9-1-2006

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The "Imponderable Bloom":
Reconsidering the Role of Technology in Education
by Robert Sanders

As educators, we must find ways to incorporate critical theory into courses as a means to counterbalance the onslaught of advertising rhetoric extolling the supposed virtues of instructional technologies. While I am an avid user and ardent supporter of instructional technology, I am concerned that my graduate students are unaware of the potential negative consequences of adopting a new technology without a critical assessment of its worth and usefulness.

One resource I have used to assist my graduate students (Exhibit 1) in becoming more critical users of technology is a is E.M. Forster's 1909 short story "The Machine Stops" (1947). This story describes a future world in which people are completely connected to one another via a "Machine" that possesses certain qualities bearing a disconcerting resemblance to today's communication technologies, especially those used in distance learning environments.

Using the allegorical nature of this story as a structure, this paper will address the problems inherent in our willingness to adopt various communication and distance learning technologies without much thought or discussion regarding the potential impact of these technologies on that which defines our humanity.

"The Machine Stops"

I see something like you in this plate, but I do not see you. I hear something like you through this telephone, but I do not hear you. That is why I want you to come. Pay me a visit, so that we can meet face to face and talk about the hopes that are in my mind. (Forster 1947, page 146 [print]; "The Air-Ship," ¶ 26 [online])

In this chilling and poignant story of a lost relationship between mother and son, Kuno asks his mother, Vashti, to make an unprecedented journey to visit him at his home. The Machine offers mother and son a way to communicate electronically, but for Kuno this total connectivity is not enough; it is not the same. He asserts that the Machine has robbed Vashti and others of their humanity, that they no longer value physical presence as an important facet of human interaction. Instead, Vashti imprisons herself in her technological cocoon, limits her interactions with others, and uses technology as a means of preventing face-to-face (F2F) human contact.

Like Kuno, my students are apprehensive of technologically mediated interaction, arguing that communication and collaboration in an online learning environment is simply not the same as in a F2F environment. While they do not necessarily expect the experience to be the same, they are frustrated by the disconnect they sense between themselves and the other students. My students realize that what they see and hear in an online world is something like a real classroom, but it is not the same as a physical classroom space. Virtually being there is not the same as physically being there. As a result, these students sense a void in what could otherwise be a rich learning environment (Exhibit 2). In response, I have attempted to incorporate various technologies such as interactive video, chats/IM, discussion boards, e-mail, and audio conferencing to address this lack of proximity and immediacy.

While these tools do seem to yield some positive results, my students continue to maintain a belief that there is still value in occasionally meeting F2F, even if that means traveling great distances or meeting at inconvenient times. My students miss those serendipitous moments of learning that so often occur in a F2F

environment—the overheard remark, the discussion in the hallway, the before-class updates on the lives of their friends. While these opportunities can be simulated in an online environment (via chats, discussion boards, e-mail), the simulations seem contrived and too arranged. It is one thing to accidentally overhear the instructor's response to a student's question after class; it is another to have to log on to a course site, navigate to the discussion board, locate a thread, and scroll through dozens of comments, questions, and musings to locate the one question that had similar relevance. While serendipitous learning can occur in both environments, there is something about physical presence that they believe allows this kind of learning to happen more naturally. My online "water cooler" just does not promote the kind of informal conversations that invariably take place when my students take a break during one of my classes. My small group assignments in which students are provided with private collaborative work environments complete with chat, discussion, and e-mail tools do not completely replicate the kind of F2F connections students make when body language is used consciously or subconsciously to express support for or dissatisfaction with what is being discussed. While I can be present in online group discussions or interact one-on-one with students using various communication tools during virtual office hours, I find that my F2F interactions with students are lengthier, more involved, and generally more supportive than those mediated by the technologies available to me.

These comments are not to suggest that all F2F instruction is engaging or interactive. Few of my students would want to give up their online access and the ability to work from the comfort of their own homes. These expressed concerns, however, address the need for instructors to utilize a variety of tools to facilitate interaction and to incorporate opportunities for some F2F interactions. We should then carefully and thoughtfully select tools for distance learning when there is no need to meet F2F. And we must recognize that there are times in which the technologies available inadequately provide for the kind of interactions and learning desired (Dreyfus 2001). In both F2F and online environments, we need to be conscious of the fact that students need to be engaged in authentic learning experiences. Each tool has strengths and weaknesses that must be considered. Instant messaging, audio, and video, for example, provide for immediate interaction but require that students are online at the same time, negating the notion of "anytime" learning. Discussion boards, blogs, and e-mail do not require this simultaneous connectivity, but as a result, they also do not meet the immediate learning needs students might have. A combination of these and other new tools is necessary to address the diverse experiences desired in an online teaching and learning environment.

Online Learning/Online Worlds

There were buttons and switches everywhere—buttons to call for food, for music, for clothing. There was the hot bath button, by pressure of which a basin of (imitation) marble rose out of the floor, filled to the brim with a warm deodorized liquid. There was the cold-bath button. There was the button that produced literature. And there were, of course, the buttons by which she communicated with her friends. The room, though it contained nothing, was in touch with all that she cared for in the world. (Forster 1947, page 149 [print]; "The Air-Ship," ¶ 60 [online])

Within Vashti's world exist advanced methods and tools for communication, interaction, and learning. The technology to facilitate these activities has evolved to the point of allowing everything to be done from the privacy of one's own home. In Vashti's world, first-hand experience of the world is overrated and eventually becomes an archaic way of learning and knowing. While it is possible to learn through the experiences of others as communicated through words, text, pictures, sound, or video, I find it more intellectually gratifying to experience the world first-hand when possible. Reading about the city of Rome, watching a video of an active volcano, or viewing an animation of the phases of the moon are technically personal experiences of learning, albeit ones that are mediated by the technologies of text, video, and animation. However, none of these experiences can compare to the personal experience of actually standing inside the Coliseum in Rome, perching on the edge of an active lava flow, or gazing at the night sky. Often, such experiences are even more satisfying when shared with others participating in the same first-hand experience.

New tools for communicating, learning, collaborating, and information gathering are introduced to us nearly every day. Our lives are becoming simplified in our becoming more connected through a growing reliance on cell phones, PDAs, e-mail, IM, blogs, video conferencing, and other technologies. A new approach to teaching and learning emerges from this connected world in which access to information is immediate and considered paramount. However, equating learning with knowledge acquisition and reducing the learning process to the ubiquitous access of information in the form of text, images, video, and audio is overly simplistic and lacks an understanding of the development of higher order thinking skills. Learning has more to do with making connections between ideas and concepts than simply focusing on the information itself. While technology can be used to identify potential connections, it also takes reflective thought and meaningful dialogue to make meaning of these connections. And even in cases where technology can facilitate such reflective thought and dialogue, I contend that there often remains a crucial need for physical human contact and interaction as a means of fully appreciating the value of these connections.

While some of my students appreciate this ability for "anywhere, anytime" learning, they can also encounter problems with this type of access. Students are connected at different levels of connectivity. Resources available to some are not necessarily readily available to others because of access or connection speeds. Even when connectivity is not an issue, other problems persist: lost passwords, unclear directions, dysfunctional browsers, missing plug-ins, unavailable applications, broken links, and incompatible platforms. As a result, students often take more time working with the tools than with the content. It seems that we too often put the tools before the learning or that we find solutions but lack a problem. For example, Prensky (2005) promotes the use of cell phones as a new means of learning. But even he notes that the instruction delivered must be designed correctly and that this design process "requires a good deal of rethinking and flexibility on the part of educators" ("Designing Cell Phones as Learning Tools," ¶ 1). While having to learn a new technology to participate in a course or complete a class activity is not necessarily undesirable, the process of learning this new technology can often interfere with intended course content objectives. And while I am sure that learning activities, if well-designed, can be supported through cell phones, I still have to ask the question, "Are cell phones the *best* technology for the learning process?" What new problems might learners encounter in their attempts to utilize cell phone technology in the way Prensky describes? The question is not "Can students learn in a mediated environment?" As Downes (2004) points out, all experiences are mediated in some way. Rather, the question should be "What is the best form of mediation to use for the objectives desired?" My intent is not to stymie innovative uses of new technologies in the classroom; rather, I want to focus on the instruction first and then selectively integrate those technologies that can best support my instructional objectives, not vice versa.

I am not suggesting here that we should avoid adopting and integrating new technologies to support and facilitate teaching and learning. A thorough evaluation of these technologies is necessary and can ultimately benefit students and teachers alike by identifying tools that are effective and intuitive to use. Rather, I am concerned by my conversations with colleagues and students who often confuse new with best by assuming that any new product on the market is inherently bigger and better. Their implementation of this new technology therefore goes unchecked. Subsequently, there are those who use blogs, wireless handheld devices, and podcasting not because these technologies address a specific instructional need or solve a challenging pedagogical problem, but simply because these tools exist and are currently in vogue. We must remember that just because a tool exists, it does not mean that an *educational* need or use for that tool exists. Prior to exposing my students to Forster's story or other writings with a critical perspective on technology, these students proudly share with me news of the new hardware and software recently acquired by their schools. They are impressed by the intuitive interfaces of the new videoconferencing system they now own, excited by the portability of the new lab pack of wireless PDAs they have just purchased, and intrigued by the ease in which they can now design an online course using the new learning management system to which they now subscribe. When I ask them a question once asked of me by an advisor and mentor—"What is the problem for which this technology is the solution?"—their blank stares suggest that these students have not yet thought of technology as a solution to any problem and that the acquisition of newer, faster, tools with more bells and whistles is a worthy end in itself. While there may not always be a problem for technology to solve, this question begins the conversation and introduces students to alternate

perspectives on the appropriate uses and applications of instructional technologies.

I do not intend to imply here that F2F learning is always better or more personal than distance learning. Most of us recall that F2F course in which we felt alone and disconnected, and online learning environments sometimes provide the only means through which students can access higher education. My concern, however, is that technology adds one more potential obstacle for my students to overcome in connecting with each other, with the content, and with me. Regardless of the medium used to create a distance-learning environment, the environment itself becomes one that is different and unlike the real world in which one typically exists. With this new and strange environment come new and unfamiliar expectations, notions of etiquette, and concomitant challenges. Students must feel confident that they can overcome these additional challenges of college before they can focus on their learning. Of course, many times we do not have the option to choose between F2F and online. Distance education technologies are often necessitated by geographical distance between the instructor and his or her students. So the issue is not necessarily which is better but, rather, what can be done to eliminate any potential barriers to learning and to help students overcome these challenges.

That Which is Lost

You know that we have lost the sense of space. We say, "space is annihilated," but we have annihilated not space, but the sense thereof. We have lost a part of ourselves. He [Kuno] continues, Man is the measure. That was my first lesson. Man's feet are the measure for distance, his hands are the measure for ownership, his body is the measure for all that is lovable and desirable and strong. (Forster 1947, page 167 [print]; "The Mending Apparatus," ¶ 25 [online])

Distance-learning technologies reduce the importance of the physical world as a context for learning and being. Students are no longer learning and working in a physical world like the world of a F2F environment and, if one follows Kuno's logic above, are no longer completely themselves but rather representations of themselves. Online worlds attempt to recreate the physical world through the use of simulations and metaphors, intentionally employed to make the experience more like the real thing (Burge and Carter 1997; Cates 1994; Cates 1996; Henry and Crawford 2001). These efforts, however, fall short for many students who recognize that a representation of something is not the same as that real or physical something with which they feel most comfortable. Despite these representations, "self" and "space" do not truly exist or, at least, do not exist in the same way in a virtual, online world. The representation of self as presented in an online world, whether as an avatar or as simply a user name, is an overly simplistic, or even a completely fabricated, version of the self that exists in the physical realm. Likewise, space is merely an illusion created by the designer to simulate the world in which people live. Kuno's comment that "Man is the measure" contrasts with efforts of an online environment to eliminate the importance of self, time, and space as potential constraints to learning. However, these dimensions of life are not necessarily obstacles to overcome. Rather, they are part of what makes us human, and through them, humans have the ability to know and measure "all that is lovable and desirable and strong." There is a human and physical dimension to living and learning. While the physical world does continue to exist at either end of an online connection, it is reduced to students sitting in a room, typing on a keyboard, looking into a monitor, and engaging in an internal dialogue regarding the learning experience. What is represented at the other end of this ethereal connection is subsequently reduced to a hollow voice, misspelled text, and a pixilated avatar.

We must take this issue into account when creating online worlds of learning. I am concerned that the physical nuances of interaction and presence are often taken for granted and dismissed by course designers as nostalgic relics of a physical world that have little, if any, relevance in an online learning world. We need to instead create environments in which students must work, reflect, interact, create, and take the time to be truly engaged with one another on a human level. While it may one day be possible to create this sort of online environment, I am unfortunately yet to experience it. While working on this paper, for example, I found that I had occasion to interact with my department chairperson. On occasion, I chose to e-mail him, which

usually consisted of a single comment or question. His reply was equally short—end of communication. At other times, I chose to stretch my legs and walk down the hall with the intention of delivering a similarly short message. On the way there, however, I stopped by the graduate assistant workroom to request some copies, wandered by our department secretary's office to check on the health of her family, chatted briefly in the hall with another faculty member about a study I'm conducting, and finally arrived in my chairperson's office to deliver my message. Unlike the e-mail exchange we had earlier, this interaction went far beyond the simple comment I had intended to make. We ended up talking about his new grandchild, the department meeting the day before, and the upcoming course schedules. While I could have recreated this entire experience via e-mail ("I need 10 copies." "How's your family?" "How did the meeting go?" "When are schedules due?"), I would likely not have done so. My walk from my office to his office directly resulted in these important but unplanned interactions with others. Each interaction was qualitatively different from what would have been discussed if I had initiated each discussion via e-mail. My choice to move my physical self through a physical space allowed for these serendipitous interactions to occur in a way that could hardly be simulated in an online environment.

In designing online coursework, I want to find ways to recreate these types of interactions between and among my students. However, I have yet to find tools to capture these physical nuances of interaction and presence effectively although I admit that 3-D virtual world technologies hold some promise in this arena. I look forward to experimenting cautiously with these immersive technologies to determine whether they can begin to address some of the concerns I have voiced.

Wither the Imponderable Bloom

… she [Vashti] fancied that he looked sad. She could not be sure, for the Machine did not transmit nuances of expression. It only gave a general idea of people—an idea that was good enough for all practical purposes, Vashti thought. The imponderable bloom, declared by a discredited philosophy to be the actual essence of intercourse, was rightly ignored by the Machine, just as the imponderable bloom of the grape was ignored by the manufacturers of artificial fruit. Something "good enough" had long since been accepted by our race. (Forster 1947, page 148 [print]; "The Air-Ship," ¶ 44 [online])

We can continue to design and build tools that make mediated realities more like F2F physical realities. Tomorrow's students might be able to isolate themselves from human contact and simultaneously be more connected than at any previous point in history. However, I believe that something will still be missing in this notion of connectivity and have yet to be convinced that technology can completely replace or replicate the nuances of human interaction and community. We cannot simulate the "imponderable bloom" of learning. The more we try and fail, the more we will be told it does not really matter. We will be told by those willing to accept the claims of technology that a discussion board or a chat room is "good enough" for a class discussion, that a streamed video of someplace will be just as good as actually being there, and that online interactions can simulate the experience of human contact. Downes (2002) argues that "the experience of that world [the online world of the computer screen] is real, and in the end, that's all that matters" ("The Promise of Indirect Experience," ¶ 4). This notion of "reality" concerns me. What is real or not has been debated for centuries. Regardless of the final outcome of this debate, the only sense of reality in which I am interested is my students' sense of reality and that which contributes to their learning. And at this time, they still desire Kuno's physical reality over Vashti's reality of the Machine.

For many students, the online learning experience can be a positive one. My students are often pleasantly surprised by what they learn from a distance course. Some, however, express distaste for the online format (Sanders 2005). I am encouraged by their critical feedback to rethink how I might make the experience different and better for the students the next time I teach the course. However, while I might know how to make the experience different for students, I am still troubled by the question as to whether my efforts will make the course better with technology. Unfortunately, much of what is being offered online currently is simply traditional F2F instruction transferred to the Web without anyone actually creating anything truly

different and better, which results in simply making learning more distant (Riedl, Tashner, and Bronack 2005). As a result, our graduate program has gained many students who prefer programs that continue to offer some F2F courses to programs that are entirely online. That is not to say that my fellow faculty members and I do not use online learning technologies when we believe it necessary or appropriate. As a technologist, I strive to create that better experience for my students with the tools available to me and to identify new tools that might assist me in this effort. However, the discontent expressed by these and other students in our program makes me cautious in my attempts to ever move entirely online with my instruction.

The End of the Machine?

This is not the first commentary on the dangers of our over-reliance on technology nor will it be the last. The warnings have come to us through the years though novels such as *Frankenstein* and *Brave New World*; movies such as *The Terminator*, *The Matrix*, and *2001: A Space Odyssey*; and from scholars such as Postman (1992); Tenner (1997); Naisbitt, Naisbitt, and Phillips (1999); and Dreyfus (2001) among others. For as long as we have used technology, there have been those among us who have reminded us that our use of technology can be uncertain and full of risk. We must continue to hear and take heed of these warnings. On the other hand, technology is also part of what makes us human. There is nothing inherently wrong with technology; it is neutral. Unfortunately, the potential of technology to control and shape us rather than our controlling and shaping it always exists. We must not allow ourselves to be abusers of or to be abused by technology.

The ultimate purpose of this commentary is to challenge readers to continue to be innovators and critical users in the field of distance education and, while doing so, take the responsibility to lead others to a more effective and engaging utilization of the technologies available. Technology does not have to be an obstacle to teaching, learning, and interacting the way it is portrayed in Forster's condemning story. It is my hope to encourage instructors to put students, content, and the design of engaging instruction first and then to identify those technologies that are necessary to meet the instructional objectives for the specific students being taught in that unique context of learning.

"The Machine Stops" ends with a conversation between Vashti and Kuno in which Vashti asserts, "Oh, tomorrow—some fool will start the Machine again, tomorrow." "Never," responds Kuno, "never. Humanity has learnt its lesson" (page 197 [print]; "The Homeless," ¶ 81 [online]). I fear that humanity will never even wonder what lesson there is to be learned. While some might acknowledge the negative consequences in our use of technology, many continue to propel themselves forward in what seems like a neverending race to build it bigger, faster, cheaper, and with more bells and whistles than the earlier model. Educators continue to flock to the latest and greatest technologies, often dismissing older instructional technologies for the newer versions, regardless of how effective they might be.

I do not anticipate that one day our connectedness will come to a grinding halt as it eventually does in "The Machine Stops." But if it does, I would hope that we would take a moment to ask, "Why?" before starting the Machine up again. We currently believe that the advantages and value of our modern technology far outweigh the negative consequences of its use. However, we must continue to pause, reflect, and reassess how our technology is changing and impacting our lives for the better and for the worse and decide to what extent we value that which I think makes us truly human.

[Editor's note: This article was modified from a presentation at the League of Worlds annual conference in Helsinki, Finland, October 2004.]

References

Burge, E. J., and N. M. Carter. 1997. *It's building, but is it designing? Constructing Internet-based learning environments.* Paper presented at the World Conference of the International Council for Distance Education, University Park, PA, June.

Cates, W. M. 1994. *Designing hypermedia is hell: Metaphor's role in instructional design.* Paper presented at the 1994 National Convention of the Association for Educational Communications and Technology, Indianapolis, IN, February.

Cates, W. M. 1996. *Towards a taxonomy of metaphorical graphical user interfaces: Demands and implementations.* Paper presented at the 1996 National Convention of the Association for Educational Communications and Technology, Indianapolis, IN, February.

Downes, S. 2004. Education and embodiment. http://www.downes.ca/cgi-bin/website/view.cgi?dbs=Article&key=1019853845 (accessed May 12, 2006).

Dreyfus, H. 2001. *On the Internet: Thinking in action.* New York: Routledge Press.

Forster, E. M. 1947. The machine stops. In *The collected tales of E. M. Forster*, 144-197. New York: Knopf. http://brighton.ncsa.uiuc.edu/~prajlich/forster.html (accessed May 12, 2006).

Henry, A., and C. M. Crawford. 2001. *Creating a collaborative Web-based environment through the inclusion of metaphorically enhanced graphics.* Paper presented at the WebNet 2001: World Conference on the World Wide Web and Internet, Orlando, FL, October.

Naisbitt, J., N. Naisbitt, and D. Phillips. 1999. *High tech high touch: Technology and our search for meaning.* New York: Broadway Books.

Postman, N. 1992. *Technopoly: The surrender of culture to technology.* New York: Knopf.

Prensky, M. 2005. E-Learning and ICT: What can you learn from a cell phone? Almost anything! *Innovate* 1 (5). http://www.innovateonline.info/index.php?view=article&id=83&action=article (accessed May 12, 2006).

Riedl, R., J. H. Tashner, and S. Bronack. 2005. *Innovation in learning: Assumptions about teaching in a virtual world.* Paper presented at the 2005 International College Teaching Methods and Styles Conference, Reno, NV, September.

Sanders, R. 2005. Interaction and online learning communities. In *Proceedings of Society for Information Technology and Teacher Education International Conference 2005*, ed. C. Crawford, D. Willis, R. Carlsen, I. Gibson, K. McFerrin, J. Price, and R. Weber, 2320-2325. Chesapeake, VA: Association for the Advancement of Computing in Education.

Tenner, E. 1997. *Why things bite back: Technology and the revenge of unintended consequences.* New York: Knopf.

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