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Opening the Window

I would like to begin this essay with three quotes:

The student feels like he is being taught by a teacher.

B. F. Skinner introducing his teaching machine

The students in this classroom are being taught by the best teachers, even though they are computer generated by a server in Washington DC.

AT&T film, 1992

Researchers say the pace of innovation is such that these machines should begin to learn as they teach, becoming the sort of infinitely patient, highly informed instructors that would be effective in subjects like foreign language [...].

B. Carey, J. Markoff, "New York Times" essay on robots assisting classroom teachers

In all three cases we hear the redefinition of teaching and learning. The school of the 20th of century as we know and understand it, is either giving way to developments in new media, high speed networked processors, new definitions of the individual and reality, or resisting it.

The school of the future, and not so distant future, may not be a place, but an environment. An environment that may exist within a processor created world, on the surface of an inserted chip placed in the brain, or on nano-processors that exist within our biology.

The new media of high-speed processors (I am not referring to them as computers) networked with humans and other processors, linked to knowledge collectors and search agents, will construct social worlds that link individuals to a collective, redefining our current notion of the individual as isolated, localized, self-contained, and self-directing.

Depending on one's understanding of the historic role of audio-visual education and instructional technology in education, one finds a major shift of perspective and power in the period surrounding World War II. Before World War II classroom education was directed and controlled by the classroom teacher. The classroom teacher could make decisions regarding the learning environment and the transmission of information and concepts within the confines of a physical space and available time and resources. Audio-Visual Aids generally positioned the teacher as a person in front of the classroom using various devices to enhance the learning of her students. The teacher was in control. These devices included radio, film, phonographs, blackboards and charts, stereopticons, photographs, textbooks, overhead projectors, and later filmstrips, slides, and other "modern" devices that would store information for the teacher and the student to access and use.

It was after World War II that education witnessed the merging of three fields: system engineering, a psychology of learning, and education. System engineering has its roots in the late 19th century efficiency movement and scientific societies, the growth of urban industrial centers, and the employment of empirical science to meet the needs of a growing industrial economy and in controlling the production process. The “Scientific Management of Labor.” (Note the word “scientific”) provided a systematic means of control over the production process. Schooling assumed the structure and look of factories where students were treated as raw material to be molded and shaped, the curriculum being designed by experts and instructional developers located outside the school, and the teacher as laborer who would deliver the prescribed curriculum and maintain order.

Learning was re-casted in terms of neo-behaviorism, knowledge was reduced to related and identifiable parts and acquired knowledge by the learner was measured to determine teacher effectiveness and to hold the system accountable. The purpose of schooling, as well as the population it served, shifted as well. After World War II in the USA, as the result of government support and the growing cold war, many individuals who never would have attended college now had the economic support and opportunity to do so. Middle class women who were drawn out of their traditional roles to enter the workforce and support the war effort completed high school and entered higher education (even though traditional gendered jobs were still there in most cases the only option open to them).

It is within this context, and a growing concern over the quality of teachers in the classroom that we find the roots of programmed instruction. The Skinner Teaching Machine and the SRA Kits are solid examples of systematic and controlled environments entering the daily life of students and teachers alike. The critical point here was that early attempts in programmed learning redefined the teacher to a manager’s role. Instructional Television is another example where the instruction and the supportive materials came from outside the classroom. Instructional (educational) television created an environment where instruction was “broadcasted out” by a master teacher providing the content in the same way to all children. It was not until the 1980’s and the advent of the desktop computer that the curriculum and its delivery could be “locked down” and carry with it the symbols of modernity, technology, and the future.

In the 1980s and 1990s computer based and computer assisted instruction would lock the “computer disk” so the teacher could not modify the content. In short, teachers were not trusted and under suspect. The system, the program, evolved out of the late 20th century, lesson plans, integrated learning system, and end of year exams held the system, teachers, and students accountable.

As we leave the first decade of the 21st century we bring with us further developments of the digital world into our daily lives. From video cell phones to Google searches, from 2nd life to nano bio-chemistry, developments have changed not only how we live our lives and but how we understand ourselves in the world. Recent developments, not only effects how we think of our selves and others, but how we begin to define and steer the future. The question for us in the business of education not only requires an understanding of technological and social change as a result of more powerful processors and expanded

information and social networks, but to re-visit the question of what is the purpose of education, and in that context what it means to be a “teacher” and a “learner”.

Considering the developments in the reverse engineering of brain functions, explorations in virtual worlds, cloud technologies, smart robots, increased speed and power of processors, the merging of the biological with the non-biological, and the increasing use of and power of mobile communication systems, educational institutions need to reply in an assertive and progressive manner. To continue early and mid 20th century educational practices into the 21st century, clearly suggests that education’s purpose is to maintain the social and economic status-quo where educational programs steered students to pre-determined futures; working class remain working class and upper class simply keep what they have.

To reflect on the engagement of educational institutions, at all levels, with developing technological systems and emerging digital devices, we need to ask what will change. How will the curriculum, teachers, and students, change as a result of this engagement? Will educational leaders at the state and local levels frame online education as another form of face-to-face classrooms? Will pedagogical institutions continue to train teachers or will they educate them? Now that students and teachers have access to the dynamic framework of shifting and expanding knowledge, the ability to collaborate and cooperate not only with colleagues in their school but from across the world, and to publish their own ideas, thoughts, and visions, education needs to reply.

In the United States, Canada, and across the European Union, students who are starting school at six (6) years of age were born in 2004. They have come into a world with diminishing borders, no secrets, and no fixed horizon lines. They will grow up at a time when notions of time and geography take on different meanings. By the time they are in high school their textbooks will not be bound paper objects, but flat screen, hand held digital devices where information may be updated and disseminated at a touch of a finger. Knowledge will shift from a text-based format to prerecorded and live video, sound, as well as from a 2-D to a 3-D world, where students and teachers may enter and experience a world different from the one given to them. The virtual will become real and the real will become virtual.

Robots and computer-generated avatars will replace and supplement the traditional role of the teacher. Basic “fixed” knowledge will be delivered through various integrated learning environments, where as higher order thinking will be guided through intelligent expert systems and intelligent people. A few years’ later students will be fitted with chips that can store and be accessed via biological systems. New knowledge in the math and sciences, as well as languages, will be downloadable to the inserted chips and accessed when needed. For example; students who speak and understand Polish will be able to “just know” Chinese or English by accessing their language chip, in the same manner that paraplegics are able to steer a wheelchair or use a computer by their thoughts alone.

Schooling – teaching and learning – will be defined differently as the result of the digital environment. How we understand the individual, the group, and the community, in part will be defined by traditional terms, while being challenged at every moment

by shifting landscape of the digital networked world. The control over the learning process and environment will have shifted from the teacher to the system, a technology of learning.

Environmental Design

As learners expect more from their teachers and schools, and teachers expect more from the institution, region and state, what becomes an issue is the design of learning environments.

With digital devices offering students outside the classroom walls the opportunity to access almost anything on the “net”, communicate with anyone on the “grid”, and publish their thoughts and visions in text, video, and audio formats for the connected world to experience, the instructional design models of the past will not work. With knowledge being fluid, and learners collaborating, individualized instruction and measurable repeatable outcome objectives belong to another time when “maybe” they made sense within the social-political landscape of the mid to late 20th century.

Learning theories and resulting practices guide the use of various digital tools in the quest for learning. When a computer or another digital device is brought into a classroom, the school, or the home, the environment changes. Consider for a moment a classroom with no windows. Because of the physical design of the room there are limitations and possibilities. Add a very large window (that can be opened) to the world outside the classroom, and you have not only changed the physical environment but an environment that opens up other ways for learners to engage the world outside. In this engagement the walls of the classroom disappear, in a real sense the traditional classroom no longer exists.

Conclusion

For schooling to change the power structure (social, economic, and political) needs to change as well. If nothing changes in the environment except for the introduction of a (or many) digital device(s) nothing will change. If learning is still defined in mid-1950s terminology and thinking, if teaching and learners are defined as they have been for over 100 years, and schools are understood as the vehicle to a better life by working against others, schools may look and sound different but has anything (will anything) change?

Educational reform in the United States, during the 1990s, was viewed by many as the rearrangement of the deck chairs on the Titanic. The boat was going down, no matter what view was held.

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