basic mouse skills, and the learning of complex series of selections to create effects in authoring projects.

The category of *Higher Order Thinking Skills* theories refers to the use of skills such as application, comparison, analysis and evaluation. As students read and sorted the information in the letters from the seniors in the Benchmark-Blackwell project, they tried to understand the life events of someone who was a child over sixty years ago, adjusting it to coincide with their previous understanding of their own world. In keeping with constructivist theory, knowledge is a construction erected by the individual to "fit" with his or her experience of the world, and social constructions and personal interpretation influence that interpretation of experience. Assessment, too, reflected student use of inquiry, comparison, and analysis, through the use of rubrics. Application skills were continually assessed by student groups and reflected in their work logs and daily journals, as they manipulated the computer program to present their information in the best way.

The *Diversity Of Others* category would seem to refer to such theories as multiculturalism or tolerance approaches, but is in fact defined by Reigeluth & Squire as those theories that "don't fit neatly into an category." In other words, the name of this category is misleading, and might better be "miscellaneous." The Benchmark-Blackwell project dealt with none of the theories for which Reigeluth & Squire were unable to find classifications.

"Best Practice" by Educators

A review of learning theories and eclectic approaches relevant to the Benchmark-Blackwell project must also include a discussion of the approaches advocated by this author's school district, outlined in the book *Best Practice: New Standards for Teaching and Learning in America's Schools* (1993) by Steven Zemelman, Harvey Daniels, and Arthur Hyde. It was this book that this author was advised to read before interviewing with this district; the authors of *Best Practice* have presented at least three staff development sessions in this district in two years. The premise of the book is that educational reform cannot occur without a renewed look at curriculum (content) and teaching practices (method), and that these are ignored in theoretical discussions in current literature. Zemelman, Daniels and Hyde identify thirteen characteristics from recommendations made in a number of reports on theories made by national councils of curriculum:

Child-centered: kids' real interests, students' own questions
Experiential: active, hands-on, concrete experience
Reflective: opportunities for learners to look back, reflect, debrief
Authentic: real, rich, complex ideas and materials

Holistic: whole, real ideas, events and materials in purposeful contexts
Social: always socially constructed and often interactional, with "scaffolding"
Collaborative: cooperative rather than competitive or individual
Democratic: a model community, citizens of the school
Cognitive: developing true understanding, higher order thinking, inquiry
Developmental: schooling fits a series of definable but not rigid stages
Constructivist: not receiving content; re-creating and re-inventing cognition
Psycholinguistic: language itself becomes the primary tool for more learning
Challenging: genuine challenges, choices and responsibility in own learning

The thirteen characteristics of the *Best Practice* paradigm of learning are interwoven in each of the curricular areas throughout the rest of the book, and, more importantly, they offer insights into real classrooms where the curriculum and teaching methods actually reflect these characteristics. As with Reigeluth and Squire's proposed paradigm, this model draws the best characteristics from a number of previous theories, and in so doing, becomes a new eclectic approach, just one of many such vehicles available to educators today.

Engaged Learning: One Model

The engaged learning model serves as a basis for successful integration of technology into the constructivist classroom. This model, authored by Jones, Valdez, Nowakowski & Rasmussen in 1995, in fact grew from a study of effective teaching and learning variables completed two years before. That report, for the U. S. Department of Education and the Office of Educational Research and Improvement, was titled *Using Technology to Support Education Reform* (Means, Blando, Olson, Middleton, Morocco, Remz & Zorfass, 1993). The first four researchers listed were from a firm called SRI International and the final three authors were from a firm called the Education

Development Corporation. However, the name of the first author listed, Barbara Means, has become synonymous with the findings of that report. This study identified seven variables "that, when present, indicate that effective teaching and learning are occurring" (Jones, Valdez, Nowakowski & Rasmussen, 1995).

Table 1, adapted from the work of Means, Blando, Olson, Middleton, Morocco, Remz & Zorfass (1993), lists the seven approaches of conventional instruction and the elements preferred in current instruction. The items in the right column have come to be known as the seven variables of effective teaching and learning.

Table 1 *Elements of Conventional Instruction vs. Effective Teaching and Learning*

Common Practices of Conventional Instruction	**Variables of Effective Teaching and Learning**
The teacher is a knowledge dispenser.	The teacher is a facilitator in learning.
Students complete short blocks of work on single subjects.	Children are engaged in authentic and multidisciplinary tasks.
Didactic teaching is the norm.	Interactive modes of instruction are normal.
Individual work predominates.	Students work collaboratively.
Students are grouped by ability.	Students are grouped heterogeneously.
Instruction is teacher-directed.	Students learn through exploration.
Assessments are based on fact knowledge and discrete skills.	Assessments are based on students' performance of real tasks.

Adapted from Means, Blando, Olson, Middleton, Morocco, Remz & Zorfass (1993)

The authors of the engaged learning model, (Jones, Valdez, Nowakowski & Rasmussen) "reorganized [these variables] into a set of eight categories of learning and instruction -- vision of learning, tasks, assessment, instruction, learning context, grouping, teacher roles, and student roles" (1995, p. 7). They claim to have "expanded on Means' variables with information from recent research on learning and instruction and added many new variables" (1995, p. 7) totaling twenty-six variables or learning indicators in all. The distinguishing feature of the engaged learning model, however, is that it then goes on to list twenty-two variables of technology performance, providing a framework for educators to create technology-enhanced programs that complement learning. "Technology that does not advance students' learning has little value in the classroom. Technology used in conjunction with the most recent research and development findings on learning, however, can help all students achieve in school" (Jones, Valdez, Nowakowski & Rasmussen, 1995). The variables of technology performance will be examined in detail in a later section.

The first of the eight categories of instruction in engaged learning is *Vision Of Learning*, which describes the underlying philosophy of this approach. Therefore, the four indicators in this first category, in essence, describe the learner. First, engaged learners are "responsible for their own learning", taking charge, managing changes in plans, and being self-motivated and self-regulated. Second, engaged learners are "strategic," applying and transferring knowledge creatively and knowing how to learn and how to refine their learning skills. Third, students in engaged learning settings become "energized by learning," resulting in a lifelong passion for learning itself. The last indicator in this category is that engaged learners are "collaborative," understanding that learning is social, valuing others and being able to work with them skillfully.

In 1991, Newmann suggested that restructuring schools must begin with the development of "disciplined inquiry" and "classroom thoughtfulness."

> Students ought to help determine the criteria by which their work will be judged and then play a role in weighing their work against those criteria. This achieves several things at once: it gives students more control over their education, it makes evaluation feel less punitive, and it provides an important learning experience in itself (Kohn, 1998, p. 259).

Lehrer, Erickson and Connell (1994) suggest that the metaphor of students as designers must include, among other things, a specification of the kinds of mental skills students should develop. Their list of ten items provided students with specific areas for self-regulation, and placed the accountability squarely on the students' shoulders. Student-designed rubrics can be developed in conjunction with a demonstration of sample projects of varying strengths can be a useful tool, both in the inductive reasoning and observation skills employed and in the basis of providing a group-created checklist of items against which students can measure their work.

The next variable or category of engaged learning is based on types of *Tasks*. The three task descriptors in engaged learning settings are authentic, challenging, and multidisciplinary. "Authentic" tasks are important to learners and are learned in context, "much as real-life practitioners use that knowledge" (Jones, Valdez, Nowakowski & Rasmussen, 1995). Tasks are "challenging" and complex enough to be sustained but not frustrating. Finally, engaged learning tasks are "multidisciplinary," which refers to the fact that they integrate instruction and blend curricula, usually in the form of projects;

"most work in real life involves multidisciplinary projects" (Jones, Valdez, Nowakowski & Rasmussen, 1995).

Lehrer, Erickson and Connell (1994) suggested a system of benchmarks for tasks, such as developing a timeline, specifying research topics, specifying expected dates of completion, and assigning tasks to individuals. In the Benchmark-Blackwell project, this system of benchmarks was particularly obvious as student tasks were scaffolded and assessed in an ongoing manner. The average eight-year-old could certainly not have been expected to lead an effective interview with a senior citizen, take notes, comprehend what was being said, and report on the interview accurately without considerable assistance. Thus, interviewing skills were practiced and role-played weeks in advance, students prepared three "big" questions on note cards, and the social worker from the retirement community spoke to the children about what to expect from the elderly. Additionally adult facilitators from school were in each room to keep interviews on track and on time, write down salient details that were beyond the children's spelling or note-taking abilities, and provide the appropriate socially-acceptable openings, transitions, and exit comments. Because of the scaffolded approach, students were able to accomplish far more in the areas of listening, speaking, and later reading and writing than they could have done without the supports. The affective benefits were also immense, although they were not intended or even predicted.

The third category of engaged learning indicators deals with *Assessment*. Evaluation must be "performance-based," often a demonstration for a real audience for a real purpose. Assessments that are "generative" have some meaning for the learner and "generate" a product or service or new information. The third indicator of engaged learning assessment is that it is "seamless and ongoing," allowing students to learn from it and correct their work as they are assessed. Finally, the assessment process must be familiar to parents, all students, and teachers, ensuring "equitable" standards that are fair to all students.

Brunner (1996) found that assessment criteria traditionally used by teacher for writing are too linear, and not sufficient to evaluate this new kind of work. Sometimes, educators are so amazed by the amount of energy students put into multimedia projects, that the correctness of the information presented is barely a factor of evaluation. This author has certainly found this to be true in previously attempted projects, and for this reason, suggested a simple alteration to the classroom routine to prevent this. Many elementary teachers incorporate the use of Daily Oral Language into the daily routine. This is traditionally presented as one or two sentences full of common mechanical errors, written on the board or projected on the overhead. These sentences have little or no meaning to the students, and are presented entirely out of context. This author found that by using an LCD device designed to project from the computer screen (such as the Sharp projector), classroom teachers could pull actual student work off the network, and project current work-in-progress. Students gained immediate feedback on their own work, could compare their own progress to peer groups' work, and often commented that they had just made the same mistake in their own writing. Students actually *asked* if they could bring their Daily Oral Language notebooks to the computers to make corrections afterwards. An additional benefit to the teachers was that they had less "correcting" to do on their own time or in small group conference times.

The fourth engaged learning category ensures that the instructional model is *Interactive*, requiring the teacher or technology to be responsive to students, and again "generative," always creating an activity or experience or new meaning. Throughout the Benchmark-Blackwell project, students contributed ideas to the experience. When the music teacher obliged with a unit on music of each decade since the turn-of-the-century, students polled their senior citizen partners for their "favorites" and performed the math to link five-second audio clips to the appropriate stage of the seniors' biographies. When some senior citizens had no photographs for students to scan into their project, several students located public domain historical photographs and borrowed generic photographs of eras from staff members' old family photographs. A few parents shyly volunteered to help organize holiday craft sessions in December for the students to make simple "gifts" for the seniors, and the students kept these parents quite busy through holidays into June. Several students begged their parents to take them to *The Benchmark* for "extra" visits with their senior partners, and a few continued this habit for months after the project concluded.

Learning Context is the fifth category of indicators of engaged learning. These learning contexts are truly "collaborative" in nature, whether in person or via technology. These contexts involve people with multiple and differing perspectives in order to foster "knowledge-building communities." Because they value diversity and such multiple perspectives, they must be "empathetic" as well. Students wrote sensitively about seniors who were of different race, of different religion, of different sex, and obviously, of a far different time. Connections were made, of course ("I can't believe it! She's Jewish just like me!") but diversity was held in respectful awe ("He was a bombardier in World War II, but he doesn't like guns anymore…").

Grouping in engaged learning settings must be heterogeneous, involving different groupings of students with various backgrounds and ability levels. Grouping must also be "equitable" and "flexible," so that over time, different groupings ensure all students' chances at succeeding at challenging tasks with different people. "The Department of Labor estimates that 60% of America's frontline workers will work together in self-directed teams by the year 2000," and the assumption is that these teams, comprised of the general working public, will be heterogeneous in nature (Vollmer, 1994).

While collaboration is a critical piece of engaged learning theory, it is evident that outside of "tool software," computer use by multiple students in most schools is awkward at best. Cavalier and Klein (1998) found that "a search of 14 educational software catalogs revealed that only 40 out of 5,964 CBI programs were designed with the option of implementing the program with more than one student at a time" (p. 6). Furthermore, the very design of most computer work areas is a straight-edged counter, around which three students and their materials cannot fit comfortably. Chairs tangle, elbows hit ribs or noses, and papers fall to the floor. In the Benchmark-Blackwell project, this author found rolling computer carts to be most amenable to the issue of personal space, especially in the cases where students worked in hallway "coves" outside of classrooms with parents.

With regard to students working collaboratively on multimedia projects, Johnson, Johnson and Holubec (1991) state that a cooperative group is more than a sum of its parts; students perform better academically than they would if they worked by themselves. According to Ivers and Barron (1998), both heterogeneous and homogeneous grouping styles have advantages and disadvantages, depending on which grouping variable is selected – ability, learning style, intelligence, cognitive preference, gender or background. In addition to heterogeneous and heterogeneous groupings, teachers may choose to group students by interest or random assignment, or may choose to allow students to self-group. Some of the advantages and disadvantages of common grouping variables and types are outlined in Table 2. Johnson, Johnson, and Holubec (1991) suggest that most studies on cooperative learning concern group sizes from two to six students, and larger group sizes may require greater interpersonal skills, but may result in less cohesive groups. Small groups work best over short periods of time, requiring all students to be more accountable, and making it easier for teachers to identify and resolve group difficulties. According to Ivers and Barron (1998), teamwork is essential for most classroom multimedia projects.

In the Benchmark-Blackwell project, students were grouped according to the "Learning Together" model described by Slavin (1990). This model incorporates

Table 2 *Common Grouping Variables*

Grouping Variable	Type	Advantages	Disadvantages
Ability	Heterogeneous	This arrangement provides the best opportunity for peer support and tutoring	This grouping may breed a sense of the "free-rider" effect, whether legitimate or not, in high or low ability students
Ability	Homogeneous	Students tend to bond and communicate more effectively	Low-ability students are often left at a significant learning disadvantage
Learning style, intelligence or cognitive preference	Heterogeneous	Students are exposed to many other peers' perspectives and problem-solving methods, thus stimulating students' cognitive and social development	This grouping may be hard to accomplish if students display a preference for one dominant learning style, intelligence, or cognitive preference; communication skills may be more difficult to develop because of different interests
Learning style, intelligence, or cognitive preference	Homogeneous	Students tend to bond and communicate quite effectively	Students' focus and exposure to different perspectives are limited by this grouping
Gender or background	Heterogeneous	This grouping reduces stereotypes, promotes equality among perceived ability and leadership roles	Teachers may need to ensure that social skills are in place to eliminate preconceived biases; time required may jeopardize original project goals and timelines
Gender or background	Homogeneous	This arrangement may benefit specific interest groups or class topics	This arrangement may cause unnecessary tension between groups, not representative of the real world

(Adapted from Ivers and Barron, 1998)

heterogeneous student groups that work on a single assignment and receive awards based on their group project. Each student would receive the same final grade for the group product. Because of the length of the project and the constant scaffolding by adults, there was little concern that individual accountability would be weak – one of the common pitfalls of this approach. Ongoing assessment of the groups' dynamics provided early signals of discord, which then were peer mediated and resolved by the group with adult support. Most of these students already had some exposure to collaborative work on smaller projects, so the longer project was a natural extension of that experience. During the presentation of the projects to the seniors, it was not uncommon to hear student statements crediting peers with various good ideas that were incorporated into the project.

In engaged learning, the *Teacher Role* must be one of facilitator, not controlling project work but monitoring and assisting with group negotiations. The teacher must also be a "guide," helping students with every assistive means possible to construct their own meaning for knowledge. Finally, the teacher must consider him or herself to be a "co-learner," taking risks outside of areas of own knowledge and expertise, and a collaborator with colleagues.

None of the three classroom teachers who participated in the Benchmark-Blackwell project were experienced *HyperStudio* users, and while they put varying amounts of effort into learning the program itself, they enjoyed the new role of co-learner alongside their students. The classroom teachers assumed most of the responsibility for helping students comprehend the cursive scrawls that held the answers to so many questions. The senior citizens' lives were clearly full of unexpected "teachable moments" to capitalize on; explanations of ice wagons, stickball, pinafores and Victrolas were marvelous springboards to impromptu history lessons. Classroom teachers also assumed the responsibility of linking the elements of the local history unit to the project at hand; it became increasingly evident as the project unfolded that very few of "our" senior citizens were actually from the local area originally. Thus, connections had to be made, speculations were made about what had brought them to *The Benchmark*, and then about the bigger issues of the arrangements for the elderly in the students' families.

Collaboration among colleagues is a ripe issue in teaching today. This author's school principal had provided monthly half-day subs for grade level collaboration time for teachers, in addition to the twice-monthly grade level meetings held at each school during staff development time. This generous provision of time only scratched the surface of the hours devoted to project coordination by the teachers involved, and the time required would certainly have been much greater, were it not for the extremely high level of parent volunteerism that the Benchmark-Blackwell project generated.

Finally, the *Student Role* in engaged learning is multi-faceted. Students must see themselves as "explorers" of knowledge, ideas, and tools. They must be "apprentices of cognition" as developers of ideas and skills, simulating practitioners. Students in engaged learning settings are encouraged to be "teachers" of others and "producers" of products with authentic uses. Each student group in the Benchmark-Blackwell project explored material that no one had ever covered before – the life of a specific senior citizen – and attempted to organize it in a fashion that was interesting and logical. They collaborated on ideas and shared techniques, both within their groups and with other groups. They knew that their final product was being made for an authentic audience, and they took their jobs as producers very seriously.

Engaged Learning: A Second Model

Kearsley & Schneiderman (1998) have presented another definition of engaged learning theory, one that assumes active cognitive processes such as creating, problem solving, reasoning, decision-making, and evaluation. It also assumes that students are "intrinsically motivated" to learn due to the meaningful nature of the learning environment and activities. Engaged learning theory, according to Kearsley & Schneiderman, is based on three principles: collaboration, project-based learning, and authentic focus outside of the classroom. They summarize these three components with the words Relate-Create-Donate. The collaboration element, having been discussed at length in the previous model of engaged learning, will be a basis for the introduction of the topic of parent involvement in the Benchmark-Blackwell project. The coverage of the project-based-learning element will focus on the integration of curricular areas, which in the case of the Benchmark-Blackwell project involved local history and several strands of the language arts curriculum. Finally, in the section on authentic focus, the "outside customers" in the Benchmark-Blackwell project were the senior citizens, and the topic of intergenerational projects in the school can be explored here.

Engaged Learning: Collaboration with Parents

In the *Relate* component of Kearsley & Schneiderman's model of engaged learning, team efforts involve communication, planning, management, and social skills – skills that the modern workplace demands, but that traditional teaching methods do not foster. Collaboration, of course, entails all of the student grouping and cooperative learning elements discussed previously, but also includes collaboration with other adults within the school community.

There has been a significant increase in the number of articles in educational journals regarding the topic of parent involvement in the schools. Epstein (1983, 1985, 1987, 1988, and 1995) has written extensively on the topic, initially describing four types of parent involvement: basic obligations of parents, school-to-home communications, parent involvement at the school, and parent involvement including learning activities at home.

> Far too often, our efforts to work with parents have left them in the position of silent partners… and opportunities for parents have been little more than token efforts. Parent involvement is important… to facilitate changes in schools and teachers that will enable them to be more responsive to community needs (Cairney, 1992, p. 8).

Epstein later added a fifth category, parents as decision-makers or advocates who work for school improvement. Her most recent addition was a sixth category of collaborating with community (1995, p. 704).

Several articles support the recent changes in levels of parent involvement, moving parents from traditional roles of fundraising, room mothering, and clerical work into nontraditional and dynamic roles, where parents are actively involved in shared decision making. Nontraditional roles mean that parents have "selected textbooks, created new courses and report cards, investigated dress codes, developed new formats for parent-teacher conferences, reinvented student orientation experiences, and developed technology plans involving hundreds of thousands of dollars" (Cavarretta, 1998, p. 12). In the Benchmark-Blackwell project, this author speculated that this school community had:

1. a visibly higher ratio of educated and/or affluent non-working mothers than the "average" school,
2. a healthier level of parent involvement and volunteerism than many other schools, and
3. a fairly high percentage of families who owned a personal computer.

After parents became enamored with the senior citizens, and the level of interaction between them and the students, a group of parents approached this author and offered more assistance. The parents were, in turn, asked to help out with computer sessions led by this author and the Learning Technologies Facilitator. The parents initially insisted that they didn't know enough about computers and didn't know enough about the software being used. A private "parents-only" training session led by this author was offered to them, and after a week or two, twelve parents had signed up to take the class. A commitment of six hours on this author's part resulted in a total of more than 400 hours of parent volunteer time. This was time that parents worked with small groups of students in hallway coves and the computer pod, used the flatbed scanner and digital camera to digitize senior citizens' photos for student use, and volunteered to transfer the students' completed biographies from the computer to videotape. In addition, parents volunteered over 350 hours total toward chaperoning and nurturing the student and senior relationships.

Hatch (1998) reported that community involvement contributes to improvements in the attitudes and expectations of parents, teachers, and students, as well as the depth and quality of the learning experiences. King (1996) suggested that both parents' and teachers' attitudes toward the process of parent involvement appeared to become more positive as their levels of involvement intensified.

Research has demonstrated consistently that parent involvement is one of the keys to success in school for children of all ages and all types. Meaningful parent involvement has been shown to result in improvements in student achievement, attendance, motivation, self-esteem, and behavior. Parent involvement is also a major contributor to children's positive attitude toward school and teachers (Henderson, 1987 as cited in Burns, 1993).

> My experience seeing my children move through the school system underscores a critical factor in school improvement efforts, that of parental urgency. Children slip through schools quickly. Parents don't have a lot of time to wait for schools to get it right. We want it right for our kids, and we want it that way now (Cavarretta, 1998, p. 15).

Engaged Learning: Integrated Curriculum

The *Create* component of Kearsley & Schneiderman's model of engaged learning makes learning a creative, purposeful activity. "Because they get to define the nature of the project, even if they don't get to select the topic, they have a sense of control over their learning which is absent in traditional classroom instruction" (1998, p. 20). Project-based learning is based on "relatively long-term, problem-focused, meaningful units of instruction that integrate concepts from a number of disciplines" (Laffey, Tupper, Musser & Wedman, 1998).

Students involved in the Benchmark-Blackwell project knew that they were piloting a new way of "doing" local history and biography, and they were excited about having the chance to do something different. They took great pride in their work, and took their many "jobs" seriously – letter-writing, interpreting responses, interviewing the seniors, listening to the audio tapes of the interviews, sequencing and sorting information, writing their textbox entries, and finding relevant pictures for the text. While they learned about local history, most were unaware of the "other" curricular areas that were being addressed: reading, writing, listening, and speaking. All four of these areas are no doubt addressed in most language arts curriculum guides across the country. However, this particular unit, which dealt with a group of people raised in a more genteel era, provided an excellent basis for the teaching of social graces and etiquette – which many people today feel is missing in the lessons delivered at home. To the average eight-year-old, the word "etiquette" might conjure up images of tea parties, but the adults involved in the Benchmark-Blackwell project concentrated instead on the "social chatter" that can be included in first conversations or friendly letters. Nydegger & Mitteness (1988) categorized many forms of family conversations, and found that this type of "empty discourse" is reserved for family insiders only during periods of great stress, or for outsiders. In either of these situations, it is rarely applied to situations involving children, and is not generally "absorbed" by children until an age later than nine. As this skill was one that required much "scaffolding," parents and teachers role-played situations with students and were actively involved in the conversations between students and seniors, breaking awkward silences and smoothing over rough edges.

Similarly, active listening is a skill that requires development in most elementary students. Porat suggests that, while listening has been mandated as an important strand in language arts, nothing much is being done in that area, perhaps because teachers are unsure of what to teach, how to teach it, and how to evaluate it (1990, p. 67). Edwards (1991) proposes that students

1. be taught to concentrate on body language and gestures to enhance attention,
2. practice techniques to overcome negative attitudes toward listening, and
3. learn to identify important aspects of a speaker's material.

Students in the Benchmark-Blackwell project were coached informally on several such techniques for active listening. However, as recalling interviewees' answers with 100% accuracy was not likely, or even age-appropriate, parent volunteers took notes *and* tape-recorded the interviews. Students then were able to concentrate on speaking clearly and asking the right questions *during* the interview, but in later class sessions were able to refer to both the audio tape and the adult's notes.

Reading was an integral part of every stage of the Benchmark-Blackwell project, from the rotating library of fiction and nonfiction books that reflected life at the turn of the century and the eras that followed, to the letters from the seniors themselves, to the dialog boxes and prompts on the screens of the *HyperStudio* stacks. Because of the sheer magnitude of material to be read and interpreted, students worked closely with a number of adults in a number of settings while reading their letters. Project coordinators, classroom teachers, classroom instructional assistants, the Reading Improvement Program instructional assistant, parents, and even the school principal helped students read and interpret the seniors' letters. One common observation among these adult helpers was that the majority of students at this age read very literally; therefore they miss the meaning of metaphors or phrases from previous eras such as "We didn't have two nickels to rub together," or "He was never one to throw the baby out with the bath water!"

Writing occurred at every stage, as well, in the students' learning logs and group progress reports, in the letters to the seniors, in the storyboards and on the interview preparation cards, and of course in the textboxes on screen. A number of current articles shed light on the impact of technology on student writing. Edinger observed that when fourth graders use a word processor to write, "revision mixes with initial composition, and the process becomes even more recursive as we write, rewrite, add, and delete text" (1994, p. 58). Others have reported that student writing has improved (Taggart, 1994), particularly when student have a high degree of access to the computer (Hancock &

Betts, 1994). Peck & Dorricott (1994) suggested that writing on a word processor has a temporary feel, making it easier to take creative and grammatical risks. Turner & Dipinto (1992) found that students approached writing with hypermedia software differently than writing with a word processor; the nonlinear feature of hypermedia breaks writing tasks down into smaller chunks of writing that can be linked, rather than one long, continuous stream of writing. They even suggest that some students may become better writers because of this changed view, and may write subsequent reports in smaller sections to link together later. Finally, November (1998) challenges teachers to give students "a really big complex problem to work on for a long, long time" that they can publish either via multimedia or the Internet, and "wait to see how much time they spend on it." Traditional reports and theme papers are rarely worked on after the teacher returns them, yet web pages and multimedia projects are worked on long after the "due date" (November, 1998).

Engaged Learning: Outside Community and Intergenerational Projects

The third component of engaged learning defined by Kearsley & Schneiderman is creating projects with a realistic focus, for an "outside" customer. "Learning takes place in an authentic context, so students learn skills and knowledge with higher transfer to work settings. They also learn skills associated with teamwork and client interaction that are often not taught...but probably should be" (Kearsley & Schneiderman 1998, p. 22).

> Doing authentic projects provides a higher level of satisfaction to students than working on artificial problems, since they can see outcomes/impact of their work on people and organizations. Finally, the results of their efforts may bring them

professional recognition or awards which are ultimately much more motivating than grades (Kearsley & Schneiderman 1998, p. 22).

There are a number of articles published in educational journals recently documenting intergenerational projects involving senior citizens and the schools. Senior citizens and children share common needs, such as the need to be heard, the need to feel independent, and a need for others to provide care; despite these similarities the two generations seldom interact with each other (Frego, 1995). This has been attributed to the fractured family units of the increasingly mobile Western society (Newman, Ward, Smith, Wilson & McCrea, 1997)). While an increasing number of children are being raised by their grandparents, most children are now geographically separated from their grandparents, and society has become more segregated by age, both physically and socially (Halford, 1998). Contact between young and old may be limited to negative media reports or to brief and infrequent visits (Frego, 1995). The result is that today's children go without a sense of history and community, and senior citizens miss out on a certain vibrancy and a sense of social contribution (Halford, 1998). In addition, studies have shown that children as young as eight internalize negative and stereotypical attitudes about older people and even describe seniors as "tired, ugly, helpless, and ready to die" (Frego, 1995, p. 17). A 1995 study by the American Association of Retired People (AARP) found that children tend to have negative views of growing old, and instead of associating it with increased opportunities for recreation and personal growth, associate aging with declining health and abilities (National Association of Elementary School Principals, 1997).

Fraenkel & Hadfield (1988) organized a partnership in which between deaf senior citizens' life histories were written down by students in senior English classes at a school for the deaf in New York. Fraenkel & Hadfield observed that students had "little prior contact with people over sixty years old, mainly because of communication barriers" (p. 6) and that students in their project expressed fears and concerns about the issue of aging, just as the students did in the Benchmark-Blackwell project. Instruction was scaffolded similarly as well, with role playing used to teach interviewing skills. Interestingly, the hour-long interviews were videotaped "to assist in the memory process" (p. 6), and interview setting became an important factor because onlookers tended to interrupt the process, which presented problems of confidentiality and privacy. In the end, Fraenkel & Hadfield observed that "the students… had developed skills for asking good questions, listening, and communicating with others. The project had been a source of personal growth and intellectual stimulation, and had enhanced students' self-esteem and sensitivity toward older people" (p. 7).

Similarly, Orwig (1995) described a "portrait writing" project that a Pennsylvania teacher began with high school students and later implemented with fifth graders. Students listened to guest lectures on authoring biographies, historical fiction, and oral or video histories, and then used CD-ROM references to locate interviews of notable people. Senior partners were selected by students from a nursing home, their own family, or the greater community. Students made extensive use of reference tools and peer-editing. Students involved in early versions of the project published books, though the article indicated later classes experimented with multimedia projects. In the same article, Orwig described a project in suburban Detroit where local school districts equipped drop-in senior centers with computers, modems, and phone lines so that seniors and fifth graders could communicate via e-mail. The cross-curricular project involved geographic and historic research, bar graphs and charts, word puzzles, and culminated in a published biography for each senior.

Matters (1989) describes a grant-funded intergenerational project involving major contributors from Iowa and Arkansas, in which experienced senior volunteers and fifth, sixth, and seventh grade students shared cross-cultural activities. Native American culture, Black History week, soul food, Ragtime music, and Pioneer Days were incorporated into a year-long schedule of activities that fostered relationships between the generations.

Frego (1995) delineated a Canadian intergenerational program in which students and senior citizens begin writing weekly letters that were couriered by a choir director who worked with both groups. Joint rehearsals were held a few months later, with public appearances scheduled for the end of the school year in a number of community settings.

Neysmith-Roy & Kleisinger (1997) described how undergraduate students in a life-span developmental psychology class at the University of Regina (Canada) "assisted a senior citizen in writing his or her own life story… and submitted a paper demonstrating how their particular senior citizen experienced and worked through each of the life stages" (p. 116).

D. B. Smith (1997) suggested that in his project, involving seventh graders in Connecticut and seniors at an assisted independent living facility, "students developed a sense of worth through fostering trusting relationships with caring adults and being recognized and appreciated for their own achievements" (p. 51). Smith detailed the interdisciplinary project aspects, outlining specific English and American history objectives, research skills, and final presentation qualities. Again, interviewing and social skills were among the most challenging elements of the project to the students, and again, students and seniors felt, overall, that the partnership had been a worthwhile experience.

In an attempt to increase senior volunteerism in local public schools in Florida, Phelan (1992) organized a practicum, one phase of which was titled the Living History Day. Students interviewed senior citizens about their experiences during World War II "and presented historical papers based upon their interviews and library research to fellow students and the senior citizens" (p. 36). In this project, students actually wrote letters to the town where the senior citizen was born, requesting the town history.

A number of other articles discuss the value of senior volunteerism in the elementary and intermediate grades. Wallace (1990) described a practicum in which residents of two senior citizen facilities in Florida communities tutored fourth, fifth, and sixth grade students in reading comprehension and vocabulary. J. Smith (1998) outlined the successes of senior adult volunteers with read-aloud programs for K-2 students in Florida.

Halford (1998) described two recent partnership projects that capitalize on the "rapidly aging society" and a "rich untapped resource" (p. 49). The first partnership, between high school students and senior citizens in St. Louis, forged unique community connections, such as the intergenerational prom at the high school based on "Reliving the USO Years." The second project, between K-12 students and seniors in South Dakota, began with students refurbishing mobile homes to reduce a shortage of housing for senior citizens, then progressed to collaborations in writing community history. That rural district even hired a part-time intergenerational program coordinator, and plans to construct a nursing care facility that would be attached to the school.

Forty percent of the U.S. adult population has no daily or even weekly contact with school children; this, when coupled with the fact that there has been a sharp increase in the number of taxpaying American citizens over 85, can be a nail in the coffin for public education (Halford, 1998, p. 49). Educators and administrators have initiated hundreds of small-scale programs to link senior citizens to the elementary schools in recent years (Vollmer, 1998). Halford suggests that this is because "by fostering ongoing relationships, intergenerational programs can reshape the perceptions that older adults and youth have of one another" (1998, p. 50). More importantly, intergenerational programs contribute to student learning "by tapping into the wellspring of experience, dedication and diverse expertise that older adults have to offer" (Halford, 1998, p. 50). Such programs "make sense out of history, reason out of relationships, and rhyme out of life" for children (Frego, 1995, p. 17). Furthermore, seniors frequently demonstrate values and ideals that have "survived the test of time" and thus give children a more positive view of the total life span (Frego, 1995, p. 17).

Kearsley & Schneiderman's engaged learning model (1998), based on the three principles of collaboration, project-based learning, and authentic focus outside of the classroom, while less specific than the Jones, Valdez, Nowakowski & Rasmussen (1995) model, serves as a valuable reference for reviewing various important aspects of the Benchmark-Blackwell project.

As recently as March of 1999, a monthly teachers' union publication stated, "As educators, we serve as coaches, guides, facilitators and co-learners as we help students become engaged learners – not only anywhere and anytime, but everywhere and all the time" (Illinois State Board of Education, 1996, as cited in *teacher today Publications, Inc.*, p. 3). Only two months later, the same publication's May issue centered on a theme of "Technology Update," in which the editor's column stated,

> We are moving away from the traditional model of the teacher as the main source of information and meaning to models of engaged learning that involve more collaboration between teacher and students, increased student interaction, greater emphasis on the teacher as facilitator and the use of technology as a vital learning tool (McKenzie, 1998, as cited in *teacher today Publications, Inc.*, p. 1)

The repetitive appearance of such statements in Illinois teacher publications hints at the pervasiveness of the engaged learning approach in the Illinois school system's administrative literature.

Concluding Remarks

Toffler (1990) found that there has been a dramatic shift from behavioral theories of learning to cognitive theories of learning. The educational journals are rife with new models, most of which are based on constructivist theory. With such a plethora of new models, school districts and teachers are hard-pressed to find one that works well for all students in all situations. In fact, standardization of educational approach opposes the creativity which teachers must be allowed, to find the elements of each that work for them in their classrooms, with their many students' varied abilities and interests. Reigeluth and Squire (1998) categorized many of the current theories, and called for a new paradigm that honors the eclecticism that allows teachers to make exactly these choices. Zemelman, Daniels and Hyde (1993) identified characteristics of current theories, and suggested that educators must carefully reconsider both content and method when designing their own classroom "best practice." Both the engaged learning model offered by Jones, Valdez, Nowakowski & Rasmussen (1995) and the later simplified model delineated by Kearsley & Schneiderman (1998) outline several indicators of successful integration of technology into the constructivist classroom, and served as an excellent framework for the Benchmark-Blackwell project.

Computers in Education: Integrated Learning Technologies

In the past century, several "new" technologies have emerged, each promising to revolutionize education.

> There have been many attempts to change the technology of schooling. In the 1920s, radio was expected to have a major impact. In the 1930s, it was to be film. In the 1950s, television, and in the 1960s, teaching machines (Mehlinger, 1995, p. 9)

According to Knirk and Gustafson, the U. S. military developed a number of training techniques between 1914 and 1970 – the period of American history that our country went to war four times – that survived and were incorporated into everyday instruction in the public schoolroom. Even blackboards are credited to a West Point instructor in 1817, "a Frenchman who spoke poor English and wanted to draw visuals to overcome his handicap. He painted a wall of his classroom black and wrote on it with chalk" (1986, p. 5). The 16mm projector entered education after World War II when the U. S. Army spent a billion dollars to make training films (Schlechter, 1991, p.4). The opaque projector was originally designed to improve map briefings during World War II, and its successor (the overhead projector) found its way into American schoolrooms (1986, p. 5). Skinner's programmed instruction and Crowder's branching sequences were also supported by the military. Knirk and Gustafson report that the first instructional design models were developed when "the Department of Defense asked university professors and industrial trainers for plans for applying a systems approach in the development and management of training courses" (Knirk and Gustafson, 1986, p. 5).

Schlechter details the educational setting that awaited the arrival of the microcomputer:

> The U. S. student population nearly doubled between 1950 and 1975... Educational expenditures dramatically increased... Computers were expected to

> help the system handle these increases… by allowing hordes to receive a quality education without the need to hire a proportionate number of staff. (1991, p. 5)

Yet, computers were still relatively expensive. In 1977, Steve Jobs and Steve Wozniak built an inexpensive personal computer in Jobs' garage, and the company they created on the concept of affordability made technology accessible to the public and even to education. Instructional technology was launched into a phase of accelerated change overnight due to the effects of that legendary garage incident.

Three years later, Sydney Papert stated in his best-selling book, *Mindstorms*, "We are at a point in the history of education when radical change is possible, and the possibility for that change is directly tied to the impact of the computer" (1980, as cited in Dwyer, 1994, p. 4). Many educational theorists echoed these words, often citing the incredible rate at which technology reinvents itself. "In recent years, technology has burgeoned, piling machine upon machine and system upon system, adding fantastically to the control and manipulation of information. Technology has transformed American society… it is affecting our educational institution" (Knirk & Gustafson, 1986, p. 7).

Best Hopes, Worst Fears, and Much Finger-Pointing

Recently, however, the wonder of technology's impact is accompanied by a criticism of education's inability to use it effectively. Though the pace of technological innovation continues to accelerate in our society as a whole, in schools such innovation is "painfully slow" and "lags far off the pace" (Kelley, 1990; Hancock & Betts, 1994). Dwyer (1994) agreed, stating "[Sydney Papert] promised that technology in schools would someday be as common as paper and pencils, and many educators believed that technology would revolutionize America's ailing education system. This optimism, however, rested on very thin evidence" (p. 4).

There are multitudes of explanations, reasons, and excuses given for this gap between "the rest of the world" and "the classroom." It isn't enough to simply dump a computer in every classroom (Dwyer, 1994), and this is a feat that many school districts are far from able to accomplish financially, still. Early explanations focused on funding and training, or the lack thereof; criticisms of this nature in current literature can be traced to the business world and to school districts where neither time nor money has been committed to technology integration (Vollmer, 1994 [video]). Bailey, Ross, & Griffin (1995) supported this simplistic explanation:

> American schools have not embraced technology as a major school transformation tool for a variety of reasons. Lack of leadership within their ranks, lack of state and national government support, lack of staff development, and lack of money are a few of the reasons which can be attributed to our current state of "technology-integration limbo." (p. 16)

Yet, as critical as money and "computer training" for teachers are, they are not sufficient in and of themselves. Even in well-intentioned districts where funding of technology has been a priority, and where teachers have been trained in "basic computer literacy," computers collect dust, going unused by the teacher *or* students, turned on each morning and left untouched until they are turned off at the end of the day. This phenomenon is so common that it has earned itself a name: "screensavers' disease" refers to the condition described in many schools across the country (McKenzie, 1998).

This phenomenon came as a surprise to many, and the literature is filled with theories about the causes. Hancock & Betts lamented "A key obstacle… is the limited support teachers have for integrating unfamiliar technologies into instruction. As a result, teachers frequently avoid new technologies or use them for purposes other than those for which they were designed" (1994, p. 24). Evans-Andris (1995) confirmed this sentiment, as they scientifically observed elementary teachers with new computers in their rooms and found that "approximately 62% tended to engage primarily in distancing routines (limiting their involvement with the machines), and only 38% engaged in routines embracing their opportunities to use the computer" (p. 17). Even as recently as 1997, Harrington-Leuker stated, "technology won't make a difference in student achievement unless school systems make a substantial commitment to helping teachers learn to use computers effectively" (p. 3).

As educational theorists urge teachers to prepare students for the workplace of the future using inquiry-based, collaborative projects, teachers are still bound to cover curriculum designed in previous eras. To further complicate the issue, teachers feel pressured to master new technologies before beginning such projects with their students. The unfortunate result is that new methods and technology are not used, or are used poorly. Appropriately authentic assessment is not employed, and accountability fades. Much has been written about technology and the need for educational reform, and two themes that emerge are that:

1. Preparing students for the Communication Age requires more active and interactive learning than in the past, and this necessitates new forms of lesson

design, new forms of assessment, new approaches to use of resources, including information, equipment, and people.

2. Technology must be an integral piece of teaching and learning, but it must be seamlessly incorporated, a tool rather than the focus. The accomplishment of this task requires many specific and inseparable elements. Schools and districts neglecting these elements face certain failure in preparing their students.

The literature does provide clear direction, gathered from organizations whose primary focus became the study of technology integration in schools, both successful and unsuccessful (Anglin, 1995; Fisher, Dwyer & Yocam, 1996; Reigeluth & Garfinkle, 1994; Wishnietsky, 1994). What must change first is the instructional approach, as applying technology to behaviorist learning theory results in drill-and-practice learning, basic skills learning, or learning at the "low" end of the thinking skills. Applying computers to classrooms that still employ teaching methods of the behaviorist era is counter-productive and wasteful.

> The history of instructional development is about the confluence of research, technology, and systems. The beginning of the 1990s finds instructional development with these major themes still in evidence, albeit in much more complex and sophisticated forms. Unfortunately, the breach between educational research and educational practice described by Glaser (sic) almost 30 years ago is also still very much in evidence. The power and the promise of instructional development were and are one of the few bridges across the chasm. (Anglin, 1995, p. 18)

A critical factor, according to the literature, is that teachers take an active role in educational reform, utilizing technology as one of many tools available in conjunction with knowledge of current brain research and learning theory. "Rather than sitting back (like passive television viewers) marveling at the ever-increasing quantity of information and the rapidity of change, educators must lead students through a careful, cumulative acquisition of information literacy and technology skills" (Hancock, 1997, p. 63).

> One way schools can use technology effectively is to support the kinds of changes that many school reformers have been urging for the last decade. Generally… these reforms reflect constructivist theories of learning, which urge schools to distinguish between instruction that emphasizes the transmission of information and instruction that is designed to support students 'efforts to construct their own understanding' (Wiske, Niguidula & Shepard, 1988, as cited in Harrington-Leuker, 1997, p. 3).

Setting the stage for this kind of change will require some advance legwork, and is unlikely to happen quickly, however. According to experts in both technology and educational reform, systemic changes of this nature do not display results immediately. The results and the full effect of the changes can take anywhere from seven to twenty years, with the average being twelve years (Reigeluth & Garfinkle, 1994; Selfe & Hilligoss, 1994).

> There must be the realization of the monumental changes being asked of teachers; that of changing their basic beliefs of how learning takes place. In order for such a change to place, school administrators must be trained to help teachers become change agents. This administrative training needs to include skills such as providing strong support and being patient, as teachers will need much time to go through this transition. (Adams, 1993, as cited in Byers, 1993, p. 38)

There are plenty of opinions presented in the literature as to *why* the staff development related to technology as a curricular reform tool has failed thus far. Teachers, especially those who have been teaching for many years, have seen many changes come and go, and have attended staff development sessions and been unfazed by the continuous efforts of administration to implement changes. While teachers know that technology now has a permanent place in the classroom as in the rest of the world, they may not be committed to the curricular reform that must accompany effective integration of technology.

Fullan & Stiegelbauer (1991) offer this suggestion:

> One of the most fundamental problems in education today is that people do not have a clear, coherent sense of *meaning* about what educational change is for, what it is, and how it proceeds. Thus, there is much faddism, superficiality, confusion, failure of change programs, unwarranted and misdirected resistance, and misunderstood reform (p. 4).

However, Wu suggests, teachers are unlikely to take recommendations, particularly regarding technology, back into their classrooms and employ them. "The techniques need to be... explicit and the teacher needs to become convinced (a) that the practice is worthwhile (in... teacher or student outcomes) and (b) that the change can be made without too much work or disruption" (1988, p. 14).

Fullan and Stiegelbauer (1991) posit that change is only one among many problems teachers encounter.

> Sociologically speaking, few of us, if placed in the current situation of teachers, would be motivated or able to engage in effective change. Obvious strategies do not seem to work. Teacher participation in curriculum development has not been effective when it comes to other teachers' use of the results. Inservice training of teachers has been ineffective and wasteful more times than not. (p. 11)

This sentiment is echoed throughout the literature on staff development (Anglin, 1995; Bailey, Ross & Griffin, 1995; Hirschbuhl & Bishop, 1998; Reigeluth & Garfinkle, 1994; Selfe and Hilligoss, 1994; Thornburg, 1989).

It appears, then, that merely recognizing the need for systemic changes in curriculum delivery and instructional methods is not enough, just as merely providing staff development is not enough. This author is employed by a school district which, like many across the country, has invested much in staff development – toward curriculum reform, toward improvement in instructional method, and toward technology training that runs the gamut from basic computer literacy to multimedia projects driven by constructive practices. This, amazingly, was "not enough."

A Common Vision

Miller (1994) explained that "A new design must be fully designed and articulated to all stakeholders, including identification of the participants and roles, goals, objectives, strategies, process and products" (p. 150) with the sole purpose of "adopting a common vision in a community" (p. 149). Stakeholders include administrators, parents, teachers, students, and community partners. In a large school district such as this author's, where the schools serve children in birth-to-five programs, elementary classrooms, and middle school programs, with a multitude of special needs, a common vision can be hard to achieve. Miller suggests, nevertheless, that "differentiated programs could co-exist peacefully and productively under one overall vision if care is taken to orchestrate and support the common as well as the unique needs of all" (p. 151).

Without the common vision and careful management, confusion, envy, and a lack of accountability will arise. Educators in the schools of tomorrow, suggests Miller, will

> find themselves not only having to rethink and redesign curriculum, strategies, and learning environments, but also to carry the burden for lobbying for changes in policy, of justifying their new ideas to administrative boards… involving more stakeholders means they not only design and implement the "right" programs but are able to spend more professional energies paving new paths for learning rather than in waging battles for survival. (1994, p. 154).

In this author's district, just such a group of stakeholders came together and designed a comprehensive plan for technology which was formally adopted by the board of education in 1996 (Information & Communication Technologies Planning Task Force, 1995). Having taught in eight schools on the United States' east and west coasts, as well as in British schools and U. S. Department of Defense schools, this author has noticed a few unusual characteristics of this Midwestern suburban district's plan. These will be discussed within the framework of the indicators of technology effectiveness designed by Jones, Valdez, Nowakowski & Rasmussen (1995) previously mentioned, which goes hand-in-hand with the indicators of engaged learning that were discussed in the section titled "Current Thinking."

In this author's district, a comprehensive plan for technology included a team of internal consultants who are now called Learning Technology Facilitators, originally referred to as Information & Communication Facilitators (Information & Communication Technologies Planning Task Force, 1996, p. 17).

Learning Technologies Facilitation

Learning Technologies Facilitators offer ongoing support to and collaborate with teachers, principals, and others in the schools to develop effective strategies for integrating technology across the curriculum. Their focus is to promote uses of technology that enhance learning and add value to instructional practices. Facilitators also design and offer a variety of professional growth opportunities for individuals and groups. An LTF is a certified teacher who maintains a flexible schedule to assist staff and to meet the needs of the schools to which they are assigned. They have knowledge of "best practices," use of technology tools, and adult learning strategies (Moffitt, Bingham, Eldredge & Muench, 1998). A clear expectation is that these LTFs work primarily *in the classrooms* and *with teachers and students*. In this way, they are best able to directly impact student *and* teacher learning, and implement incremental steps towards the approach needed.

Fullan and Stiegelbauer suggest that such consultants in other districts with broader roles are "variously called curriculum coordinators, resource teachers, internal change agents, external change agents, organization development specialists, disseminators, linking agents" (1991, p. 12).

Miles, Saxl & Lieberman documented the key skills needed by "change agents" to function effectively (1988). Fullan & Stiegelbauer summarized, "the consultant needs to combine subject-matter knowledge, interpersonal skills while working with individuals and groups, and planned change skills for designing and implementing larger change efforts" (1991, p. 12). In non-school hours, LTFs are found consulting with teachers, planning with principals and instructional coordinators (also in-school consultants in this district), and leading staff development classes for salary lane credit at the district's Technology Learning Center.

Killion & Simmons (1992) clarified the distinction between trainers and facilitators, suggesting that trainers give information and skill and operate from specified outcomes and timeframes. Facilitators, on the other hand, guide interaction and operate from an overarching goal. The design and plan of action as well as the outcome emerge as the group works on the situation or problem. Open, honest discussions between facilitators and groups can lead to problem solving, decision making, conflict resolution, and task accomplishment. Facilitation can lead to changes in mindset.

Even with a comprehensive, into-the-classroom staff development and reform program, many school districts are not "done" with technology integration. Such change requires careful management and a clear "vision" of the big picture. Universal decisions need to be made about hardware and software licensing and compatibility, network management, and technology support services.

For example, people making the purchasing decisions of both hardware and software are often unqualified to do so. As a rule, teachers have little time or inclination to research technology purchases well, and given the opportunity, will fill the software caddy with drill-and-practice or gaming software that serves very specific niches in small portions of their grade-level curriculum. Administrators reading the current literature, on the other hand, may purchase programs and systems for knowledge construction and multimedia presentation which teachers then find difficult or impossible to implement without the investment of time, effort and understanding toward that deep curricular rethinking. Such decisions made by a person or a group of people dedicated to that successful implementation will likely be more reflective of the district's goals.

In this author's district, the Learning Technologies Department makes most of the software decisions. Knowing that students learn best when constructing projects to demonstrate their learning, we use very little "educational software" in favor of tool software. While teachers and sites can purchase single copies or lab sets of titles specific to their classroom or curriculum, a sizeable collection of "standard issue" tool software exists on every computer purchased by the district for classroom use. This collection includes several presentation programs useful for demonstrating or constructing knowledge, brainstorming software, several graphics and photo programs, a publishing suite (word processing, spreadsheet, presentation), browser software and numerous other specific applications. All of these programs are supported by the hardware purchased, and all of them are pre-installed on district-issued workstations. This collection of powerful tools is so sizeable that most teachers admit to having used only a few, and having mastered one or two. Teachers employed by the district can sign up for classes during school hours with substitute coverage, or outside of school hours and get salary lane credit or incentive credits for software packages for their home computers.

As teachers, Learning Technologies Facilitators teach students how to use various computer applications only when they are about to use that application for a project, and encourage teachers to approach their own learning in the same way. Teachers experience more success with new programs when they take on one program at a time, and apply it to a specific project that supports their existing curriculum.

In 1999, the district completed the final phase of accessibility (School District 54 Information & Communication Technologies Planning Task Force, 1996, p. 31), which placed one computer in every "learning space," thereby including not only self-contained

Table 3 *Computer Lab Settings*

Computer Setting	**Advantages**	**Disadvantages**
Lab setting (10-20 computer stations)	Groups: all students have access to computers at the same time; teacher can facilitate whole-class instruction	Usually limited to 30-40 minutes a week
	Computer coordinator may be available to help students	Fire drills, assemblies, holidays, other routine interruptions may cause lab time to be missed
	Students can take turns working individually on computers with coordinator while other students work on noncomputer assignments with teacher	Computer use is more likely to be an isolated activity than an integral part of the curriculum
	Less cost to secure and network computers; printer not required for every classroom	Whole school uses the same computers and printers, causing more wear and tear on the systems, more variable problems, and additional software costs to meet everyone's needs
		Instructional time is lost going to and from computer lab
Lab setting (25-35 computer stations)	Same as other lab situation	Same as other lab situation
	Individual students can access computers at the same time; teacher can facilitate whole-class instruction	
	Additional computers may be available for multimedia purposes such as digitizing and editing	

(Adapted from Ivers and Barron, 1998)

classrooms, but art, music, physical education spaces as well. At the time of this project, the majority of classroom teachers in the district were entering their second or third year of access to classroom computers. On the other hand, two of the three teachers at Blackwell involved in this project had only had access to a classroom computer for two months, due to the building's recent reconstruction and rewiring for connectivity. A common misconception among teachers is that "big projects" cannot be done in schools that are not equipped with a computer lab. The authors of this district's technology integration plans subscribe to numerous ideas outlined by McKenzie (1991; 1998), such as a fundamental belief that computer labs are counterproductive to the type of rethinking of curriculum that teachers need to do to successfully integrate technology. Table 3 outlines some of the advantages and disadvantages of computer lab settings. In many school districts, plans have been laid for computers in every classroom. In far fewer districts, classrooms boast more than one computer each. Table 4 outlines advantages and disadvantages of classroom computer numbers.

A further issue that complicates matters for school districts is the reliability factor (or lack thereof) of things technological. When funding is tight, as it so often is in public school districts, technology may be purchased without service contracts. The same frugality is likely to result in a lack of technology repair and maintenance services in-district, or even help desks and mobile tech support. LeBlanc observed as recently as 1994 that:

Table 4 *Classroom Computer Numbers*

Computer Setting	**Advantages**	**Disadvantages**
Classroom (1-2 computers)	Computer available everyday for "teachable moments" If projection device or large monitor is available, can be used to facilitate whole-class/small group instruction Software funds can be used to purchase a variety of software that meets students' and teachers' individual needs vs. lab sets that may not be used by all teachers or students	Individual computer time is difficult to arrange Some computer group objects may take an undesirable length of time to complete due to limited access More cost involved with purchasing computers and printers for every classroom, networking, and securing every room
Classroom (3+ computers)	Same as other classroom situation Student groups can have daily computer access Computers are more likely to be used as an integral part of instruction and tools for learning	Requires more classroom space than 1-2 computers More cost involved with purchasing computers and printers for every classroom, networking and securing every room
Mobile computers for checkout	Can provide additional computer access for group projects Can be removed from classroom, freeing up space when not in use	Not always available Time needed to move systems in and out of classrooms Computers may be damaged in transit

(Adapted from Ivers and Barron, 1998)

> The software available… usually consists of drill-and-practice… programs. As students vie for snatches of time, their efforts are often plagued by faulty equipment, incompatible hardware and software, and the underlying problems… Many of the teachers are so frustrated by their attempts to use computers in their classrooms, some so disillusioned that they have given up any real effort at curricular integration of the technology. In these schools, which are much more typical than the well-equipped institutions, the integration of computers has been largely ineffective, inequitable, and inadequate in fulfilling our hopes for their use in literacy education and schooling in general. (in Selfe and Hilligoss, p.25)

It is worthwhile to examine the literature of schools and districts where basic ideas about teaching and learning and curriculum were restructured *successfully*, where technology integration supports best educational practices already in place – rather than being offered as a panacea or a supplemental patch to ailing practices. Such examination yields a list of factors that appear to make a difference.

Indicators of Technology Effectiveness

Alden (1998, p. 1) advocates extensive planning, commitment, and vision from districts. "To implement the effective use of technology in our classrooms takes commitment to rethinking our teaching objectives, curriculum and methods and commitment to on-going professional development and helping of others to learn."

Harrington-Leuker cites researchers who argue that:

> Project-based curricula and … commitment to linking computers with widescale school reform are among the most promising ways to use technology. And they support their argument with studies of high-performing districts that have made substantial investments in technology and put that technology in the service of a specific educational goal or agenda. (1997, p. 3)

School systems must make a "substantial" commitment to helping teachers use technology effectively but it must be driven by careful examination of educational goals, she contends, and while that process will take time, technology won't make a difference in student achievement until then.

Jones, Valdez, Nowakowski & Rasmussen (1995) devoted the second half of their publication to delineating the factors that they believe determine whether the use of any particular technology system in the classroom will be effective. They maintained that, just as student tasks and teacher practices have a variable range of effectiveness, so do even the most powerful (and expensive) technological systems.

According to Jones, Valdez, Nowakowski & Rasmussen (1995), the features of technology that make it effective and important to learning are divided into six categories, the first of which is the *Access* which a school has to diverse technologies and resources. The first indicator of this *Access* category is "connectivity" otherwise known as access to the Internet and other resources. The second indicator in the *Access* category is "ubiquity," which translates to equipment being conveniently located, readily available to all teachers and students with no wait-time and no travel to another location necessary. The third indicator is "interconnectivity" of students and teachers, meaning that information is shared in both directions in diverse ways using technology. The final indicator in this category involves "equity" of access, in which students have connections to the best and most extensive resources the technology has to offer.

> "If a system has home-school connections but no connections to the local library system or to the Internet, or if only students in gifted classes or in magnet schools know how to use those connections effectively, the technology is not being used *equitably*. Technology in schools should be available to all students so that everyone has access to rich and challenging learning opportunities" (Jones, Valdez, Nowakowski & Rasmussen, 1995, p. 32)

The second category of high technology performance is *Operability*. Technologies that are "interoperable" are those that allow easy and convenient exchange of information between other hardware and other software. In order to accomplish this, the technology must have what is referred to as "open architecture" allowing students and teachers to access this other ("third-party") hardware and software. The technology must also be "transparent," moving from one format or program to another, unaware of the procedures and protocols used by the hardware and software. *Operability* indicators allow teachers and students to go about the business of learning without having to be bothered with the distractions of complex and time-consuming technology problems.

Organization indicators of technology performance relate to "distribution" of resources rather than centralization. This apparently focuses on the advantage of LANs and the metaphor of shared information and resources, as opposed to WANs, where information flows in one direction only. The "user-contribution" advantage of such systems allows users to provide input to the system, as opposed to being only a recipient. The final indicator in this category is that the technology is designed for "collaborative projects."

The fourth category of technology performance indicators involves *Engagability*, or the features in the technology's design that promote engaged learning, such as the capability to provide "challenging tasks, opportunities, and experiences." The second feature of *Engagability* is that the technology enables students to "learn by doing," using tools like simulations and scenarios. Finally, "guided participation" is evident from the technology, in the form of tutorials, "wizards," or error analyses. These features allow learners to anticipate problems in their work.

Technology must have a high "*Ease-of-use*" level. "User friendly" is a trite and almost meaningless phrase today, so that alone will not suffice. The technology must also provide "effective helps," and encourage "user control." It must be "fast" and have "available training and support." Finally, the technology allows for random access of "just enough information" at different levels and times, which means that people with immediate and pressing needs can access information as successfully as those who have time for greater exploration and in-depth reflection.

The final category of technology performance is that of *Functionality*. The technology must provide "diverse tools" from the basic database/spreadsheet/word-processor to the more specific and high-level uses by specific fields of professionals. The technology must incorporate other "media," whether these are printers or video or editing equipment. The technology must prepare students to use tools to create new programs and tools for others, which means that it must "promote programming and authoring skills," which must be available but *not* taught as an end in and of themselves. The final indicator in this final category is the technology's capability to "support project design skills," such as setting goals, monitoring budgets, and conducting research, for example.

Concluding Remarks

As yet another in a series of twentieth-century inventions that promised to revolutionize education, the personal computer was received with much fanfare, touted by many as the panacea to many classroom ills. However, the effectiveness of this invention has been under fire in the last decade, and as such, has brought to light many questions. Those who would search for the answers often began by observing sites where technology did have a positive impact on student learning, and comparing these observations to sites that did not.

Their findings reflect that effective implementation of technology requires planning and spending on many levels, and does not simply end when the computer is delivered to the classroom. Staff development must include elements of constructivist learning theory and the accompanying alternative assessment methods, and must be provided when and where teachers are ready for it. Those time and place configurations may be after-school sessions in labs, one-on-one or small group during planning periods, or modeled lessons in the teacher's own classroom. Hardware and software must be accessible, operational, and maintained and upgraded by a knowledgeable team. Tech support must be made available through on-site troubleshooters, easy-to-read manuals and/or flip charts, and easy-access "help desk" phone lines. Technology effectiveness factors can be measured, just as student learning indicators can be observed. All of this support will be piecemeal at best if not guided by one commonly held vision of technology in education, formulated and carried out by a committed team of representative stakeholders who strive to keep the focus on student learning.

Hirschbuhl & Bishop (1998) describe the "new vision" of technology in education, which uses technology to support excellence in learning, in ways such as searching, inferencing, and deciding. The role of the student has undergone a remarkable change in this vision. Students work at much harder problems, larger-scale and more meaningful projects. Students have more responsibility for their own learning, and are able to work "in a variety of styles that reflect differences in gender, ethnicity, or simply individual personality" (p. 7). Because of this new vision, instruction of students suits their learning styles and gives them a more active role in the learning process. Thus, Hirschbuhl & Bishop conclude, the "creative use of technology by skilled teachers offers a promise quickly and effectively to restructure education as we know it" (p. 8).

Hypermedia and Multimedia

In the early days of personal computing, word processing predominated. Software programs then evolved to incorporate the use of pictures and graphics, and desktop publishing emerged. Sound soon was added, and this new dimension made it possible to personalize computers and programming. For a time, software companies produced tutorials and simulations that enabled users to learn the sequences and commands necessary to create their own programs.

For years, the term "multimedia" meant simply using multiple media, such as supporting a unit with artifacts or realia, photographs or slides, audiocassettes, videotapes, and a variety of books. Today's technologies have changed the meaning of the term "multimedia" to imply the integration of several media forms such as text, graphics, animation or videos – using a computer.

Later, software corporations embedded commands by connecting a button (a clickable point that commands the computer to take the user to another place in the program) to a word, the concept of "hypertext" was invented. Hypertext facilitates interaction between readers and text by organizing information into text chunks and linking it to other information. Rouet, Levon, Dillion, and Spiro (as cited in Ivers and Barron, 1998) found that hypertext helps students make associations, understand definitions, view examples of complex concepts, and comprehend relationships between blocks of text. Hypertext and other forms of "transparent" programming became a new way for users to present ideas in a non-linear way.

By the mid-1980s, several "hypermedia" programs enabled users to create and present screens of information. These screens could be linked by buttons, which were controlled by computer language running in the background called "scripting." Thus, "hyper" environments, including hypertext and hypermedia contributed to the complexity and sophistication of the multimedia definition, although they are considered to be subsets of multimedia (Ivers & Barron, 1998).

Most of the literature written before 1990 regarding hypermedia refers specifically to Apple's *HyperCard*, which was the first multimedia authoring tool and was based on the "stack of cards" metaphor. *HyperCard* was monochromatic, or without color, until 1987, when the Mac II brought the ability to display and manipulate photo-quality pictures. Because of its ability to handle graphics, the Mac still remains the machine of choice in the professional world of print and for making multimedia.

Some hypermedia articles and studies also reference Roger Wagner's *HyperStudio*, another multimedia authoring program available in 1989 for the Apple II, and later the Mac and PC. The arrival of this program in education provided a rich environment to create the same "stacks of cards" using text, graphics, sound, CD-ROM access, and QuickTime video, but with an important difference. The *HyperStudio* author never sees "code" or "scripting," and this fact makes an authoring tool accessible to children as young as preschool. The "transparency" of the newest programming tools makes multimedia authoring possible *without* the need for knowledge of programming. Yet the resulting stacks are sophisticated enough that high school teachers accept school projects authored with this program. This author's school district included *HyperStudio* among the dozen district-licensed, standard programs installed on all computers.

As more schools are connected to the Internet, the term "hypertext" in the educational journals has found more frequent application to the textual links available online. Multimedia "absorbs" the historically older and somewhat broader notion of hypermedia. "Hypermedia" has broadened to include not only materials created with multimedia authoring tools, but also the text, graphics, sound and video available on the Internet. Perhaps in an attempt to clarify the exclusion of the Internet, educators and researchers more frequently use the term "multimedia" to refer to materials created in the classroom which are *not* intended for the Internet. In this literature review, the original definitions have thus been identified, and the reader will understand the cross application of terms identified in current literature.

It has been suggested that "integrated media" is a more appropriate term for multimedia, in that it reminds us as educators that our goal is to integrate the media in order to facilitate learning, rather than simply multiplying the number of media available to learners (Cognition and Technology Group, 1993). Regardless, educators and the technology industry have yet to agree on a single definition of what the concept of multimedia includes, and this explains some of the cross-application (and mis-application) of terms in current literature (Strommen & Revelle, 1990).

Three possible uses of the classroom computer were proposed by Taylor in 1980 – tutor, tutee, and tool. As a tutor, the computer instructs the child – reflective of the behaviorist theory, programmed instruction, and drill-and-practice software. As a tutee, the child "instructs" or programs the computer – presumably to perform a specific task or sequence of commands, such as a LOGO-driven robot or a spreadsheet that calculates values. As a tool, students are given the freedom with the machine, using it as a tool to gain more control over their learning. This last application of the computer refers to the many possible uses of the computer involving multimedia or the Internet.

Similarly, students can use multimedia in three ways today. Students can be consumers of commercially produced multimedia. Students can use multimedia authoring programs as tools to help them organize information and construct knowledge. Taking the second application one step farther, students can present the programs they have authored to other people, thereby becoming producers of multimedia. Authentic audiences might include other students in their own class, other classes at the same grade level, teachers (for use in teaching in future years), and community groups outside of the school.

In order for students to become authors of hypermedia, they must learn "not only the *content*, but also the *tool skills* they need to use the hypermedia or multimedia software. Thus, hypermedia becomes an object of instruction as well as a medium for teaching and learning" (Turner & Dipinto, 1992).

Dryden (in Selfe & Hilligoss, 1994) suggests that hypermedia can make the teaching and practice of thinking "a truly democratic enterprise that respects and serves the needs of both the individual learner and the larger community of learners" (p. 284). Dryden goes on to elaborate three ways in which he feels hypermedia can help in some desperately needed areas:

1. to empower students to become creators of knowledge and constructors of their own meaning;
2. to reintegrate the fragmented, departmentalized vision of knowledge that schools currently offer students; and
3. to heal the cleavage… between the academic literacy of schools and the broader "public literacy" practiced by the rest of society" (in Selfe & Hilligoss, 1994, p. 284).

While some of the earlier linear technologies allowed users to remain passive, interactive multimedia programs *allow* users to become involved – and even *demand* involvement. In this way, interactive multimedia has closed the gap between earlier learning theories and our current knowledge of learning styles. Interactive multimedia appeals to visual, auditory, and kinesthetic learners.

Ivers (1998) suggests that multimedia projects allow students to show their understanding of a topic in a variety of ways, and more importantly, "provide students with the opportunity to explain their work and ideas to others" (p. 3). Ayersman (1996) suggested that, while the research is still limited, the use of multimedia can be effective for teacher and learning with all levels of students.

Dual Coding Theory Applied to Multimedia

Some time ago, Paivio introduced the dual-coding theory (1979, 1986) which provides a partial explanation of why many think that hypermedia-enhanced instruction is so beneficial in the learning process. Paivio suggested that each person is capable of processing information through both verbal and imaginal systems, and that providing information that has "contextual meaning" to both of these systems would seem to assist the learner in his or her ability to store and retrieve that information. The information then has two memory codes rather than one. If information is stored in both forms, it is "coded" in two forms, or "dual coded," and stands a much better chance of being recalled than information which is non-imaged or abstract. Such a relationship is called a multimodal approach, and is thought to be particularly effective for accommodating students with diverse styles and preferences for learning. According to Kozma (1987), the educational significance of this fact is that concrete materials will enhance memory recall. Large, Beheshti, Breuleux, and Renaud (cited in Ivers & Barron, 1998), found that the combination of text, graphics, sound and video results in greater comprehension, recall, and inference.

Mayer and Anderson (1992) showed that, in creative problem solving situations, learners exposed to visual and verbal explanations were more effective than those exposed to verbal explanations alone or visual explanations alone. It can thus be inferred that multimedia, which addresses multiple "channels" of the brain, can create and activate both visual and verbal entries in long-term memory. Providing students with multimodal approaches is an effective way to accommodate students' diverse learning styles, and is an effective way to transmit knowledge that is not easily conveyed through print or verbal explanations alone (Ayersman, 1996). Such multimodal approaches or use of "integrated technologies" may provide enriched context and anchor instruction to meaningful and concrete references (Cognition and Technology Group, 1993). Allowing students greater levels of learner control is likely to result in better, deeper understanding, because learners pursue the methods that work best for them.

If this is true at the knowledge-absorption level, it would seem that at the knowledge-construction level, learners would also employ multimodal approaches. Dual coding that occurs at the authoring level could serve to reinforce the learning just as it does at the receptive level.

Cooperative Learning and Multiple Intelligences Applied to Multimedia

In keeping with the constructive approach, teachers must consider the learner as an active participant of learning, and reexamine ways to include more effective learning strategies in the instructional process. Cooperative learning (Slavin, 1990) and multiple intelligences (Gardner, 1983) are two strategies that relate to the design and development of multimedia projects.

According to Ayersman (1996), some of the benefits of using cooperative groups for multimedia design include improved collaboration in help-seeking and help-giving, increased use of metacognitive and elaborative strategies, improved accommodation of individual differences, increased self-reflection, increased motivation and a more positive attitude toward learning, and increased performance.

Multimedia authoring seems to be ideally suited to collaborative learning. Wilson and Tally (1991) found that it promotes small-group interactions and allows for the development of original projects reflective of collaboration. In 1995, Riddle found that students were found to develop new ideas and more actively engage in peer collaboration when using hypermedia software than when doing traditional paper-and-pencil activities. Moreover, Toomey and Ketterer (1995, p. 480) found that the instructor's role changed significantly toward a facilitative role, "working collaboratively with the other mediators in the room, namely other children and technology."

Multimedia and hypermedia, with their multimodal approach, seem particularly well suited to assist in the development of multiple intelligences. Of the seven intelligences -- recently expanded to eight, possibly nine (Checkley, 1997) – the "big two" are linguistic and logical-mathematical. "These are the two that schools focus on, and anyone who falls short in either is considered to be a candidate for remediation or special education services" (Green, 1995). The other five are spatial, musical, bodily

Table 5 *Group Sizes in Multimedia Design Teams*

Group Size	Advantages	Disadvantages
One	Students can work at own pace Students not dependent on others	Every student needs time on the computer; more time overall This does not reflect real-world learning or promote learning from different perspectives
Two or three	Students can learn from each other and share project responsibilities This grouping supports real-world learning, learning from different perspectives, and cooperative problem solving	Teacher needs to ensure that everyone contributes and has a chance to speak
Four	Students can learn from each other and tasks can be broken down to share This grouping supports real-world learning, learning from different perspectives, and cooperative problem solving This arrangement increases computer access time, and projects can be completed in less time More talent and resources are available to create each group project	Teacher needs to ensure that everyone contributes and has a chance to speak This grouping requires greater interpersonal skills, and sharing a computer can be difficult
Five or six	Same as four	Same as four It can be easier for a member to not contribute while others shoulder an unfair amount of work Disputes, leadership difficulties and off-task behavior to delay the project are more likely Group dynamics may be more appropriate for older, more mature students

(Adapted from Ivers and Barron, 1998)

kinesthetic, interpersonal, and intrapersonal. These areas, along with the recently added eighth (naturalist) and possible ninth (existentialist), are the areas in which children identified for special services and remediation often do well.

Dijkstra (1997) agrees, and maintains that the problem for educators is to determine how the students can construct the "objectified" knowledge for themselves in such a way that it will be remembered, understood and used *and* "communicate about it with colleagues and teachers ... effectively and efficiently" (p. 12).

Multimedia projects are indeed the key to this vision, offering students new opportunities for organizing, synthesizing, and evaluating information. However, Ivers (1998) cautions that blanket approaches, applying uniform teaching and assessment strategies to all students while utilizing multimedia, will only complicate the issues:

> There are no magic potions... teachers can use a variety of strategies to ensure that student learning is an active, personally relevant, meaningful process: cooperative learning, constructivism, identifying each... student's needs and talents, using a variety of alternative assessment techniques (p. xvii).

Dijkstra (1997) suggests that educators must involve students in a knowledge construction process by regularly presenting problems which require them to "make categorizations, interpret phenomena and design artifacts" (p. 12).

One of the major benefits of multimedia authoring noted by Lehrer, Erickson and Connell, is the scaffolding that occurs at multiple levels (1994). When educators model cognitive skills and provide students with organizers or templates, this is referred to as scaffolding cognitive skills. When educators provide multimedia authoring systems with transparent programming designed to aid organization, this is referred to as scaffolding with computer tools. When educators ask leading questions that require them to approach their learning metacognitively, this is referred to as scaffolding through inquiry. Most importantly, however, providing ongoing assessment to students in the areas of group cooperation, product design and content, and competence in using computer tools is referred to as scaffolding through alternative assessment.

Linear versus Non-linear

Some of the major cognitive benefits observed when multimedia authoring tools are used are the process skills related to organizing information and to writing (Turner and Dipinto, 1992). Students often have a hard time writing reports because they view the writing process as one long, continuous stream. Using multimedia authoring tools, students are able to work on sections at a time, can easily see which sections need more work, and can allow the program to help them make needed transitions. Studies have also shown that space limitation on the "cards" or screens in multimedia stacks force students to determine which information is most relevant, and edit out the rest. For reluctant or struggling writers, then, authoring in a piecemeal method allows them to experience success as they improve their skills.

There is some evidence that writing skills do in fact improve, though Ayersman (1996) points out that the literature focuses on the widely held belief that the multimodal attributes and the high level of learner control inherent in hypermedia may accommodate various learning style differences, and this may be related to the controversy regarding linearity and nonlinearity.

Gordon and Lewis found that linear sequences are thought to be most beneficial for conveying details and cause and effect relationships, while nonlinear structures allow a broader context and additional information that augments global learning (1992). Reed and Giessler (1995) found that some types of experiences are better predictors of nonlinear pathways while others are better predictors of linear ones. For example, chronologies are naturally linear; the template designed for students to work on in this biography project could easily have been designed in a linear fashion. However, students with different learning styles and differing degrees of computing experience may prefer different linear and nonlinear pathways through a hypermedia program (Reed, Ervin & Oughton, 1996). One might then conclude that having both options available could conceivably accommodate a greater diversity of learner preferences.

In the Benchmark-Blackwell project, this author and cooperating teachers anticipated that information would be received by the student authors from their senior citizen partners in a piecemeal fashion; to counter the likely frustration with unfinished parts of a linear progression, the template was designed to be nonlinear. Interestingly, when the time came to transfer the *HyperStudio* stacks to video, almost every student group chose a chronological progression, and even removed navigational elements like buttons and menus, rather than showcasing the nonlinear feature of their stack.

Ayersman (1996) suggests that traditional organizations of information (linear) have existed for quite some time, and to expect students to quickly adapt to nonlinear organization in their authoring might be unrealistic. Schroeder found that nonlinear structures can result in initially lower levels of achievement until students become comfortable and proficient with hypertext (1994, as cited in Ayersman, 1996). Ayersman (1995) posited later that "students did not necessarily *progress* toward choosing nonlinear formats for representing their knowledge structures, even though clear gains in hypermedia knowledge were evident."

Assessment

An important factor in successful integration of multimedia and hypermedia is that assessment is ongoing, process-based, and based on a variety of types of feedback to the student (Brooks & Brooks, 1993; Freedman, R. L. H. 1998). Complex performance tasks such as the creation of a multimedia biography must focus on understanding as an educational goal. Students *really* understand the idea or issue or event only when they can empathize with the people involved, critically question a commonly held view, recognize a prejudice without it being pointed out to them, or make subtle distinctions between two versions of the same story (Wiggins, 1997). Similarly, when students can critique their own work in relation to their peers', and accurately self-assess the areas that need more improvement, they have an understanding of the process (Goodrich, 1997).

Students in the Benchmark-Blackwell project employed peer review and discovered a profound result: they were able to have "professional" conversations with their "colleagues." They were then able to go back to their work and make improvements, and as this process was repeated over and over, they made more revisions to this project than any they had ever done before. Rubrics and informal conversations with other students or parent volunteers were responsible for as many changes as group mini-conferences with the teacher, comments written in the margins of student journals. Perhaps the most dramatic changes resulted from the Daily Oral Language Lessons, in which the teacher projected a screen of text, randomly selected from the student groups' work in progress. By making the mechanical and grammatical changes to each other's actual work rather than meaningless practice sentences, students were able to see the value of this daily exercise, and were often motivated to go back into their own work and correct similar mistakes. In this case, the value of having an authentic audience played a large part in motivation; students continued to improve upon their work because they wanted it to be the best it could be by the time it was presented to their friend at the retirement community. It is doubtful that students would have been as dedicated to making revisions if they had believed that their product was being produced only for the teacher, or was staying within the school walls.

Concluding Remarks

In recent years, research in educational journals has focused on the use of hypermedia and multimedia, but failed to adequately define these terms. As technology improved, authoring tools became easier to use, and scripting moved to the background. Transparent programming made these authoring tools accessible to learners of all levels. Multimedia authoring requires interactivity, and allows for many different learning styles. Cooperative learning (Slavin, 1990) and multiple intelligences (Gardner, 1983) are two strategies that are particularly appropriate in developing multimedia projects.

There is some controversy over the benefits of linear versus nonlinear approaches in multimedia programs that allow students to create branching sequences. This area, like so many areas of educational technology, needs further research. Much of the research that has been done is confounded by the wide variations across the country in accessibility, instructional settings, and especially in the level of competence of the teacher/facilitator.

Multimedia authoring projects allow students opportunities to construct information for themselves, and allow teachers a unique opportunity to scaffold instruction at a variety of levels. Process skills related to organizing information and to writing are examples of the areas that teachers may find that students need support. One area that many would-be multimedia-using teachers find especially exasperating is assessment of student learning. More staff development and coaching in this area would be beneficial, but it must be accompanied by actions within the district that allow for greater freedom in reporting student progress, whether in altered forms of report cards or portfolios.

The Pedagogy of Social Studies

Prior to the Revolutionary War, "books" for school children were practically nonexistent, but those that did exist were readers, and history information was conveyed as a part of the reading lesson (Cordasco, 1967, p. 113). The first known social studies book written in America was a geography text published by Jedediah Morse in 1784

(Kaltsounis, 1987, p. 9). Most of the books that followed were geographies and histories, moralistic and slanted in their approach to favor Western Christian countries (Cordasco, 1967, p. 114). Books written in New England were scornful of the South, books written by Protestants favored Protestants over Catholics, and so forth, in such a manner that "facts" were distorted to support the values held by those who had written them (Lucas, 1972, p. 483). (Much controversy still exists regarding "true" and "accurate" presentation of "facts" in history texts published today.) In 1892, studies done by the National Education Association and the National Society for the Study of Education resulted in the recommendation of a particular scope and sequence for teaching social studies (Kaltsounis, 1987, p. 9). This scope and sequence consisted primarily of history, geography and civics.

John Dewey, the father of progressive education, provided a theory of education around the 1920s that can be used as a framework in which to place the purpose of social studies; "Dewey defined education as the process of bringing newborn children into the life of the society in which they are born" (Cremin, 1961, p. 267). When societies were less complex, family and friends taught the knowledge and skills necessary; this was the norm for centuries, named only recently "informal education." As change in societies accelerated, knowledge increased. Industrialism and the emergence of technology caused an increased pace in society, decreasing the ability of family and friends to provide all necessary education. Formal education was born.

According to Kaltsounis (1987, p. 10), "social studies came to be dominated by the descriptive approach, and remained so until the late 1950s and 1960s." As Hakim (1997, p. 52) writes, "about 50 years ago, we got away from the classic presentation of history as story. When Factory Age thinking began to dominate schoolrooms, history changed from its natural narrative form to a factual litany. History's stories were replaced with names, dates, and dull details."

However, the world's population continued to grow at an astounding rate, and colonial empires gave way to newly independent countries. Information expanded exponentially, and social studies evolved into a vast, complex course of study. Students memorized information only for tests, and then forgot it. The narrative and anecdotal nature of the new approach did not combine well with the expository presentation that teachers tried to retain (Kaltsounis, 1987).

In the late 1960s particularly in the 1970s, the pendulum swung away from the traditional, "descriptive" approach of transferring knowledge and facts to students. The opposite approach that evolved came to be known as "activity programs", characterized by "direct involvement with their immediate environment, in which they were free to pursue their own interests with the guidance of teachers" (Gutek, 1986, p. 307). However, according to Jarolimek and Walsh (1974, p. 5),

> The activity-type programs were found wanting because of their substantive thinness. Moreover, the nature of pupil involvement in them gave the impression that such classrooms were 'play schools,' thereby associating them with the late Progressive Movement, the latter always a target for criticism and ridicule. With Sputnik orbiting the earth the nation was in no mood for play schools. It wanted work schools.

Yet, the traditional programs were still under fire, too. They were still unpopular for several reasons:

> because they (a) placed too much emphasis on memorization of facts, (b) were often inaccurate in subject matter of emphasis, (c) ignored large portions of the world, (d) were dominated by history and geography, (e) developed little depth of understanding, (f) did not develop independent methods of inquiry, (g) relied too heavily on expository teaching procedures. (Jarolimek & Walsh, 1974, p. 5)

The pendulum could not swing back to the traditional approach, and the resistors to open learning and activity programs were vocal.

The American social studies curriculum was in need of a major overhaul. "In the mid 1960s, Congress allocated a considerable amount of money to improve the teaching of social studies in the schools… During the 1960s nearly all publishers revised their social studies programs to reflect the conceptual approach" (Kaltsounis, 1987, p. 10). This "conceptual approach" was modeled after the fields of mathematics and science, as the social sciences had no viable prototypes of its own. The conceptual approach was a method of organizing facts around basic understandings, and it satisfied both the critics of the traditional, descriptive method and the critics of the activity programs. The primary critics of this program were students who were not college-bound, who according to Kaltsounis (1987) found this approach "too difficult and removed in content from their concerns" (p. 11). In 1981, Morrissett asked in his article in The Social Studies: Eightieth Yearbook of the National Society for the Study of Education, "Are other futures possible? … Is it not possible that some radical changes in the teacher-centered, textbook-dominated, thirty-students-in-a-box way of doing things?" (p. 121).

Social Studies Knowledge and Skills

The adjustments made to the social studies curriculum after this reflected the belief that while not all students would go to college, all students would need to be able to function in society. Therefore they would need to know how the social studies, such as government and economics, can affect them and how they can affect government and economy (Jarolimek & Walsh, 1974).

> Children need not only acquire knowledge directed to an understanding of these problems; they must also develop the requisite skills for resolving them. The purpose of social studies is defined within the context of the overall purpose of education, which is to provide the knowledge and skills needed to cope with given physical and social environments. (Kaltsounis, 1987, p. 11)

Seven years later, a very specific listing of curricular areas was included in the following formal definition for social studies created by the National Council for the Social Studies (NCSS):

> Social Studies is the integrated study of the social sciences and humanities to promote civic competence. Within the school program, social studies provides coordinated, systemic study drawing upon such disciplines as anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences (1994, p. vii)

In 1978, Massialas and Hurst published a book based on the elementary school as a laboratory, and formulated much of their theory on the teaching of social studies on the work of Jean Piaget, the renowned educational psychologist. Piaget contended that children aged 7-11 are in a "concrete" stage of cognitive development which he referred to as a part of "the operational stage." Children in the concrete operational stage are developing logical thinking grounded in logical principles and beginning to apply this thinking to concrete situations. At this stage in life, children are liberated from egocentric thinking, newly able to seek the opinions of peers and to value social interactions. Because of this change in their thinking processes, they are able to hypothesize, distinguish, generalize – and all of these are operations of inquiry learning. Therefore, Massialas and Hurst contended, "Truly cooperative, as well as competitive, behavior becomes evident" (1978, p. 18), and this is an ideal stage at which to introduce social studies.

A Change: Decision Making

This change in students' thinking process makes the time ripe for the development of another skill. Social studies deals not only with the concepts and generalizations of a particular topic, but with its relevant issues of action as well. "It is through such issues that the learner is given challenging situations in which to practice decision making," Kaltsounis contends, and "it is that decision making that is now the ultimate goal in social studies" (1987, p. 9). In fact, the second half of the definition adopted by the NCSS in 1994 states, "the primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world" (p. vii).

Interestingly, this change is reflected in the updated Illinois State Learning Standards – interesting not because individual states would naturally utilize national council's direction, but because this change is the most significant and permeating alteration made to this curricular area in the Illinois State Learning Standards between

1987 and 1994. In the Appendices of the Standards, the "Crossroads" section delineates changes between previous versions and the current update. Therein was the following statement, "The 1985 goal that addressed application and decision making has been incorporated into the Applications of Learning and the standards and benchmarks under *all* [italics added] of the 1997 goals for social science" (p. 106).

The Illinois Learning Standards adopted in 1997 list five applications of learning for each curricular area: (1) solving problems, (2) communicating, (3) using technology, (4) working on teams, and (5) making connections. These applications are strands that run throughout the curriculum. These five applications of learning as they specifically relate to social science are listed in Table 6. The interrelationship of current learning theories (cognitive, cooperative, constructive) and technology use is evident in the Illinois Learning Standards, which served as one of the basic starting points for the development of this project.

The Illinois Learning Standards for social science are State Goals 14-18 of thirty goals that span the curricular areas. The Goals are written broadly in order to accommodate a variety of Standards which then span the educational years. Five periods (Early Elementary, Late Elementary, Middle/Junior High School, Early High School, and Late High School) each make up vertical columns, across which Benchmarks are placed. As students progress through periods of their schooling, age-appropriate Benchmarks are achieved for the Learning Standards that remain the same throughout the school years. Appendix A illustrates this concept for Illinois State Goal 16, for only the first two of

Table 6 *Applications of Learning*
Illinois State Learning Standards: Social Sciences

Applications of Learning	**Student Activities**
Solving Problems	• Recognize and investigate problems • Formulate and propose solutions supported by reason and evidence
Communications	• Express and interpret information and ideas
Using Technology	• Use appropriate instruments, electronic equipmen computers and networks to access information, process ideas and communicate results
Working on Teams	• Learn and contribute productively as individuals and as members of groups
Making Connections	• Recognize and apply connections of important information and ideas within and among learning areas

Adapted from Illinois State Board of Education (1997)

five periods of schooling, and for only the items that related to this unit, which focused on local history.

Values Clarification

Continuing on the theme that students need not only knowledge and skills to cope with their physical and social environments, but also opportunities to practice decision making, Kaltsounis (1987) concluded that some decisions can be made on the basis of knowledge alone, but most require the use of the individual's value system. This poses a problem, in practice. Children in elementary school often have not yet identified their values system, and may in fact be still forming them. Educators have been (and should have been) reluctant to impose their own value systems upon students. The public school system as a body has avoided values education. As a matter of fact, the brief introduction of "character education" into the elementary classroom was controversial, at best. Lickona and Skillen (1993) provide a "point/counterpoint investigation into appropriateness of character education as a function of public schools" in which Skillen maintains that public school curriculum may present the elements of character education without a sufficient diversity in viewpoint, and therefore may anger and upset parents and other interested parties. This is characteristic of the current literature regarding values education, but some are hopeful nonetheless that the schools will reabsorb the task:

> Despite an ambience of strict church-state separation and religious pluralism, there is a growing consensus that certain widely accepted virtues (honesty, fairness, and respect for others) can be taught in U. S. public schools. Character education should be pursued, but whether ethical habits can be separated from specific religious traditions remains a difficult question. (Heft, 1995)

There is, admittedly, a percentage of the American population that finds this concept objectionable. There are parents who will not allow their children to participate in classes on substance abuse, sex education, or family life. There are those who would support decisions not to dissect frogs, earthworms or livestock organs. So too are there parents who find it unnerving to leave the values education to the schools. Yet, according to Amitai Etzioni, founder of Communitarianism, a new social movement supported by George Bush's endorsement of family values and in Bill Clinton's call for community service, the fact remains that "today about half of the families no longer see it as their duty to pass along values from generation" (Etzioni, interviewed by Berreth & Scherer, 1993, p. 12).

> Unless *somebody* [italics added] embraces the agenda of instilling values, children won't have the strength of their values to fall back on... It sadly falls on the shoulders of the school. If we don't do this, then just as we have adults who are deficient in writing and science, we will find that adults won't have the character and the values needed to be decent members of the community or decent employees or decent soldiers. (Etzioni, interviewed by Berreth & Scherer, 1993, p. 12)

That "somebody" to whom Etzioni is referring will apparently be the teacher.

Jamie Vollmer likes to take his audience of educators and community leaders on a little journey through history, with the purpose of demonstrating a fascinating point. In the context of the last 70 years, he says, the American public educational system has absorbed many responsibilities that previously were assigned to the American family. After Vollmer rattles through many examples (see Table 7), he stops abruptly. "And yet, ladies and gentlemen, not one minute has been added to the school day" (Vollmer, 1998). Vollmer's point, though dramatic, is not aimed at convincing educators that they shouldn't teach values, or any other subject that society deems appropriate. Rather his point, and the message always central to his campaign, is that "You cannot do this alone." Vollmer urges community involvement in the classroom. He believes that community partnerships should be forged, that community leaders should get into the classroom and should participate in school decision making. In this way, the community can ensure that each student graduates with sufficient information and skills to live an effective adult life (Vollmer, 1994).

Table 7 *Topics Shouldered by U.S. Public Schools Reflective of Societal Pressures*

From 1640-1900, America's public schools focused on:	• Teaching basic reading, writing and arithmetic skills • Cultivating values that serve a democratic society (some history and civics implied)
From 1900-1950, we added:	• Nutrition • Immunization and Health • Vocational education and Practical arts • Physical education • School lunch programs (significant shift to feed 1/3 of meals)
From 1950-1970, we added:	• Safety education • Driver education • Foreign language requirements are strengthened • Sex education introduced (topics escalate through the 1990s) • Career and consumer education • Peace education • Leisure and recreation education
In the 1970s, the breakup of the American family accelerates and:	• Special education is mandated by federal government • We add drug and alcohol abuse education • Parent education • Character education • School breakfast programs appear (2/3 of meals)
In the 1980s, the flood gates open, and we add:	• Keyboarding and computer education • Global education and ethnic education • Multicultural/nonsexist education • English-as-a-Second-Language and bilingual education • Early childhood education and preschool for children at-risk • Full day kindergarten • After-school programs for children of working parents • Stranger-danger education • Sexual abuse prevention education • Child abuse monitoring now legal requirement for teachers
In the 1990s, we continued to add:	• HIV/AIDS education • Death education • Gang education in urban centers • Bus safety and bicycle safety

Adapted from Vollmer (1996)

Etzioni agrees that the community must have input, because moral standards must be based on consensus:

> There are lots of values that you can transmit before you get to the argument about whose values you're going to teach.... But I'd like to see the community that says we should teach lies instead of truth-telling or discrimination instead of the opposite. If the community is asked if they want certain values taught, they will tell you they do (in Berreth & Scherer, 1993, p. 12).

Concluding Remarks

"Knowledge and the individual's values are so basic in decision making, social studies attempts to provide learners with those skills needed to acquire and use knowledge, to assess social values, and to clarify their own values" (Kaltsounis, 1987). If educators accept this view, then one objective in the social studies classroom would be to foster students' decision making skills. A crucial step in decision making is action. Social studies students must be given opportunities to carry out their individual decisions, but also to investigate events that shaped other's lives and indirectly experience the cause-and-effect process that shapes us all. Involving the community in the teaching of social studies ensures that values are transferred in the manner that that society wishes.

Conclusion:
Engaged Learning Applied to Local History

This literature review has provided an historical overview of learning theory, the impact of technology on the classroom, and the evolution of social studies as a curricular area. Learning theories often overlap, each representative of the economic, political and societal pressures on education in various eras (Guild, 1997; Reigeluth & Squire, 1998; Roblyer, 1996; Zemelman, Daniels & Hyde, 1993). The learning theories of each era reflect society's understanding of the changing workplace (Vollmer, 1998). Teachers, the purveyors of front-line action or inaction, must understand the reasons for changes proposed in curriculum, technology use, and assessment (Harrington-Leuker, 1997; Hirschbuhl & Bishop, 1998; Hurst, 1994; Hollingsworth & Eastman, 1997; Prawat, 1990; Wu, 1988). In order to achieve actual, lasting change, school districts must invest heavily in staff development, facilitation personnel, technology support, and planning and development time for teachers to assimilate and organize new understandings, processes and practices (Anglin, 1995; Fullan & Stiegelbauer, 1991, Mehlinger, 1995; Miles, Saxl & Lieberman, 1988). Most importantly, however, the investment of all of the above must be guided by an overarching vision, designed by a committed group of community stakeholders (Hancock, 1998; Moffitt, Bingham, Eldredge & Muench, 1998; Selfe & Hilligoss, 1994.

Despite its questionable success to date, technology has the potential to positively impact student learning now more than ever. While emerging technologies are exciting, increased accessibility and reliability within the schools nationwide are more important (Bailey, Ross & Griffin, 1995; Fisher, Dwyer & Yocan, 1996; Jones, Valdez, Nowakowski & Rasmussen, 1995). Used carefully, employed judiciously as a tool, seamlessly incorporated into current curricular goals, technology's greater potential to affect student learning is affected by progress in educational reform.

Early efforts to move technology into the classroom failed to have lasting positive effects on student learning because these attempts were based on the wrong model of teaching with technology (Fisher, Dwyer & Yocan, 1996; Hirschbuhl & Bishop, 1998; Means & Olson, 1994). Drill-and-practice packages were based on behaviorist theory, and delivered isolated rote development of specific basic skills – thus relegating them to use by identified students with learning disabilities or disadvantaged backgrounds (Heinich, Molenda & Russell, 1993; Roblyer, 1996). On the other hand, games and simulations generally involved more challenging material which represented a very small portion of curriculum guidelines – thus relegating them to use by identified gifted students or students in magnet schools (Heinich, Molenda & Russell, 1993; Roblyer, 1996). Because of their narrow application, these two classes of software had little effect on what most teachers did with the bulk of their students for the majority of the school day (Cohen, 1998, as cited in Means & Olson, 1994; Fisher, Dwyer & Yocan, 1996).

Today's application and tool software, on the other hand, is much more likely to fare better because of the new climate of school reform – which strives to change the system by fostering a different style of learning (Dwyer, 1994; Means & Olson, 1994; Reigeluth & Squire, 1998).

Today, students in constructivist classrooms are challenged with authentic complex tasks, in settings where much has changed recently. Teachers have become facilitators on the sidelines, flexible cooperative grouping occurs with high frequency, scaffolded instruction occurs when and where it is needed, and students are assessed using a great variety of authentic and performance-based assessments (Brigham, Hendricks, Kutcka & Schuette, 1994; Brooks & Brooks, 1993; Brunner, 1996; Zemelman, Daniels & Hyde, 1993). In this setting, technology can maximize its potential as a learning tool. This feature of today's technology – the ability to help people obtain, organize, manipulate, display, and present information – will become an integral part of schooling (Dwyer, 1994; Means & Olson, 1994).

Engagement theory is a model for learning in technology-based environments, synthesizing many elements from past learning theories (Jones, Valdez, Nowakowski & Rasmussen, 1995; Kearsley & Schneiderman, 1998; Means & Olson, 1994). Engaged learning, based on the concept of creating successful teams of learners who collaborate on an ambitious project that affects someone in the greater community (Kearsley & Schneiderman, 1998), forms an ideal framework for using technology seamlessly in the classroom. Collaboration, project-oriented learning, and authenticity are effective methods employed with any subject area or topic of study. The Benchmark-Blackwell project focused on local history – a subdivision of social studies – and the integrated skills employed – reading, writing, listening and speaking – to accomplish the task of composing and producing a senior citizen's biography.

Social studies has shifted from a dull, dry rote memorization of names, dates, and places to a more dynamic approach in which students are encouraged to explore and question their own value systems, weigh and decide issues of importance, and view history as the dramatic story of people before us (Illinois State Board of Education., 1997; Kaltsounis, 1987; National Council for the Social Studies, 1994; Massialas & Hurst, 1978).

Technology provides the kind of environment for electronic learning, encouraging the creativity and communication needed to engage students. Engagement theory represents one of many new paradigms for education today, emphasizing the positive role that technology can play in human interaction.

CHAPTER III: PROBLEM, GOALS, AND IMPLEMENTATION

An integral part of the third grade social studies curriculum for Illinois schools is a unit on local history. In 1985, Schaumburg teachers and local historians wrote a complete unit about the history and development of this farming community outside of Chicago, detailing its metamorphosis into the bustling suburb that it is today. While "the Schaumburg unit" was thorough and intricate, it was due for revision in 1998, the summer following this project. The revision was to include updated teaching techniques and events because many of the original lessons were whole-class teacher-directed, and based on information and methods that were fifteen years old. Activities in this original unit were worksheets limited to rote memorization, fill-in-the-blank, very basic map and graph skills, and vocabulary matching exercises. Assessment of students' progress was limited to testing, most of which was similar to the pencil-and-paper activities.

The design of the original unit was clearly based on the thinking that prevailed during the years prior to the unit's design in 1985, which was behaviorism, a belief that students could be "trained" to learn facts or behaviors by the use of external stimuli. Furthermore, despite the fact that the material covered was inherently related to students by virtue of the fact that it was their town being studied, the nature of the activities was still rooted in behaviorism, with drill-and-practice and rote memorization dominating the unit. Preferred methods of teaching today reflect more student-based activities, with healthy doses of cooperative learning, problem solving, and technology use (Illinois State Learning Standards, 1997; Kaltsounis, 1987; Steffey & Hood, 1994).

Similarly, an integral part of the language arts curriculum for Schaumburg third graders is the exploration of biography as a genre. As biography is introduced as a component of fifth and sixth grade social studies, the biography volumes in the school Library Media Center are heavily worn each year and have a unique line item on the annual budget. While Sacajawea, Helen Keller, Paul Revere, Winston Churchill, and the like continue to be read and reported upon, biographies of current celebrities were more popular. Books about national sports heroes and pop culture icons continually circulate at a high rate, even when biography is not being taught anywhere in the building. While one surely cannot overlook the similarity of this trend to the massive circulation of supermarket tabloids, perhaps a less obvious explanation is that which was voiced by a student: "Most people would rather read about living people than dead ones."

Teachers today are continually reminded to connect learning experiences to students' lives, to draw the connections of relevance for the students when those lines are not obvious; these concepts are deeply rooted in constructivism, the educational philosophy that calls for students to build knowledge rather than absorb it. It is not surprising that most students find that reading about the events in the lives of "real, live people" to be more relevant and appealing than plodding though the biography of someone who died many years ago. Like the local history unit, "coverage" of the biography unit usually consisted of inhaling many facts and spilling them back out onto paper; students demonstrated their lack of interest in this futile exercise in a number of ways, such as not getting the facts right or getting the order of events wrong.

This school district recently reorganized central administration, creating two camps of curriculum consultants, who were named Instructional Coordinators and Learning Technologies Facilitators. Both groups are charged with modeling techniques proven in current educational research, putting sound educational theory into practice in co-teaching situations, and facilitating change at the classroom, school, and district levels. Educational reform is a process of systemic change, which requires time, effort, vigilance, and a basic belief that the job is never done. Technology, some say, exponentially complicates that matter, reinventing itself with such speed that "new" learning tools can scarcely be piloted before better ones appear. Thus, educational reform must be inextricably linked to an ever-changing body of educational research and the advent of new technologies, and therefore can never be "done." Beliefs of this nature are prevalent throughout all levels of the district, and well-reasoned change is encouraged and supported.

The problem, then, was not that the curriculum couldn't or shouldn't be changed, but that it hadn't yet been changed to fit current beliefs about how students learn best. The material was dry and unrelated to students' lives. Constructivist theory maintains that students can only learn new things by associating them with previous knowledge and by assimilating all of the pieces into a mental model, discarding useless information and adjusting pieces to fit their previous model (Association for Supervision and Curriculum Development, 1992; Biehler and Snowman, 1991; Freedman, 1998; Good & Brophy, 1995). Students needed a more concrete way to connect two things that they perceived as remote and disconnected to them (local history and the chronology of another person's life) to their own experiences.

Thus it was that in the fall of 1997 -- as the Schaumburg unit was scheduled for revision and the biographies of living people were flying off the shelves of our Library Media Center -- this author conceived the idea of having students learn about the community's history by interviewing real people. Forming friendships with local senior citizens could be a wonderful way to connect students with local events and lifestyles from the time of the town's birth almost fifty years ago. By recording and organizing the personal anecdotes of the seniors, associating those with milestones in history, and complementing all this resulting text with the seniors' personal photo collections via a multimedia authoring program, students could create an authentic and treasured product for a very real and specific audience. Thus, designing a "new" approach to "old" units provided an opportunity to put current educational theory into practice.

The goal of this M.A. project then developed into three inextricably related facets. First, through the use of technology and a classic curriculum development model, update and blend two existing units in the district's scope and sequence (biography and local history) into an engaged learning project in which students authored multimedia biographies of local senior citizens. Second, infuse current methods of authentic assessment, providing ongoing feedback to students and coteachers, not only to assess skills and spur efforts towards improvement, but also to document serendipitous learning, which may occur in other areas of intelligence. Third, use this co-teaching opportunity to model best practices and supported learning theories.

These goals were accomplished through:

1) student use of multimedia authoring tools to document intergenerational exchanges (meaning that students used HyperStudio to record the new information that they learned over the course of many letters and conversations)
2) teacher application of the engaged learning model (meaning that teachers explored a new way of teaching, by trying out a current instructional model which employs the basic tenets of constructivism), and
3) coordinator planning using a validated model of curriculum design, (meaning that the project coordinator relied on a familiar format of unit development, which employs four basic steps – analysis, design, implementation and evaluation).

CHAPTER IV: PROJECT REVIEW

A Model for Curriculum Development: A-D-I-E

A number of curriculum design models have been developed over the years, and it is not surprising that the good ones are rather similar. This author has consistently found the model designed by Wiles and Bondi (1989) to be a reliable starting point for designing units and lessons, and used this paradigm to form the theoretical basis for the design of the project. The Wiles and Bondi model uses the mnemonic A-D-I-E to represent the four phases of curriculum development, which are *Analysis*, *Design*, *Implementation*, and *Evaluation*. The basic four phases of the Wiles and Bondi model provide an excellent framework for organizing some of the special preparations necessary for planning, implementing, and evaluating effective multimedia projects for students. Table 8 outlines these four phases, calling upon several of the multimedia planning stages suggested by Ivers and Barron (1998).

As Table 8 indicates, this author's subsequent experience with constructivist and engaged learning theory has led to one small but significant alteration in the original interpretation of the Wiles and Bondi paradigm – the belief that evaluation *of students* must be ongoing throughout the project, rather than relegated to the end. This author would also argue that teachers accustomed to providing ongoing and regular evaluation of student learning often already have a number of alternative assessment tools to draw from in their classrooms already (learning logs, daily or weekly student conferencing,

Table 8 *Analysis, Design, Implementation & Evaluation of Multimedia Projects*

Phase	**Teacher/Facilitator Activities**
Analysis	Define student population to be involved
	Brainstorm content for project
	Review state/district learning standards, curriculum guides, models
	Maximize integration of other curricular areas
	Conduct pre-research with other facilitators and coordinators
	Consider support methods for special needs or identified students
Design	Co-plan with other teachers
	Outline content, using learning standards and curriculum guides
	Design sample project, and information sheets outlining goals
	Draft rough calendar and outline responsibilities of all parties
	Collect titles for library visit, visuals for bulletin boards, realia
	Garner support from other school and district personnel
	Coordinate details with outside community, if relevant
	Create storyboards or templates for student use
	Plan for project documentation and record-keeping systems
	Introduce "problem" to students, discuss possible "solution"
Implementation	Introduce topic and facilitate class discussion of research methods
	Facilitate discussions of how students will show what they learn
	Present possible samples of finished products
	Accept student input for rubric items, based on sample products
	Determine 'basics" with class – groupings, timeline, templates, etc.
	Provide groups initial planning time with clear expectations
	Begin scaffolded instruction of planning, drafting, revising
	Begin scaffolded instruction of program navigation, creation
	Offer mini-lessons and employ peer coaches for technical needs
	Continue scaffolded instruction, creation, review rubric items
	Facilitate peer evaluations, offer suggestions for improvements
	Conference regularly with students on small group progress, program content, writing mechanics, appropriateness of graphics
	Scaffold instruction for debugging program
	Plan and rehearse presentations, using student-made rubrics
Evaluation	Evaluate peer work again
	Conduct self-evaluations, review student learning logs and journals
	Allow time for revisions before presentation to authentic audience

regular peer evaluation sessions). Thus, evaluation can occur seamlessly from one project to the next for each student. Also, if one interprets the final phase as the evaluation of *the unit*, the model is basically still intact, as a careful review of the unit's merit cannot take place afterwards.

The Illinois State Learning Standards and classroom teachers' judgment of salient goals from the "old" units formed the basis for the first phase of this project, *Analysis*. The 26 indicators of engaged learning identified by Jones, Valdez, Nowakowski & Rasmussen (1995) served as a reliable tool for teacher/facilitators during the *Design* phase, as well as a valuable resource for ongoing (student) *Evaluation*. Throughout the *Implementation* phase, many new strategies were employed by teacher/facilitators, both alone and in teamed situations. Many of these strategies related to changing roles – from expert to co-learner, from dispenser of information to framer of questions, from instructor to coordinator of details. Many others related to changing practices for classroom teachers – providing ongoing and authentic assessment, allowing students time to work with parent volunteers in mini-sessions throughout the day, attempting to conference with small groups regularly to gain insight on group dynamics. Some of these changing roles and practices resulted in changed attitudes and perceptions, and some proved to be too far outside of the teachers' comfort levels to maintain. This must be viewed as an expected part of the change facilitation process, and is reflected upon in greater depth in the *Evaluation* section.

The Analysis Phase

In an attempt to familiarize the reader with the student population that the Benchmark-Blackwell project served, a brief explanation of the community and school is in order.

The Village of Schaumburg, Illinois, is located 26 miles northwest of Chicago, and in its brief history of forty-five years, has experienced astonishing growth in everything from population to business to housing to labor force. "The term 'Edge City' refers to booming, information-age suburbs on the outskirts of major metropolitan cities (such as Chicago) that have emerged in the last twenty to thirty years. Edge Cities have many of the same characteristics of metropolitan cities: jobs, cultural attractions, educational institutions – but offer residents the advantages of living in more of a community-type setting" (Community Profile Network, Inc., 1996). To most Midwesterners in the surrounding states, Schaumburg equates with shopping, as it is home to the 2.5 million square foot Woodfield Mall. Not surprisingly, "…the Village of Schaumburg is the largest center of economic development in the State of Illinois, outside the City of Chicago, with more retail sales here than anywhere else except the City, as much office space as downtown Milwaukee and ten million square feet of industrial development" (Larson, as cited in Community Profile Network, Inc., 1996).

The public school district that serves such a community must embrace growth and change. Schaumburg School District 54 – which serves students who live in Schaumburg, Hoffman Estates, Elk Grove Village, Roselle, Hanover Park, Streamwood, and Rolling Meadows – consists of 22 elementary schools and five junior high schools. Its enrollment of over 16,000 students makes it the largest elementary school district in Illinois. District 54's population is spread across nearly 31 square miles, and is increasingly diverse, where 61 languages are spoken (Community Consolidated School District 54, 1998).

> In 1996, the [District 54] Board passed a $7.5 million plan for technology purchases through 1999. But according to recent figures, the district spent closer to $10 million over the last three years. In September 1997, the district had about 700 Macintosh computers for 28 buildings... At the end of its three-year plan, it has added 3,500 Windows-based computers and connected them to a district-wide network. Every classroom has access to at least one Internet-ready computer, and laptop computers can be brought in to each room if necessary. All staff members have e-mail and many take advantage of the 115 different computer courses for teachers (Mortell & Cookis, 1998).

Approximately two years before the Benchmark-Blackwell project's inception, District 54's Department of Curriculum and Instruction underwent an administrative restructuring, wherein several curriculum department administrators returned to the classrooms as teachers, and the schools were each assigned three facilitator/coordinators – an Instructional Coordinator, a Learning Technologies Facilitator, and a Gifted Education Resource Teacher. Each school's team of three people (all certified teachers or administrators with teaching experience) worked flexible schedules with teachers at three to four schools. Often they acted as facilitator, co-teacher, co-learner, consultant, or a combination of these roles. By making these people available and accessible in the buildings where the teachers were, the district addressed some of the major complaints shared by teachers across the country, those being a lack of time and specialized expertise to accomplish the type of teaching that they'd like to be doing. Always, however, the goal has been to facilitate growth toward best practices, authentic and engaged learning, collaborative and student-based learning, and constant restructuring and rethinking of teaching methods.

Two years before the above restructuring took place, a small adjustment was also made in the job description for all Library Media Teachers in the district. This restructuring found its origin in the previous decades' controversies over the elementary school teachers' lack of planning time commensurate to middle or high school colleagues. As partial answer to pressure from the teachers' union, District 54 inserted a clause in the contract which required Library Media Teachers to provide classroom teachers in grades 1-8 with 45 minutes of planning time every two weeks. This served, to varying degrees within the district,

- to increase the role of the Library Media Center as a literacy hub,
- to foster the collaboration between the classroom teacher and yet another of the growing number of consultant/facilitator/co-teachers available in the schools,
- to encourage a student-centered, project-based learning environment, which often requires larger commitments of time and energy than the average teacher is able to successfully devote,
- to increase students' exposure to the influx of technology all school sites received as a result of renovation and a comprehensive district-level technology use plan,
- and obviously, to provide the desired planning time.

In some schools, one or more of these goals occurred. In several schools, most of these occurred. Possible obstacles to the accomplishment of the first four might have been related to the fact that Library Media Teachers, traditionally among the most experienced teachers in the district, were perhaps more resistant to change. Many had their hands full with the new requirement of providing contractually allotted time to classroom teachers on a regular basis. However, the Library Media Teacher's greatest obstacle was usually that a fair portion of the teaching staff resisted collaboration, for a number of reasons: lack of time during the school day to plan for (or with) someone else, a full schedule of staff development and grade level and curriculum meetings, and a general frustration with the term "co-teaching" – a term perceived by many as a situation in which a consultant co-plans and co-presents, but leaves the classroom teacher alone to assess or evaluate students. Another unspoken obstacle to the complete achievement of these concepts was resistance to change, and it is arguably the toughest to conquer.

Many Library Media Teachers thrust into this new role compensated for these obstacles by attending grade-level planning meetings and curriculum meetings alongside classroom teachers, or utilizing before-school, after-school, and lunch-hour happenstance meetings as opportunities for conversations with teachers. In this way, Library Media Teachers caught glimpses of possibilities for collaborative projects, which they then partially developed and presented back to the classroom teachers. Often, such tactics were met with enthusiasm. Yet, the above scenario was not standard at all school sites, and the outcome was not either.

Nonetheless, it was in this set of circumstances that the author of this project, a new employee to the district, and the third Library Media Teacher at the school in as many years, discovered the opportunity for a project that serendipitously accomplished all of the above-mentioned possible outcomes, and a few additional affective and academic learning objectives as well.

The school at which this project took shape was in many ways typical of the district. Table 9, adapted from the 1998 Elizabeth Blackwell School Report Card (Keeley, 1998) summarizes the details about the students involved.

Table 9 *Blackwell Student Statistics for the 1997-1998 School Year*

	School	District
White	73.9	72.6
Black	9.2	7.0
Hispanic	3.7	7.1
Asian/Pacific Islander	13.1	13.1
Native American	0.2	0.1
Low-Income	3.2	4.0
Limited English Proficient	0.0	4.2
Attendance	95.7	95.8
Mobility	15.1	10.5
Chronic Truancy	0.0	0.0

At the time of this project, this school had twenty-two classes, and the children involved in this particular project had been placed into three of those: a single multiage classroom – a 3rd-4th combination – and two traditional third grade classrooms. All of these class sizes were slightly higher than the district average of 23.2 students (Elizabeth Blackwell School Report Card, 1998), and higher than the national norm of 23.5 students (U.S. Department of Education, 1998, p. 124).

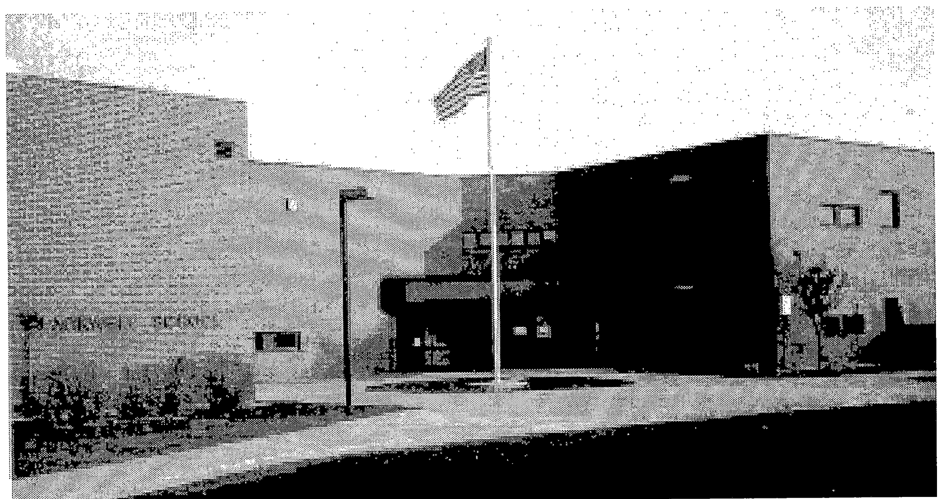


Figure 2: Elizabeth Blackwell Elementary School

Blackwell students reaped the benefits of a wonderfully engaged parent volunteer force. The economics of the 1990s in America have resulted in more families with dual incomes, and that has clearly impacted school volunteerism; mothers and fathers who work full-time simply have less time to dedicate to their children's classrooms. Parents participated in this project on a number of occasions, with varying degrees of time, effort, and training required. Parent involvement opportunities were both traditional (field trip chaperones and classroom craft leaders) and non-traditional (becoming software experts, working with small groups on authoring presentations, performing complicated software-to-video transfers, and proactively involving themselves in decision-making levels of the project on a long-term basis. In each of these phases and levels, parent enthusiasm was high, and parent interest was on the students' growth.

The district's technology use plan (Information and Communication Technologies Plan, 1995) was in its second year of implementation, an aggressive plan embraced by a community familiar with the changes that technology has wrought on commerce and the vision of the future workplace. In the year that this author began her employment with this district, the third phase of school sites were wired for connectivity. These sites were relegated to this third phase based on scheduled building renovations; why wire a building that will undergo massive structural changes for modernization and safety?

The "backlog" effect of necessary changes at this school was a phenomenal progression, a virtual "fast forward" of the computer age in schools within a one-year span. This author's first week on the job in September of 1997 exists as a memory of unpacking twenty-five hopelessly tangled Apple IIe's to reassemble the so-called "computer lab." This lab was available for sign-out and was used, for the most part, to deliver the keyboarding and drill-and-practice software of fifteen years ago. Most teachers had much more powerful machines in their rooms, although the "one-computer-classroom" was perceived by many of them as a dilemma, concerning issues of equitable access and available class time. By November 1997, the initial wave of computers arrived at Blackwell, filling out the final classrooms with new IBMs and Compaqs (see Appendix B). A few teachers embraced the connectivity to the Internet and the district LAN (local area network, see Terminology and Appendix B), and a large number toyed with word processing or even e-mail on their own. Many more teachers remained technologically hesitant, cautiously regarding the machine that had arrived in their classroom, and avoiding the wide array of district-sponsored technology inservice courses offered for either salary credit or software incentive. The Learning Technology

Facilitator serving the building at the time found other teachers at other sites to be more demanding of his expertise in incorporating technology into learning; therefore, he invested his time in those who sought his help with projects at other schools, and continued to be puzzled with the reticence at this school.

The very spaciously designed "computer pod" in the Library Media Center boasted only a single IBM computer, which was renamed a "professional workstation," a "student publishing center," a "student research area," and a "multimedia center" as situations arose. The district's stance was (and continues to be, today) that research indicates that computer labs are not the most effective use of technology dollars. This is based on research findings that labs tend to be used for keyboarding, gaming unrelated to curriculum, and lockstep technology instruction (McKenzie, 1991). This district instead favors the innovative, student-centered, project-based authentic and engaged learning which research indicates our students must be a part of to succeed in the work world of tomorrow. It was, however, ironic that the "computer pod" was a stark room full of counter-space, with computer-cord drop-holes drilled at precise intervals to maximize the use of fifteen Internet drop connections, but there were no computers – desktop or laptop – to house there, and no "stamp of approval" from the district.

With imagination and dedication, this shell of a room became a project center after all. The computers purchased in the previous two waves arrived with carts. (Another example of the district's well-organized plan is the fact that district-paid technical support staff unpacked computers at the school sites, installed standard district issue software on them, performed troubleshooting immediately, set them up on carts, and made certain that all "orange plugs" – Internet drop sites – were functional in each room.)

The Design Phase

As the Schaumburg unit was scheduled for revision and the biographies of living people were flying off the shelves of our Library Media Center, this author saw the opportunity to develop a new unit, one in which the students could learn about the community's history by interviewing real people, and author multimedia biographies for the senior citizens.

The third grade teachers were interested in the idea, but concerned about the amount of time they would need to spend on "background details" such as finding senior citizens and learning the new computer program. Planning meetings were scheduled and collection of resources began in earnest.

One idea was to contact some of the local nursing homes, but at least one of the classroom teachers expressed concern about that setting's high ratio of seniors with Alzheimer's or progressive dementia. It was suggested that perhaps a senior community center or even a senior day care center might be a better option. As so often occurs in teaching, the best resource was presented itself at an incredibly opportune time. By happenstance it was discovered that the school principal's mother was a resident of a brand new senior rental community only ten minutes from the school. The student-senior partnership project was presented to him. He expressed an interest, pointed out a number of possible additional benefits to the students and seniors, raised several valid questions and concerns, and encouraged further investigation of the idea. As the meeting came to an end, he said (of his mother), "It's fascinating that she, like so many of her contemporaries, can't remember what she had for breakfast, but she can give richly detailed accounts of events from her childhood." He said he'd see if he could find a name and number for a contact at *The Benchmark*, where his mother lived. Within minutes, the principal had placed a call to his mother's facility, and this author was outlining the idea to the Executive Director of *The Benchmark*, who was enthusiastically receptive. A meeting was scheduled at *The Benchmark* for the following week to discuss details of the proposed project.

Drawing on the expertise of the specialists in the district, this author arranged a meeting between the Instructional Coordinator, Learning Technologies Facilitator, and herself (Library Media Teacher) to develop the project concepts further. At this meeting, those in attendance drafted a project rationale, long term learning goals, project objectives, a plan for student assessment, a list of questions and considerations to raise to classroom teachers, and a tentative project calendar. In addition, well-developed plans for engaged learning, constructivist learning, and best practices call for a variety of indicators of student success; these indicators were referred to often in the course of the project pre-planning meeting.

The project rationale was posed as a question ("Why would we teach such a unit?") and the answer was determined to be as follows:

- To form a relationship among three generations and draw experiences from the relationship

- To emphasize that history is important; as we learn about the past, so can we learn about the future

- To teach, authentically, the sequencing of real and actual events in personal and general history

- To generate the idea that a timeline is an effective visual tool to use to gain perspective

- To enable students to realize that significant events in a person's life can be linked to historical eras, and be used as "guideposts" or references

- To allow students an authentic and practical experience at the interview process

- To summarize personal narrative information and present it in a technologically diverse format

- To connect this learning experience to the students' personal lives, relating some experience with someone in their own lives such as a relative or neighbor.

The long term learning goals drafted in this initial pre-planning meeting were a source of some discussion. It was important to some that the goals were actual *learning* goals, representative of the *Illinois State Learning Standards* (Illinois State Board of Education, 1997). Others argued that some goals could also be entirely based in the affective domain, and that those goals would be equally worthy. As a result, the first two goals and the eighth goal written were not framed in academic goals.

1. Students will take an interest in the biographical history of the senior citizens in the Schaumburg community.

2. Students will develop an understanding and appreciation for a senior citizen in *The Benchmark* community.

3. Students will make use of a variety of investigative and research methods, including correspondence and interviewing, to collect information about the senior citizen's life. Students and teacher/facilitators will explore together a variety of other historical sources, including Schaumburg Township Historical Society, Schaumburg Public Library, old newspaper accounts, local history books, and the Internet. As *The Benchmark* staff and friends and family of the senior citizens may contribute photos, memorabilia, and anecdotes to be included, students will discover that they have a wide base of support in this project.

4. Students will learn interviewing skills and apply them in a real life situation, acquiring knowledge in this way. Students will use the interviewing skills to develop a summary of events in the senior citizen's life. Students will make inferences about the similarity and differences of parallel events in their own lives.

5. Students will add to their knowledge base of (and broader tolerance of) cultural, religious, and historical beliefs different from their own. Students will develop a sense of history as something that exists in every person's life and community, something we create. An expanded sense of community and history will be a natural byproduct.

6. Students will learn how to organize scattered and unrelated facts in a semi-organized and/or chronological manner

7. Students will understand that a biography is a history of a person's life. Students will write the biography for an authentic and broad audience (their classmates, the school population, *The Benchmark* population, and the families of *The Benchmark* residents involved).

8. A percentage of students will experience serendipitous learning about a related topic. (*I.e.,* 60-80% of students will discover or experience something unforeseen as a result of the project.) For example, a percentage of students will express an interest in the biographies of their own grandparents, and may be inspired to research these as an extension of the original project.

The Benchmark-Blackwell project objectives, from a constructivist teacher-facilitator point of view, needed to:

- result in a number of learning indicators being present

- address a number of intelligences
- have varied effects (outcomes leading to different studies for different learners), and
- be integrated and have good continuity, with breadth and depth of exploration.

The engaged learning model (Jones, Valdez, Nowakowski, & Rasmussen, 1995) offers a collection of learning indicators. The italicized phrases are these learning indicators, and the blocks of text below each explain how the indicator applies. The Benchmark-Blackwell project:

Encourages students to be responsible for their own learning

Throughout the project, students will be faced with a number of choices and options. Constant feedback from the facilitator and the senior citizens will assist them in making responsible choices, but ultimately, the The students themselves will determine amount of learning.

Encourages students to use effective learning and problem-solving strategies

In the course of the project, each group will have to determine what to do about having too much information, having too little information, how to organize the facts they have, and what additional resources to use when the obvious ones have been exhausted.

Draws on the students' intrinsic motivation

Using real live people as sources instead of books about dead people will be motivational, as will using technology rather than paper and pencil. Another inherently motivating factor is the regular exchange of mail; both parties love to receive letters, but the universal understanding is that one must send a letter to receive one in return. The proposed interview day should provide similar motivation at that point in the project, as will the fact that students will ultimately be presenting these biographies back to the seniors, an authentic and expert audience on the subject.

Requires student interaction with each other and adults to develop knowledge

Students will be cooperatively grouped; interaction with group members will be an integral part of the project. However, it is hoped that teachers and facilitators will allow and encourage groups to help each other at all stages, but particularly at the multimedia authoring stage. Interaction with will be similarly an integral part of this project, as students correspond with and interview senior citizen partners. Throughout the process students will interact with facilitators and teachers, inquiring, explaining, justifying, consulting, self-assessing, and sharing ideas and techniques.

Connects learning tasks to the real world, making them interesting and relevant

Students will interview real people in the community to learn about biography, learn about the history of their own town, and work in project teams that mirror the workplace of their future. They will present final projects to a real audience composed of the seniors and their families and a number of other people. Media coverage of this experience is planned; while the school and students have different agendas for this public relations move, it will nonetheless be appealing to students to be able to view media coverage of their project in their own homes with family.

Ensures that tasks are complex enough to require the students' effort and time

Organizing scattered and unrelated facts in a semi-organized and chronological manner are expected to be quite challenging, and yet will be a skill that will undoubtedly prove useful in later years. Similarly, the complex thought processes that occur as students author a *HyperStudio* stack – composing screens, testing appearances, adjusting content to fit graphics (or the reverse) – will form a valuable basis for future project organization, using this or other authoring tools which develop in the course of their school years.

Ensures that the tasks are multidisciplinary

Using the *1997 Illinois State Learning Standards* as a framework, early elementary state goals will be addressed in the disciplines of Language Arts, Mathematics, Social Studies, and Physical Education. Similarly, the *District 54 Scope and Sequence* learning objectives that relate to this project fall into the relevant grade levels' curricular areas of Language Arts, Mathematics, and Social Studies. (Appendices)

Allows students to develop presentations to demonstrate what they know

Students will design and create *HyperStudio* projects that reflect their ability to effectively present facts and events relevant to one person's biography, sharing elements of local history in the process.

Allows students to create assessment criteria and tools

Students will be introduced to the concept of student-designed rubrics at a number of junctures. Individual and group self-evaluations will be performed via checklists, student journals, and periodic project "gallery walks" wherein students will be able to view other groups' projects at varying stages of completion in order to objectively assess their own progress.

Requires that the teacher integrates instruction and assessment

A variety of alternative and authentic assessment methods will be presented to classroom teachers. One efficient example might be using peer editing (text box entries from the *HyperStudio* projects) in place of the current factory-produced teacher tool for Daily Oral Language; teachers could instead display actual screens from the projects using the LCD projector for the class to practice correcting spelling and grammar errors. Reading for comprehension could be frequently assessed using each group's letter files and question organizers or storyboards. A progression of students' writing skills (both mechanics and style) could be maintained quite simply by photocopying letters written to the senior citizens and inserting them into each group member's portfolio. Cooperative group dynamics will be periodically checked using quick-writes or student journals. Anecdotal notes of student progress can easily be maintained using sticky notes for insertion into portfolios later.

Ensures that assessment is appropriate for all learners

Student-made rubrics will be created in Library Media Center time, and distributed to classroom teachers and special support staff, such as the Reading Improvement Program instructional assistant, Special Services Resource Teacher, Social Worker, Gifted Education Resource Teacher. They can support their students in achieving these goals, and to work with classroom teachers to ensure that their students would be able to succeed in these areas, as well as in ongoing classroom assessments.

Involves students in decision-making regarding their learning

In one sense, students will choose to create multimedia biographies rather than to study local history and biography in the traditional manner. Students will later make a number of other decisions, such as which senior to interview, which peers to collaborate with, etc., though each classroom teacher will allow different levels of choice on different issues. In constructing the final product, students will collaborate on choices of screen design (within parameters), content of letters, content of interviews, etc. In helping to design the rubrics, students will help determine which elements are most important to them for assessment.

Encourages students to construct knowledge in deep, meaningful ways

Creating a biography for someone else, particularly a senior citizen, will provide students with an altruistic purpose as well as the self-serving purpose of learning something in school. Hopefully, students will be able to see that, in participating, they affect more than one single senior citizen; perhaps the seniors' families will appreciate the piece of family history that will be recorded. Perhaps some of these students will gain a deeper understanding of aging, of their own grandparents, of their own mortality.

Promotes the learning community, building collaborations in untapped areas

The partnership between *The Benchmark* and Blackwell School will be unlike any that has been formed in this district. By reaching out into the local community, we can help students form valued relationships with people that have much to offer in the way of time, companionship, and life experience. It is hoped that seniors will find some joy and meaning in their relationships with the children at Blackwell School, so that there is mutual benefit in the partnership.

Encourages students to build knowledge based on diverse perspectives

Today's lifestyle provides students today with less exposure to the elderly, a diverse population with the benefit of a lifetime of experience and exposure to a wide variety of prejudices and discriminations. Frank, honest discussion of such realities will hopefully broaden the students' perspectives and enable them to be more tolerant of diversity in their world.

Enables students to value diversity and multiple perspectives

Students will understand that it is the composite of many people's lives which formed the community and affected history. By talking to some of the people who settled in the local community, students will come to understand how diversity can enrich life for all members.

Involves groups that reflect the diversity within the class

Seniors will be selected on criteria that involve their willingness and ability to participate. The group of seniors that work with the students will have no parameters based on religion, race, or gender, and should be fairly representative of the diversity within the class. There will likely a lower ration of males among the senior population, however.

Involves groups that are equitable, allowing all students to learn

Classroom teachers will have the freedom to arrange student groups, but will be encouraged to ensure that groupings are heterogeneous by ability and opportunity. School support staff will assist all identified students within the group setting to ensure that all students experience success.

Allows flexible grouping, with groups forming and reforming to accomplish goals

While students will spend the majority of their project time working in small groups, lessons will incorporate a variety of groupings, ranging from whole-class to individual, as adults work with students on group goals or provide mini-lessons on specific skills.

Enables teacher to assume the role of facilitator

Teachers will have many opportunities to help students make decisions about what content to include, what screen design elements to incorporate, what questions to ask, etc. Because the content of the resulting product is not predetermined,

Enables teacher to assume role of guide, helping students construct meaning

Teachers will have many opportunities to work alongside students -- questioning, prompting, guiding, teaching, learning, and discovering. Through this process, students will build on previous knowledge and construct their own meanings for the new information.

Enables teacher to assume role of co-learner

Classroom teachers will be co-learners of the biography content, multimedia software , and process of multimedia. Additionally, the use of student-made rubrics, regular small group conferencing, and authentic performance-based assessments will be incorporated throughout; classroom teachers are familiar with these already, but will have an opportunity to use them more freely.

Allows student to participate as an explorer, discovering concepts through research and interactions with the world.

Students will in fact explore history through primary sources, people who were alive for the past sixty years. For many of them, this will be a first experience with any authentic primary source; research methods for this type of source are quite different from textbooks and reference books.

Enables students to observe and apply practitioner thinking skills, becoming cognitive apprentices

The processes of questioning, interpreting, summarizing, retelling, and presenting will provide students with more authentic experience with research than more didactic methods.

Allows students to be teachers of others

It is expected that students will teach their peers and classroom teachers navigation and programming tricks they discover in the multimedia software. In presenting each senior's biography, students will teach their peers about daily life many years ago. After the project's`conclusion, students will be available as mentors for classes that wish to use construct multimedia projects in future years.

Allows students to create a useful product for themselves and others

In creating a single multimedia biography, each group will have fashioned an impressive presentation of one person's life, an enduring record for the senior's family, and a valuable teaching tool about local history and biography.

From involvement in this Benchmark-Blackwell project, it was hoped that some students might be self-motivated to :

- participate in some form of reflective experience, hoping for or predicting their parents or their own elderly care situation, and will come to understand that realities of finance and time factor into decisions that are different from our original first choices.
- develop an active sympathy toward a senior in regards to a variety of gradual or sudden handicaps that he/she may incur.
- employ the tools previously learned to research their own personal histories, organize and present in a family tree of their own.

At this time, this author also met with the school Learning Technologies Facilitator to plan for the unit. As explained earlier, one part of the Learning Technologies Facilitator's role in the schools is to act as an internal consultant for the district, a project co-coordinator and/or consultant for curriculum-driven projects that incorporate technology (Information & Communication Technologies Planning Task Force, 1995). The Learning Technologies Facilitator and the classroom teachers involved in any project work together to determine the level of involvement required from the Learning Technologies Facilitator; some teachers require more assistance, more support, more follow-up than other teachers. The Learning Technologies Facilitator's challenge is to determine what services are truly needed, and deliver "just enough, just in time" to the teacher and students (McKenzie, 1998), always with the goal of maximizing student learning. As this author was comfortable with the overall plan of the project, and how the technology could help the students accomplish the goals better, the Learning Technologies Facilitator was most involved in the Design and Implementation portions of the project.

For example, this author first introduced the idea of students writing biographies of local senior citizens to the Learning Technologies Facilitator, explaining that this project would combine elements of the current units of biography and local history. The school district installs three multimedia presentation programs on all district computers, and this author had minimal experience with all of them. Therefore, the Learning Technologies Facilitator was asked which of the programs he would recommend using, given a number of factors to consider. These factors included, among other things, the age of the students involved in the project, the ultimate purpose of the individual presentations, computer time available, and the nature of media that might be used in the projects. The Learning Technologies Facilitator suggested that many teachers find

KidPix to be appropriate for grades K-2, *HyperStudio* for grade 3 and up, and *PowerPoint* for grades 6 and up, but that these were rough guidelines. Because sound (seniors' voices on tape) and pictures (current and childhood photos, as well as clip art) were likely to be included in many students' projects, *HyperStudio* was thought to be the program of choice for the project. When the possibility of short video segments was discussed, *HyperStudio* became the only alternative, as it was the only one of the three that supported the incorporation of all of these media at the time.

In addition to making the original suggestion to use *HyperStudio* as the multimedia program because of its flexibility and appropriateness to use by students of this age, the Learning Technologies Facilitator immediately became a co-coordinator of the project and maintained a level of involvement over six months. Essentially, he designed a simple *HyperStudio* template for the students to use in building their biographies (Appendix C), led the hands-on instruction in *HyperStudio* when students began to input information, and coordinated the details of making *HyperStudio* and the school LAN semi-compatible. A rough calendar for the project was drafted between the Learning Technologies Facilitator and this author, based on his available dates to facilitate and co-teach (Appendix E).

With these logistics of the technology integration in the works, the next step was to work out the plans with the staff of *The Benchmark*.

Initial Meeting at The Benchmark

At nine stories, *The Benchmark* is an imposing, modern, brick building. It is easily one of the tallest buildings for miles around, being bordered by a large pond and park leading to a golf course, a very large parking lot, and a forest preserve across the road. Standing outside the main entrance, one can see that the large windows above

Figure 3: The Benchmark

boast draperies, plants, reflective stained glass decorations, and a number of other personalized touches. The main entrance itself is similar to that of a large hotel, with the long awning-covered sidewalk leading directly to large glass doors. Beneath the awning, a number of oak benches line the full 25' to the doors. A motion detector controls these sliding glass doors, which open to a large foyer containing a rather large reception area on the right, complete with video monitors of the premises. The left side of the foyer is home to a large waiting area similar to a posh hotel lobby; comfortable couches and chairs surround a glass table, and oriental carpeting and ferns add a glamorous touch to the marble floor and floor-to-ceiling windows.

On the center of the back wall of this foyer is a glass door controlled by the receptionist. Through this door, one can see the inner lobby of the first floor, and it is not the typical view of a senior care center. Glass and brass accent contemporary décor, with carpeting and textured walls in hunter green and mauve. Comfortable seating areas are everywhere, and a huge ballroom-style chandelier at the far end of the inner lobby is just beyond the curved balcony railings where one has a view of the even larger lobby on the floor below.

This author is normally not impressed with interior design, and yet these decorating elements were startlingly unexpected and uncommon in buildings of this purpose. Most people move quickly from this stage of awe into a phase of speculation about the cost of residing there. Eventually, nearly everyone is struck by the fact that the décor has monopolized their attention, and that the residents of this building are seated all around them, often watching this awestruck reaction with amusement. This "home" to senior citizens fits none of our past experiences. There are no vacant-eyed people staring at the ceiling, no seniors in wheelchairs randomly parked in corners. There are no lost souls mumbling and shuffling about the lobby, and there are no sounds of yelling or crying down a distant hallway. There are no stale odors, no chemical cleaning agents assaulting the nose. There are no people in hospital attire of any sort. Polished casual work attire is the norm for the staff, who looks as if they themselves just stepped out of a hotel lobby.

There are a few indications that this is a home to seniors. The residents all look like grandparents, and they move slower than the staff. Their conversations with each other and with the staff members are noticeably louder than normal, and punctuated with "What?" or endearing laughter. There is a rhythm to senior citizens' conversation, and it can be felt here.

The receptionist nodded toward the door, where a young woman dressed in a suit appeared. Nancy McCaffrey, the Director of *The Benchmark,* welcomed this author and led the way to a meeting room, equally impressive with a massive conference table and elegant surroundings. Most surprising, however, was the number of people in attendance; two social workers, an activity director, and a member of the marketing department were waiting there. This author was relieved to have prepared adequately.

The concept was outlined, questions were exchanged, and approval was voiced around the table. Numerous comments were made to the effect that school is certainly different than it was years ago, that technology as advanced as that which had been described was not available in this staff's life, and wasn't it wonderful that children today have the opportunities they do. This author saw this as a springboard to a discussion about the potential inclusion of media coverage, something that would be beneficial for both institutions. The director indicated that the marketing department would be happy to assist in any way possible.

It was clear that this staff knew their population's limitations; they raised a number of issues that revealed their compassion for the residents. One such very direct question posed: "And what will happen at the end of the school year? Is this project just immediately over then?" The response was that after a strong five months of correspondence, it was hoped that a good number of the students (and their parents) would continue to foster the relationship, and that the school representatives would promote this idea among the parents. It was important to be realistic at this point, and not make promises that could not be fulfilled. It was clear that the staff had the seniors' best interests at heart, and intended to protect them if possible from investing in friendships that would be short-lived. This conversation opened the door, though, for a more frank discussion of the concerns of the Blackwell staff.

The Benchmark is home to over 800 seniors, and the students at Blackwell involved in this project only numbered 74. It was clear that *The Benchmark* staff would narrow the candidate field prior to forwarding names; the Blackwell teachers sent their list of suggested criteria. It was agreed that senior candidates for this project:

- Must be volunteers, and thus truly interested in participating
- Must be "pleasant" and "approachable" in demeanor
- Must display good clarity of mind
- Must have reasonable ability to retrieve memories of childhood
- Must be capable of maintaining correspondence
- Would preferably have spent better part of life in northern Illinois
- Would preferably have family in the vicinity to support documentation efforts

The staff noted these items and excitedly began a list of possible candidates to approach. They briefly discussed the best means of promoting the project, and eventually settled on one-on-one conversations with the seniors from an anticipated list of candidates meeting the other requirements. From these conversations, the staff of *The Benchmark* felt that they could best determine which seniors were truly interested in the biography project.

The Benchmark staff was very interested in having the students and seniors meet, and felt strongly that such a meeting should take place at *The Benchmark*, preferably in the seniors' apartments. This author was unprepared for such a suggestion, and immediately concerned about parental permissions, the number of chaperones that would be required, transportation, and management of 74 students spread throughout a nine-story building. The enthusiasm of *The Benchmark* staff was overwhelming, however, so this momentary panic was kept quiet until it could be further investigated and thought through.

At that moment, *The Benchmark* staff pointed out that, in one of the larger public rooms background noise and other concurrent interviews could pose a problem for some seniors with hearing difficulties. They also suggested that seniors would be most comfortable surrounded by their own things; this not only made sense, but it gave rise to another argument in favor of the apartments. If the seniors were surrounded by their belongings, might the students then learn much more about the very essence of the person, be permitted to look at photographs, and even use the presence of memorabilia to spark conversation?

Despite the seemingly insurmountable logic, and despite the professional ethical cautions known to educators today, this author became committed to the notion of having students interview the seniors in their own apartments. The question changed from, "Which large room at *The Benchmark* is best suited to hold over a hundred people?" to "How can we safely manage 74 children while they perform interviews in thirty-two apartments?" It was suggested that the three classes might visit on separate days, but this posed a problem with the cost of paying for the bus transportation on three different days. However, this phase of the project was three or more months away, and there would be numerous meetings and opportunities to improve upon the plans along the way.

All parties agreed that the first step would be to find enough interested and capable seniors to correspond. The social worker at *The Benchmark*, Stacy Shores, was designated as the contact person there. This author agreed to the same responsibility on behalf of Blackwell Elementary School. It was decided that the letter exchanging could be best managed by setting dates to ferry the letters back and forth, providing each group two weeks to respond; with this plan, each group would only be responsible for correspondence only once a month.

The activity directors agreed to begin planning for the day of the culminating event, when the students would present their project to the seniors. The grounds behind the building are particularly pretty, with a pond surrounded by a park; while it would provide a perfect setting for a picnic, alternative plans would have to be made in case of rain. Transportation would be an issue again, as well.

So it was that, with a great deal of "good possibilities" and a long list of the way things could progress if there were no obstacles, the meeting was adjourned. Everyone left that meeting with pages of notes, lists of items to look into, a great sense of anticipation, and the excitement. This excitement had many facets, but one that this author had not anticipated was the joy of organizing an event with such an altruistic outcome; prior to this point, the knowledge of "what's good for children" had been the focus of designing the project. The staff at *The Benchmark* had embraced the idea with such enthusiasm that it was clear that this project had the potential for many of the positive outcomes this author had hoped for – seniors feeling that their lives were significant, seniors enjoying the companionship of youth, seniors being emotionally supported by a community of people outside of the walls of *The Benchmark*. Furthermore, it was becoming clear that the students would also benefit affectively from this experience, and a subset of values, as yet undefined, would be transferred.

Following the meeting, this author was introduced to the marketing staff at *The Benchmark*, who offered their assistance on the project, and shown one of the empty apartments. The shock of the size and elegance of the entire facility was no longer an issue, and yet the apartment was a surprise. Perhaps this author no longer expected to see the typical nursing care room scarcely large enough to contain two hospital beds, but the size, cleanliness, and brightness of the three-room apartment was stunning. It was quite possible to imagine two or three children and an adult seated comfortably around the living room with a senior.

Communication with all parties was clearly going to be a key to the success of this project. A memo was drafted to the teachers, informing them of the results of the meeting at *The Benchmark.* (Appendix D) While *The Benchmark* staff compiled as list of senior candidates for the biography project, the lesson plans were made for introducing the idea to the students.

Much has been written about "contrived" student-based projects. This author was relatively certain that, with certain facts presented and certain questions asked, the students would quite possibly arrive at this project as an alternative to writing the biography reports and the local history reports traditionally assigned. There is a certain value in any project that students "think up" themselves, and a "buy in" that cannot be achieved by assignments that are imposed upon them. An experienced teacher knows what interests children, and is not often caught off guard by the turns that class discussions take. It requires little skill to present learning objectives and provide a variety of options for students to choose from; it requires even less skill to predict which alternatives will be the most popular. If the group consensus also happens to be the project that the teacher expected the class to choose, there is nothing unethical about that – unless the teacher provided an unduly unappealing list of other alternatives, or was unprepared to teach the other alternatives if they were indeed chosen by the majority. Neither of these were so, and the project moved from the *Design* stage to the *Implementation* stage.

The Implementation Phase: With Ongoing Student Assessment

As agreed in this first meeting with teachers, a number of books from the town library were checked out to the school – historical accounts of American life sixty to eighty years ago, popular juvenile fiction of the same period, and books about grandparents or children's relationships with the elderly. As a Library Media Teacher, this author had a number of excellent resources available. However, the list provided by a computer search of the local library's juvenile holdings proved to be more extensive. Over one hundred titles from the public library were rotated into the three classrooms. (For a partial listing of these, see Appendix F.) This wide range of literature added to the classroom libraries provided a rich literature base for subjects with which many children were relatively unfamiliar. The teachers were asked to add these books to the shelves without explanation of their purpose; doing so would have compromised the content of the class discussions planned for the project introduction.

Family photographs from the turn of the century were a particularly dramatic addition to the unit preparation. This author was fortunate to have an excellent collection of black-and-white and sepia-tone photographs of ancestors from a wide range of cultures and from a broad range of socioeconomic standings. Because they were not color photographs, the process of photocopying them was faster, less expensive and perfectly efficient. The photocopies were mounted on construction paper in various shades of brown, grey, and black, and then laminated. These visuals were rotated among all three rooms, posted on bulletin boards, and used as stand-alone writing prompts. The photos were a source of great interest to the students, provoking many conversations and inspiring students to thoughtful reflection in their journals.

Library Media Center Lessons

The three classes of students were scheduled to visit the school Library Media Center once every other week, at the beginning of the project. Thus, over a period of two weeks, this author met separately with the three classes to introduce the project. All three teachers had already familiarized their classes with the major elements of the curriculum to be covered during the year, so it came as no surprise to most students that biography and local history were raised for discussion by the Library Media Teacher. Information literacy was a theme that had run through much of the year in the Library Media Center visits – knowing where to look for information, knowing how to get help in the event that the information is not easily accessible, working with too much information, and determining when there is not enough information.

The students were asked, during this introduction to the unit, if they could think of any ways to combine the two units of biography and local history. In all three classes, the first answer offered by the group was that students could write reports on people of historical importance to the community. When asked where they would get their information, silence followed. Some students thought that the local library might have some information. One student was aware that there was a Historical Society, but thought that that society "might have already written all the good biographies already."

Another student agreed, saying that he had thought of the community's web site already, but had discounted it for the same reason.

The Library Media Teacher asked the students if they knew when Schaumburg had officially become a town, village, or township. The students guessed wildly at first, and in all three classes, one or more students recalled that Illinois had not become a state until 1868. Most students concluded from this information that the official recognition of towns and villages must have followed statehood. The students were asked to consider how they might find out more about something that may have occurred in the last eighty to one hundred years. All three groups eventually landed on the idea that they might be able to ask questions of people who had been alive during that time. The students were asked where they might expect to find a large number of people in that age range, and it was not long before someone suggested that a nursing home or senior center might be able to help them find out more.

The Library Media Teacher capitalized on this moment to suggest that the principal's mother resided at one such community nearby. With the promise to look further into the details of that senior community, the discussion was then guided toward the types of questions that students might ask seniors if given the opportunity. The questions were keyed into a word processing program as they were generated, projected on the wall for students to see, and subsequently printed and copied for all students to refer to for a later lesson.

In the course of this discussion, students in two of the classes asked for clarification of the goal; were they to learn all about the senior citizen's life, or were they to learn all they could about local history? This author was impressed with the need for this clarification, and turned the question to the class. The students concluded after some discussion that in learning about the seniors' lives, they would get <u>some</u> information about local history from some of them. The students also correctly anticipated that a fair number of seniors at a local center would have come from other locations, and would therefore not have any contributions to the local history knowledge base.

At this point in the discussion, each of the classroom teachers had returned to retrieve their students, and reassured the group that some of the local history exercises from the traditional Schaumburg unit would be taught anyway. Before each class left, the Library Media Teacher suggested to each class that during their next meeting, they could get some ideas from the multimedia biography created for her grandmother's 85th birthday. The students left the Library Media Center excitedly convinced that they had invented a much more exciting way to study biography and perhaps even local history.

The following week, the students viewed a *HyperStudio* stack created by the Library Media Teacher of her grandmother's biography. This was the first exposure to *HyperStudio* for almost all of these students. They were excited about the use of actual photographs, and about features of *HyperStudio* that allow the user to scroll text. They were especially impressed with the program's "special effects," that allow the author to "dissolve" from one card to another, for example. Interestingly, the students commented on the Library Media Teacher's choice of sepia tones and black-and-white to add to the nostalgic effect.

After viewing the stack once, the Library Media Teacher projected the list of questions generated by the students the week before. The students reviewed these questions, and re-viewed the stack, to find that most of the questions had indeed been answered for this individual. The students were then asked to talk to a partner for a few minutes to brainstorm about ways to categorize the questions, which at that time were projected on the wall in the original order that they had been brainstormed. Students easily discovered that there were "sections" or periods of life, ranging from birth through childhood, adolescence to adulthood, marriage and or career, middle age, and old age. The questions were then sorted into these categories, titled by students (Appendix G).

Next, students were asked to discuss with a partner all the ways that they could find out the answers to their questions. The purpose of this seemingly simple exercise was to get the students to think outside of the traditional school routine. All of the students suggested that letters could be written. Rarely did a student immediately respond with the option of asking the senior citizen *in person*. Not one student suggested that the telephone could be a useful tool. One student did suggest that letters could be written to members of the seniors' families, as well. When it was proposed *to them* that they might ask the seniors in person, students reacted with a somber surprise that the seniors would come to Blackwell. The suggestion that a field trip to the senior center might even be possible was met with the same surprise.

This author was fascinated by the students' reactions; colleagues have referred to the ironic "learned helplessness" that the school walls promote. Perhaps it is the result instead of education's practice of presenting students with prepared and finite sets of information from which to draw conclusions, lessons that merely require students to retrieve and restate facts. Or perhaps it was shyness or a lack of social skills that kept some from pointing out this option. Still, this author was amazed that students did not initially seek out first-hand and immediate information as a reliable and authentic source.

Before leaving, students were encouraged to talk with friends and family, and then think about how to write a first letter to a pen pal, what types of questions to ask, what polite things to say, and how much information to give about oneself. They were told that they would be writing these letters to seniors during the next meeting, and that these letters would be given to a select group of seniors at *The Benchmark.* Classroom teachers agreed to find the "friendly letter" section in the language book and do a mini-lesson before the class returned two weeks later. Teachers also agreed to work with students on forming small groups of two or three students to write to one senior citizen.

At the third meeting in the Library Media Center, students worked as a whole group to guide the Library Media Teacher through the process of writing a mock letter to a senior. The collaborative effort was projected on an ordinary overhead projector in handwritten print, so that the knowledge was more easily transferable to the student's handwritten efforts that followed. In this way, the Library Media Teacher reviewed the format of a friendly letter, and provided students with some ideas of what to say in their letters. Initial suggestions from students indicated that they would have simply translated their list of questions into paragraph form, bordered by a "Dear" and a "Sincerely". With some effort, most became convinced that it was in fact necessary to introduce themselves a bit and that some degree of social "small talk," even if it wasn't "polished" but was "kid talk" made for a smoother sounding letter.

In each class, one or more student expressed uneasiness with writing to a complete stranger, "especially an old person." This proved to be a great "teachable moment" to discern between writing to strangers (as some children admitted to doing in Internet chat rooms) and writing to new people, experts of sorts, with the protection of school staff. The next concern voiced was that the seniors would be "mean" or "cranky," providing another excellent opportunity for open discussion about the elderly, about their impressions of "children today," about the misfortunes of stereotyping by either group. According to Halford (1998), this is a widespread perception among children in our society. Some students suggested that it would be easier to write their letter if they imagined that they were writing to one of their grandparents' friends. A number of students liked this idea. Before ending the discussion, the Library Media Teacher explained the selection process that the staff of *The Benchmark* had used to find the best candidates for our partnership. The criteria suggested by Blackwell's team of teachers were that seniors be most "approachable," have some clarity, and possibly also have some involvement with family or friends living nearby. Students seemed more comfortable after this.

Teachers provided the Library Media Teacher with the groupings of students before the end of this third session. The Library Media Teacher had asked teachers to consider letting students self-group, and then adjust for known behavior problems or ability levels. Each teacher dealt with the task of grouping students in a different manner; one teacher grouped students entirely on her own, same sex and different ability level, allowing known friends to work together if she felt it was normally productive. A second teacher had students turn in names of first and second choices for partners, and then used this student input and her own judgment to fashion groups. A third teacher let students form their own groups, and made only one change based on group size. All of the students involved in this last teacher's change were happy with the resulting groups, however. The advantages and disadvantages of grouping students by a number of different factors is outlined in Table 2, adapted from Ivers and Barron, 1998.

The list of senior citizen names had arrived by fax, and the Library Media Teacher keyed the names into a master list. The list of 32 names was divided in thirds, so two teachers received 11 senior names and one received 10 names. Again, teachers handled distribution of names differently. One teacher went down the list in order and assigned groups in order of the appearance on her class roster. Another teacher allowed student groups to draw names blindly out of a box. The third teacher had student groups choose their senior by last name, not revealing a first name or the senior's gender until all groups had made their selection.

During the fourth meeting with each class, the Library Media Teacher displayed a sample letter to a fictitious senior citizen, handwritten on a sheet of acetate for projection on the overhead. Students worked as a whole class to "correct" her errors in mechanics, edit the content, and add "social talk." In this way, reinforcement of the previous lessons on letter writing was provided, and students had a model from which to work as they began their own first letters.

Students broke up into their groups, found spots under tables and in corners and hallways to begin writing. They dutifully put the date and "Dear" in the proper place and many followed this with the senior's first and last name, just as it had been printed for them on the card. A mini-lesson took place on the socially acceptable practice of referring to one's elders with "Mr." or "Mrs." until given permission to be more familiar. The possibility was raised that some of the women might not be married. The Library Media Teacher promised to check this detail with the staff of *The Benchmark*, and students writing to women decided to use "Mrs." unless asked later to change it, as the probability was high that most were indeed married, though very likely widows.

As students continued with their letters, the school's social worker began to pull one group of students at a time into the hallway to take pictures of each other to send along with their letters. Students were thrilled with being able to do this themselves using the digital camera, a relatively new purchase by the Parent-Teacher Organization at the Library Media Teacher's request. They were also fascinated by the fact that the photographs could be immediately downloaded into a program and printed on the school's many networked color inkjet printers. Students wanted the seniors to be able to put individual pictures of them on refrigerator doors, so group members took solo pictures of each other. During class time later, the students retrieved their pictures from printers around the building, cut them out, and enclosed them with their letters.

While the photos were being taken, other students continued writing. Circulating between groups, the Library Media Teacher found the dialogue amusing, with the usual dominant students making suggestions about how to add the "social talk," and others complaining mildly about how it would be so much easier to just list the questions. Time ran out before the letters were complete, and students were concerned about having time to finish. Classroom teachers promised class time in the next few days, and a number of students opted to take them home to finish.

The Library Media Teacher drafted an introductory letter to the senior citizen residents and their family members, and made copies for each senior, to be delivered along with the student letters. (See Appendix H.)

The letters were ready by the Monday before students left for the Thanksgiving holiday. Two mothers stopped the Library Media Teacher and a classroom teacher in the hallway to volunteer to lead an art activity in which the students would make Thanksgiving cards for their seniors. This was the first indication that the parents might be a valuable asset to the project, and their level of involvement grew to be quite impressive as the project progressed. For the Thanksgiving holiday, each senior received a letter and two or three turkey cards from their penpals. Some chuckled, a few cried, and most kept those funny birds on their refrigerator through June.

The waiting began. Students asked daily if their letters from the seniors had arrived yet, despite the fact that they knew the Library Media Teacher wouldn't pick up their letters from *The Benchmark* staff for another week. To keep the students excited and involved, the Library Media Teacher shared the next step of the project with each class. The *HyperStudio* template designed by the Learning Technologies Facilitator was projected on a wall screen using the Sharp Notevision. The Learning Technologies Facilitator used the headings from the student-generated list of questions for the seniors as major categories of the biography. In the template, he had made each of the headings into a button, leading to a card dedicated to that "section" of life. For example, since there were a number of questions that fell under the category of "childhood," a button on the main menu of the template said "Childhood." Clicking on this button made the program go to another screen on which the details of the senior's childhood could be laid out.

The template was shown to the students via projector so that they could experience the interactivity of the stack, and see how their own categorization of the questions they had generated had resulted in this organization. They were given "hard copies" of the template stack, or copies of each screen printed on paper, and were told that this would be a temporary "organizer," or a "storyboard" for their information. By writing the sentences onto these paper versions of the screens, they would easily be able to see which areas they needed more information, or which screens they would decide to eliminate, or which areas would perhaps require multiple screens. The students were also told at this time that they would be able to rearrange their stack to their liking later. It was explained to them that since *HyperStudio* was a "branching" program, and since their information would very likely come to them from the seniors in a random order, this would be a good tool to start with. Students eagerly began changing the area on paper that they already knew – the senior's name.

The students were hardly able to contain their excitement on the day the letters arrived. They eagerly tore open their envelopes, having scurried under tables and into hallways and corners to read and giggle. Because of the level of anticipation of these students, the classroom teachers and a number of other staff members were on hand, including the school social worker and the principal. This proved to be very beneficial, as we soon discovered that many of the seniors had written in cursive – "old people cursive is even *harder* to read" as one child bemoaned – and the great majority of these students could not yet write or read cursive. With adult help, all the letters were read, and some students were able to then nearly recollect the entire letter and thus re-"read" it. Interestingly, we discovered that the legibility issue was not one-sided. One senior asked her students to please write in pen or pencil from now on, because her eyes were unable to read red crayon very well. This led to yet another "teachable moment" about aging senior eyes, and later provided a good example for the discussion of high contrast text color on screen background.

Much to the children's delight, several seniors had included photos of themselves, some recent and some from years ago. Groups excitedly shared bits and pieces of their senior's letter with each other. Before the session was over, the Library Media Teacher asked for the letters back so that they could be photocopied for the group. Students left with the understanding that they would use class time that week to transfer information into their storyboards. During their next Library Media Center session, they would write their next letters to their seniors.

All 32 of the original letters from students to seniors had been photocopied before being delivered to *The Benchmark*. The original reason for this step was that student writing progress could be tracked better if copies of all letter samples were retained. However, in the two or three weeks that passed between the letters written by students, many student forgot what they had written – especially when seniors did not answer all their questions. Having copies of their previous letters to refer to helped students remember, but also provided classroom teacher and the Library Media Teacher with a valuable tool in helping groups decide what to ask in future letters. Some seniors answered "the easy questions," as one girl referred to it, or the questions that required short answers. Later, it was learned that her senior had been sick in the week during the response-writing time, and had become easily tired. The girls in this group developed a new empathy for their penpal, and tended to write questions requiring shorter answers after that. Working with teachers and parents, they developed a special understanding of "information literacy," because they had to make their questioning very efficient in order to complete their project successfully.

On the other hand, one group received a large manila envelope in response to their short initial letter. In the envelope was a seven page laser-printed letter, complete with scanned photographs. In the hours that it took them to read the letter, they learned that the son of their senior citizen saw this exercise as his opportunity to document his father's very rich and interesting life. The senior had a great number of important jobs, and had retired fifteen years earlier as the president of one of the local colleges. His son realized that time was slipping away, and threw himself into this project, spending hours with his father to listen to his recollections. All of the adults involved in the project were touched by this unexpected outcome. Yet, the boys assigned to write his biography were frustrated. There was simply too much information to wade through, and they felt that they weren't getting to do their job in the same way as all of the other students were. Again, working with teachers and parents, this group developed a unique sense of "information literacy," having to determine which parts of the "too much information" they were going to use in their project.

Project organization moved into another level at this time. Classroom teachers were concerned about senior letters getting lost in messy student desks, and yet everyone wanted students to have "ownership" of their penpal letters. Large manila envelopes for each group listed the senior's name and apartment number, and teachers retained these, along with original letters to and from seniors and original photographs. Each student was given copies of everything, to make group work easier. While the issue of conserving paper was discussed, students needed to be able to refer to their own copies in order to contribute to group letters and storyboard organization.

It was a somewhat eye-opening experience for many of the adults involved in the project at this point, that some students had as much difficulty comprehending the senior responses as they did. It was true that seniors used many phrases that the students had never encountered before, such as "It was something else, let me tell you!" There were also the expected and hoped-for new words like "icebox" and "peddler" and "storm cellar" that provided wonderful opportunities for spur-of-the-moment historical snapshots that the students found interesting *solely because* it was suddenly relevant. Most interesting, however, was the tendency of children to read *literally*. One teacher questioned a child's placement of the word "books" in the screen about childhood friends. The girl pointed to a paragraph in the letter that read, "When I was a girl, I loved to read. Books were my best friends. Do you like to read?" Despite the fact that the woman had spent two pages telling about all the trouble that she and the family maid's daughter used to get into, the student had not made the connection that the maid's daughter was a friend. This was certainly an indication to the teacher that closer conferencing was needed with this group, and that some time might be dedicated in class to critical reading. Overall, teachers found that students benefited from taking home copies of the letters and templates; parents enjoyed reading the letters with their children, and many involved themselves at this point with helping their children to construct the biography storyboards.

The second letters were finally ready one week before winter break. Teachers and room mothers worked together to make crafts for the students to give to the seniors. One well-intentioned room mother brought in a large donation of Christmas wrap, and a normally silent child said solemnly, "But she's Jewish… like me." Solid blue wrapping paper was located in the art room rather quickly.

As the week before winter break is a good time to abandon schedules and do activities that focus creativity and energy, the Library Media Teacher suggested that classes might prepare videos for the senior center, sort of narrated tours of the school and the classroom. The Library Media Teacher provided classroom teachers with some guidelines for making a class video. (See Appendix I.) The students were delighted, and teachers were impressed with the level of enthusiasm students displayed in planning the tapes. Again, teacher handled the assignment differently. One class chose to have each student to narrate a portion of the tour. Another class chose one or two narrators, but everyone contributed to the planning – and to the making of signs that they used as title cards for different sections of the tape. Another class had the teacher narrate a class-scripted comparison of how the students thought school today might differ from school when the seniors were children, but each student delivered a personal greeting to their senior. All three videos, as different as they were in content and construction, turned out to be 10-15 minutes long.

The staff at *The Benchmark* gasped when they saw the boxes of festively wrapped packets and letters arrive. Over the winter break, the staff of *The Benchmark* showed the videos a number of times in the "common rooms" and reported that many of the seniors brought their friends who were not involved in the project to see "their children."

This time the interval between letters was harder for the students, because they had to wait through the winter break for their answers. They were eager to have *some* information on all screens. They began asking questions about when they would get to meet their penpals, and some wanted to know more about what they looked like, not only as seniors but as children. They were beginning to identify with them, making the connection that even "really old people" once played hopscotch, fought with their brothers, felt lonely on the playground, and got bored on rainy days. The Library Media Teacher sent copies of a second letter to each senior, this time requesting photographs and reassuring seniors that the photos would be safeguarded and returned intact. (See Appendix J.)

With the second wave of information from the seniors arriving imminently, the Library Media Teacher and Learning Technologies Facilitator turned the student focus to stack construction. The students had already seen a mock-up of a stack, so they were somewhat familiar with the navigational tools available in *HyperStudio*. However, time still needed to be devoted to teaching all three classes how to insert these tools and edit their own stacks to make them more personal. It was clear that each group would need a fair amount of time on networked computers. Students would need to access multiple folders of clipart, a collection of historic photos scanned for the project by the Library Media Teacher and Learning Technologies Facilitator, as well as other folders containing scanned photographs that the seniors might provide. It was also clear that all 74 students could not be trained in a hands-on manner at the same time. While a project room (known as "the pod") was available with adequate network connections, the room contained only one desktop workstation that was connected to a flatbed scanner. It was clear that this situation would require an "outside of the box" approach. The school owned plenty of desktop computers, but they were all located in different classrooms. However, they *were* all on carts.

A line in the Library Media Teacher's job description stated that he or she was the manager of all audio-visual and technical equipment in the school. It was not a huge leap to divide the classrooms (and resident computers) into two groups, which were designated after the school colors, blue and gold. With the principal's support, a rotating schedule (Appendix K) was developed for teachers to wheel "their" classroom computers to the pod at any time on Friday. The Library Media Teacher and the Learning Technology Facilitator hooked these computers up on the weekend or early Monday morning, so that students involved in this project could work on them Monday morning. During Monday afternoon (and sometimes Tuesday), other classes could reserve this temporary lab setting for their own use, thus making the prospect of "sacrificing" a valid classroom project area somewhat more appealing to the classroom teachers who actually did use the computer as a student project area. As the computers were conveniently in one location already, after-school training sessions were offered on these days for any staff members on topics ranging from e-mail to desktop management, and from web searches to the use of various peripherals. Many of these courses were already offered at the district's Technology Learning Center, an outcome of one very well developed staff development portion of the three-year *Information & Communication Technologies Plan*. However, as the building had only just been wired one month before this project began, the great majority of the staff had not yet enrolled in these sessions. Offering onsite training to staff members in the pod made the entire situation a little more palatable to those who might have vehemently objected to sharing "their" computer otherwise, and set a precedent in the building for creative and cooperative use of limited technology equipment.

The essence of this arrangement was that every other Monday there were eleven desktop workstations on carts located in the pod from the "blue team," and on the alternate Mondays, there were the same number from the "gold team." There were no noticeable differences in the age, speed, or capacity of the two groups of computers. The only significance in mentioning the two groups of machines is that it did result in a greater amount of time, mostly on the Learning Technologies Facilitator's part, doing "background" work such as "pathing the network" on each machine. *HyperStudio* is a wonderful and flexible tool for student authoring; however, accessing multiple layers of network folders cannot be done "seamlessly," as other applications on the same machines allow. For a more detailed description of the pathing process specific to *HyperStudio*, see Appendix L.

Another "detail" that had to be worked out was the fact that the Library Media Teacher and Learning Technologies Facilitator agreed that weekly hands-on 45-minute sessions with the students were needed. However, the Library Media Teacher's legal contract entitled the classroom teachers to a 45-minute session every other week or a 22-minute session weekly to be used as contractually provided planning time. The Library Media Teacher thought nothing of simply increasing the time in favor of the project's goals, but a district union representative contacted her and advised against this in light of other teachers in the building demanding equal time. In another "outside of the box" effort, the three classroom teachers involved in the project were asked to bring their students for weekly 45-minute sessions and attend at least half of the sessions with their students. Ultimately, this contributed to a number of other areas.

First, as the classroom teachers were only moderately familiar with the *HyperStudio* program, mandatory attendance at half of the classes resulted in increased familiarity with many functions or the program and processes of creating the stacks. Second, classroom teachers were acutely aware of student group interactions and progress, not only by indirect observation but also by direct conferencing with small groups as they worked together. Because they experienced the creation of the stacks firsthand, they were able to see the need for mini-lessons in verb tense, capitalization and punctuation. They added bonus words to their weekly spelling tests that were relevant to the project, such as "descendants" and "marriage" and "traveled." They were perhaps more flexible when time ran short and student needed more time to complete cards, so the teachers rearranged schedules and shared supervision responsibilities with each other for extra class time in the pod on Tuesdays. Finally, they learned alongside their students in precisely the manner that most teachers find difficult to envision without experiencing it, that being the scaffolded or "just enough, just in time" method. So many teachers assume that they must first *teach HyperStudio* and then start the project. These teachers saw that the students can learn stack construction in bite-size pieces, learning several steps at a time as a whole group but applying that knowledge in small groups at each juncture.

In order to accomplish the type of teaching described above, using a projection device (such as the Sharp Notevision mentioned previously) is ideal. In this manner, student groups can remain at their computers but direct their attention to the large screen while the instructor leads them through a series of steps. The instructor then allows groups time to perform the same series of steps at their computers, circulating and helping where needed. There were times, especially in the beginning, when this projection method was used.

As time progressed, however, less of the steps were "lockstep" and more required group decisions or differing amounts of time. The instructional methods of the Library Media Teacher and Learning Technologies Facilitator changed to fit this progression. When a "problem" arose, the "fix" was narrated to the students as they performed it. They then in turn were able to help the next group that encountered the same problem moments later. This practice, sometimes referred to as "each one teach one" is commonly used in other cooperative group settings (Slavin), but is very effective in technology as well. As a matter of fact, observers in similar settings have suggested that student groups are more likely to help one another when technology is involved than in other educational settings (Ayersman, 1996). This behavior can be encouraged in this setting and can transfer to other settings, but this is dependent on the teacher's comfort level with students getting up and walking around the room (Evans-Andris, 1995).

It is also worth noting here that there were occasions on which the projection device (the only one in the school at the time) was being used elsewhere by another teacher. It was not difficult to gather 25 students around the computer, have them all able to see the necessary steps, and then send them back to their computers to work on their own stacks.

In the first lessons in the pod then, the Learning Technologies Facilitator reviewed basic *HyperStudio* navigation with the students by "clicking around" the actual template projected on the wall. Each group received a disk with the template saved on it. The students were taught how to open *HyperStudio*, access the "A: drive," and open the template. Each group saved their stack by giving it a filename using the first eight letters of their senior's surname.

This is, incidentally, an excellent time to discuss the very common innocent mistake that frustrates many teachers new to technology use in the classroom. Teachers are accustomed to having students do written assignments that are referred to by the same label, such as "limerick." However, if every student in the classroom keys their limerick into the computer and saves it under that name, then in the end there will only be one file called "limerick" in the folder – the one belonging to the last student at the computer. The students in the pod enjoyed this discussion, and easily transferred this knowledge to other situations they encountered later in the project, giving graphics files and sound clips unique names.

Next students were shown how to pull down the toolbox and color palette, and move the stack over to one side of the screen so that the stack and all necessary editing tools are visible and readily available. The first of these steps, pulling down a "tear-off" menu actually requires fairly sophisticated mouse skills, as the user must "drag" the toolbox straight downward until a faint outline of it appears, and then continue dragging it off to one side of the screen before "letting go" or lifting the finger off the mouse. In this author's experience, each group of two or three students has at least one student who requires three or more tries with patient encouragement in order to accomplish this. Once mastered, however, a number of other similar tasks are much simpler, as the student can transfer that psychomotor skill to those tasks, such as dragging the color palette off or (later) selecting areas of graphics to crop.

In these first moments of "real" group work at the computers, it is interesting to observe student interactions. Normally quiet students sometimes emerge as wonderfully patient coaches, while typically dominant students can be "equalized" by their peers with greater "mouse dexterity. Patterns develop in these first few moments, and it is important to be aware of those groups that might need more gentle guidance about sharing decisions and sharing the mouse.

In this first hands-on computer session in the pod, students also learned how to edit a text box in the title screen. In demonstrating this, the Library Media Teacher and Learning Technologies Facilitator led the first of many discussions about screen design guidelines. It has been this author's experience that, given no guidelines, students will choose text and background colors that have limited contrast, and are easily impressed by fonts with great flourishes and many curlicues. In this situation, the instructors were able to reason with the students that their stacks were in fact presentations to senior citizens, and that as such, they needed to bear in mind the special considerations of that audience's aging vision as they made decisions regarding screen design. Legibility could be increased by using certain high-contrast color combinations (see table) and choosing one of four fonts pre-selected by the instructors. Students often ask if they can use several fonts throughout the stack, and some have suggested that television, particularly commercials aimed at youth, use this tactic. In situations such as this, students are asked to reserve their wildly creative urges for stacks assigned later in the year that express their personal interests, and select a single font to use throughout this stack, capitalizing on the screen design guidelines outlined. After this discussion, students returned to their computers, modified the template stack to bear their senior's name, and made decisions as a group about background color, text color, and font selection.

Finally, instructors pointed out one of the buttons on the main menu, where the Heading "Descendants" had been intentionally misspelled. Correcting or changing the name of a button is a different process than changing a text box, and students were led through the steps to make the correction on their own stack. At this point, students saved to the disk or drive A, closed *HyperStudio*, and turned their disks in to the Learning Technologies Facilitator. Students were given the mini-preview of the next Monday's lesson, and reminded that the information coming in the next batch of letters from the seniors needed to be penciled in to their storyboards.

After all three classes had gone through this process, the Learning Technologies Facilitator had collected all 32 disks. One of the first "background" jobs was to "path the network" (see Appendix I) on each of the eleven computers on carts so that in future sessions, students would be able to save their stacks to the network, and access external graphics and sound files from within *HyperStudio*. The Learning Technologies Facilitator created a folder for saving student stacks on the network. Almost as an afterthought, he decided that since *HyperStudio* is somewhat quirky when files get to be too large, and since a large number of students would be working on these stacks on constantly rotating sets of computers, there needed to be two different locations to save work. During the week that students worked on the computers provided by "blue team" teachers, the students would save their work to the "Blue" folder on the network. Similarly, during the week that students worked on the computers provided by "gold team" teachers, the students would save their work to the "Gold" folder on the network.

The result was that there were always two versions of the stacks saved in different locations. Though conceptually confusing at first, this proved to be extremely prudent. There were a number of times when a glitch caused the program to misfunction, save incorrectly, or crash. When students reopened the stack, numerous things had disappeared or changed. On more than a few occasions, the adult working with the group was unable to recover the lost data. Rather than continue working on a corrupted stack, the saved version from the week before was opened from the blue or gold folder, revised and saved as the newest version.

In the next few sessions, students repeated the established pattern of receiving new (second) letters from their seniors, grappling with reading and comprehending the information given, selecting and sorting the information into the paper storyboards, and writing their next letter to their senior. Groups were also given the task of selecting the font and color scheme to use throughout the biography stack, referring to a color palette projected on the wall and a poster displaying the different font styles and sizes that were acceptable for this project. All groups had completed these tasks by the time the next computer pod session arrived. Additionally, classroom teachers had conferenced with each group and given them tentative approval to key in the text for one or two of their best storyboards, based on discussions with the group about the accuracy of the information and based on at least one quick check for spelling and mechanics.

In this next computer pod session, then, students were eager to begin entering text. The Learning Technologies Facilitator led the group through the process of creating a text box and setting the style and color scheme. Before releasing them back to their computers, however, the Library Media Teacher quizzed the group aloud on basic text entry standards – how many spaces between words, how many spaces before and after a comma, how many spaces before and after a period, etc. Again, spending the ten minutes to do this before students began typing was an immense time-saver later. The average third grader is not an experienced typist, and reviewing the basics (such as how to make a capital letter) saved everyone a great deal of time and frustration.

Students returned to their own stacks, created the text boxes, set the style and color scheme, and entered their first sentences about their seniors. Students were invited to get up and look at other groups' cards when they finished, and were encouraged to help if another group had trouble. "Helping" was defined to them as using words to *tell* the other student how to do it, possibly even pointing at the screen briefly – not grabbing the mouse and doing it for them. With this little bit of guidance, students became very good at coaching others through a series of steps. This was excellent practice at communicating directions clearly to another, and a wonderful way to develop patience and self-control.

Once the entire group was finished entering text on one or two cards, the whole group was shown how to access the *HyperStudio* clipart files, select individual pictures or borders, and insert them into their stacks. Students were given the remainder of the session to "play around" with this feature, and told that the clipart they inserted on this day would be "just for practice" and would be deleted before they left. It was explained to them that their real stacks would contain very few clipart pieces, but would contain mostly old photographs from a number of sources. The process of inserting photos was essentially the same as inserting clipart, but the photos would not be available to insert for another week or two.

As students lined up for the end of class, a brief discussion was conducted on copyright issues. They understood that they were free to use clipart from *HyperStudio*, though it was not of the same historic quality as a photograph, and therefore made the stack look "ordinary" or even, as one student suggested, "less credible." Few of the students had received any photographs, and the level of concern was understandably high. Students were assured that the Library Media Teacher had collected a great number of family photographs and public domain photographs to scan and place in network folders for students to use. Also, it was suggested that especially on the cards titled "Activities and Hobbies," students could search for relevant pictures in books. These pictures could be scanned and used to illustrate those cards if the students cited their sources.

Countdown: One Month Before Interview Day

The next few weeks were spent in preparation for the impending visit to the senior citizens' residence, *The Benchmark*, on February 13. Students continued to work with classroom teachers and other adults in the building to glean information from the letters and add to their storyboards. Classroom teachers conferenced with groups to determine which storyboards contained the least information, and these areas became the focus for the upcoming interview. Students prepared lists of ten questions to ask the seniors, and then prepared file cards for each question.

The Library Media Teacher met again with the staff at *The Benchmark*, again with the classroom teachers, and again with the team of Learning Technologies Facilitator, Instructional Coordinator, and school principal. At each of these meetings, the focus was on making the visit positive and pleasant for both seniors and students. This author had devised a plan that enabled all 74 students to meet the 32 senior citizens, each interview taking place under the guidance of two school chaperones in the senior citizen's apartment. Further requirements and personal wishes also had been accounted for in this plan:

- the need to get all students transported to and from *The Benchmark* on a district school bus in the very small window of time allowed by the district between regular daily bus runs for other schools;
- the need to do this using as little money as possible (translated: one bus rather than three);
- the need to accomplish this visit with adequate supervision for all children at all times provided by a total of 21 parent chaperones, 3 classroom teachers and a handful of other school staff members; and
- the desire to document each interview using every medium possible – audio tape, videotape, digital camera, and accurate handwritten notes.

This became feasible when the Library Media Teacher mapped out a schedule in which students traveled one class at a time to *The Benchmark* in overlapping "shifts," while parent volunteers remained at *The Benchmark* for all three shifts of classes. Thus, most of the 21 parent volunteers supervised three interviews with three different seniors and three different groups of students, with only one group containing their own child. This freed classroom teachers to attend one interview of their choice, based on interest or student behavior concerns, and left teachers adequate time to unload and load children from the bus and be sociable to parents and the staff of *The Benchmark* as well.

Preparing a plan for parent involvement in the interviews also proved to be a good investment of time. The Library Media Teacher wanted two parents in each interview in the somewhat likely event that one child of the two or three would need to use the bathroom or leave the interview for some other reason. One parent would need to escort that child to wherever he or she needed to go, and the other child or children interviewing the senior would not be left unsupervised. Having two parents in the room was, however, a tremendous waste of "manpower" if they were simply sitting there. Therefore, it was decided that parents would have specific roles in keeping the interview moving and recording notes. (Classroom teachers expressed early in the year that it would be extremely challenging to third graders to ask questions, listen to answers, concentrate in the unfamiliar surroundings, and record responses with any accuracy.)

In the weeks prior to the Interview Day, the Library Media Teacher asked certain other staff members at Blackwell Elementary if they might be available to either chaperone or be roving camera operators. These staff members were all on flexible schedules, able to rearrange, reschedule or trade their duties with advance notice, such as the physical education teacher, the aide responsible for the Reading Improvement Program, one of the school's social workers, the Gifted Education Resource Coordinator, and two student teachers. The one or two parents that were "left over" for each shift of interviews (always a different parent) would also serve as camera operators for one shift each.

Additionally, the principal would attend the entire morning's interviews at *The Benchmark*, one portion of which he planned to sit in on his mother's interview "to make sure she doesn't tell any embarrassing stories about me." The Learning Technologies Facilitator and Library Media Teacher and the principal were intentionally left free to be available to answer parent questions, coordinate the exchanges of audiovisual equipment, supervise the influxes of children at scheduled times, and serve as "command post" in the building's first floor lobby.

As the date neared, and parent chaperones confirmed their attendance, it became clear that there were at least three mothers that wanted to participate, but wanted to know if their smaller children could come along. This author was certain that a preschooler would not contribute to student comfort during an interview in a senior citizen's apartment. Yet the parents wanted to attend and had no sitter options during that time. Another parent, a regular Library Media Center volunteer who had no children involved in the project agreed to provide daycare in the pod for the small ones while the other mothers attended the interviews. The computer and other equipment were cleared out of the pod, toys and games were loaned from the kindergarten, and a few sixth graders volunteered to read stories and play with the little ones. The childcare venture, originally an obstacle, turned out to be yet another indication of the school community's ability to come together to support a worthwhile project.

Making efficient arrangements for student transportation to *The Benchmark* proved to be challenging, as well. Approximately one week before the interviews, it appeared that each class of about 25 students had 5-8 parent volunteers to chaperone the excursion. It was safe to assume that each of these parents would want to be present for his or her own child's interview. It was also clear that, even with a number of volunteers and draftees from the school staff, this author would have to request that all parent volunteers remain at *The Benchmark* for a few hours, while classes rotated in and out of the facility.

An Organizer

In order to maximize efficiency, this author prepared a spreadsheet earlier in the project. In the interest of protecting the privacy of the senior citizens and the students and parents involved, this has not been included in this project review as a table. However, the first column listed the names and apartment numbers of the senior citizens, and the next three columns listed the names of his or her two or three student biographers. The first eleven rows of the spreadsheet listed the senior partners of the first class, the next eleven rows listed the senior partners of the second class, and the final ten rows listed the senior partners of the third class. Initially, this spreadsheet served as a quick and easy reference for classroom teachers and coordinators at both *The Benchmark* and Blackwell School.

In planning for the interviews, this spreadsheet was modified to include fifth and sixth columns for assigning two parents to each interview. By color-coding the spreadsheet cells in matching colors for students whose parents were chaperoning, it was easy to then place each parent first with his or her child, regardless of whether the class "rotated in" to *The Benchmark* first, second, or third. This process was repeated with a number of staff volunteers and draftees, such as the Reading Improvement Program aide; in order to justify her time spent in this activity, we paired her with the students that she serviced on a regular basis. Similarly, assurances were made that Blackwell's principal could attend his mother's interview, and then be available for coordination of details with this author and the Learning Technologies Facilitator in the lobby of *The Benchmark.* In the remaining white spaces of the fifth and sixth columns, parent chaperones were then assigned to other students' interviews during the times that their own children were not at *The Benchmark.*

The result was that after all parents were assigned to their own child's interview and one other child's interview at a different time, some were then assigned to a third child's interview in a third block of time. Those who were not assigned to an interview for one of the three blocks were potentially available to help out with audiovisual equipment, or to answer the questions posed by the members of the press who would be invited.

This color-coded spreadsheet was then printed out for a number of people, and also proved useful in mail-merges later to print student and parent chaperone name tags, parent volunteer thank you notes, and a "keep-in-touch" sheets for students and seniors at the end of the project.

Ultimately, though, it was a visual organization tool for this author, a way to make "too much information" suddenly manageable. It made it apparent that students, parent chaperones, and school staff could indeed meet the time constraints being imposed by two parties, the staff at *The Benchmark* and the bus company contracted by the school district.

The Benchmark staff felt that all of the seniors would be able to handle brief interviews with a number of "strangers" in their apartments, but the staff felt that some would become agitated, nervous, or tired rather quickly. The staff recommended an interview time of 10-15 minutes. Initially, this did not sound like an adequate amount of time, to this author, and students were thus very well prepared for their brief visits. However, parents and classroom teachers voiced their approval of the time allotment, stating to this author that the children were able to stay focused and well behaved "under pressure" for that period.

The bus company imposed time limits for another reason entirely. In this school district, bus drivers are assigned to a number of overlapping shifts. On a given morning, one driver may pick up children going to middle school, drop them off, then pick up children going to elementary school, and drop them off. There are also different times for morning and afternoon kindergartners, as well as morning and afternoon preschoolers who are part of the Early Childhood program. There are buses reserved for field trips, but they cost considerably more and therefore are used for trips that take the better part of the day. Given the fact that *The Benchmark* was located only ten minutes from Blackwell School, it seemed feasible that three classes could each, in turn, board the bus at Blackwell, ride to *The Benchmark*, be allotted five minutes to meet pre-assigned chaperones who would accompany them for 10-15 minute interviews, and be allotted five minutes to board the bus. In the 25 minutes that the first class was at *The Benchmark*, the bus driver could return to the school for the next class, so that the two classes crossed paths in the lobby of *The Benchmark*. Chaperones could supervise bus boarding and then pick up the children for their next interview from the teacher waiting with her class.

Based on this estimate, starting and ending times were added to the spreadsheet, and it became a working schedule for each adult involved, including the bus driver, parent volunteers, staff members, and project coordinators. Copies were also reserved for the school secretaries, the receptionist at *The Benchmark*, visiting school district officials and board members, and members of the press that attended.

Chaperone Kits

The final step of preparation for Interview Day was preparing "survival kits" for the parent chaperones and other school staff. Fifteen huge manila envelopes were marked with the names of parent volunteers who would be "in charge" of each packet, as well as the parents who would be rotating in and out of interviews with them. The color-coded spread sheet and an interior map of *The Benchmark* was secured to the back of each packet. Inside the packet, coordinators placed a variety of direction sheets that pertained to each parent's role or responsibility, a hand-held audio cassette player, three blank audio cassettes pre-marked with senior citizens' names and room numbers, pencils and notepaper. Also, because the bus could not hold all students and staff *and* parent volunteers, parents were asked to meet at the school for a brief informational meeting and then drive to *The Benchmark*; directions and a map of the route to *The Benchmark* were included in the manila envelope.

As mentioned earlier, the project coordinators and classroom teachers felt that it was not an age-appropriate expectation to assume that third graders could conduct a composed interview and accurately record responses as well. For this reason, parents were provided pencil and notepaper and asked to take minimal notes – such as specific names, dates or details that the students might forget later. Eleven hand-held audio cassette players were also provided, so that each interview was recorded from start to finish. Students consulted these tapes a number of times later as they constructed their biographies, proving that it had been a worthwhile support provided.

Blackwell did not own any such cassette recorders at the beginning of the year. This author consulted the district's Learning Technologies department, and was given the names of a few Library Media Teachers at other schools that might have some. One such colleague at a middle school agreed to loan all they had, which was six, and Blackwell's principal approved the use of student activity funds to purchase five more. The same fund provided a bulk purchase of audio tapes, a few videotapes, batteries, and laser printer nametags.

Countdown: One Week Before Interview Day

The week before Interview Day, the chaperone packets were labeled and assembled. An information letter was sent home to parent volunteers, requesting that they meet with this author the morning of the Interviews. Childcare arrangements in the school building were confirmed with all necessary parties. School staff members were given copies of the schedule and maps, written directions for operating the digital camera or camcorder to which they were assigned, and a one-on-one equipment operation session with this author.

The social worker from *The Benchmark* visited Blackwell, and spent nearly an hour speaking with the 74 students, explaining exactly what they could expect to see and hear when they visited. She asked children to describe their grandparents, and together they made a list of how they spoke and acted differently sometimes, with their grandparents than they did with their friends. This visit was very helpful, and the children asked many pertinent questions, to which she responded directly and honestly. In addition, she told the students all about how busy *The Benchmark's* hair salon had been lately, as all the seniors prepared for the big day. They were preparing their very best clothes, she said, and were acting just like children do when the holidays are coming. Everyone enjoyed this image, and the laughter helped ease some of the nervousness the students were experiencing. As the students filed out of the Library Media Center, many were discussing what *they* were going to wear for the special day.

Countdown: One Day Before Interview Day

The day before the interviews (February 12), a few mothers worked with all three classes during lunch, tying red satin ribbons on heart-shaped cinnamon-applesauce sachets that said "Benchmark-Blackwell Partnership" on one side and "Be My Valentine" on the other. The students then wrapped these in pink cellophane, and stored until the next day, when they were presented to each senior by "their" children.

The afternoon before the interviews, students met again to finalize their note cards or questions, and then role-played with classmates and teachers. Teachers reported that this exercise was an excellent time to discuss some of the points that the social worker from *The Benchmark* had mentioned, such as voice volume and eye contact. Each teacher also talked about "personal space," both for the children's benefit and the seniors', and students offered suggestions to their peers about how to improve. Voice volume seemed to be the biggest issue, and teachers and parents reminded students about this the next day. Children were concerned about what to do when the senior "rambled on," as the social worker from *The Benchmark* had predicted, and they were reassured that that the parents would be there to help them through exactly that type of situation.

As students went home that day, several parents shared stories with teachers about the children's excitement. One parent reported that her daughter hadn't slept well, and others laughed that even the boys were worried about what they should wear. This author headed over to the middle school to borrow the audio cassette recorders, and then to the district media library to check out additional camcorders. That evening, a call to the social worker at *The Benchmark* revealed that she had made arrangements with other staff members to do a "wake-up" sweep and double-check later on all of the seniors' readiness.

Morning Preparation at Blackwell School

This author arrived early at school that day, and loaded all of the cassette recorders and camcorders into their assigned places, to be ready for the parents and staff members. Donuts and juice were set up by the nametags for parents. The childcare room and the bus company were double-checked.

A call was placed to *The Benchmark*, and the social worker explained that almost everything was fine. Two seniors were still in the hospital as they had been ill; these children had been prepared for this, but had also been hopeful that the seniors would be back home anyway. A third senior had a doctor's appointment that she had overlooked and could not reschedule; she had called the boys two days before and been apologetic, so they, too were prepared. But the fourth senior that presented a problem on this day was one that had only very recently begun to show signs of dementia. Her family had been called that morning because she was very upset, and the social worker did not think that she was in any condition to meet with the children. As this was an unexpected surprise, the girls were very disappointed. They had worn their best clothes, and even had brought a bouquet of flowers for her. The girls were told that about this at

Blackwell, and reassured that they would get a chance to visit her another day, when this author and the principal returned to take the boys to see the senior that had the doctor's appointment. All of the children whose four seniors were unavailable for interviewing that day were asked to "help out" a friend's group of their choice. This arrangement worked out well for everyone, and caused no problems for anyone.

Parents had gathered in the Library Media Center, and the principal and this author welcomed them and briskly covered the agenda for the day. Chaperone kits were distributed, and parents reviewed the driving and parking instructions and the map of *The Benchmark.* This author explained the tight schedule and the different rotating responsibilities that parents would have. The two basic parent roles were described again as they had been in the letter, and parent partners determined which would assume which role. The Learning Technologies Facilitator gave a brief hands-on session about how to load and operate the audio cassette recorders, and two parents were given specific directions about the type of camcorder work they would be doing. The parents and school staff headed to their cars just as the bus arrived at school to pick up the first class of students.

The crowd of parents and school staff, sporting chaperone kits and audiovisual equipment, gathered in the spacious outer lobby of *The Benchmark.* A few district officials and members of the press joined them. Several members of the staff of *The Benchmark* welcomed the crowd, and thanked everyone for keeping nametags visible.

The receptionist opened the security doors, and the crowd of parents moved into the inner lobby and took positions for the first class of students; those assigned to digital cameras and camcorders unpacked them, while others made a human corridor to collect their assigned small group of children as they entered.

Through the large glass windows and security doors of the lobby, the parents could see the children getting off the bus. Several parents chuckled about how uncharacteristically well dressed and well mannered the students were, and others answered that shyness was a wonderful quality in children at times. The students removed their coats, and staff members from *The Benchmark* checked to see that the children and teacher had nametags. The class was ushered through the glass security doors, and parents quickly gathered their assigned students and led them off in the directions of their seniors' apartments.

The Big Moment

Standing outside the apartment, shy children looked panicked or embarrassed, momentarily forgetting their coaching as they looked at the floor and murmured polite greetings. The senior strained to hear, and parents filled in the missing words. The senior grasped smaller hands with both of their own, sometimes leaning close to see or hear better. Students relaxed just a little as the senior turned away, welcoming the sizeable crowd into the apartment. Parents nudged students forward, as the senior shuffled into the living room. Students moved forward open-mouthed, as parents followed, commenting on the beautiful surroundings, the seniors' personal furnishings, and often flowers and knick-knacks. Adults settled into chairs, and the senior usually objected to the students sitting on the floor, but accepted this when parents explained it would work better for recording the interview. The hand-held tape recorders were shown to the seniors and set to record.

The interview began, usually as students blurted out sincere and naïve questions and then looked embarrassed. Seniors chuckled and responded, sometimes answering the question, but often not. Plates of cookies were offered when conversation stalled momentarily. Sometimes very observant parents or students noticed photographs or memorabilia around the room, and asked about them. These questions proved to be virtual goldmines for gleaning information. Eventually, the time was up, and there were often awkward goodbye hugs. Many people commented later about the students and seniors waving at each other from behind the glass of the school bus and apartment windows.

So many visions blurred together as district personnel, senior citizens' families, members of the press, parent volunteers and numerous staff members from *The Benchmark* milled around the plush and spacious lobby after the children left. They commented to each other about how smoothly the day had gone, how excited the seniors and students had been, how wonderful the digital camera technology was (displayed instantly on the laptop in the lobby for all to see). They shared chuckles over their own perceived technological inabilities, and alternately boasted about the quality of their videotaping or digital photographs. They organized student notes, the chaperone kits and the many audio tapes without being asked to do so, and began carrying cameras and other equipment to the many waiting cars. But most of all, they took time to express their appreciation to the coordinators of the project, and asked how they could be of more help to foster the partnership between the school and the facility, and what the "next steps" were for this particular biography project.

Parent Helpers in HyperStudio

The parents' offer to help was sincere, and this author believed that parents could be most helpful by working with each small group individually on the computer. The greatest obstacle was the parents' perception that they didn't know enough about computers or the program being used. This author envisioned meeting with a number of parents after school in the computer pod for a few nights, teaching them the basics of HyperStudio within the context of this project.

Further discussions with the Learning Technologies Facilitator revealed that the outline for such a mini-class had already been prepared by Learning Technologies for use in staff development classes, and handouts had already been created. The Learning Technologies Facilitator agreed to lead the class and secure a copy of the handouts. This author took note of the Learning Technologies Facilitator's available dates to teach such a class. Later, these dates were checked against the school's master calendar, and with the principal. Rather than inconveniencing classroom teachers with additional dates that computers would be rounded up into the computer pod, this author checked into the availability of the computer lab setting at the district offices used for staff development, the Technology Learning Center (TLC). On the two mornings requested, the TLC was available, and thus reserved for this project's use. Two days after Interview Day at *The Benchmark*, a note went home with each child involved in the project (See Appendix M). Parents were invited to sign up during parent-teacher conferences for one of two available class times, specifically configured to begin as early as children were delivered to school but also finish before lunch mothers were required to report for duty. The three classroom teachers also agreed to have copies of the note available to parents at conference time. When conferences ended, only six parents had signed up, but they were evenly distributed across the three classes. A week later, this number had doubled. In all, fifteen parents signed up, twelve actually attended one of the classes, and eleven followed through by signing up to help small groups of children later.

It is important to note here that the method of instruction was intentionally different. While scaffolded instruction on an as-needed basis was used with students, the sessions with parents were much more limited in time and the purpose was quite different for these adult learners. The children were creating, using a tool to organize and share information; the parents needed to be well-versed in the operation and programming aspects in order to be able to troubleshoot and suggest alternative methods when things didn't work the way students wanted. The resulting class for the parents moved quickly from HyperStudio basics, into exploration of the template designed for the project, and finished with detailed coverage of network navigation (so that parents would understand how to access photos and sound clips on the network). Fortunately, all parents who attended the class had some computer experience already, and many had a home computer, so time was not spent on mouse skills or other pre-basics. In fact, the class was well received by the parents, and a number of good suggestions came from the parents who attended. One such suggestion referred to the many old-time photos available on the network; would it be possible to make a "catalog" of these, with filenames listed below each, so that they could be reviewed and inserted more quickly? The obvious nature of this suggestion was almost embarrassing. Of course such a step would make it easier! This author made a note of this, and produced such a catalog within a matter of days, available through classroom teachers whenever students or parents wanted it (Appendix N).

A second interesting discussion raised by parents was that student narrations of their own projects would be incredible time-consuming in an already tight schedule; while it would be a nice touch, most parents felt that the time spent rehearsing and re-recording muffled parts of the recording would not be worth the investment of time. Several parents pointed out that most third graders are not comfortable nor fluent reading aloud in class, and that "performance reading" requires a "stage presence" that requires maturity or coaching. Some groups' narration, therefore, would be much better than others, and this might even make some otherwise good projects worse, but for the narrators' talents. Because time was tight and parents were surprisingly united on this issue, this author acquiesced, thinking that perhaps the inheriting family members of the senior citizen might be appreciative of the "silent" nature of the scrolling text. One parent did suggest that one way to "level the field" would be to find a single adult voice to narrate all of the videos; however, no one volunteered for this huge undertaking, and so the issue was dropped.

Classroom teachers ran their own individual schedules for HyperStudio-trained parents to sign up to help students with the biographies, and thus were responsible for providing time blocks and their classroom computer. Giving the responsibility to the teachers resulted in a number of progressions. All three of the teachers made arrangements with other teachers not involved in the project to place their classroom computers just outside the room in the "cove." This enabled parent volunteers to work with small groups of students without disturbing the regular classroom activities, yet enabled the other teacher to still have access to her computer between sessions to access e-mail or print materials. This thinking "outside of the box" came from the teachers themselves and was one of the first uses of the network dropsites in the cove areas. A year later, this was common practice at the school.

Another progression made as a result of teachers running their own parent volunteer schedules was that dialogue between the parent volunteers and teachers about each group's progress was inevitable, and both parents and teachers were obligated in some ways to provide additional time for groups lagging behind. This phase, then, resulted in greater "buy-in" on both parents' and teachers' parts, at a time when it would have been easy to become frustrated with slow progress.

Parents reported to teachers and project coordinators that students were "much more interested" in inserting photos than in writing up the details, and that often, the photos selected by students had nothing to do with the text that belonged on that screen. Classroom teachers and project coordinators reviewed these points in the larger sessions, but it was interesting that parents often insisted that the student groups finish text boxes before allowing them to go on to inserting graphics or photos.

As a result of these parent volunteer sessions, this author was given much more verbal feedback from involved parents in hallway conversations. One clear reaction from the parents was that the individual stacks were progressing slowly enough that it might be worthwhile to forego insertion of video segments from Interview Day. An informal follow-up poll of students showed this to be the case, and the idea was abandoned in favor of time. However, students were interested in viewing the videotapes, and lunch mothers agreed to run the tapes during pre-assigned lunch recess times for those interested. Several students took their templates and pencils to these sessions, and many reported that after viewing the tapes they added information they had forgotten about.

Rescheduled Interviews

A few of the seniors had been unavailable on Interview Day, and the Library Media Teacher and social worker from *The Benchmark* worked together to find times to reschedule these interviews. Separate permission slips had to be signed, parent chaperones had to be re-recruited, and audiovisual equipment had to be lined up again. On both of the days that these rescheduled interviews took place, legal transportation required that students be driven in the principal's vehicle, with another school employee passenger (this author). In both cases, one of the three students rode to *The Benchmark* in his or her parent's car, as the parent had volunteered to chaperone for that day. In these interviews, students had more of a sense of what to expect, having witnessed their peers' interviews a few weeks before. The parents involved were also more comfortable in their roles the second time around. One additional parent volunteer was accompanied by the school principal and *The Benchmark*'s own social worker as she retook some digital photographs that didn't turn out originally and one video segment that had not been found. Perhaps because they had to wait so very long before having their interview with their senior, these students returned to school very excitedly and immediately begged for computer time.

Senior Visitation Days

This idea originated in the classroom, on the original Interview Day, after students returned from *The Benchmark* and excitedly shared their experiences. Several students said that their senior friends had really enjoyed the class videotapes made about the school earlier in the project. The students wondered if the seniors could visit Blackwell. As a result, each class planned a one-hour "party" of some sort for their seniors. Each of the three classes planned their party for different days, because *The Benchmark's* minibus could accommodate a limited number of seniors. Students knew in advance that all of the seniors would be invited, but that each class would have a certain number of "no-shows" because some seniors were not ambulatory, and some were uncomfortable outside of the facility. Characteristically, each room's party was quite different. One class hosted a "tea" for the seniors, with donuts and muffins and juice. Another class had a more typical class party with chips and soda, but provided veggie trays and juice as well. A third class hosted an actual lunch in the room. In all three classes, students and teachers provided the food and decorations. In each case, about half of the seniors were able to attend, resulting in five or six visitors for each class. On the morning of each visit, *The Benchmark*'s social worker called the Library Media Teacher with the names of the seniors who would be traveling to the school. Student desks were pre-grouped around "their" visiting seniors' chair, and then students invited peers to join them. The hosting students shared the known information about their senior with their larger conversation group before the party. Teachers, parents, and other staff members coached these larger groups in appropriate questioning and polite conversation again, so that the resulting visits were relaxed and comfortable, and yet yielded new information to the hosting students. One very pleasant surprise to many of the students whose seniors were unable to attend was that the senior at their table knew their senior, or brought a message from him or her. (In a facility that houses over 800 senior citizens, this actually was rather remarkable.) Classroom teachers checked out the digital camera in advance and recruited parents or other staff members to take pictures of the celebrations. Many students later used the photograph from this event on their final screen, a happy photo of their senior and the student multimedia biography team.

The principal arrived in the middle of each class party, offering each time to take the visiting seniors on a walking tour of the school building. *The Benchmark*'s staff members accompanied the seniors on the building's elevators, and the seniors were particularly impressed with the spacious Library Media Center, gym, and the view of the playground, park and ponds. Students eagerly pointed out their artwork and writing on display in the hallways, and seniors stopped to admire these items. Upon making the usual stop in the tour at the principal's office, one of the classroom teachers quipped that she'd never seen the office so neat before. The principal blushed, laughed, and admitted sheepishly that he *had* spent some extra time cleaning it that morning, knowing that his mother was visiting it for the first time. The seniors laughed about that for days afterwards.

Audio Clips and Authentic Photographs

In each classroom, two groups of students with visiting seniors were selected to show their "work in progress." Seniors gasped in delight when they saw the projects. One wonderful woman was actually moved to tears, and hugged her very startled student biography authors. Others resolved to send more childhood photographs for students to use. Still others enjoyed the music clips that some students had inserted, and resolved to go back to their apartment and review the list of clips available, so that they could tell their student authors which ones to insert in their stacks. The processes of adding these authentic details to the stacks were fascinating to the senior citizens, and are outlined below.

Seniors combed through boxes and albums in their apartments, and entrusted the best original photographs to *The Benchmark*'s social worker for a day or two. The Library Media Teacher was drove to *The Benchmark* whenever photographs were ready for pickup, and took them over to Blackwell for scanning. This process involves placing the photograph face down on a platen glass of a flatbed scanner attached to a desktop computer. On the computer screen, a control panel appears that allows the user to alter resolution, image size, image type and file output type. Most of the photographs received from seniors were black and white or sepia tone, and most also tended to be smaller than 5 x 7". This meant that most of these could be scanned with little adjustment for memory (color and large images take up more memory). The file output type was set to default to .jpg – one of the several file types that HyperStudio allows, but one of the easiest for students to make later alterations to, if necessary, in the district's standard photo editing program (Epson Photo PC500 version 2.0 for Microsoft). These digital photograph files were then saved onto the network in some recognizable name for student use; Mr. Gilbert Renner submitted five photos, and these were saved as *renner1.jpg, renner2.jpg, renner3.jpg,* etc., in a network folder containing only photos contributed by seniors. Parent volunteers notified students of the existence of these photographs on the network when they worked with small groups. Because the photo files were identified by seniors' last names, there was no confusion between student groups about which photos could be used by which authors. Original photos were driven back to *The Benchmark* by the Library Media Teacher, and safely returned to the seniors within 24 hours.

Music clips were another matter entirely. The project coordinators approached the school's very talented and versatile music teacher in the fall about presenting a lesson or two related to "period music" for the early 1900s. Over the winter, she collected a variety of well-known pieces from each decade. Just before Interview Day, she presented a series of lessons to the three classes involved, in which she *briefly* explained the political and historical backgrounds that influenced each of the pieces she had selected. Students were given lyric sheets to follow as the songs were played, and were asked to identify common instruments or styles of the instrumental pieces. Students *loved* these lessons, and continued to request some of their favorite songs from these lessons well into the following months during music class.

Recording the clips from these was a greater concern, as she was very conscious of copyright governings. In many cases, she was able to find public domain versions of the songs, and in a few of the others she attempted to restrict the music clip to a length under five seconds. In the end, the titles and sources of all of the five-second clips were typed out on a sheet that was distributed to each senior inside the videotape cover (Appendix O). The multimedia biographies were created for a select private audience, not for resale, and the audio clips added authenticity and depth to the presentations. Efforts were made to fully credit the sources, and that served to demonstrate our frequent message to the students, which was to fully document sources (text, graphic, and audio) at all times.

The recording process is described in detail on a "Help Sheet" which was created by Learning Technologies (Appendix P). Briefly, however, a portable stereo with cassette and CD capabilities was connected to a desktop computer workstation via external plugs. A sound recording program included on the computer was used to record short clips cued on the portable stereo. Specific settings were left to the music teacher's discretion and file saving directions were provided to her by the Learning Technologies Facilitator. The music teacher named these files by era, so students were able to click on *1920a.wav, 1920b.wav, or 1920c.wav* to access three popular tunes from the 1920s. It was great fun to pass by a small group of excited students working in the hallway, and hear strains of "The Charleston" (followed by groans of disappointment when it ended after five seconds). Some parents did actually report that their children purchased cassettes or CDs of "oldies" collections subsequently, and so this author felt that the music industry had in some way been compensated by this lesson in appreciation of music of other eras.

The Evaluation Phase

Around mid-April, the first groups began reporting that they were "done." Though this author had hoped classroom teachers would find time *throughout the project* to conference individually with groups, this was not the case. Similarly, it had been hoped that teachers would make *ongoing* use of evaluative and feedback methods like using the Sharp projector and student-created screens for mini-lessons in proofreading and language mechanics, but this was not implemented on a regular basis. A meeting was called between the project coordinators and classroom teachers to coordinate the details of project wrap-up. Both of the above methods were again stressed as valuable tools in student project evaluation, and this author offered tips on student-made rubrics, and offering to co-teach this concept in the classrooms.

In the following days, one teacher did invite this author in to the classroom for the student-made rubric sessions. High points of that lesson included having students list qualities that made two mock stacks "good" versus "poor," prioritizing and clustering those qualities into groups, developing a rating scale that was in student-friendly language, and modeling appropriate ways to write constructive comments. This author also stressed that each group would present their "finished" stack to the class for evaluation using the student rubrics, and then be given one week to make any changes they wished to make before posting the "final" stack on the network for parents to transfer (Appendix Q). This gave student groups a "safe zone" before the teacher evaluated the finished product and also allowed them the discretion to make peer-suggested changes or ignore them.

Samples of completed rubrics for a few student groups revealed that teachers also made comments on these initial evaluations (Appendix R). Teachers were encouraged to use the same rubrics in final evaluations, and to transfer the results of these evaluations to gradebook pages for reading, language arts, and social studies; this author offered to help classroom teachers with these translations.

Anticipating the Final Presentation

The tentative date for the presentation of multimedia biographies to the senior citizens was finalized in a formal meeting between the Library Media Teacher, school principal, and several members of the staff at *The Benchmark.* As before, the staff at The Benchmark had a number of specific well-thought-out suggestions for how to make the day run smoothly for their residents, and the principal had a number of specific concerns for student safety and comfort. Because the date for the culminating activities was Friday, May 22, a picnic was suggested. Weather in northern Illinois at that time of year can turn quickly from warm and sunny to grey and rainy, and thus everyone thought it best to have plans available for sudden rain. This author found it surprisingly difficult to keep *The Benchmark* staff's focus on the viewing of the multimedia projects; discussion at the meeting kept turning to food, games, and conversation areas. However, in the end, the staff brainstormed and decided that two "public rooms" were available, one of which already had a TV and VCR in it, and one that could be modified to accommodate an extra TV and VCR from elsewhere in the building. This author was asked about the average length of each presentation, and estimated them to be approximately three minutes each – although none had been actually transferred into final form at this time.

Use of these "public rooms" meant that classes would remain together in a relatively small space for the biography presentations, and that other residents of the facility would very likely be present during the presentations as well. The availability of a school bus during limited times also imposed some limitations on time, and the staff of

The Benchmark was mindful of the effects excitement and fatigue that an extended activity schedule might have on their residents. This author was asked to arrange rotating schedule similar to the one used for Interview Day, in which each class arrived together. The first "station" would be the "viewing" rooms, where in a 40-minute time block the eleven senior biographies would be shown in turn. Students and their seniors would then move (with parent chaperones and teachers) onto the patio terrace for several games which seniors and students could play together or seniors would enjoy watching students play. The activity directors at *The Benchmark* would provide equipment and leadership for these games. The third "station" would be for shared lunchtime between students, parents and seniors. The staff of *The Benchmark* suggested the simplest solution to dietary concerns and preferences. Students would bring brown bag lunches and the seniors would be provided box lunches from *The Benchmark's* kitchen. *The Benchmark* would provide a variety of canned sodas and juices, as well as trays of cookies. Large patio tables with umbrellas would be the fair-weather location for this station. Large public dining rooms were reserved for this date as rainy day locations for the second and third stations.

Upon returning to school after this meeting, this author began coordination of the many details for the culminating date, using the checklist from the previous effort. A press release was prepared (Appendix S). Transportation, chaperones, audiovisual equipment, and other details were organized and then communicated to classroom teachers (Appendix T). Parent volunteers for this date already exceeded the number that chaperoned for Interview Day, so a formal request was not sent home, but students were encouraged to invite their parents to attend the picnic at *The Benchmark.*

Making Access Universal

Parents rallied to help during the next stage, that being the transfer of the completed stacks onto videotape (Appendix U). By this time, the dedicated parent force was confident in the routine of being given the initial set-up and parameters, and then proceeding on their own, knowing that the Learning Technologies Facilitator and/or Library Media Teacher would be available to troubleshoot problems or answer questions. This element from the parents – the confident and trusting approach coupled with enormous blocks of time -- formed the basis for the resulting success of this stage of the project.

The logistics of the transfer process involved connecting a multimedia desktop computer workstation to TV and VCR. The cable used is commonly called an RCA cable and can be found in most hardware stores; it consists of standard red, yellow, and white plugs that fit into the jacks found on the back of most modern TVs and VCRs. In this case, the computer provided the source signal, so the cord plugs were connected to the computer's audio and video output jacks. The other ends of the plugs were connected to the TV's audio and video input jacks, because parents needed to see that the computer program was transmitted to the TV. The TV's audio and video output jacks were connected to the VCR's audio and video input jacks, thus sending the signal to the videotape when the "Record" button was pressed.

This equipment was set up in an "extra" classroom that had housed Apple IIes earlier in the year. Parents were familiarized with the preparation steps for the transfer process, and the Learning Technologies Facilitator and Library Media Teacher remained in the room as a number of the first videos were transferred by parents, supervising and reminding the parents of next steps. The first step in this complex process was the simplest; a parent had to preview the stack and become familiar with the progression through the stack that the student authors had designated. The next step for the parent was to check that all sound buttons functioned and that all scrolling textboxes worked properly; the parent then made the buttons controlling these functions invisible, and set them to activate when the screen opened. The next step was to add the "Credits" card designed by the Learning Technologies Facilitator and Library Media Teacher, and key in the relevant students' and senior's names. This final card was set to begin scrolling slowly upon opening. Once all cards and buttons functioned properly, the parent then removed the toolboxes and menus from the screen and placed a blank videotape in the VCR.

At this point, the parent volunteer manually operated the student-created stack using computer keyboard shortcuts (such as Ctrl-Shift and the ">" symbol to move from card to card) after the "Record" button was pressed. Because the buttons were invisible and automatic, sound clips played when each card opened, thus eliminating the appearance of a cursor or browse tool in the middle of an otherwise polished and professional-looking multimedia biography presentation. Parents patiently waited as the screens scrolled slowly enough for senior citizen eyes to read the text and view the photographs. When the recording was complete, the parent pushed the "Stop" button on the VCR, rewound the tape, and ensured that the program had in fact transferred completely and accurately to the videotape.

Some students had requested their own personal copies of their completed projects, and had provided their own new videotapes on which to record them. These second copies were made at this time as well, and more parent volunteers labeled the student copies and sorted them by classes. Others took the senior citizen's copy of the multimedia biography, labeled it appropriately, inserted the audio clip credits sheet, wrapped the video in a large Mylar gold bow, and sorted those by classes.

One of the classroom teachers created colorful certificates of completion to distribute to all of the students and senior citizens at the picnic, with signature lines for the classroom teacher, this author, the principal, and the social worker at *The Benchmark*.

Two days before the picnic, classroom teachers reserved VCRs and arranged to show their students' ten or eleven completed video biographies. While these were nearly identical to the multimedia versions evaluated by them only days before, none of the students had seen the "finished" version, which was free of menu bars and buttons and had the added feature of rolling credits at the end. Students really enjoyed viewing these more polished videos, and of course every student was thrilled to see his or her name roll by on the credits screen. In all three classes, students voted to have adults present at the picnic read their screens aloud, cognizant of the fact that senior ears need loud and clear voices. Students commented that they themselves would be nervous, and that they'd rather simply focus on the seniors' faces and enjoy their reactions, since they were, after all, giving them gifts of a sort that they had worked hard on.

An additional benefit to these "premier screenings" was that teachers were able to confirm that all videos could be viewed in the forty-minute timeframe allotted for the picnic. Teachers reported that this "dress rehearsal" was well worth the class time spent, as students came away from this viewing with a great sense of pride, a sense of closure to their work, and an eagerness to present these fine projects to their senior partners. The air swelled with the students' excitement, and the afternoon bore telltale signs of anticipation. On a Thursday that students might normally have been discussing family plans for the upcoming Memorial Day weekend, conversations were instead overheard about what students were planning to wear the next day, what favorite foods they planned to pack for their brown bag lunch, and which student groups were going to make special cards or bring garden flowers for their senior.

The Day of the Picnic

The weatherman predicted a "blustery" day, and this proved to be the case. Project coordinators greeted each other early that morning with relief that alternate venues had been readied for the outside activities. The Learning Technologies Facilitator arrived at the school looking a bit greenish, and offered his apologies for missing the day's celebration. He didn't think that the staff or residents of *The Benchmark* would appreciate getting his flu along with their biographies, so he'd only come in to school to see that everything was ready. Staff members stopped in to confirm times that they were to meet everyone at *The Benchmark.*

Parent chaperones began to arrive for the meeting before school. The principal arrived and thanked everyone for the phenomenal hours spent on the project. This author briefly explained the three-station rotation process for the day, and offered suggestions for ways that parents could be of assistance. The "workload" for the day was considerably less than Interview Day, in that the focus for the first and most important station was the television screens on which the videos would play, and the other the staff of *The Benchmark* would supervise two stations. A core group of parents who had been involved with the HyperStudio class and video transfer process began toting audiovisual equipment and boxes of beribboned videotapes and certificates to cars, comfortable in the "take charge" role without being asked.

Parents climbed into each other's cars and headed out of the parking lot as the bus arrived at the school to pick up the first class. A sense of déjà vu was felt as the nervous and excited students appeared at the school front entrance in their best clothes.

Parents gathered in the lobby of *The Benchmark*, and were permitted entry as the social worker led them to the large public rooms on the floor below. Two parents were posted at the large doors on the ground floor's back entrance, and the others followed her to the two large living rooms where the videos would be viewed. A few parents began unpacking and organizing the videotapes, and others greeted their children's senior partners like old friends. By the time this author arrived downstairs with the security-cleared school district representatives and newspaper reporters, the air was filled with celebration. Parents were organizing the first class of students, ensuring that students were somehow able to sit near their seniors in the "living room" setting. *The Benchmark* staff seemed content to let these competent parents take charge, so they did – emceeing and moving the video viewing process along in both rooms, inserting tapes into the player, narrating the videos in loud and clear voices, and returning the videos to the correct seniors.

Caught in conversations with district employees and the press, this author was struck by the sense that the project had become the community's. The parents had taken the helm, allowing the students to enjoy the fruits of their labor. The students were entranced by their seniors' emotions, which moved quickly from astonishment to joyful tears, punctuated occasionally by an embarrassed chuckle, a whistle, or hand wringing. Seniors murmured "Oh my," and teased each other about photos from their younger days. When each video came to an end, a senior clasped wrinkled hands around smaller ones, and searched for words to express their gratitude. This collection of emotions, singular to each project and out of the hands of school personnel, proved to be the most meaningful evaluation of each student's work, far outweighing any peer comments, rubrics, or grade. Real people in a truly objective audience reacted very strongly to the efforts of these eight- and nine-year-olds, giving the students a sense of accomplishment in the real

Closing Remarks

Participants in this project were consistent, by group, in their evaluations of the overall project. Having received much praise and emotion-laden thanks for their efforts, most students were glad that they had been a part of the project, and many were able to identify with great accuracy and detail a number of skills and values that they had gained. Parents involved in the project raved about its value despite the long hours required by them, and several of their positive comments were documented in district publications and local newspapers. District administrators enjoyed this positive press, and were pleased that the project's original learning goals, aligned with state and local guidelines, had been met. The staff of *The Benchmark* also reaped the benefits of the positive press coverage, and their quotes characteristically reflected their interest in their residents' improved quality of life. The classroom teachers involved in the project were also recipients of much of this praise, but when asked by parents if the project would be repeated, all three gave a definitive "no." Their reasons, given in private interviews with this author, were best summarized by a teaching veteran's observation:

> Constructivism, multimedia, intergenerational biography documentation and all that… These are all based on sound, quality theories, but translation into the classroom is problematic. Actual everyday practice has indicated over the years that teachers consider all of the above to be too time-consuming. It simply requires too much effort, especially in cases where little or no support exists from the district or site administration in the form of technology or time or acceptance of authentic assessment (Fahlbeck, R. J., personal communication, March 3, 1999).

This theme represents the primary obstacle to effective implementation of technology in today's classrooms. Engaged learning or any other model that effectively

This theme represents the primary obstacle to effective implementation of technology in today's classrooms. Engaged learning or any other model that effectively employs technology and authentic learning consumes massive amounts of time. Teachers feel pressured to cover the required curriculum in a certain timeframe, and often have difficulty replacing previously taught specific units of study with amorphous new projects. Even when learning goals are clearly stated and accomplished, and even when serendipitous learning occurs in affective areas, teachers may not feel that the loss of direct teaching time was worth sacrificing. This feeling may be complicated by reticence on many teachers' parts to fully implement and utilize ongoing methods of authentic assessment, such as learning logs, regular small group conferencing, and frequent dedicated times for peer editing.

This having been said, it must be noted that one of the classroom teachers and this author teamed on an extension of this project to document her preferred treatment of this subject as a springboard to students' interest in their own family trees. This extension of the project involved two other classroom teachers, making a team of four educators from Elizabeth Blackwell School of the 100 teachers involved in a variety of online projects funded by the Northwest Technology Articulation Committee. Details of this project can be found online (Mulford, 1998) along with many other projects completed by other teachers on other topics (Bingham, 1998). In the course of completing the online project, this author's team pioneered the practice of using photographs of students and seniors on webpages for the district, and thus developed precautionary practices later adopted or adapted by the district. These included limited use of student photographs (unidentified, blurred, and with parent permission only) and use of senior citizen photographs; forms for legal permission to use these photographs were designed and utilized (Appendices V and W).

In addition, this author taught an enrichment class for second and third graders in the district summer school program, in which students constructed family tree books which included scanned photographs and anecdotes from each member of the family. In the latter project, students used a variety of maps to record family members' geographic paths over time, and a variety of graphs to demonstrate birth year trends for generations.

Nonetheless, this author and countless other educators and administrators will continue to attempt projects such as this one, involving varying amounts and levels of constructivism and technology implementation. A number of lessons will be learned by doing each, and documentation of these lessons learned makes the implementation of each future undertaking a bit smoother.

If this author were to attempt to repeat this project with another group of students, several topics would bear consideration. This particular project benefited enormously from the extremely high level of parent involvement, and the absence of that in any other school would require that the project coordinator or staff or students compensate for the missing parent hours. This is no small amount; parent hours must certainly have approached a thousand, by conservative estimates.

This particular project could also have been more successful if ongoing alternative methods of assessment were regularly employed in all of the classrooms, and this author would spend considerably more hours focusing on that issue with teachers, probably in the form of coteaching. The teachers who agreed to participate in this project, like so many educators today, faced a great deal pressure, both internal and external, to cover district curriculum, prepare students for standardized tests, and focus on individual student needs. In a perfect world, there would be no interruptions to one's train of thoughts, and teachers' best laid intentions for major projects would not fall prey to school-wide assemblies, fire drills, power outages, network failures, field trips, and a host of other everyday demons that regularly interfere with student progress. This is not reality, at least not in most classrooms. Teachers who attempt new projects, of their own or others' design, must be credited for their progressiveness rather than held to even higher standards. Shortcomings perceived by project coordinators must, out of necessity, be re-evaluated to determine whether more external support could have been provided to the classroom teacher. In this case, this author believes that it could have been.

One unexpected controversy between parents and teachers arose as the video transfer process commenced. Teachers and parent helpers had belabored all of the suggested editorial changes with student groups for two or more months, and rubrics had been completed, and revisions had been made. "Final" versions were moved from one network share folder into another as they were deemed "done" by the student authors. The parents who came to volunteer their time to transfer the HyperStudio stacks onto videotape were dismayed to find that the "final" versions still had errors in them, some errors of writing mechanics and some errors of biographic information accuracy. Parents wanted to correct these errors, and quickly, in order to get their job done and get it done right. Teachers, however, accustomed these days to such things as inventive spelling and poetic license, were more reluctant to "fix up" student work. This difference of opinion actually smoldered for over a week, with both sides somewhat resentful of the other's position. In the end, parents justified making changes by calling in one or more of the student authors for each project, reviewing the entire stack together, and making proposed changes only with student approval. As a result, the students learned even more, parents and teachers could each live with the results, and no senior citizen was the recipient of an inaccurate biography.

Other educators considering intergenerational correspondence between students and seniors might give serious communication to telecommunication possibilities at both ends. If this author were to attempt such a project again, grant monies or other alternative funds would be solicited in order to provide a computer and modem and portable keyboards to *The Benchmark* for at least the duration of the project. While one can romanticize the charm of handwritten letters and cards between students and senior citizens, the value of information immediacy would have been tremendous at times when student interest waned due to long periods without responses from the seniors. In addition, the issues of legibility of red crayon and elderly scrawlings would have been moot. Finally, it is likely that writers on both ends would have produced lengthier letters with portable keyboards as tools rather than pencils or pens. Upon hearing this line of reasoning, some adults with borderline involvement in the project suggested that phone calls become the central means of communication, but neither the seniors nor the students in this project possessed the memory or note-taking skills to make that an effective option. Furthermore, the reading and writing and information literacy skills practiced throughout this project would be lost as would any permanent trace of the content of these calls, once the receivers were replaced. The photographs, cards, and other thoughtful sentiments could still be exchanged, even if e-mail became a central means of communication. Both students and seniors found these tokens delightful, a humanizing and capricious expression in a serious assignment, and parents and teachers even suggested that future partnerships undertaken might benefit from a parent volunteer whose time was dedicated entirely to organizing and planning student crafts for senior gifts.

A great deal of the project coordinators' time was spent, during the Benchmark-Blackwell project, on locating, scanning and preparing graphic files for network access by students. Pre-locating and loading public-domain photographs of a historical nature would have been advisable, but particularly those that represent turn-of-the-century lower and middle-class daily life – women doing the endless daily chores or children playing alone or together – were the most commonly requested and most difficult to locate. This author was fortunate that one parent took the time to learn to use the scanner and navigate the network; when the project reached its height in May, that parent was adept at pulling graphics from share folders for student use. The list of step-by-step instructions that she prepared for other parents was taped to the computers in the hallway coves outside classrooms, and this author heard little more from that point on about missing graphics.

On the subject of graphics, it is not possible to overemphasize the need to teach and re-teach visual literacy throughout multimedia projects. A frequent exasperation from parents was that student groups continually inserted photographs or clipart on screens with text that had absolutely nothing to do with the picture. Parents and classroom teachers frequently blamed modern television's hyperactive advertising methods for the skewed connections. Regardless of the source of blame, it does seem to be challenging to children to determine which of several graphics is the most appropriate to accompany given text. This issue was taught in large group sessions by the Library Media Teacher and by classroom teachers, and in small groups with parents and other staff members such as the Reading Improvement Program aide.

Staff at *The Benchmark* suggested that more emphasis be placed upon students keeping in touch with seniors after the biographies were complete. This author felt that every attempt had been made toward that end, but agreed that it would be nice if more students maintained contact. Students were encouraged from the onset of the project to consider the biography as a beginning to a long friendship. In reality, this author doubted that most eight- and nine-year-olds possess the inner drive to maintain such a correspondence without adult assistance. Therefore, two avenues were pursued to encourage lengthier relationships. The first was a regular campaign to parents, involving constant encouragement to take their child to *The Benchmark* on a weekend day for a spontaneous visit, to help their child call the senior one weekday evening, and to send a postcard to the senior from the family's vacation (Appendix Q). A number of working parents who were unable to be involved at school did follow through on some of these suggestions, and it was their children who remained in touch with their senior more than a year after the project's perceived completion. A few parents took their children for regular visits for quite a while after the school year ended, and one mother-daughter team expanded their involvement, distributing Holy Communion on a weekly basis at *The Benchmark*. One parent was quoted in the paper as saying that the experience had made her feel rather guilty about not visiting her own elderly family members often enough, and that she had in fact made a point of visiting a few times as a result of her involvement in the project (Anderson, 1998). Many other parents echoed these sentiments. The second avenue pursued by this author to encourage lengthier relationships was through the teachers of the next grade level. Copies of all student names and corresponding seniors and apartment numbers at were distributed to the teachers that students would have the following year, along with a letter offering ideas for ways to tie a follow-up letter into curriculum. The Benchmark-Blackwell project had received a fair amount of attention and publicity, and teachers throughout the school were familiar with it already and responded favorably to the ideas.

The favorable press was not accidental, and perhaps that invites the next reflection. Coordinators of any such project involving the community outside of the school would do well to invite the press to attend (Bohen, 1998). This author found that writing press releases and faxing them to the editors of the local news agencies was quite effective in gaining coverage of the events that took place press (Anderson, 1998; Cookis, 1998). In many districts, this must be forwarded through a particular person or office at the school district. In the Benchmark-Blackwell project, forwarding a copy of the press releases to the Community Relations office at Schaumburg Community Consolidated School District 54 resulted in even further coverage of the project in the district's quarterly mailing to residents in the school district (Keeley, 1998b). Students involved in the project proudly brought copies of the articles in to class to share, and were predictably enthusiastic about seeing reviews of "their" project in print.

The final reflection, appropriately, brings the focus back to the student learning that occurred. The greatest example of empathy in learning context came unexpectedly. The coordinators of the Benchmark-Blackwell project had briefly considered the statistical possibility of one of the senior citizens becoming ill during the course of the yearlong project. However, when one of the men passed away in April, the three boys were as shocked and unprepared for his sudden death as everyone else was. Still, they carefully collected the obituaries of this former prominent citizen from the local papers, created a beautiful construction paper card of a black tree silhouetted against a watercolor sunset, wrote a priceless tribute to their hero inside, and completed the multimedia biography to present to the man's son. Those boys, who had previously quarreled about every detail of the project, suddenly bonded and learned how to work together, because as one of them was later quoted in the newspaper, "he would have wanted it that way."

Students in the Benchmark-Blackwell project were asked throughout the project and in June to identify what they had learned. This process of metacognition was critical, of course, but dreaded by many, because as one girl put it "Just thinking about everything I learned today makes my head hurt!" Students became adept at questioning, inquiring, and seeking information in alternative ways. They practiced reflective listening, which was a real challenge to many of them at first, but helped their summary skills tremendously. They became masters of some of the historical phrases and experts at identifying the year associated with certain pieces of period music. Their letters, photocopied and kept for months in a portfolio, provided a visual record of how much their letter-writing skills had improved. They were introduced to basic social skills of introductions and brief visits, and many learned how to politely raise their voice to a level that was audible by their senior partners. They became multimedia pros, and better writers, very sensitive and very aware of writing for an audience. These students learned multitudes about organizing a long-term project, and all of them completed it successfully – something that this author thinks might have been a first for a few of them. They learned that their parents cared about what they were learning, especially when it related to values and respecting one's elders. They learned that their parents and teachers can learn from them, especially about technology. They learned that history is a story, and what matters is how it is told.

LIST OF APPENDICES

APPENDIX A:
ILLINOIS STATE LEARNING GOAL 16
BENCHMARKS AND STANDARDS RELEVANT TO THE
BENCHMARK-BLACKWELL MULTIMEDIA BIOGRAPHY PROJECT

State Goal 16: Understand events, trends, individuals and movements shaping the history of Illinois, the United States and other nations

Learning Standard	Early Elementary Benchmarks	Late Elementary Benchmarks
A. Apply the skills of historical analysis and interpretation	16.A.1a Explain difference between past, present, future; place self in time 16.A.1b Ask historical questions and seek out answers from historical sources 16.A.1c Describe how people in different times and places viewed the world in different ways	16.A.2b Compare different stories about history, analyze differences in perspective. 16.A.2c Ask questions and seek answers by collecting and analyzing data from historic documents, images and other literary and non-literary sources.
B. Understand the development of significant political events	16.B.1a (US) Identify key individuals and events in the development of the local community	*[Benchmarks in this section not relevant to the Benchmark-Blackwell Multimedia Biography Project]*

State Goal 16: Understand events, trends, individuals and movements shaping the hist Illinois, the United States and other nations

Learning Standard	Early Elementary Benchmarks	Late Elementary Benchmarks
C. Understand the development of economic systems	16.C.1b (US) Explain how the economy of the students' local community has changed over time 16.C.1a (W) Identify how people and groups in the past made economic choices (e.g. crops, to plant, products to make, products to trade) to survive and improve lives 16.C.1b (W) Explain how trade among people brought an exchange of ideas, technology and language	16.C.2b (US) Explain how individuals... contributed to economic change through ideas, inventions and entrepreneurship 16.C.2c (US) Describe significant economic events including industrialization, immigration, the Great Depression, the shift to a service economy and the rise of technology that influenced history...

APPENDIX A(cont'd)

State Goal 16: Understand events, trends, individuals and movements shaping the hist Illinois, the United States and other nations

Learning Standard	**Early Elementary Benchmarks**	**Late Elementary Benchmarks**
D. Understand Illinois, United States and world social history	16.D.1 (US) Describe key figures and organizations in the social history of the local community	16.D.2a Describe the ways in which participation in the westward movement affected families and communities
		16.D.2c (US) Describe the influence of key individuals and groups... in the historical eras of Illinois and the United States
	16.D.1 (W) Identify how customs and traditions from around the world influence the local community	16.D.2 (W) Describe the various roles of men, women and children in the family, at work, and in the community in various time periods and places
E. Understand Illinois, United States and world environmental history	16.E.1 (US) Describe how local environment has changed over time	16.E.2a (US) Identify environmental factors that drew settlers to the state and region
		16.E.2c (US) Describe environmental factors that influenced the development of transportation and trade in Illinois

Adapted from Illinois State Board of Education (1997)

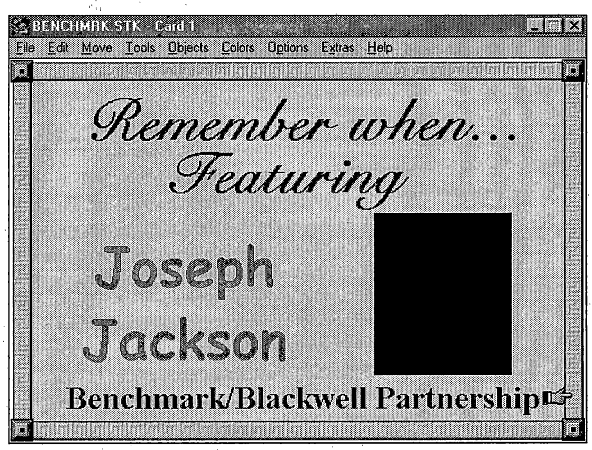
APPENDIX B
HARDWARE AND SOFTWARE PRODUCT LIST

Product:	Purpose:	Company:
HyperStudio, version 3.0 (software)	Hypermedia development application based on cards and stacks	Roger Wagner Publishing, Inc. 1050 Pioneer Way, #P El Cajon, CA 92020 (619) 442-0524 www.hyperstudio.com
Inspiration Education Edition, version 5.0 (software)	Visual thinking and learning software used for brainstorming and organizing thoughts	Inspiration Software, Inc. 7412 SW Beaverton Hillsdale Hwy, Suite 102 Portland, OR 97225-2167 (503) 297-3004 www.inspiration.com
IBM PC 300GL 200MMX Desktop	Student Workstations	International Business Machines Corporation New Orchard Road Armonk, NY 10504 (914) 499-1900 www.ibm.com
Compaq Presario 4184ES	Student Workstations	Compaq Computer Corp. 20555 State Highway 249 Houston, Texas 77070 (281) 370-0670 www.compaq.com
UMAX Astra 1200S Flatbed Scanner	Color flatbed scanner (with software) that enables digitizing of images (such as old photographs) for use in other programs	UMAX Technologies 3561 Gateway Blvd. Fremont, CA 94538

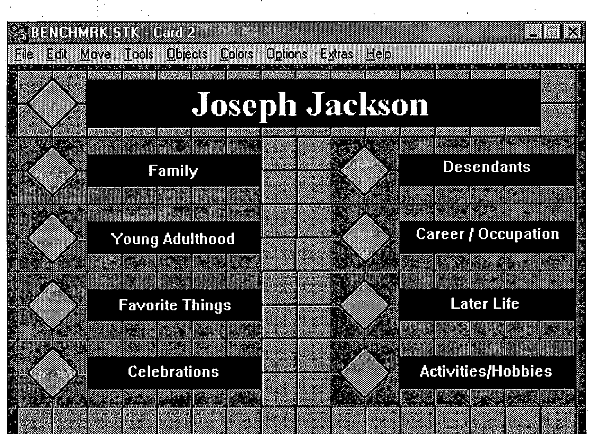
Product:	Purpose:	Company:
Epson Digital Camera G640A and Epson Photo PC500 version 2.0 for Microsoft	Camera (with software) that enable photographs to be transferred directly to computer for use in the	Epson America Inc. 20770 Madrona Avenue, Torrance, CA 90503
Panasonic CD player SXBS (model no longer made)	Sound source for recording sound clips into the computer for use in the HyperStudio biographies	Matsushita Electric Corporation of America www.panasonic.com
BayNetworks AH Router 56k direct Internet access	Local Area Network (LAN) component that provides a connection to the Wide Area Network (WAN). Routes information packets to the modem and then to the Internet Service Provider (ISP)	BayNetworks 4401 Great America Pkwy Santa Clara, CA 95052
Cabletron hubs SEHI 24 and SEH 24	Local Area Network (LAN) component that allows multiple data locations to access network resources	Cabletron P.O. Box 5005 Rochester, NH 03867
Lucent Cat 5 Plenum Cabling	Local Area Network (LAN) component that allows high quality connectivity from each data jack to the patch panels and therefore the hubs and router. Provides up to 155 MB bandwidth.	Lucent Technologies Inc. 600 Mountain Ave. Murray Hill, NJ 07974 908-582-8500 www.lucent.com

Product:	Purpose:	Company:
Racal DSU 6424 Modem	Wide Area Network (WAN) component that provides the connection to the Internet Service Provider (ISP).	Racal-Datacom 1601 N. Harrison Parkway P.O. Box 407044 Fort Lauderdale, FL 33340-7044 FAX (305) 846-5510
Sharp Projection Unit	A projector that connects to the back of most IBM or Macintosh computers. This device projects whatever is on the monitor screen onto the wall screen for viewing by audiences of more than a few people.	Sharp Corporation Osaka, Japan (800) 237-4277 http://www.sharpsav.com

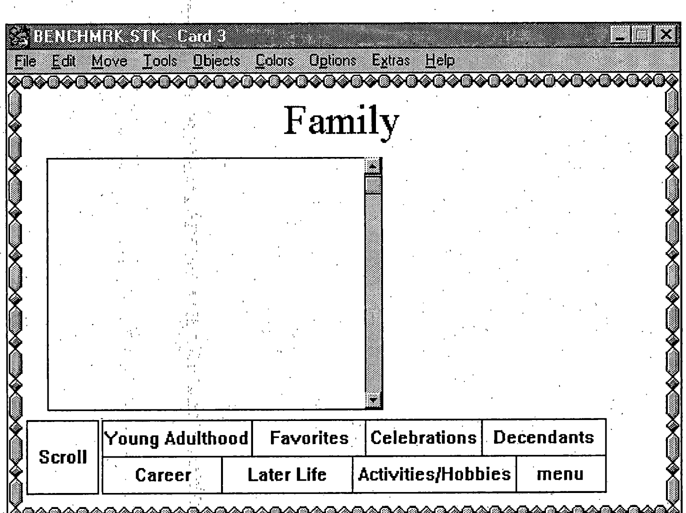
APPENDIX C
TEMPLATE CREATED BY
LEARNING TECHNOLOGIES FACILITATOR

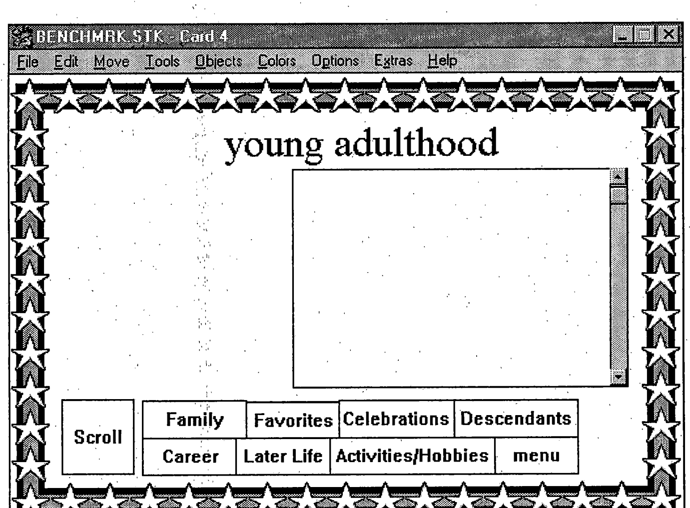


For the title card (above), students learned to access and edit text boxes by replacing the name (Joseph Jackson) with the name of their senior. Students then learned to insert a graphic object by pasting a photo of their senior that had been taken on Interview Day. The main menu (below) intentionally contained a spelling error (Descendants) in a text box for the students to correct, giving them and opportunity to practice this new skill independently – a first example of scaffolded instruction in programming skills.



The cards below show template screens provided to students, both on paper (as an advance organizer) and on the network (for scaffolded instruction in creating a biography stack for their senior. Students were taught how to edit button names and text boxes, how to change borders and add graphics and change background and text colors. Few of the finished products resembled this template, in appearance or interactivity. This was viewed by project coordinators as a sign that students had used this template as an organizational tool only, as it had been intended, and felt competent enough in their programming and creative license to personalize their own project.





APPENDIX D
FIRST MEMO TO TEACHERS

TO: Debbie Davis
Carlotta Lencioni
Bev Thompson

cc: Brian Eldredge
Maureen McKeough
Larry Mynars
Dr. Lucier

FROM: Kymberli Mulford

Yesterday, I went to The Benchmark to meet the director, Nancy McCaffrey. She's very excited about the project. She led me to a conference room, where she introduced me to three of her assistant directors. I shared our draft of the plan we discussed Monday. I think that they were a bit awed by the technology aspect of it, but were eager to begin the partnership.

They are working to find 30 or so great candidates from the 280+ residents. We clarified that the Benchmark staff would select (from a group of volunteers) the seniors most "approachable" who have some clarity and possibly also the seniors who have some involvement with family or friends living nearby.

They preferred that we correspond *en mass* via large envelopes. They also indicated that a number of the seniors that they already had in mind would not be comfortable being interviewed outside of The Benchmark. Also whenever possible, they would like to have the students (escorted, of course) meet the senior in their own apartments, where they are surrounded by their own belongings and memorabilia. They felt that this would also solve the potential difficulty of hearing problems.

The biggest problem we are still facing is the logistics of the interview process in March. The preference seems to be that twenty students interview their ten seniors at a one time (as opposed to sixty interviewing thirty). This breaks us neatly into our own class designations anyway, and the possibility of finding ten school adults to assist is a reasonable one. The question of transportation remains, as the Benchmark "wagon" can only be used for transporting seniors, as we suspected. I assume that funds are the issue on our end. I posed the question to Lonna, and she had some great ideas, questions, and names of district people to contact. (What else would you expect from Lonna?☺)

Marianne Zito called last night to discuss the possibilities. She's checking with Transportation to find out if we could get one bus to do three round-trip circuits in one day, and therefore pay for only one bus, for one day. She suggested that we put together a list of supplies needed (such as videotapes, craft supplies, etc.) and discuss it first with Dr. Lucier for the possibility of "discretionary funds" and then bring it to her. She's looking into finding some extra money from Social Studies.

I'll follow through this weekend with a base set of materials (books, photos, maps and such) from the library and historical society. If you plan for the K-W-L experience early next week, introduced general letter-writing skills, and possibly fit the turkey card in somewhere, I'll plan on delivering the first package as we head out for Thanksgiving break. I'll also work on getting recruits to get photos of your students (from the Epson to the computer onto your printer), and on drafting the letters to your students' parents and to The Benchmark residents' families.

APPENDIX E
FIRST DRAFT OF CALENDAR

October: Teacher/facilitators will provide a variety of materials for student exploration:

- memorabilia/photos from 1900-1940
- historical fiction
- fiction relating to grandparents or the elderly

Library Media Teacher will contact *The Benchmark* to coordinate details of project, draft letter to families of *The Benchmark* residents, and draft letter to students' parents.

Teacher/facilitator will do a K-W-L exercise with the class, and explore a plan for study.

Teacher/facilitator will introduce the idea of interviewing local senior citizens.

Library Media Teacher will share a multimedia biography of a senior.

Teacher/facilitator will focus ensuing discussion on ways to gain more background historical information about the time period and lifestyle.

Class will brainstorm a list of questions that may be appropriate for initial contact.

Class will brainstorm a parallel list of questions that students could use as a framework for their own introductory paragraphs about themselves.

Students will make initial contact by correspondence. Pairs of students will write introductory letters and make a Thanksgiving card for their new friend at *The Benchmark.* Photos of the students will be included.

December: Students make and send craft to seniors.

Students begin to receive return letters from seniors.

Students develop classroom system for recording information from letters.

Students develop rough timeline template for classroom, begin personal timelines.

Students make plans for class video to *The Benchmark.*

January: Students produce video from classroom to *The Benchmark.*

Students explore interview skills by watching interviews, role-playing and practicing.

Students continue correspondence with *The Benchmark* residents, collecting information.

Learning Technology Facilitator will begin to teach *HyperStudio* to students. Students will begin to construct *HyperStudio* stacks.

February: Library Media Teacher will coordinate final details of *The Benchmark* visit for March.

Students make and send Valentines to seniors.

Students will identify which U.S. Presidents have held office in seniors' lives and calculate their senior's age at the time of selected major historical events.

Students will develop storyboards documenting seniors' lives, and from this, develop personal lists of unanswered questions.

Students will plan interview questions.

Learning Technology Facilitator will continue to teach *HyperStudio* to students. Students will continue to construct *HyperStudio* stacks, entering information collected. If families of the senior citizens have provided any photographs for scanning, these can be transferred .

March: Students will interview seniors at *The Benchmark.* Full team of school and district support personnel and parent volunteers will assist students in videotaping, audiotaping, and photographing seniors, seniors' families, and students together.

Learning Technology Facilitator will assist students in transferring audio, video, and/or digitized photos into *Hyperstudio* stacks.

April: Students will plan an Earth Day celebration with seniors, to include a cooperative art project made with recycled materials.

Teacher/facilitator will assist students in collecting any additional pieces necessary for completion of the seniors' biographies.

Students will create multimedia biographies using *HyperStudio*. Learning Technologies Facilitator will work with students closely during this phase.

All staff involved in this project will help in task of transferring *HyperStudio* stacks onto double copies of videotape.

May: Students host a picnic for seniors, at which time students will present one copy of the videotaped multimedia biography to the senior partner and/or the senior's family. The other copy will be inserted into the student's portfolio.

APPENDIX F
CHILDREN'S SUPPLEMENTAL LITERATURE LIST

Grandparent-Living in Child's Home

Argell, Judie	*Secret Selves*	Ages 11-13
Donnelly, Effie	*So Long, Grandpa*	Ages 9-11
Langner, Nola	*Freddy My Grandfather*	Ages 5-8
Mearnai, Judy Frank	*Someone Slightly Different*	Ages 10-12
Sachs, Marilyn	*Class Pictures*	Ages 10-13
Shreve, Susan Richards	*Family Secrets: Five Very Important Stories*	Ages 9-11
Smith, Robert Kimmel	*Jelly Belly*	Ages 10-12
Stolz, Mary Slattery	*What Time of Night Is It?*	Ages 11-14
Stren, Patti	*There's A Rainbow in My Closet*	Ages 8-10
Tate, Joan	*Luke's Garden and Gramp: Two Novels*	Ages 10-13
Testor, Sylvia Root	*Sandy's New Home*	Ages 5-8

Living in Home of Grandparent

Adler, Carole S.	*The Silver Coach*	Ages 9-12
Ames, Mildred	*Nicky and the Joyous Noise*	Ages 9-12
Bates, Betty	*That's What T.J. Says*	Ages 9-12
Bridgers, Sue Ellen	*All Together Now*	Ages 11+
Bridgers, Sue Ellen	*Notes for Another Life*	Ages 12+
Butterworth, W. E.	*Leroy and the Old Man*	Ages 12+
Byers, Betsy Cromer	*The Two-Thousand-Pound Goldfish*	Ages 9-12
Dyer, Thomas A	*The Whipman is Watching*	Ages 10-14
Farley, Carol J	*Twilight Waves*	Ages 10-13
Gaardniner, John R.	*Stone Fox*	Ages 8-10
Gerson, Corinne	*Tread Softly*	Ages 9-12
Greenfield, Eloise	*Grandmama's Joy*	Ages 4-8
Hermes, Patricia	*What if They Knew?*	Ages 9-11
Hest, Amy	*Maybe Next Year*	Ages 9-12
Holland, Isabelle	*Now is Not Too Late*	Ages 10-13
Irwin, Hadley	*Moon and Me*	Ages 11-14
Irwin, Hadley	*What About Grandma?*	Ages 11+
Phipson, Joan Nash	*A Tide Flowing*	Ages 12+
Potter, Marian	*The Shared Room*	Ages 10-12
Somerlott, Robert	*Blaze*	Ages 10-13
Voigt, Cynthia	*Dicey's Song*	Ages 11+
Voigt, Cynthia	*Homecoming*	Ages 11+

Love for Grandparent

Abercrombie, Barbara M.	*Cat-Man's Daughter*	Ages 11-13
Bates, Betty	*My Mom, The Money Nut*	Ages 10-12
Bawden, Nina Mary Kark	*The Robbers*	Ages 9-12
Brancato, Robin F.	*Sweet Bells Jangled Out of Tune*	Ages 11-14
Brandenberg, Aliki L.	*The Two of Them*	Ages 3-7
Bridgers, Sue Ellen	*Notes for Another Life*	Ages 12+
Caines, Jeannette F	*Window Wishing*	Ages 4-7
Clifton, Lucille	*The Lucky Stone*	Ages 6-10
DePaola, Thomas A.	*Now One Foot, Now The Other*	Ages 4-7
Donnelly, Elfie	*So Long, Grandpa*	Ages 9-11
Farber, Norma	*How Does It Feel To Be Old?*	Ages 8+
Gardiner, John R.	*Stone Fox*	Ages 8-10
Goldnam, Susan	*Grandpa and Me Together*	Ages 2-6
Greenfield, Eloise	*Grandmama's Joy*	Ages 4-8
Harris, Robin	*Hello Kitty Sleeps Over*	Ages 2-5
Henriod, Lorraine	*Grandma's Wheelchair*	Ages 3-7
Hurd, Edith Thatcher	*I Dance In My Red Pajamas*	Ages 3-6
Irwin, Hedley, (pseud.)	*What About Grandma?*	Ages 11+
Knox-Wagner, Elaine	*My Grandpa Retired Today*	Ages 4-7
Langner, Nola, Freddy	*My Grandfather*	Ages 4-7
Lasky, Kathryn	*My Island Grandma*	Ages 4-7
L'Engle, Madeleine F.	*A Ring of Endless Light*	Ages 11-14
Lexau, Joan, M	*I Hate Red Rover*	Ages 6-8
MacLachlan, Patricia	*Through Grandpa's Eyes*	Ages 5-8
Madler, Trudy	*Why Did Grandma Die?*	Ages 4-9
Mearian, Judy Frank	*Someone Slightly Different*	Ages 10-12
Mohr, Nicholasa	*Felita*	Ages 8-10
Sebestyan, Ouida	*Far From Home*	Ages 12+
Skolsky, Mindy Warshaw	*Carnival and Kopeck and More About Hannah*	Ages 7-9
Somerlott, Robert	*Blaze*	Ages 10-13
Stevens, Margaret	*When Grandpa Died*	Ages 4-6
Stren, Patti	*There's a Rainbow in My Closet*	Ages 8-10
Townsend, M. & R. S.	*Pop's Secret*	Ages 5-7

Respect for Grandparents

Butterworth, W. E.	*Leroy and the Old Man*	Ages 12+
Farber, Norma	*How Does It Feel To Be Old?*	Ages 8+
Hall, Lynn	*Danza!*	Ages 9-12
Hurmence, Belinda	*Tough Tiffany*	Ages 10-13
Skolsky, Mindy Warshaw	*Carnival and Kopeck and More About Hannah*	Ages 7-9

APPENDIX G
QUESTIONS GENERATED BY STUDENTS

Note: The feminine pronouns have been used intentionally, indicating our discussion of the reasons that the majority of our senior citizen partners are women.

Birth Details

Where was she born?
When was she born?
What time was she born?
To whom was she born?
Was she born poor or rich?
What was her birth order?

Childhood

How did she behave in his childhood?
Did she play any sports?
Did she have any nicknames?
What was her childhood like?
How many siblings did she have?
Was she the oldest or youngest?
Did she have a large or small family?
Did she have a lot of friends?
What did she do for fun?
Where was her hometown as a child?
What was the style (of clothes) back then?
Did she have a lot of clothes?
What was she interested in?
What chores did she have?
Did she have any pets?
Did she wear glasses?

Education

Where did she go to school?
Where did she go to college?
Did she get a good education or drop out?
Who was the most important person/teacher to affect her?
What kind of homework did she have?
Did she walk to school?
Did she go to public or private school, or was she home schooled?

Young Adulthood: Descendants and Family Today

Was she married?
To whom was she married?
Did they stay married?
Did they have children?
Who worked to support the family?

Later Adulthood

Where does she live now?
Is her husband still alive?
Do her grown children live nearby?
Does she have grandchildren?
How does she celebrate the holidays today?
What hobbies or activities does she enjoy?
What friends does she have?
Is she still in touch with any of his childhood friends?
Of which accomplishment is she most proud in her life?
Does she have any goals or wishes that are still unfulfilled?
Does she have any regrets? Would she have done anything differently?
What advice does she have for children today?
How can children today affect their grandparents' lives more positively?
(Conversely) How can seniors today affect their grandchildren's lives more positively?

APPENDIX H
FIRST LETTER TO SENIORS
Original sent in large, bolder font

Dear (*Name of Benchmark Resident*), November 27, 1997

Blackwell's third and fourth grade students are very excited about your participation in our local history and biography project. They thank you, in advance, for volunteering. I thought you might appreciate an explanation of what you might expect out of participating in our learning experience.

The attached letter and photograph is from students who will be working with you. These students have been looking at books and photographs from the 1900-1940s, and trying to picture what life might have been like as a child during that time. You are obviously an expert on this subject. Your accounts of your childhood, teen years, and young adulthood are exactly what these students are hoping you will share.

They want to know everything you can remember, in detail. For example, what did your house look like? How many brothers and sisters did you have? Did you get along with them? Did you ever get into trouble? What kinds of toys and games did you have? What did you do for fun? What kinds of chores did you have to do? What did your school look like? What was your favorite subject in school? Who was your best friend? How did you meet the love of your life? How many children did you have, and what memories do you have of being a young parent? There is no limit. The more you can tell, the better.

I realize that this could be an exhausting task. If writing is difficult, please do enlist the help of a friend or family member to write down the words you dictate. Try to do a little each day, rather than a large quantity all at once, and stop when you get tired. If it is easier to just talk, see if someone can tape-record you talking about those memories. Look back at photographs and your personal memorabilia. Maybe they will spark a memory or two. Start thinking about which of these photographs you would like to have us record in your biography.

The staff at *The Benchmark* will be collecting your letter. On Monday, December 8, I will deliver your letter to your Blackwell friend. The students will begin to organize your recollections into a computer program called *HyperStudio* that can combine text and sound and photographs and videotape. Your young friend at Blackwell will probably need to exchange several letters with you in order to get enough information to write your life story. Also, if you have family or friends in the local area, we'd like them to contribute anecdotes about your life or even photographs.

Your photographs will be safeguarded by me personally; I can use an electronic scanner to "take pictures" of your photographs. You will get your photographs back unharmed, and you will be able to see them in your multimedia biography that the students create.

When the multimedia biography is all done in May, you will get a copy of it on videotape. You can watch it on your own VCR, share it with your friends at *The Benchmark*, or even give it to your friends or family one day as a piece of history.

In March, we're planning to have the students visit you at *The Benchmark*. With your permission, we'd like to videotape you talking with them, and take a photograph of you with them.

Thank you, again, for agreeing to participate. You have so very much to share. It's wonderful that you can contribute to the learning experience in this way. Please do talk to your visitors and neighbors about your involvement with our school project. If you or they have any questions or concerns, please let *The Benchmark* staff know. We'll be happy to work with you to make this a most positive experience.

Sincerely,

Mrs. Kymberli Mulford
Library Media Teacher

APPENDIX I
SUGGESTIONS FOR CLASS VIDEO TAPE

TO: Debbie Davis
Carlotta Lencioni
Bev Thompson

FROM: Kymberli Mulford

Keep the camera very still for nearly all of the time that it's on.
(Lots of movement tends to give the viewers vertigo.) Use the tripod, and if you're going to use a student cameraman, be sure they understand that less movement is better. A single, slow pan around the room should be enough. Other than that, consider moving the kids to the camera, rather than the other way around.

Be sure that "background noise" is kept to near-silence. Be sure that any students talking on the video have *practiced* speaking loud and clear, and not dropping off the ends of sentences (as kids will do when embarrassed).

Similarly, take a very critical look around your room for cluttered areas. (No, your classrooms would *never* be "cluttered," but it's amazing to me that every time I have the family camcorder in hand, there's a pile of laundry or papers directly in the background…) Have students do a quick spit-and-polish treatment of their desks, centers, boards, etc. before you start recording.

Talk in advance about how "dumb camera behavior" is distracting from the video, and won't make a good impression on their senior friends.

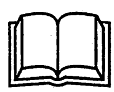
Have fun with the content. See if you can understand the video if you play it with the sound OFF, or with the contrast set to total blackness. Half of the seniors won't be able to hear it *and* see it very well anyway. Brainstorm ways to solve either problem – a very clear narrator, or temporary focusing on "subtitles" you can write on the board to divide sections of the video.

APPENDIX J
SECOND TEACHER LETTER TO SENIORS

To: Our Senior Friends at Benchmark
From: Your Student Friends at Blackwell

Dear (Name of Senior) Monday, April 20, 1998

Your biographies are coming along really well. You may get a phone call in the next week or so, if we have any more questions, but in general, we're excited about how much information we have.



As you may realize, our computer program has places for photographs and drawings, as well as typed words. We have to put pictures on every "page" of the computer's "book" about you. If you have any photographs from your childhood or young adulthood, please consider loaning them to us for one day. (Otherwise, on a page about your family, we might have to put a generic photograph of some other little children when we write the part about you and your siblings!) As we promised before, if you give your photographs to Kim downstairs at The Benchmark, she'll see that Mrs. Mulford (our Library Media Teacher) gets them "copied" into the computer. You'll get your original photographs back, safe and sound, within days.

Last but not least, we hope to be able to put short music clips in from some of the favorite songs from the 1900-1940s. Attached is a list of several songs we have studied with our music teacher. Please put your name at the top of the page, and choose about three songs that you like. Then we can make sure that a short bit of that music is recorded into your video biography. You can give this Favorite Songs sheet to Kim, as well.

Thanks again for helping us with our biography projects! We'll write again soon!

The students at Blackwell
- Mrs. Davis' class
- Mrs. Lencioni's class

APPENDIX K
HARDWARE MANAGEMENT

Computer Teams were broken down with the following thoughts in mind:

1) People who just got new computers (largely a group that has gone without, all year) should not have to immediately surrender these new treasures. Call them the Gold Team.

2) However, people who have shared computers all year should not continue to be hit up each week. Call them the Blue Team.

3) For this particular project, using Macs creates a complication. We'll combine them into the mix more for other projects later and next year. Call them the White Team. (See the school colors?)

For all Mondays, the IBMs currently housed in Kymberli's area of the LMC, the pod and the one school "floater" on a cart will all be used. The laptops will be available to classes on a signout basis, as usual.

As a reminder, if your computer is going to be used on a Monday, please move your computer to the pod sometime the previous Friday. You can retrieve your computer any time after 3:00 Monday.

Regarding sign-up times for the pod on the Mondays:

1) Teachers are encouraged to sign up for the 30-minute afternoon slots. We'll use the same teams.

3) The sign-up sheets are located just outside of the computer pod door.

4) Teachers must remain with their classes for computer pod time, and it is assumed that alternative assignments will be made for any student who has not returned an Internet Access Permission slip. It is also assumed that students searching the Internet will be searching curricular topics, using specific sites that teachers have previewed. Students should <u>not</u> be doing recreational "surfing" in Web areas not previously visited by the teacher. Our part of the shared responsibility of student web use includes assuring parents that we have taken these steps to preview appropriate sites for their children to use in their studies.

APPENDIX L
PATHING THE NETWORK

In order to access the additional graphics (such as scanned photographs of a senior's childhood or candid photos taken on Interview Day or class party days) and sound clips recorded by the music teacher, follow these directions:

Open HyperStudio and open the students' stack to the card that requires a graphic.

From the menu bar, choose "Objects" and "Add a graphic object..."

You want to get your graphic from a disk file, so click "OK" on the next box.

At the top of the next box, next to the words "Look in:" click on the down arrow that appears next to the folder called "HSArt".

Click on "Network Neighborhood". The list that appears is a collection of all of the computers in the school district that are online at the time. They are alphabetically arranged.

Use the horizontal scroll bar to get to "BLA001" (at the end of the B's). This is Blackwell's server.

Double-click on BLA001.

Double-click on the folder called Teachers.

Double-click on the folder called Mulford.

Double-click on the folder called Benchmark.

Double-click on the folder called Digital Photos.

Choose the photo you want from the folders called Childhood, Interview, or Parties. Seniors' photos are identified by the first six letters of their last name and are sequentially numbered (for example: *renner01.jpg)*.

APPENDIX M
INVITATION FOR PARENT TRAINING IN *HYPERSTUDIO*

As promised, a special class *just for parents involved in The Benchmark Project* is being offered. Any parent who has a child in Mrs. Davis' class, Mrs. Lencioni's class, or Mrs. Thompson's class is eligible to attend. (Even if you were unable to join us for the day we visited The Benchmark.)

The students in these classes are just beginning to work with a program called *HyperStudio*®, which is a very flexible and fun presentation program that combines text, graphics and sound. This program can be used from about 3rd grade through high school. (Just last summer, I attended a teaching seminar in which the instructor showed off several HyperStudio projects on recent history created by juniors and seniors at Hoffman Estates High School.) Anyone can learn the program, so don't worry if you can "barely turn the computer on!" You won't get left behind. We'll have fun!

Here's how it works. You attend <u>one</u> of the two-hour classes listed below, and then become available to your child's classroom teacher for an hour or two as a Parent Helper for HyperStudio. Each teacher will be running her own individual schedule for students to be working on their programs (one small group at a time ☺) from mid-March to the end of April. You can sign up for classroom help in pairs, so you won't be entirely alone.

Benchmark HyperStudio for Parents
Date: Monday, March 2, 1998
Time: 9:00 – 11:00 a.m.
Where: District 54
Technology Learning Center

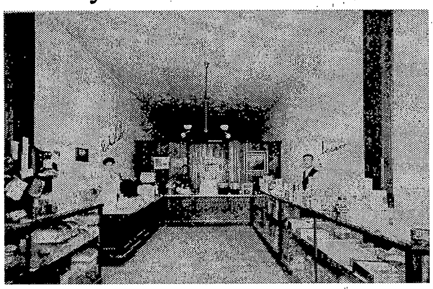
Benchmark HyperStudio for Parents
Date: Thursday, March 12, 1998
Time: 9:00 – 11:00 a.m.
Where: District 54
Technology Learning Center

Sign up for only <u>one</u> of the class times listed above. Sign-up sheets will be posted outside the appropriate classrooms during conference times. You can also reserve a space by calling Mrs. Mulford. We need a minimum of six parents per class, in order to be able to retain the Technology Learning Center, which is normally used for technology instruction for District 54 staff. At the time that these classes are offered, teachers will have determined their individual classroom schedules for rotating students through the computer stations to work, from the week before Spring Break through the last week of April. Parents will have an opportunity to sign up for any number of times to work with the students on the projects.

If you have any questions, see Mrs. Mulford.

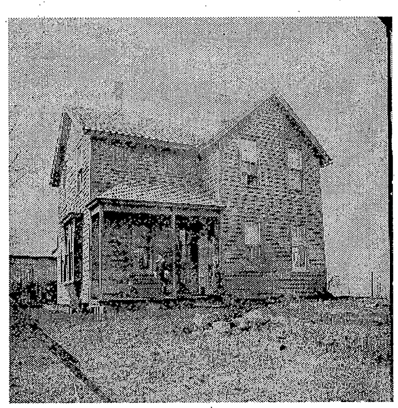
APPENDIX N
SAMPLE PAGE FROM PHOTO CATALOG

bakery



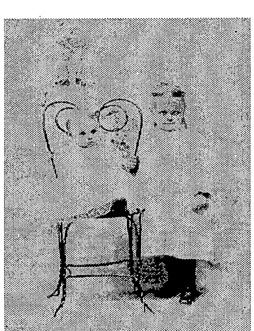
artwortf

dadart



wortmanh

dollyw



bhaz

amycovey

burchard

dadartm

APPENDIX O
SOURCES CITED FOR AUDIO CLIPS

Some of These Titles May Have Been Included in Your Biography:

File name	Song Title (Artist)	Recording Source
1900	Alexander's Ragtime Band	McGraw-Hill Music Series
1900	Palm Leaf Rag (Scott Joplin)	McGraw-Hill Music Series
1900	Sugarfoot Stomp	McGraw-Hill Music Series
1900	You're a Grand Old Flag (George M. Cohen)	McGraw-Hill Music Series
1910	Yankee Doodle Boy (George M. Cohen)	McGraw-Hill Music Series
1920	My Blue Heaven (Gene Austin)	Billboard Pop Memories-1920's
1920	Sonny Boy (Al Jolson)	Billboard Pop Memories-1920's
1920	Whispering (Paul Whitman & Ambassador Orch.)	Billboard ... -1920's
1920	Charmaine (Guy Lomberdo & Royal Canadians)	Billboard ... -1920's
1920	April Showers (Al Jolson)	Billboard Pop Memories-1920's
1920	Swingin' Down the Lane (Isham Jones Orch)	Billboard Pop Memories-1920's
1920	Charleston	Strictly Dancing: Charleston
1920	Lost your Head Blues	McGraw-Hill Music Series
1920	Travelin' Blues	McGraw-Hill Music Series
1930	Sing Sing Sing (Benny Goodman & Orch)	Billboard Pop Memories-1930's
1930	Begin the Beguine (Art Shaw & Orch)	Billboard Pop Memories-1930's
1930	Penny's from Heaven (Bing Crosby)	Billboard Pop Memories-1930's
1930	Stein Song	Billboard Pop Memories-1930's
1930	Boo Hoo (Guy Lombardo & Royal Canadians)	Billboard Pop Memories-1930's
1930	Night and Day (Leo Reisman & Orch)	Billboard Pop Memories-1930's
1930	Mood Indigo (Duke Ellington & Cotton Club Orch)	Billboard ... -1930's
1930	Over the Rainbow (Judy Garland)	Billboard Pop Memories-1930's
1930	Moonlight Serenade (Glenn Miller & Orch) B	Billboard Pop Memories-1930's
1930	It Don't Mean a Thing	McGraw-Hill Music Series

1940	In the Mood	McGraw-Hill Music Series
1940	Boogie Woogie Bugle Boy (Andrew Sisters)	Boogie Woogie Bugle Boy: Music of the War Years, V. II
1940	It Had to be You (Betty Hutton)	Billboard Pop Mem.-1945-1949
1940	The Trolley Song (The Pied Pipers)	Billboard Pop Mem.-1945-1949
1940	Swingin' on a Star (Bing Crosby)	Billboard Pop Mem.-1940-1944
1940	Don't Fence Me In (Bing Crosby)	Billboard Pop Mem.-1940-1944
1940	Riders in the Sky (Vaughn Monroe & His Orch)	Billboard Pop Mem.-1945-1949
1940	My Dreams Are Getting Better All the Time	Billboard Pop Mem.-1945-
1949		
	(Les Brown & His Orch)	
1940	Buttons and Bows (Dinah Shore & Her Happy Valley Boys)	Billboard Pop Mem.-1945-1949
1940	Sentimental Journey (Les Brown & Orch)	Billboard Pop Mem.-1945-1949

"Anchors Aweigh" performed by the U.S. Naval Academy Glee Club. *Set Sail (CD version)* produced by Richardson Records, © 1991, Annapolis, MD.

APPENDIX P
CREATING AUDIO RECORDINGS
FROM A CASSETTE OR CD PLAYER

Connections: **Make these connections prior to starting up the computer.**
Connect an audio cable from the player (cassette or CD) to the Sound input connector of the computer. This connections varies by brand of computer. Look for a "mini" plug one-eighth of an inch in diameter. It may have a sound (note) icon next to it. On the Compaq computers it also has an arrow pointing to the note icon.

The recording program is found by clicking on the **Start** menu, dragging to the **Programs** choice. Next highlight **Accessories,** then **Multimedia,** and finally **Sound Recorder.**

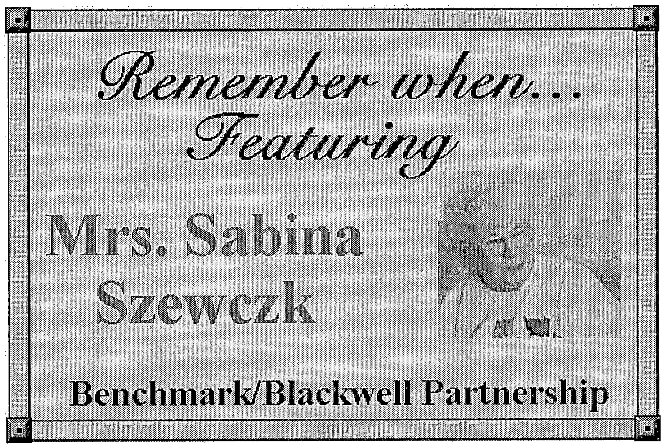
The sound recorder has buttons to record, playback, move forward fast, move backwards fast, and stop.

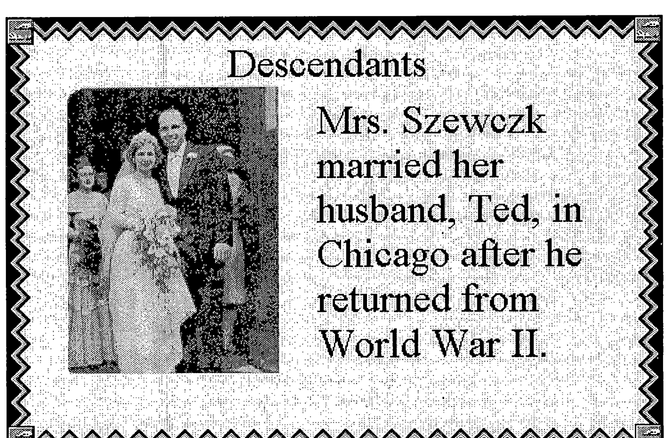
Begin playing the music from the source (cassette or CD) and then press the red record button. It seems that the first time it allows only 5 - 6 seconds of recording time. If you press record again it lengthens the total amount of time for subsequent recording time. Ten seconds of time is about 500KB of memory size. Try not to exceed that length because files will become very large quickly.

Saving Selections:
Go to **File** and choose **Save as..**
When in **Save as..** window make these changes:
- Click on **Changes**
- Choose **PCM 22,050 Hz, 8 Bit, Mono**
- Give the file unique name and save in a file with other sound files (make a new folder if this is the first one). This is just to keep them together.

To create another sound file, choose **File, New.** Be sure to check the **Format** sound file when you save. Be sure it is **PCM 22,050 Hz, 8 Bit, Mono**.

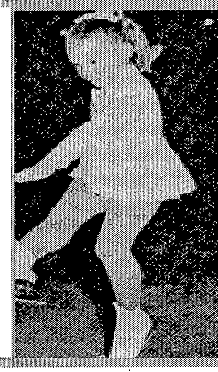
APPENDIX Q
FINISHED PROJECTS: SAMPLE SCREENS





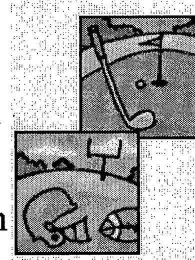
Activities/Hobbies

Mrs. Wilkes liked to skate on a tennis court when she was a girl. People who worked at the park would freeze it over in the winter time. Also, she would go sledding with friends.

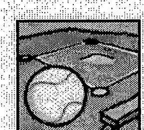


Favorite Things

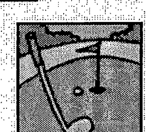
Mr. Wilson watches golf on Channel 11 WTTW. He likes football, but does not watch the whole game. He just watches the highlights on the news.



Activities/Hobbies

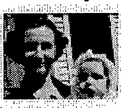


Mr. Wilson played baseball with a sixteen inch ball. He also played golf.



Family

Mrs. Zimmer has two sons, and two daughters in-laws. She has seven grandchildren. Soon she will also have some great grandchildren!



Childhood

When Mrs. Zimmer was a child, she lived on a farm with her parents, her two brothers,

Celebrations

Mrs. Zimmer really loves getting together with her family on the holidays. When they are together, everyone talks

COMPLETED RUBRIC: SAMPLES

Student's Name Mehwish and Krystle
Senior's Name Josephine C.

Category	1- Where is it?	2- Somewhat	3- Way to go!
Spelling		X	
Grammar			X
Punctuation and Spacing		X	
Picture relates to the text			X
Added detail to the cards		X	

Total number of points: 12

Teacher comments: I know that you were really overwhelmed with the number of photos she sent, and I think you're made good choices. We need to be sure that the text on each page is accurate and reflects that effort, too.

Student comments;

Student's Name Kenny and Brett

Senior's Name Marge S.

Category	1- Where is it?	2- Somewhat	3- Way to go!
Spelling		X	
Grammar		X	
Punctuation and Spacing		X	
Picture relates to the text			X
Added detail to the cards			X

Total number of points: 12

Teacher comments: Good effort on choosing the important details to include! Also, I know you've had to do some extra "scouting" for photos, and it shows. Let's spend some time working together on spelling, grammar, and punctuation.

Student comments:

Student's Name Kim and Jackie
Senior's Name Hap C.

Excellent Work!

Category	1- Where is it?	2- Somewhat	3- Way to go!
Spelling			X
Grammar			X
Punctuation and Spacing			X
Picture relates to the text			X
Added detail to the cards			X

Total number of points: 15

Teacher comments: Great colors and contrast! Extra effort to use his pictures paid off. It was thoughtful of you to include his wife in so much of your presentation.

Student comments;

APPENDIX S
PRESS RELEASE FOR PICNIC DAY

On the morning of **Friday, May 22**, three classes from Elizabeth Blackwell School will be traveling to *The Benchmark*, a retirement community near Hoffman Estates' Columbia Hospital, to meet again the senior citizens with whom they have been corresponding for seven months. In this culminating event, the students in these classes (Mrs. Davis, Mrs. Lencioni, and Mrs. Thompson) will be presenting their senior friends with videotape versions of the student-created, computer-generated multimedia biographies about them.

This year's partnership with *The Benchmark* has been a great way to blend the units of Biography and Schaumburg History, and it has offered the students a variety of authentic experiences in writing letters, organizing and assimilating information, creating a project, and of course, interviewing real people.

While several schools in District 54 have engaged in similar partnerships with senior living centers, Blackwell's project is unique in the way it incorporates state-of-the-art technologies to produce a memorable and impressive end-product. In October, students began corresponding with their senior partners for the first time; in February, the students met them for the first time, and interviewed them further. A myriad of parent helpers and District 54 volunteers roamed *The Benchmark*, attempting to get videotape and digital photographs of all of the seniors' interviews. Over the next few months, the 75 third- and fourth-grade students then inserted these video clips and digital photographs into *HyperStudio®*, a flexible and kid-friendly creative presentation program that combines text and graphics on the computer. In order to present these multimedia biographies to the seniors in a format that they and their families can enjoy, the computer-created biographies have been transferred to videotape. On May 22nd, in the culminating event, each senior will receive a videotape of their personal biography created by their young friends.

The staff and seniors at *The Benchmark* have been extremely helpful and appreciative of the students' efforts, and we hope that this heartwarming experience will encourage them to form a long-term partnership with us. We feel that, for the students, a greater result of the process is an understanding of another person, of the similarities and differences in all of our human lives, of the benefits of showing another person that they matter.

Date:	**Friday, May 22, 1998**	**Location:**	***The Benchmark***
Time:	**10:00 a.m. – Noon**	**Address:**	**1515 Barrington Road**
		Hoffman Estates, IL 60194	

Project Coordinator:	Mrs. Kymberli Mulford Library Media Teacher Elizabeth Blackwell School	School: 847/885-6758 Fax: 847/885-2877 e-mail: KymberliMulford@sd54.k12.il.us

APPENDIX T
BASIC INFO FOR BENCHMARK PICNIC
FRIDAY, MAY 22ND

Parents (10+) asked to meet Mrs. Mulford at Blackwell LMC at 9:15 for brief instructions. We'll then caravan to Benchmark and park in the hospital lot, as before.

Beginning at 10:00 a.m., three classes arrive at staggered times, entering through the back entrances of the building, and rotating through 30-minute stations:

1. Video presenting and sharing*

2. Games**

3. Lunch***

Parents' roles will be to circulate among student-senior groups and facilitate conversation, help photograph and videotape the event, and man the VCR or games or drink distribution, etc., as needed.

The last group boards the bus back to Blackwell at 1:00 p.m.

Various school district officials and members of the press have RSVP'd.

*Video sharing. This is really the purpose of the visit. An authentic audience will view the seven months' of work the students have done. We don't want to rush or spoil this special sharing opportunity. There will be two viewing areas, and a maximum of eleven biographies per class, each of which will run 3-5 minutes. We have 5 minutes of "pad" time between each whole-class rotation.

**Games: Horseshoes, target toss, outdoor bowling, etc. These games were chosen by the Benchmark staff, as activities that some of the more mobile seniors might be able to enjoy with the students. Even if the seniors are unable to join in for medical reasons, or simply choose not to, the staff felt that they would really enjoy watching the students. As we are having the picnic in many of the "common areas" of the Benchmark, other seniors will be watching and participating as well, from within the building, from the balcony, and from their own apartment windows. In case of rain, all activities will be moved indoors. Otherwise, only the video sharing station is indoors.

**Students, parent volunteers and teachers should bring a lunch. (Benchmark will provide senior lunches, drinks for all. Finding food that was healthy for all the seniors' diets and still appealing to kids was challenging.)

APPENDIX U
MEMO TO PARENT HELPERS ON VIDEO TRANSFER

Thanks so much for volunteering to help with the video transfer!

Brian will be training the following parents in the transfer process on Monday, May 18 at 8:30 in the LMC pod:

Carol M.	Sandy F.	Barb S.
Jeanne B.	Beth W.	Patty H.

Debbie D. has been hard at work (for days) editing the kids' stacks to be ready for the process, removing the buttons at the bottom of the page, making "minor" adjustments in spelling and content... She even gave up the Naperville field trip to work on these instead! At 3:00 today, there were six stacks ready for Brian and me to work with this weekend. I guess that means that there are thirty-one left to go...

Therefore, what I am proposing is that, once we're all "trained" on the video transfer process, perhaps we'll let Debbie show us the process she's gone through for the six that are now ready. If everyone takes three or four stacks, we could be substantially further towards our goal by lunch. We can play it by ear, and maybe those less comfortable with editing can begin the transfer process in earnest. What we absolutely don't want is to be in this state by next Tuesday or Wednesday.

On Tuesday morning, any of the people trained to video transfer are encouraged to return, of course. We'll be joined by Zora M. and Maureen M., and will hopefully get quite a bit more accomplished that morning, too.

Thanks. You guys are really great, and you're the reason the project will be a success.

Kymberli Mulford

APPENDIX V
AUTHORIZATION TO USE
CHILD PHOTOGRAPHS ON INTERNET

I, parent of (Student's First and Last Name), agree to allow the photograph shown at the bottom of this page, to be posted on the web pages listed below for an educational project. In keeping with the Internet policy of Blackwell School prohibiting publication of student photographs, I understand that the image of my child has been blurred to protect his/her identity. I grant permission for this photograph to be posted as is.

______________________________	______________________________
Signature of parent	Date
______________________________	______________________________
Signature of student	Date
______________________________	______________________________
Kymberli Mulford Blackwell School Library Media Teacher	Date

Web Address: http://web54.sd54.k12.il.us/ntac/branching_out/

APPENDIX W
AUTHORIZATION TO USE
PERSONAL PHOTOGRAPHS ON INTERNET

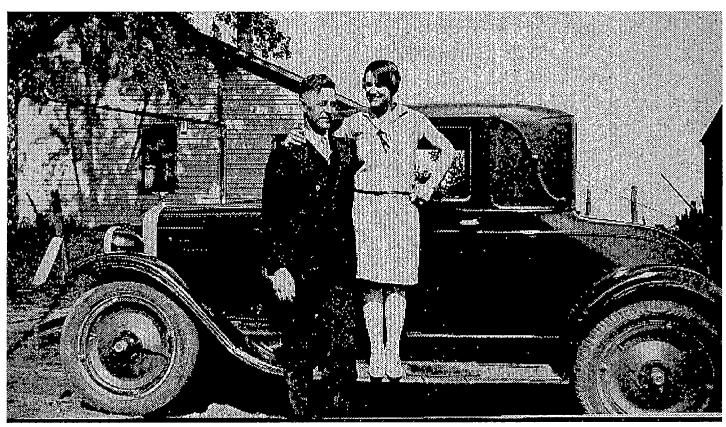
I, (Senior's First and Last Name), agree to allow the photographs of me, shown at the bottom of this page, to be posted on the web pages listed below for an educational project.

____________________________ _________________________

Signature of Benchmark Resident Date

____________________________ _________________________

Signature of Witnessing Benchmark Staff Member Date



Web Address: http://web54.sd54.k12.il.us/ntac/branching_out/

APPENDIX X
"KEEP IN TOUCH'

Monday, June 1, 1998

Dear Parent of (Student Name),

The Benchmark Partnership in which your child participated has been a tremendous success. One senior citizen's life has been greatly enriched by meeting your child, and by interacting and collaborating on this biography project. All teachers reassured Benchmark residents and staff that students would be encouraged to keep in touch, and everyone was relieved and encouraged by this news.

In order to encourage ongoing communication, we have a simple suggestion: write and visit your child's senior citizen over the summer. A postcard mailed from the family vacation, a simple short message and a colorful drawing, or even a brief visit on the Fourth of July would go so far towards brightening this senior's life. Please help and encourage your child to maintain this friendship.

Thank you!
Mrs. Mulford
Library Media Teacher

«Title» «FirstName» «LastName»
Apartment #«Apt»
The Benchmark
1515 Barrington Road
Hoffman Estates, IL 60194

Resident's private phone number: «Phone»

P.S. Our sources at the newspaper tell us the story will run on June 3rd!

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