Paper presented at the International Networking For Educational Transformation Conference
Augusta, Georgia. April 26, 2006.
A version was published Apr. 4, 06 online at http://www.techlearning.com … Article ID# 181504012

Learning in the E-Bubble

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Technology advancements have included an evolution of software, hardware, electronics and more. This discussion focuses on the future of those advancements and their effects on the way we will live.

I sit in my chair with a keyboard in my lap and an optical mouse on my side table. I watch my screen as I work: a large, cumbersome device that inflicts it's modicum of heat on surrounding papers and equipment. Ironically, I'm using this monitor to look up on the Internet the most economical option for a flat screen monitor to take up less space. Across the room is a super-large, digital television system that somehow requires me to have a minimum of three universal remotes on my side table. Nearby, I keep a cordless phone for the inevitable calls of both necessity and distraction. A further example of my techno-servitude is that I also have a cellular phone on my belt which provides a wider range of services including voice, photo, video and a wide range of audio features for communicating with almost anybody on the planet. Regardless of whether it is important or a trivial whim, I can transmit a picture of nothing to virtually anybody who may be completely disinterested. Nevertheless, the service is mine for a price and I can use it to broaden the range of my world.

Introduction

Hardware has historically been necessary to deliver communication and to establish the machine-human interface. However, just as the transistor in 1948 was a movement away from old-fashioned mechanics to a more automated functionality, fiber-optics has also constituted a movement from the cumbersome world of copper wires to a more elegant and efficient world of light transmission. The notion of hardware is being redefined.

The world of technology, not just computers, has of course made a movement toward the faster and smaller. Hearing aids used to be large and ugly and required separate, heavy burdensome batteries to operate. Today, power cells are tiny integrated components within a small and inconspicuous unit that practically hides itself in the ear. The use of technology to compensate for deficiencies if not to enhance and expand the human condition is an age-old phenomenon. The evolution of hardware from the large to the small, the slow to the fast, the awkward to the efficient has been a fundamental part of all technology histories. In many cases, as hardware becomes sufficiently small, developed and reliable, devices are even integrated into the human body as a prosthetic. The evolution of hearing aids is still a good example as portions of the inner ear can now be replaced with sensors that transmit signals that the human brain can interpret.

While not all technologies necessarily evolve toward an inevitable role as a bio-interface prosthetic, it is certainly possible and desirable for some. The first silicon microchip was a giant,

one-dimensional product of inefficiency by today's standards. But, within that new technology we found the potential for multiple levels of functionality and expansion never before realized. Many Hollywood stories from Robby the Robot of the 1960's Lost in Space series to the computers in the various incarnations of Star Trek episodes have shown how today's imagination, being the mother of invention, is not that far from tomorrow's reality. Indeed, even the character of Data (Star Trek, The Next Generation), is an ideal illustration of "intelligent" systems where even the nature of what it means to be human is blurred amid the advancement of artificially intelligent technology. The young artificial boy in Steven Speilburg's A.I. is only the latest example of the old Pinocchio story but now, of course, taking into account the hidden promise of tomorrow's technology in our lives.

Of what will the future microchip be capable and at what speeds? How many intelligent activities might the chip be able to direct and manage for us? How small and biologically compatible might so-called hardware become? It seems that what might eventually become a bio-interface prosthetic would likely evolve through a series of hardware devices we carry or attach to ourselves in some fashion. Contact lenses are more prosthetic-like than a set of spectacles with hard metal frames. Similarly, it takes time for technology to evolve through different versions, not just from prototype to production, but from an initial product through numerous variations of new and improved ideas. Like heavy glass moved to lighter weight plastic lenses, so too have hard contact lenses moved to the soft, long-wear types. Not withstanding the miracles of being able to actually change the human condition (like Lasic eye surgery), advancements in technology change the way we live as ingenuity finds its way to the general public.

The E-Bubble

Is imagination science fantasy or future fact? That is of course debatable but at least imagination does its part on one side of the evolution equation. So, extend your vision to consider the E-Bubble as a kind of spherical energy shell that would surround one's head and face. The shell might just as well not be spherical and could instead extend vertically downward in front of the face and chest somewhat like a large energy shield in front of the body. Generally, it may be maintained and kept active throughout the waking hours.

The E-Bubble would be generated by a multifunctional microchip and would act like a virtual outer skin or membrane extending perhaps 10 to 12 inches in front of the body. Perhaps the orientation of the membrane (up/down, sections, areas, etc.) could be determined by detecting and interfacing with an electrical field from the heart or brain much like an electrocardiogram or electroencephalogram can do today. This would be important as compared to an orientation relative to the position of the microchip itself which might move around or be placed in movable locations or even be located by convenience or medical necessity – while the E-Bubble should maintain a proper or functional orientation to the body. In any event, the membrane can certainly function in sections, quadrants or areas as well as operating as a whole or singular entity.

Generally, the E-Bubble would serve as a communications interface for all sorts of input and output in work, learning and recreation. Initially, the microchip might of course be worn as external hardware. Perhaps the microchip and power supply would be worn in a necklace, belt buckle or collar. Perhaps the electronic membrane might initially exist in the form of a mere hologram projection from specialized glasses. Today's military pilots see electronic projections of critical data superimposed on their natural view of their environment during flight. Some

hardware today can feed visual information into one eye leaving the other eye free to view the natural surroundings as the brain integrates the two views. The integration of visual and auditory hardware with the body has already begun its prosthetic progression from the separate and independent technologies of yesterday's cathode-ray tube (CRT) and today's plasma flat screens.

Eventually, the development of the E-Bubble technology would presumably evolve beyond the independent device carried in hand. Even with the convenience of a wrist watch or techno-necklace, such devices are still independent and that means their service to our lives is more an add-on than truly integrated and natural. It is suggested here that the E-Bubble technology will evolve beyond a separate prosthetic to such a size and state that it can become an implant no more intrusive than an inner ear replacement.

E-Bubble Technical Functions

Continuing with this futuristic contemplation, our E-Bubble operates through an electronic "field" that is generated to surround a person (Figure 1). The field would need to be divided into quadrants like a virtual grid of areas analogous to multiple screens like those used with today's computers. Of course, in these electronic fields the "screen" exists without hardware, perhaps suspended in and configured through the electro-magnetic forces in the E-Bubble's membrane. Perhaps better described as holographic, these fields can be configured, electronically of course, to manifest imagery of all sorts.

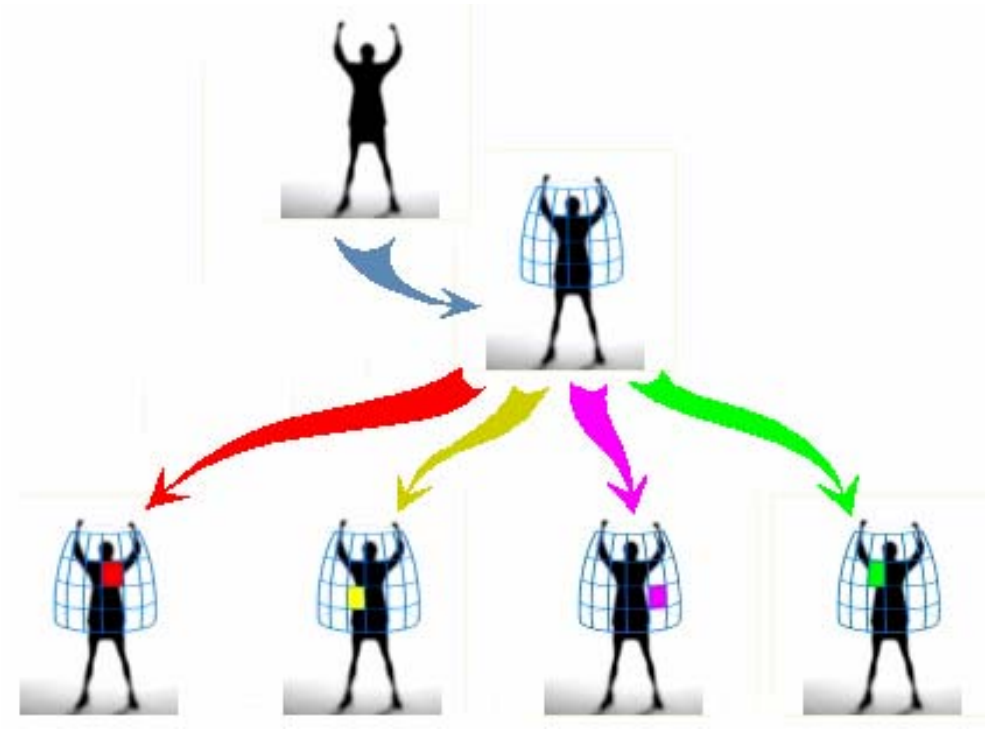

Figure 1. Illustration of E-Bubble Grid-like Interface

Images displayed in the membrane fields, would include all of the variations we know of today: pictures, graphics, text, color, and of course, full-motion video. One can imagine that

these fields could appear from the back side, as viewed by others, opaque with no detail or instead translucent and transparent with imagery appearing in reverse. Perhaps only certain fields would be allocated to video while others are dedicated to text or other static imagery.

One can imagine interactive fields used for drawing, writing or other tactile manipulations. Like dragging a magnet across a tray of tiny iron shavings causing them to align, flow and trail the stylus, one might wave a hand or drag a finger to mark upon a display or move a virtual field object. Perhaps an image might be relocated in the field matrix to open or power another area for a secondary purpose. The various fields might provide a multi-tasking experience of work and play, business and entertainment, or integrated learning and study experiences. See illustrations in figures 2, 3, and 4.

Figure 2. E-Bubble Illustration

Figure 3. E-Bubble Illustration

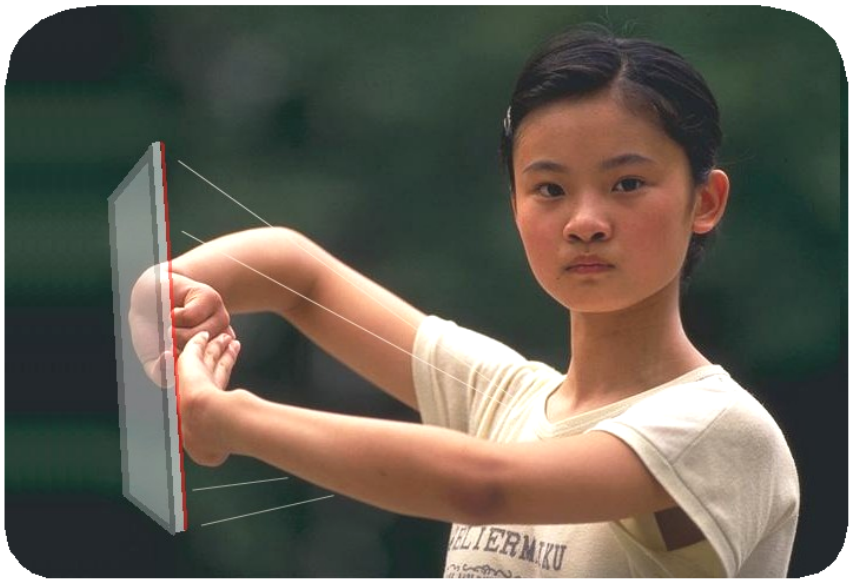

Figure 4. E-Bubble Illustration

Sound would likely be a particular problem in our E-Bubble. Since sound, as we understand it, occurs through the brain's interpretation of inner-ear vibrations, some mechanism must either transmit such motion to the human ear components or perhaps communicate electronic pulses directly to the nerves of the inner-ear to be interpreted by the brain as natural sound. Today's modern hearing-aid technology lends itself to any number of futuristic applications in the context of our E-Bubble.

To extend the functions even further, one can imagine that the E-Bubble could serve a variety of other needs. What if your pet had an e-bubble with, perhaps, limited functions for needs like control and companionship? By increasing the E-bubble's opacity in degrees, one might enjoy the ultimate sun block against harmful ultraviolet rays on a summer day. What if the electro-magnetic field that makes the E-Bubble possible could be made to repel? One might have an instant, virtual umbrella. If the Star Trek's Enterprise can repel Klingon Phaser blasts, then our E-Bubble ought to be able to handle a little rain.

Interface with the Community

Levity aside, a society of people equipped with the E-Bubble can interact through a virtual network not unlike today's Internet. But, whereas we are confined to the computer screen, the work station or the hard-wired cable connections, our E-Bubble descendants will roam freely unencumbered by any hardware restraints. On the other hand, today's palm pilot portability and wireless Internet environments have already begun to free us from the dismal workplace cubicle.

Since the E-Bubble becomes such a standardized aspect of society, like today's telephone and television, one could easily communicate with other people perhaps with blink of the eye, the click of our teeth, a wave of our hand or even just a thought maintained for so many seconds – a "phone call" is placed. The sensory nature of the E-Bubble and its ability to absorb, translate and transmit the image of its owner's face is unknown to me but one's live image in real time would be a common part of communication, bubble to bubble, person to person. I receive a bubble-call from my wife asking me to stop and pick up something for dinner, she appears with a smile in the predetermined field with a casual "How ya' doing?" and our conversation is underway. Some bubble-calls are already configured for acceptance and display whereas others would require a decision to open.

All of the aspects of today's computerized and networked society can be extended to provide the protocols and infrastructure of the future E-Bubble. It is a small step to extend our imagination to grasp and accept the differences provided by the obsolete notion of hardware. Of course, society as a whole would likely need a hardware-based infrastructure through which the E-Bubble world functions. Analogous to today's wireless Internet, a transmitter "hub" is still required. Perhaps like today's telephone poles, or our cell phone towers, nodes of service would exist throughout our society to make the E-Bubble world of electronic networking come alive.

Interface with the Environment

As the whole of society develops the E-Bubble – an electronic prosthetic placing the human being directly into a virtual world of communication – many things become possible and commonplace. While many of us now have data storage services on the Internet, consider the future where personal data storage is virtually limitless and readily available like an extension of human memory to be taken for granted as we now do simple telephones or television. Any personal information could be accessed immediately along with and integrated with countless worlds of information. Encyclopedias, research databases and even today's hundreds of millions of web pages all pale in comparison. The basis of calling up and accessing information through electronic media is being worked out today. The E-Bubble, however, will be part of an advanced world closer to the ideal of instant access to all information for every task and activity of society.

Many aspects of today's technology crudely illustrate the beginning of these trends. For example, society has responded to the wide-spread use of cellular telephones by constructing antenna towers so communication is available virtually everywhere. Competitive companies have expanded services to include photography, personal data services and even full motion video and music downloads. It is easy to imagine an elaborate infrastructure throughout society, from large cities to small rural communities, to support the interconnectivity and general functionality of the personal e-bubble.

On one level, a hospital or pharmacy could download directly from one's E-Bubble information about the condition of a beating heart or neurological function. More than mere communication, advanced E-Bubbles that include medical diagnostics and monitoring can become a standard means of seeking medical assistance. On another level, one's E-Bubble could be configured to automatically monitor and inform both the person and the hospital that urgent care is needed. With such instantaneous feedback about one's condition, alternative behaviors might avoid complications before the need for urgent medical intervention. On yet a higher cybernetic level, reminiscent of today's pacemaker, could such an electronic membrane surrounding us be made to intervene and manipulate our physiology directly to prevent medical complications before they occur?

Classroom and Learning Implications

So, what is "learning" in the context of the e-bubble? This paper suggests that learning, per se, will be essentially the same with perhaps an exception already evident in today's technology. It is far too often thought that learning means the acquisition of information. Information is presented and students are trained to seek information. Students want to know for what information they will be held responsible. Students want to know what information is to be covered on the test. Teachers even test to see whether students have in fact acquired the information presented. Scoring rewards students who can regurgitate, recall and report information accurately and completely, as if that is the goal and, indeed, proof of learning. Today's students are unfortunately often at a loss when expected to perform independently outside of the structure and rigid one-dimensional guidance provided by the exchange of mere facts. The typically want to know how many x, y, z's are required for an A grade. How much and specifically what information is to be reported on their products for an A grade? And, they believe that if the information was no given to them or if they were not told where to go and get it, that it is unfair to expect them to return it to us on their products. Unfortunately, teaching has helped to turn students into conduits or portals of information and students have begun to see themselves in that light.

Technology has made information easily and quickly available to virtually anyone at the touch of a button. The Internet connects us to vast libraries, scholarly journals, world events, political, philosophical, religious, and literary discourse and commentary. Virtually any fact on any topic is available almost anywhere at any hour of the day, 365 days a year. Ready-access to information is already becoming a given in today's society and the e-bubble of the future will make the imagined an actual reality. Learning, then as well as now, should not be – does not need to be - about the acquisition of information.

Critical thinking, the ability to analyze and synthesize information, the ability to make judgments are all aspects of learning that can be the primary focus in a society where information is universally available. Where immediate and total access to information is a given, teaching can help students focus on understanding, concept development, problem solving and on the development and application of intuition. Education can focus on making people smarter, not more informed.

Disclaimer

The manufacturer of your E-Bubble is not responsible for any allergic reaction and your warranty is void if any tampering … - all joking aside, the human body remains essentially the same as today. There is no notion in the E-Bubble that the human condition evolves outside of its present basic condition. Even though the E-Bubble notion is based on the principle of moving beyond or at least minimizing the involvement of hardware, per se, it is nevertheless technology. It is an artificial condition imposed on the human body and requires us to adapt.

It must be cautioned, however, that study, learning and advancement of the human condition in such an environment is not achieved without effort. The instantaneous availability of information and even the direct access to and integration with a world of knowledge, experts and services still does not cause the mind to think critically. As an amateur astronomer, this author has shared with others many wonders of the night sky, from seeing the International

Space Station fly overhead to watching the changing of the guard as the Jovian sentinels juxtapose their nightly posts, to witnessing the latest light arriving through a millions-of-years journey to land directly in our eye. Some may merely acknowledge with a simple "oh, ok" as though distracted by a television commercial for detergent, while others behold a deeper wonder and strive to comprehend the profound experience. The availability of technology, information and the ultimate connectivity in our E-Bubble says nothing of the ambition, motivation and curiosity that make us want to learn. The individual with the inquisitive and discriminating mind will still excel while the wonders of the new world will be of lesser value to the unreceptive, uninterested and unimpressed.