

Paul Wozniczka

Dr. Kimmelman

PTC 603

9 May 2010

Technology in American Education: The Philosophical Implications of Complementing Success  
in Interactive, Online Learning

*Introduction*

As technological advancements emerge, a society implements the technology in various fields, one of which is educational institutions. Online interactive technology allows instructors to leverage online resources to teach course material to their students. In order to understand the successful transition of traditional education into interactive, online learning in American educational institutions, one must consider the types of interactive technology used in K-12 education, the philosophy of technology especially as regards the social, political, and economic effects of technological advancements in online learning environments, such as would be related to improving social interactions, increasing literacy rates, the overcoming of poverty levels, the improving of technological availability, the maintaining of a communal learning environment, the implementation of education technology based on case studies and government policies, and the willingness of the current generation of students to adapt to the technology both inside and outside of the classroom, all of which can lead to improving performance in reading comprehension, computer-based skills, and social sciences, therefore I advocate the increased adoption of online learning by modern educational institutions to complement student technical abilities, ensuring that these institutions better prepare students for academic success in higher education—more so than the traditional methods of education used in previous generations.

### *Interactive Technology*

As society begins to understand the potential of emerging technology, it implements the technology throughout its regions. The growth of the internet has produced a global environment, overflowing with information about every facet of our lives. Children and young adults can interact with their peers using instant communication software, online forums and chat rooms, and social networking web sites. As more young students develop an understanding of this technology, they become more disconnected with communication methods that may seem “old-fashioned” to them. For example, outside of the classroom setting, a student can go online and read a book electronically, instead of relying on print. Students can also acquire audio and video products through the internet, and save these files on their laptop computers and mobile smart phones. Computer technology and internet data resources, such as journal databases, began as technology controlled by colleges and universities. As costs of maintaining this equipment has decreased, the average consumer has become able to acquire them for personal purposes.

Due to the fact that students access communication technology at lower costs, and in greater numbers, American K-12 educational institutions learned to utilize this technology in virtual classroom environments. For younger students, schools tend to focus on interactive software, usually in the form of a game. These interactive games are used for various subjects, including reading comprehension, language, typing skills, and even mathematics. Older students, typically in high school, are exposed to educational content management systems, such as WebCT, Moodle, and Blackboard. These systems became implemented by colleges and universities increasingly over the last decade, and in recent years, these software applications

were also being used in K-12 education, but primarily high schools. One can perform an online search for “WebCT high school” and the results present various high schools around the country using the software. I can search the other tools along with “grade school” and “high school” and also view results, so it is clear that these educational institutions are utilizing the technology.

One might ask about how K-12 educational institutions are using this interactive technology. These virtual classrooms emulate chat forums and online databases for many fields of interest, such as video games, music, and computer hardware, except that they are private and specific to each educational institution. The students and teachers must log in to the private classroom, where they have dedicated forum threads about individual courses, broken down into chapters, or other course material. Instructors can upload texts, video lectures, and create discussion threads to encourage active participation among their students. I argue that familiarizing K-12 students with this technology will help students further develop their academic skills, as they progress through the K-12 system, while also preparing them for higher education, due to the familiarity with the technology, and the fact that higher education also uses this technology.

With any new technology, there are always advantages and disadvantages when introducing it into curriculums, so it is necessary for K-12 educational institutions to use the technology to complement traditional education methods. College students are more suitable to complete distance learning environments than K-12 students, as the younger students require more personal, face-to-face attention from instructors. I base this idea on my own experiences in K-12 education, compared to my undergraduate and graduate university studies. A philosophical analysis can provide insight into how educational institutions can achieve this goal.

*The Philosophy of Technology*

The philosophy of technology studies the effects of technological progress and advancements on humanity. I am analyzing this philosophical concept and applying the philosophy of technology to the social, political, and economic effects of technological advancements in online learning environments. Before applying the philosophy to the technology, I must discuss the various philosophers, beginning with Plato. Plato was against formal and informal learning, which he defined as the use of “emotional involvement, unquestioned precepts” and “learning by imitation, observation, and casual assimilation” (Brown 673). This opposition seems strange to me, considering my experiences in American educational institutions, because emotional involvement and observation were two important aspects of my education. Plato suggested that educators use “technical learning,” which “can begin to dominate a society where literacy takes hold and specialists develop in every trade including that of transmitting culture or teaching” (673). This method encourages building on positive feedback between the student and instructor, and is used for younger children typically, to help build confidence. The phrase “technical learning” brings me to discuss another philosopher of technology, Jacques Ellul.

As an encompassing ideal for the effects of technology on humanity, Ellul uses the term “Technique” which has the characteristic “formed by an accumulation of means which have established primacy over ends” and that “modern man’s state of mind is completely dominated by technical values, and his goals are represented only by such progress and happiness as is to be achieved through techniques” (Mitcham 86-87). In these statements, Ellul feels that the methods

used in technology dominate the overall goals of the technology, and that humankind cannot escape the emerging technology. Concurrently, I feel that it is impossible to escape from technology in modern society because it is so integrated into all areas of our lives, such as in our homes, our cars, our shopping malls, and in our schools. Ellul asks two important questions regarding potential problems posed by technological development: “Is man able to remain master in a world of means? Can a new civilization appear inclusive of Technique?” (88). The questions posed by Ellul suggest that he ponders if humanity can balance the use of technology, without one side dominating the other. Leslie Sklair partially answers these questions when quoting Ellul, “Psycho-sociological techniques result in the modification of men in order to render them happily subordinate to their new environment, and by no means imply any kind of human domination over Technique (Sklair 220). Essentially, Ellul that believed as technology emerges, society adapts to it. As society uses the technology, it must be careful in its implementation, in order to minimize harm on humanity. A modern cliché that can summarize his philosophy is “think globally, act locally.”

Lewis Mumford described hierarchal organizations that utilized technology as “Megamachines,” such as the building of the Pyramids in ancient Egypt, or the “superb achievements in flood control, grain production, and urban building, which plainly benefited the whole community” (Mitcham 82). Comparing these achievements with modern education technology, I feel it is logical to equate educational institutions as Megamachines. These organizations are hierarchal, and their general goal is to benefit their communities of students. Not only are these institutions Megamachines, but so are online learning systems and the internet in general. Mumford warns that humanity must not be one-sided in its interpretation of how to use technology because humanity and technology evolve together (85). This idea is similar to

Ellul warning humanity that one side should never dominate the other, and that a balance is required.

It seems that the emergence and adoption of technology is the prominent topic in its philosophy. Martin Heidegger felt that the rise of technology was not due to a natural demand, but that “it was a new conception of nature as a complex arrangement of forces and energies that prompted the experimental method to uncover them as they are” (Mitcham 359). This argument suggests that nature reveals the technology to humanity. A potential consequence of a natural appearance suggests that technology would overtake humanity because of its nature of manifestation. Heidegger and Ellul are alike in their assumptions, since technology is adopted as it emerges. Though these philosophers were not exposed to modern, online education technology, they would probably argue that educational institutions must use the technology to complement traditional education. This approach would help students avoid being overtaken by technology, as well as developing an overreliance on it.

In *Cyberlibertarian Myths and the Prospects for Community*, Langdon Winner states, “The dynamism of digital technology is our true destiny. There is no time to pause, reflect or ask for more influence in shaping these developments. Enormous feats of quick adaptation are required of all of us just to respond to the requirements the new technology casts upon us each day” (Winner). I feel that this point is crucial in understanding how technology impacts society, similar to how Ellul and Mumford wrote about technology emerging, and how society adapts to it. Technology frequently changes, and the use of the technology, whether it is in a corporation or educational institution, must benefit the entire community. This action will ensure that the community and all its members are able to benefit, and in our case, American K-12 educational institutions.

As with Plato and Ellul, the philosophies of Mumford and Winner can be applied to modern, educational institutions, especially in terms of community. American students face various challenges both inside and outside of their educational institutions, including maintaining positive social interaction with their peers and families, improving their literacy rates and reading comprehension skills, while many students are in households and neighborhoods affected by poverty. The wealthy class will always be the immediate recipient of new technology, specifically hardware updates to maintain growing online learning systems, but in areas of schools with higher poverty rates, educational institutions can take advantage of open source technology, and even though they will not acquire the best hardware at the same time as more wealthy educational institutions, the cost savings by using open source software can have dramatic benefits to students in poorer locations.

Human knowledge is enhanced through the use of education, not only in the use of the technology, but the content the technology presents to new students. Instead of limiting instruction to a few text books, which the students or educational institutions must purchase separately, schools can place a multitude of supplemental content in a virtual classroom. Since most American households have internet access, educators take advantage of this availability and let their students access the online classrooms from home. In this setting, students can access course material remotely, and participate in chat discussions with other students. This action lets students communicate in a familiar manner (online), and they can go into a physical classroom setting and be more comfortable in communicating verbally with other students. They will also have an improved understanding of the course material.

It is important to consider how K-12 students respond to their cultural environments, such as a family can affect an educational experience of a student, as much as the technology itself.

Thomas Weisner writes, “Individual diversity and personalization of cultural knowledge is complementary to (not the opposite of) processes encouraging shared, homogenous beliefs and practices as determinants of human action” (Weisner 182). Students are raised in diverse backgrounds in America, and the level of importance placed on education with most cultures is very significant. In regards to parental guidance of raising children, Weisner writes that “U.S. parents want to socialize their children to be independent, self-reliant, and autonomous, with high self-esteem and pride” (183). Parents often use positive reinforcement to encourage their children to succeed in their education, and so do educational institutions. This focus on positive reinforcement is reminiscent of Plato’s idea that this method helps build confidence, especially in younger children. I feel that confidence building is one of the primary goals of educational encouragement by parents and institutions. This confidence can increase dramatically if the students are comfortable in their settings within a society, in this case a classroom, and in their interactions with peers. Building confidence is possible due to the development of community in both households and educational institutions.

Social networking outside of the classroom helps students develop and strengthen relationships with other students, especially when they are simultaneously commenting in an online classroom, or about their personal lives on Facebook. The availability of this technology to students of varying economic backgrounds is a sign that the cost of using online technology is decreasing significantly. These environments create subcultures that students use to interact with others, and they can use these types of technology to collaborate on assignments, but in doing so they improve their comfort of social interactions and technological usability. Educational institutions must continue to use emerging technologies, as keeping with current methods ensures they are comparable to virtual environments outside of the classrooms, where children

frequently access in their spare time. This approach would be consistent with what Ellul and Mumford argued, especially.

Along with the philosophical implications of education technology, it is also important to understand how children form abilities to learn. In *Foundations for a New Science of Learning*, the authors link the development of the human brain to how children learn. They begin by describing the computational aspects of learning by saying, “Recent findings show that infants and young children possess powerful computational skills that allow them automatically to infer structured models of their environment from the statistical patterns they experience” (Meltzoff 2). By nature, young children begin to learn by absorbing aspects of their environment, and they form patterns based on normal occurrences in language.

The study continues by describing the social aspects of learning by saying, “Social cues highlight what and when to learn. Even young infants are predisposed to attend to people, and are motivated to copy the actions they see others do” (2). This discovery argues that children learn about their environment based on imitation, primarily from their guardians. It is important for guardians to realize what kinds of words and emotions they express in the presence of their children. Children tend to mimic gestures, such as body language, and they also mimic emotions, such as happiness and anger. As the children progress from infancy to the age of entering K-12 education, they begin to learn from their interactions with other humans (3). Before children begin to frequent the setting of an educational institution, it makes sense that they are primarily influence by human interactions around them, as these exchanges are the quickest available.

The scientific and psychological analysis continues in a discussion of early education.

The research indicates that the early education of children is due to the areas of “early intervention programs, learning outside of school, and formal education” (7). These areas each describe a particular community that which the children find themselves located. Each area also relates to the philosophical ideas mentioned earlier, such as the motto of “thinking globally, acting locally.” For example, early intervention programs aim to expose young children to social interactions with other children, and to observe their behavior in a group setting. Learning outside of school involves interactions of young children with their friends and family, again focusing on the tendency of children to imitate their closest relatives. Formal education is the final area, in that educational institutions begin to educate young children by introducing them to a disciplinary system of positive reinforcement, while focusing attention to social interactions. The study continues in saying, “K-12 educators are attempting to harness the intellectual curiosity and avid learning that occurs during natural social interaction” (7). This approach brings the element of imitation to the traditional classroom.

The study concludes that the most important aspect of learning for young children is “the social,” defined as social interactions among young students with their peers, families, and instructors, and the authors ask, “What makes social interaction such a powerful catalyst for learning, and can key elements be embodied in technology to improve learning?” (8). I feel that social interactions are a powerful catalyst in learning because of the instant feedback and communication involved. Online learning environments mimic the instant communication, but also allow for students to reflect on their opinion before submitting them, such as by clicking the “Send” button on a chat forum dialog when they are prepared to submit the message. These tools help students develop confidence, both inside and outside of the virtual classroom.

In a study observing the use and popularity of online social networks, in this case Yahoo! and Flickr, researchers found that users interact and get acquainted with new users (through virtual invites), as long as the interest in the social networking tools has not peaked (Kumar 7). I feel this data is relevant to how students would increase or decrease interest in virtual classrooms because if the technology is kept relevant and mimicked the aesthetics and functionality of popular social networking tools, educational institutions could continue to utilize the technology, without fear that the students would become bored with it and interact less with their instructors and peers. This possibility is why I suggest virtual classrooms must remain complementary to educational institutions, as younger students require more guidance, overall, compared to students in universities who can usually leverage virtual classrooms without a great need for help from an instructor. Keeping in mind the philosophical implications of the process, I will discuss the implementation of online learning in American K-12 educational institutions.

### *Implementation*

Younger children respond better to interactive software, rather than the virtual classrooms typically used for educating teenagers. For children in the K-2 age group, a system called TBALL (Technology Based Assessment of Language and Literacy) was developed to analyze the literacy skills of young students from Mexican-American backgrounds (Alwan 16). By assessing literacy skills of these young students, teachers could modify their curriculum to improve outcomes of the students. This software used interactive games to assess the language skills of young children. The software considers background information about the child, such as gender, grade, and his or her native language, and uses this information to provide accurate results to the teacher about the educational needs of the child (19-20). These types of interactive

software applications are better suited for younger students, as they are not as exposed to interactive, online forums and content management systems, as older students, such as teenagers.

In *A Synthesis of New Research on K-12 Online Learning*, the authors discuss various case studies that were conducted to determine the overall effects of using online learning environments to measure performance outcomes of students. The study explored the core aspects of online learning:

“Online learning is a form of distance education—formal study in which teacher and learner are separate in time or space. Distance education can be delivered through nonelectronic [sic] methods (such as correspondence study) or through electronic methods. Electronic methods are primarily telecommunication-based (such as audio and video conferencing) and Internet-based (using information technologies such as computers). Mixed methods combine electronic and nonelectronic [sic] media” (Smith 4).

This study is important to the overall goal of my research, in that the use of internet-based education should complement traditional education methods.

The United States Department of Education has specific goals for a national vision for virtual schools, including providing students with access to “e-learning,” encouraging “the use of technology to meet No Child Left Behind requirements,” and to “develop quality measures and accreditation standards for e-learning that mirror those required for course credit” (9). By raising the standards of education, government policy aims to improve student outcomes. This desire becomes reality by implementing online technology into the traditional classroom. In 2005, the North Central Regional Educational Laboratory (NCREL) conducted several studies of high school students, to determine if the use of online classes provided an advantage over traditional

education methods. One of the studies looked at Virtual High School, Inc (VHS) to see how teachers adjusted from traditional face-to-face instruction into using online classrooms to complement their courses. According to this research, VHS teachers found that their students had a higher level of participation in classes that utilized both online classrooms and traditional settings, and that the number of online courses increased, and students enrolled at higher rates (25-27). These results are consistent with how the previously mentioned philosophers approached technological advancements, in the gradual, balanced implementation.

Another NCREL study observed the effectiveness of online classrooms and student outcomes, by looking at data from 410 students enrolled in courses for Algebra, Geometry, Health-Life Management Skills, and Personal Financial Management. The study found that in these subjects, “there were no significant differences between overall results of combined face-to-face versus combined online achievement scores,” although online students had higher scores in final course grades (36). These results suggest that perhaps for courses in mathematics, students probably require more face-to-face time with instructors, as an online-centric format is not optimal for Geometry, for example. The fact that online students had higher course grades overall might suggest that an online format complements conceptual information that is taught in the traditional classroom, such as theory. An online setting has more potential for increased feedback, due to the popular forum format used on many web sites.

The NCREL conducted another study that I feel is the most significant to my research. This study examined student and instructor thoughts towards online social interaction, and its goal was to see if students improve their comfort in interacting with other students, performance improvement, and commitment to the course materials. The results of this study indicated that of the 282 student study, “90 percent of students and 88 percent of teachers were satisfied or very

satisfied. Twenty-nine percent of surveyed students thought the VHS course was better than face-to-face courses, while 50 percent thought they were of the same quality” (50). A sample size of 282 students is fairly small in my opinion, but because this research is relatively new, I feel that Ellul, Mumford, and Heidegger would approve of how educational institutions are adapting the technology by “thinking globally, acting locally.”

The study concluded that using online learning can encourage student interactions and “may promote a cohesive American society by bringing together children from diverse backgrounds and encouraging them to interact in online learning environments,” but that more complex studies are required to conclusively prove the assumptions (52). I argue that even though the sample size seems small, online learning definitely complements traditional education. Students in the K-12 range are quick to adapt to new technology, and they do so from outside of the classroom. They bring mobile communication devices into the classroom and use social networking tools to enhance both their personal and academic experiences. In *Peer Effects and Social Networks in Education*, researchers found that “high clustering” helps to ensure that the success of peer-to-peer networking (Calvo-Armengol 23). This result seems logical, as for the effects of online interactions to be successful; students must actively participate and grow their personal network of contacts. As technology emerges, the younger generation is quick to adapt to it successfully.

### *Adoption to Technology*

In *Multitasking across Generations: Multitasking Choices and Difficulty Ratings in Three Generations of Americans*, researchers conducted a study about whether the technological and social changes in the United States of America are related to the advanced multitasking skills of

younger generations (“Generation X” and “Generation Y”), compared to the multitasking skills of “Baby Boomers” to the Generation X and Y groups (Carrier 483-484). The study involved a group of 1,319 Americans from these generations that answered a questionnaire, asking them to specify which daily, technology-based tasks they use simultaneously, and the level of difficulty when trying to multitask (485-486). These generations have seen tremendous changes in technology, especially education.

Multitasking is a significant component of online learning because students must simultaneously leverage course material, while communicating with students and instructors, while also using computers and software to perform these tasks. The study concludes that the younger generation had less difficulty in adapting to the technology, and was better able to multitask, but all generations shared some basic human limitations in multitasking ability (488-489). The need to simplify technology drives innovators to improve usability in their products. Most modern communication devices utilize touch-screen technology, which improves the ability of people to multitask. Not only will this ability help students in their academic progress, but also when they are introduced to the work force. Because students are exposed to comparable technology at an early age, they will find it easier to transition into a career that focuses on using the technology, and I experienced that transition in my own academics and career successfully.

In *Computing and Social Change: New Technology and Workplace Transformation, 1980-1990*, D. Hakken observed social and technological changes with workers and the technology around them (Hakken 107-108). The purpose of this study was to determine the reasons why certain people are quicker to adapt to new technology than others. Hakken found that the ability of a person to utilize technology in the workplace is directly related to their

exposure to the technology in his or her personal life (128). The results of this research recall the philosophical implications of implementing technology within society, especially in areas of diverse cultures and poverty. Citizens in poverty-stricken areas did not have quick access to technology twenty years ago, especially computers and mobile phones, but fortunately, costs have come down, and there is wider access. In this sense, society adapted to both the technology and limited availability, by increasing accessibility.

To improve the availability and access to education technology, the government has made an effort to address this need. The National Education Technology Plan aims to improve access of online education technology to poorer districts, but also to improve the student-to-teacher relationship (United States of America). I feel that government action is necessary to improve our education systems, and this task can be accomplished by utilizing online technology resources. By using online learning to complement traditional education, teachers can provide more individualized attention to their students because they are not limited to reviewing and discussing course material during traditional classroom hours. In online learning environments, students can also interact with each other to improve understanding of course material, and teachers can also use instant communication to provide progress reviews to their students.

In *From PLATO to Podcasts: Fifty Years of Federal Involvement in Educational Technology*, Mathew Cherian discusses that when implementing education technology the role of the federal government is “to ensure equitable access to new and existing technologies for all. Costs of new technologies are exorbitant, and decreasing tax revenues are limiting local funds for innovation in education. Federal participation can reduce the gap between the technology haves and have-nots” (Center on Education Policy 4). As implementing technology typically results in higher initial costs, the federal government will distribute resources appropriately,

allowing school districts throughout the country to use online classrooms with successful outcomes for students. Through surveys and questionnaires, the study found that a majority of students and teachers responded favorably to online learning environments (19-20). I attribute this success to the correct, gradual adoption of technology by American K-12 educational institutions.

### *Conclusion*

There is no doubt that society is shifting into a culture that strongly adheres to technological advancement. The success of this shift depends on realizing and overcoming any disadvantages that the technology creates, such as in American K-12 educational institutions. In my discussions about various philosophers of technology, I presented the reality that available technology emerges within a society. This emergence will occur, regardless of resistance. Technology simply has too much momentum in our modern, techno-culture. This culture is present in every area of our lives, for all ages of citizens. As children grow up in a technologically-inclined society, it seems logical for educational institutions to take advantage of a willingness to use technology to improve progress.

In order to avoid becoming consumed by the technology, K-12 educational institutions must implement online learning as complementary to traditional education methods. K-12 students require more personal interaction and attention, compared to undergraduate and graduate students. By exposing the K-12 generation to online learning, they prepare for higher education and the professional work force, where technology has an even bigger effect than in educational institutions. With the technological advancements present throughout society, I ultimately argue that educational institutions must embrace technological advancements in their

systems. I advocate that the use of online education will complement traditional education methods, resulting in modern generations having higher success in academics than students in previous generations. The technological advancements throughout society increase the demands upon young adults entering higher education and the work force. Since these students are more adept to mastering emerging technology, compared to previous generations, these students will achieve more goals and have an improved overall educational experience. Educational institutions will also adapt to the emerging technology, and the performance of students will continuously increase for years to come.

## Works Cited

- Alwan, Abeer, Yijian Bai, Matt Black, Larry Casey, and Matteo Gerosa. "A System for Technology Based Assessment of Language and Literacy in Young Children: The Role of Multiple Information Sources." *Proceedings of IEEE International Workshop on Multimedia Signal*, Chania. 2007. 16-20.
- Brown, Jennifer. "Plato's Republic as an Early Study of Media Bias and a Charter for Prosaic Education." *American Anthropologist* 74.3 (1972): 672-75. *JSTOR*. Web. 30 Apr. 2010. <<http://www.jstor.org/stable/671542>>.
- Calvo-Armengol, Antoni, Eleonora Patacchini, and Yves Zenou. Working Paper no. 645. The Research Institute of Industrial Economics, 2005. Web. 14 Apr. 2010. <<http://www.cide.info/conf/papers/c14.pdf>>.
- Carrier, L. M., Nancy A. Cheever, Larry D. Rosen, Sandra Benitez, and Jennifer Chang. "Multitasking across Generations: Multitasking Choices and Difficulty Ratings in Three Generations of Americans." *Computers in Human Behavior* 25.2 (2009): 483-89. *Online Course Module*. California State University Dominguez Hills. Web. 12 Apr. 2010.
- Center on Education Policy. *From PLATO to Podcasts: Fifty Years of Federal Involvement in Educational Technology*. By Mathew Cherian. Education Resources Information Center, Mar. 2009. Web. 1 May 2010. <<http://www.eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=E504823>>.

Hakken, D. "Computing and Social Change: New Technology and Workplace Transformation, 1980-1990." *Annual Review of Anthropology* 22 (1993): 107-32. *JSTOR*. Web. 28 Mar. 2010.

Kumar, Ravi, Jasmine Novak, and Andrew Tomkins. "Structure and Evolution of Online Social Networks." *Proceedings of the 12th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2006)*, Philadelphia. Aug. 2006. Web. 14 Apr. 2010. <<http://portal.acm.org/citation.cfm?id=1150476>>.

Meltzoff, Andrew N., Patricia K. Kuhl, Javier Movellan, and Terrence J. Sejnowski. "Foundations for a New Science of Learning." *Science* 325.5938 (2009): 284-88. Salk Institute for Biological Studies, 17 July 2009. Web. 14 Apr. 2010. <<http://papers.cnl.salk.edu/PDFs/Foundations%20for%20a%20New%20Science%20of%20Learning%202009-4145.pdf>>.

Mitcham, Carl, and Robert Mackey. *Philosophy and Technology Reading in the Philosophical Problems of Technology*. New York: Free, 1983. Print.

Ringstaff, C., & Kelley, L. (2002). *The Learning Return on Our Education Technology Investment: A Review of Findings from Research*. San Francisco: WestEd, 24 April 2010. [http://www.WestEd.org/online\\_ppubs/learning\\_return.pdf](http://www.WestEd.org/online_ppubs/learning_return.pdf)>.

Sklair, Leslie. "The Sociology of the Opposition to Science and Technology: With Special Reference to the Work of Jacques Ellul." *Comparative Studies in Society and History* 13.2 (1971): 217-35. *JSTOR*. Web. 18 Apr. 2010.

Smith, Rosina, Tom Clark, and Robert L. Blomeyer. *A Synthesis of New Research on K-12*

*Online Learning*. Learning Point Associates, Nov. 2005. Web. 17 Apr. 2010.

<<http://www.ncrel.org/tech/synthesis/index.html>>.

United States of America. Department of Education. Office of Educational Technology. *A*

*Retrospective on Twenty Years of Education Technology Policy - National Educational*

*Technology Plan*. By Katie Culp, Margaret Honey, and Ellen Mandinach. Oct. 2003.

Web. 16 Apr. 2010.

<<http://www2.ed.gov/about/offices/list/oe/technology/plan/2004/site/bb/edlite->

[Retrospective.htm](http://www2.ed.gov/about/offices/list/oe/technology/plan/2004/site/bb/edlite-Retrospective.htm)>.

Weisner, Thomas S. "Culture, Development, and Diversity: Expectable Pluralism, Conflict, and

Similarity." *Ethos the Journal of the Society for Psychological Anthropology* 37.2 (2009).

12 May 2009. Web. 16 Apr. 2010.

<[http://www.tweisner.com/yahoo\\_site\\_admin/assets/docs/Weisner\\_20091\\_Culture\\_development\\_diversity\\_A63.231161736.pdf](http://www.tweisner.com/yahoo_site_admin/assets/docs/Weisner_20091_Culture_development_diversity_A63.231161736.pdf)>.

Winner, Langdon. "Cyberlibertarian Myths and the Prospects for Community." *Langdon Winner*.

1997. Web. 15 Apr. 2010. <<http://www.langdonwinner.org/>>.