The Purpose of Educational Technology

The student sits at a classroom computer grazing the Internet - a global network linking the student with vast databases, innumerable bulletin boards and millions of users. The potential is amazing. The information harvest could be impressive. Schools that can afford it are rushing to install wide area/local area networks and Internet nodes so that all classrooms might sit down to sample the electronic feast. Access becomes priority - for some it becomes obsession. But shouldn't we be asking some important questions about this wonder? For example: What is technology and what are the purposes for integrating technology within public education?

The word technology derives from the Greek technologica meaning systematic treatment. Too often today we limit our use of the concept technology to computer hardware and software or other electronic and digital devices that facilitate communication. Technology, however, is more than a physical tool. “It is a means to an end; it is a human activity.” (Norton, 1998) Perhaps no greater technological tool exists than the question. “The secret to effective research with new electronic information sources is the use of powerful questioning strategies. In fact, questions may be one of the most powerful technologies invented by humans. Even though they require no batteries and need not be plugged into the wall, they are the tools that help us make up our minds, solve problems and make decisions.” (McKenzie, 1997)

Within the public schools, successful integration of technology, then, would require each teacher and student to possess a “toolkit” of questioning skills that can be applied across the disciplines. This technology would help teachers and students make interdisciplinary connections and “serve as a filter, structuring and directing people’s interpretations of their experiences” (McKenzie, 1997). Computer hardware and software, then, are instruments in the
hands of educators and students so that they may conduct meaningful inquiry. In the best cases, schools will use these new tools in a way that will improve student abilities to:

- Generate original and unconventional ideas, explanations, hypothesis or solutions to problems.
- Assume the role of questioner and critic in evaluating sources of information – showing an awareness that not all assertions/data emanating from authoritative sources are absolute or certain.
- Contribute to collective efforts in a manner germane to a common theme and connected to prior learning
- Practice the democratic values of shared inquiry and civility when debriefing/reflecting upon educational experiences. (Newmann, 1990)

Three Narratives that Guide Technology Integration

Neil Postman (1995), Chair of the Department of Culture and Communication at New York University, argues that educational systems often fail to supply students with a unifying narrative that inspired earlier generations. By narrative, Postman means a story that tells of origins and envisions a future – “one that constructs ideals, prescribes rules of conduct, provides a source of authority, and above all, gives a sense of continuity and purpose.” (Postman, 5). With billions of dollars spent to place technological hardware and software in the schoolroom, the business office, and the home, Americans and other peoples from “first world” nations imply that technology is important. Computers and the Internet allow business to communicate across the globe in a time efficient manner. They provide school children and their teachers opportunities to interact with different cultures. They provide the inventive to create product
from their homes and others to consume them with a click of a mouse. Clearly, technological concerns have transformed our culture to where we draw our frames of reference and symbols from the technological realm and spend an inordinate amount of time trying to cope with technological issues rather than employing technology to cope with human issues.

The narratives that explain who we are and what we wish to become define those human issues. “Without a narrative, life has no meaning. Without meaning, learning has no purpose. Without a purpose, schools are houses of detention, not attention.” (Postman, 7). This paper identifies three narratives that are or could be used to support the integration of technology into public schools. After reviewing the narratives, efforts to integrate technology by governments, non-governmental organizations, and educational enterprises are examined, with actions taken at each level linked back to one or more of the underlying narratives that guide the effort.

**Economic Utility**

Perhaps the most common rationale educators use to justify technology integration is economic utility.

Addressing the young, it offers a sort of covenant with them: If you will pay attention in school, and do your homework, and score well on tests, and behave yourself, you will be rewarded with a well-paying job when you are done. Its driving idea is that the purpose of schooling is to prepare children for competent entry into the economic life of a community. It follows from this that any school activity not designed to further this end is a waste of valuable time. This narrative preaches that America is not so much a culture as an economy. Educators who operate based on this narrative argue that kids need to learn technology to get and hold a job. (Postman, 27)

A recent survey of Fortune 500 firms, however, demonstrates that technical and computer skills were mentioned much less frequently as essential to the workplace than high proficiencies in writing, reading, the ability to diagnose and solve problems and the ability to work effectively in
groups. (Nidds and McGerald, 1995). Computer literacy, absent these skills, will not necessarily increase the employability of students. The narrative of economic utility, then, is not a very powerful argument in favor of technology education.

**Students as Problem-Solvers**

Equally ineffective is the narrative that technology is a pre-eminent example of applied problem solving. (Pretzer, 1997). This rationale is currently one of the most persuasive within the educational community. Problem solving encourages students to seek weaknesses in existing processes and structures, design a solution, and evaluate its effects. Such a model certainly meets the elements of analysis, synthesis and evaluation, but it also establishes a psychology that is negative rather than optimistic. “[I]t implies that technology can solve all sorts of problems – still we know that technology by itself cannot solve problems of war, famine, and racism.” (Pretzer, 5). Concentrating on problem-solving too often promotes the belief that technology directly leads to human benefits. “In other words, we confuse technological problem-solving with human progress.” (Postman, 28).

**The Democratic Ethos**

For the modern, western world, the story of human progress rests upon the concept of a society participating in a democratic experiment. This third narrative asks youth to grapple with a society that poses one central question: Can a nation be formed and preserved on the principle of continuous argumentation? A society that embraces this reason for schooling “provides youth with the knowledge and will to participate in the great experiment, teaches them how to argue, and to help them discover which questions are worth arguing about. [Above all, educators
should] make sure students know what happens when arguments cease.” (Postman, 74-75). In this narrative, no one is excluded from the story.

**Method of Analysis**

This paper attempts to include the various levels of the educational system that attempt to implement change. The categories of analysis here exist at three levels (Knezek et al, 2000):

1. **Macro level: National system policy making**
2. **Meso level: International organizations’ efforts to define exemplary practice and standards**
3. **Micro level: The classroom level**

Together, the three levels define the nature of current theory and practice. However, since each level operates from a different narrative, efforts to integrate technology in a systematic manner remains difficult. Clearly, the three levels should be viewed as distinct change agents as opposed to complementary layers dedicated to the same process of technological change.

**Macro Analysis: National Efforts**

In 1996, the U.S. Department of Education published a report defining what role the federal government and state governments should take to meet the technology literacy challenge. To fulfill the charge that "every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers,” President Clinton set four goals for technology integration.
• All teachers in the nation will have the training and support they need to help students learn using computers and the information superhighway;

• All teachers and students will have modern multimedia computers in their classrooms;

• Every classroom will be connected to the information superhighway; and

• Effective software and on-line learning resources will be an integral part of every school's curriculum.

United States

A cursory review of the report, would lead one to believe that U.S. Department of Education officials were operating under the narrative of the democratic ethos. However, a closer inspection reveals the rationale for federal intervention is a combination of economic utility and creating citizen problem-solvers. Consider the following cases highlighted in the report.

At East Bakersfield High School (California) technology enhances a school-to-work transition program. Technology-based instruction is integrated smoothly into coursework from beginning to end. As freshmen, students take a nine-week course in keyboarding and basic computer literacy. Writing assignments in the freshman English and history core courses are organized to ensure that all students moving into their sophomore year are proficient in the use of word processing programs. As seniors, students have to complete a technology-based project as a graduation requirement. Projects involve the use of computers, graphics software, or video equipment.

Houston’s Northbrook Middle School prepares life-long learners for the world of work by organizing instruction around four learner-centered clusters. Teachers and students in each cluster work together to support one another in gathering information and solving problems.
Technology is employed to help students develop critical thinking and problem solving skills, as well as to tailor instruction to individual student needs.

With over 400 computers in place in the school's six technology labs and 48 classrooms, Northbrook has a student-to-computer ratio of just under 2:1. Each of the school's classrooms is outfitted with five or six computers. All of the computers have built-in CD-ROM capabilities in order to expand the range of software products available for student use. Access to network resources supports student information searches. Computers in the classrooms, in the computer labs, and in the library are networked together in a school wide LAN with Internet connectivity.

The report rationalizes the East Bakersfield and Northbrook programs in the statement: “By the 21st century, 60 percent of all jobs in the nation will require skills in computer and network use. This means that any student who does not know the essentials of using computers—word processors, spreadsheets, databases, networks, and operating systems—will be at a distinct disadvantage.” (U.S. Department of Education)

The same report also praises students at San Antonio’s Pease Elementary School for using technology to test the air in their own, poor smelling classroom. Using primitive air pumps and testing tubes, students were surprised to find elevated carbon dioxide levels in the air. They replicated their experiments in other classrooms with similar results. Since they could not find the cause of the elevated carbon dioxide levels, they decided to seek help on a computer network. An environmental scientist responded to their questions. With his suggestions in hand, the students examined the school's construction and found that the likely cause was poor ventilation. Using word processors and graphics programs, the students developed a presentation of their findings for the school board, which repaired the ventilation system.
Though the student performances are noble, the context in which the program operates is not. What is truly critical is not what we value in technology, but what values we express through technology. (Pretzer, 7). The description of the curriculum is limited to student acquisition of computer skills. The values of justice, honesty, self-discipline are missing. Students are not encouraged to question, let alone grapple with answering such questions as: Is it possible to preserve democratic traditions while allowing uncontrolled technological development? Do the television and computer technology limit or expand opportunities for authentic and substantive freedom of expression? (Postman, 141). To what extent do mass communications create a global village? To what extent do they reinforce isolationism?

Great Britain

Great Britain’s blueprint for technology education mirrors the United States’. Developed by the National Curriculum Council and published in 1990, the British National Curriculum has evolved from a tradition of craft-based education. Originally organized after World War II around separate studies in woodworking, metalworking, and technical drawing, the National Curriculum fused problem solving into a program that featured Craft-Designed Technology (CDT). The National Curriculum is a mandatory program in England and Wales for all primary and secondary schools. The technology curriculum requires students to apply knowledge to solve practical problems. It merged from the craft-design traditions and information-technology capabilities. Information technology is viewed as cross-curricular and is recommended to be taught as part of all core subjects. (Wright, 1993)

The exposure that students have to technology varies among schools. Most secondary students have technology for three hours per week. These classes, however may be in materials, food, graphic media, or textiles. Lectures and demonstrations are minimal because classes are
organized around design briefs. The students are given a challenge and are encouraged to seek appropriate information as the address the problems they encounter in developing solutions. Students are expected to document their work as they generate a design and evaluate it. The majority of lab work is competed with simple hand tools and very limited machine use. However, most important is the limited opportunities for students to participate in shred inquiry— a forum to reflect not only upon how they use technology as tools, but how they are used by technology.

The weaknesses of the program outweigh its strengths. The strengths of the program are two-fold. First, technology is designed for all children, regardless of age, gender, or career aspiration. Second, technology integrates a number of subjects under a single area. Unfortunately it does not organize subjects under meaningful ideas. The curriculum lacks a strong conceptual basis. Perhaps the fundamental problem is that technology, as defined by the National Curriculum, lacks a clear mission. The merging of home economics, art, business studies and craft design technology caused the national curriculum effort to lose focus. Technology is associated too strongly with basic skills and vocational education. When information technology becomes in reality computer skills, original intentions for students to question, create, argue, and make meaning become discarded. (Wright, 1993).

The National Curriculum is much like the current movement regarding American technology programs: classroom practice is driven by state tests used to measure student and program success. In contrast, most American programs identify content and then use problem-solving activities to make the content easier to understand. Technology in Britain is considered a trade. Neither curricula, however, is built upon the narrative of promoting a democratic ethos. Australia
In Australia, economic pressures have led to increasing importance placed on technological education. Though the goals of an effective curriculum have been determined (mostly borrowed from American standards), there is a move away from aligning technology with the trade/technical subjects. Instead Australian educators seek to place it more central to the core curriculum. Though many craft teachers argue that technology belongs in their domain, and many engineers view technology as a subset of science, David Treagust and Leonine Rennie (1993) report that technology education comprises four components: literacy, awareness, capability, and information technology – aspects of which all curriculum areas should address.

In 1993, the Ministry of Education in Western Australia invited schools to submit proposals for the incorporation of technology into their curricula. No specific guidelines were given to schools. Out of 21 submissions, six high schools were designated as Technology Schools by the ministry and received funding to implement their proposals. Three of the schools submitted a intended curriculum developed around the idea that technology is a human process involving thinking and learning. One school defined technology as a change agent in society and required students to complete five projects during the year that integrated multiple-disciplines along a theme or concept. Another school devolved the responsibility of coordinating the program from a central administrator to academic departments. The Social Studies Department emphasized the use of technology as a way of thinking and conducting critical analysis. (Treagust and Rennie, 1993).

The Ministry of Education in Western Australia monitored the extent to which the intended curriculum was implemented by teachers and then achieved by students. Overall the results of the evolution revealed three major factors crucial for success of the school-based curriculum initiatives in technology education.
• There is a need for continuous coordination by someone who has the resources and time to reflect about and maintain a loyalty to the guiding principles of the initiative.

• There needs to be thorough documentation about what is intended and what is happening so that faculty can be informed and modification can be made during implementation.

• Success requires time: time to plan, modify, implement, review, and communicate findings.

These three elements fulfill the democratic ethos narrative. Each relies on active participation, reflection, shared decision-making, the critical element of leadership, and charting actions periodically to maintaining consistency with philosophy. The study of Western Australia’s efforts is best summed up by an American educator calling for the same methods to be employed in his home state of Minnesota:

We often forget the original meaning of the word “school” – from the Greek schole, “leisure.” Leisure time to learn, to reflect, to think. I do not know any good teachers who have much of that. Professional platitudes about praxis – thinking in action – are not adequate. There is also a need for theoria – to walk away and to reflect. Perhaps it is time for professors and administrators to give the teachers a breather. It may be that, if we are truly serious about increasing student achievement, we ought to reduce teacher workloads, not increase to them. Jacques Barzun once said that most of America’s education problems would solve themselves if we just left teachers alone during the school year and made them read books in the summer. While I would not go quite that far, I would say that if our teachers don’t have time to think, why should we expect their students to think well? (Carpenter, 387-388).

Meso-Analysis: Non-governmental, international organizations
Thoughtful articles in journals dedicated to the educational profession often precipitate reflection among educators. Such publications are most usually sponsored by a professional organization with a particular interest in one aspect of the educational system. A hot topic in the field today, technology education is served by organizations like the Society for Information Technology and Teacher Education (SITE), the International Society for Technology Education, and the International Technology Education Association. Each publishes a journal. Each is dedicated to the study of technology integration in schools. Though based out of the United States, each professes to be international in scope. The three organizations mentioned above are the subjects of this level of analysis. The narrative from which they operate will be determined by their dedication toward providing an international forum for shared inquiry and the content of the articles that have appeared in their respective journals during the past three years.

The Journal of Technology and Teacher Education (JTTE) is published by SITE, an international, educational non-profit organization. An analysis of the content of indicates that less than 5% of the articles published from 1997-2000 involve international comparisons and/or non-U.S. studies (see Table 1). Most articles focus on teacher and/or student attitudes toward the implementation of technology and professional development --designs that help teachers develop computer skills and transfer them to enhance classroom performance. Most articles are presentations of research, though the studies favor evaluations of what Priscilla Norton (1997) defines as stage one or stage two integrations.

In *Teaching With Technology*, Norton defines three stages in the successful integration of technologies. The first stage involves the adoption of the innovation in a manner that does not threaten a culture. Employing higher-order question strategies ad hoc or using computers as a function of “edutainment” are actions of first stage users. When the innovation is merged with
older technologies to make more efficient use of a standard skill, educators enter the second stage. Keeping an electronic grade book and using word processors as typewriters are typical examples. The third stage of technological integration involves the use of innovations that grow out of the innovation itself. Holding students responsible for generating reading quizzes, using Bloom’s taxonomy, or developing mentorship programs via e-mail chat, collaborative web-site constructions and video teleconferencing seminars are excellence third-stage educational practices.

The Journal of Technology Education (JTE), an on-line journal that provides full text research-based and op-ed articles free of charge fairs better at fulfilling the promise of internationalism (http://scholar.lib.vt.edu/ejournals/JTE/about_jte.html). Approximately 12% of articles from 1997-2000 focused on technology issues outside the United States. Content analysis of articles indicates that technology in education is presented as a concept, as opposed to a set of skills or knowledge to be acquired. Robert Wicklein’s (1997) editorial, Curriculum Focus for Technology Education, exemplifies the type of work the JTE publishes. Wicklein discusses educational paradigms that lead to curriculum friction and accommodation in the technology integration process. His work operates under the premise that identifying a purpose of technological integration is critical to its success. William Pretzer’s (1997) “Technology Education and the Search for Truth, Beauty and Love” identifies and evaluated narratives that fail and narratives that can accomplish meaningful integration of technology. His work, in fact, serves as the basis of defining the problem-solving narrative that many educators hold dear. With a board of directors representing the United States, Canada, the Netherlands, Hong Kong, Great Britain, and Australia, articles carry a more diverse range of experience and theory.
Journal of Research on Computing in Education (JRCE). Like the JTE, its board is composed of members across the globe, yet only slightly more than 5% of its articles have an international flavor. Publications include both research- and theory-based articles, though most of the topics of research deal with topics that focus on superficial applications of software programs or teacher-training efforts without a narrative that connects it toward the development of a child or a civilization. One quickly perceives that the purpose of publication for many authors is to advance the self more than the field of inquiry. Examples include:

- A Case-Based Investigation of Issues Arising from Middle School Use of Collaborative Multimedia Technology
- The Relationship of Computer Experience and Computer Self-Efficacy to Performance in Introductory Computer Literacy Courses
Harmon: Purpose of Technology, 15

- Regional Educational Technology Assistance Initiative--Phase II: Evaluating a Model for Statewide Professional Development

ISTE contributes more to the field of technology education besides publication of the JRCE. The organization has also established educational technology standards for teachers and students. The teacher standards consist principally of a set of knowledge and skills – objectives that could be easily determined through standardized testing. Though a set of standards delineate social, ethical, and human issues the goals themselves lack substance and certainly a narrative that infuses the standards project with a clear sense of purpose and meaning. Below are the standard ISTE associates with technology and human issues. Teachers should:

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.

Unfortunately, the teacher standards are based more upon teacher behaviors rather than on student outcomes and are presented as additions to the content area skills teachers are accountable for teaching.

The ISTE student standards are no better. A review of the six domains indicates that students, too, are to be burdened by skills set apart from those learned in the major disciplines. Below are listed the six domains. Aside from the human issues standards, all focus on basic
skills and problem solving. The social, ethical, and human issues subset hold the promise of uniting the other skills under a narrative of democratic ethos. Unfortunately, the social/ethical issues are declared as standards, instead of interpretive questions or concepts that students would be expected to explore through their learning.

1. Basic operations and concepts.
2. Social, ethical, and human issues.
3. Technology productivity tools
4. Technology communications tools
5. Technology research tools
6. Technology problem-solving and decision-making tools

**Micro-Analysis: Curriculum Units**

ITSE provides on-line curriculum units that demonstrate the integrated nature of technology education and core disciplines. The Commemoration of the Gettysburg Battlefield unit, designed for grades 9-12 social studies is a typical example of poorly integrated technology. The unit requires students use a multimedia project, The Valley of the Shadow: Two American Communities in the Civil War, to create a presentation about the significance of the Gettysburg Address. Students work in teams to explore the interactive history materials. By the end of the unit, students are expected to access multiple primary sources, classify information from primary sources to form generalizations about the Civil War and democracy, and hypothesize the primary theme of the Gettysburg Address.

Unfortunately, the exercise asks students for basic recall of information found in a text on-line. It does not ask engage students to explore such questions as: If the Gettysburg Address was Lincoln’s response to the major issue of the nation, what was the question? To what extent
was Lincoln’s answer shaped by the age in which he lived? How is his response timeless? Has his address shaped American politics/society today? What evidence best supports your contention?

ISTE provides no assessment to measure student understanding of the social, ethical, or human issues which they describe in the social studies and technology standards. Measures of student manipulation of software and Internet sites are apparent. Measuring a student’s engagement in shared inquiry is more difficult when one is accustomed to standardized assessments that measure standardized objectives. ISTE units and students learning standards based on a democratic ethos would call for authentic assessments – opportunities for students to infuse the curriculum with the meaning they derive from the new experience, connecting the new to previous knowledge in a way that produces a nonstandardized product. Standards for authentic assessment are not an oxymoron. They do operate on a different paradigm of assessment – one that holds:

- Education is not memorizing facts but rather connecting information to achieve understanding; it is based on previous experience and not usually, is ever, determined by the organization of textbooks and courses.
- Not knowing what everyone needs to know, the public schools attempt to teach everyone everything, a just-in-case curriculum.
- The popular assumption is that, after “taking many courses throughout their entire youth, students will somehow manage to integrate all this information into a general understanding of how the world is constituted and works. Only rarely does this happen; most people, including teachers, never make such connections.
• Authentic education cannot really be measured in any formal way – at least no immediately after it has taken place. Real education usually requires a long period before it becomes evident. It is not neat and orderly and reducible to a set of scores. (Campbell, 406).

International Baccalaureate (IB) offers perhaps the most effective technology curriculum that meets a democratic narrative. Founded in the 1960s, the IBO grew out of international school efforts to establish a common curriculum and university entry credential for geographically mobile students. These international educators were also motivated by an idealistic vision: they hoped that a shared academic experience emphasizing critical thinking and exposure to a variety of viewpoints would foster tolerance and inter-cultural understanding among young people. Their charges were principally the children of U.S. and European ambassadors who expected that their sons and daughters, upon the age of 18 would enter the university of their choice. Concentration on the last two years of secondary school sought to build a comprehensive curriculum - leading to a baccalaureate - that could be administered in any country and recognized by universities in every country.

The educational philosophy of the organization is found in its mission statement adopted in 1996: Through comprehensive and balanced curricula coupled with challenging assessments, the International Baccalaureate Organisation aims to assist schools in their endeavours to develop the individual talents of young people and teach them to relate the experience of the classroom to the realities of the world outside. Beyond intellectual rigour and high academic standards, strong emphasis is placed on the ideals of international understanding and responsible citizenship, to the end that IB students may become critical and compassionate thinkers, lifelong learners and informed participants in local and world affairs, conscious of the shared humanity that binds all people together while respecting the variety of cultures and attitudes that makes for the richness of life. (International Baccalaureate, 2000)

In 1997, the IB developed a program entitled Integrated Technology in a Global Society (ITGS). Its purpose is to prepare students to meet the following challenges:
• Understanding the uses of information systems;
• Evaluating the consequences of those technologies on society;
• Determining, evaluating, and discussing the social significance of these technologies;
• Discussing ethical consideration from using information technology (IT);
• Predicting the changes most likely to emerge in the future.

The main emphasis of ITGS is to consider how two aspects, the social significance of IT and the ethical considerations arising from IT, influence individuals, communities (including nations), and institutions. IB communicates to teachers that knowledge of the technical details of how machines process data is not critical to the teaching of ITGS. Teachers from multiple disciplines should be considered appropriate instructors of the program, provided they have experience with current trends in information technology.

Student work consists of the development of a portfolio and the completion of a technology project. The portfolio consists of four pieces of written work with each 700-1000 word paper focusing mainly on a different area classified into the following categories:

Abuse/Security/Crime  The Global Society
The Work Place  Privacy
Leisure, Home and Travel  Education
Networks/Communications

Example issues/topics that students may explore are posed in the form of questions that carry a heavy social and ethical context:

• It has been said that the advanced technologies of information are also technologies of disinformation. To what extent do you agree?
• Is it inevitable that, when security measures are used to prevent crime, they also help protect privacy rights?
• How will the development and use of IT affect disparity between information-rich and information-poor nations in today’s world?
• What are the consequences for librarians of the evolution of libraries “without walls?”
• Encryption – who should hold the keys?

The ITGS Project emphasizes “the solving of a problem. Set firmly in a context where people are affected either directly or indirectly using the integration of several IT tools.” (International Baccalaureate, 1997). This part of the course assessment allows students the opportunity to solve a problem, but the problem solving is infused with enough learner choice and exercised through an approach of shared inquiry that keeps the democratic ethos alive throughout the curriculum. Exemplary projects set the problem in a social context and explain a need for solution, explains two alternative approaches that address needs and compares their feasibility, discusses the use of particular IT tools and evaluates a plan, explains how the solution was tested, refined, and retested, and compare at least two aspects of the project that have social significance.

The ITGS curriculum exemplifies the democratic ethos in practice. It involves students in systematic methods of inquiry and tests for truth. Truth-testing is the most controversial aspect of the curriculum because it calls into question our objectivity. Yet sound educational practice must commit itself to the disclosure, pursuit and transmission of truth in all disciplines. (Whitfield, 2000).
Conclusion

As educators, we have a crucial role to play in bringing technology into the lives of learners. Whether technology includes computer hardware/software, other electronic devices, or the most powerful tool of investigation – the interpretive question – we are colleagues who gladly assume the brave task of initiating the young into paths of truth that will secure their identities and build their moral character and sensitivity as global citizens. Without a strong narrative that seeks to explain us and unite us, the human spirit is likely to become greedy, superficial and addicted to self-gratification. Technology holds the promise of increasing our passion to know and understand. Under the rationales of economic utility or problem solving, it holds the danger of emphasizing external motivation that diminishes the internal motivation for trying and mastering anything. (Pretzer, 1997). Adhering to conflicting narratives, the efforts of nations, international organizations, and local curriculum writers will continue to confuse two fundamental questions that will define the success: What is technology and what are the purposes for integrating technology within public education?

Bibliography


http://www.ibo.org/ibo/english/aboutib.htm


McKenzie, Jamie (1997) The question is the answer: creating research programs for an age of information. *From Now On*, 7(2).  
http://www.fno.org/oct97/question.html


Providing Life-long Skill Training through an Integrated Education and Training System: The Australian Experience  
http://www.unesco.org/education/educprog/tve/nseoul/docse/rpllsie.html

http://scholar.lib.vt.edu/ejournals/JTE/v5n1/tregust_jte-v5n1.html

http://www.ed.gov/Technology/Plan/


http://scholar.lib.vt.edu/ejournals/JTE/v4n2/wright2.jte-v4n2.html