Application of Information & Communication Technology in Education

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Summary

The role of the computer and information technology in the world has evolved from specialised computing machines to information devices that pervade our daily lives. In our attempts to integrate computers into our daily lives in the world, we take into account the embodied nature of our interactions with each other and object we manipulate. New technologies lead to a new kind of human being - one embodied in a new technologically enhanced body. Homo faber is the new technologically enhanced human being - who is not an objective artifact (a technology) but a subjective artifact of the new technologically enhanced (perceptually, cognitively, and desire-and institutionally-oriented) human subject. Every time new technologies were introduced, claims were made that revolutionary changes would occur in teaching and learning. I caution against thinking that the technologies alone will bring about the change. The technologies only allows us to think of new ways of learning. Just as books require good authors, the new technology will require new kinds of learning design engineers. In this article, I will suggest to rethink the application of Information and Communication Technology (ICT) alongwith the embodied nature of communication in education. To deal with these issues, it is argued to develop a culture of embodiment and technology relations in the philosophy of education.

Keywords: body, information & computer technology, human-computer interaction, phenomenology, tools, users, Rosenberger, world.

I. Introduction

Information and computer technology provides a new way of understanding the world in terms of "embodiment," which we can think of as a uniquely sensitive and manifold interface (includes seeing, touching and hearing). The role of the computer in the world has evolved from specialised computing machines to information devices that pervade our daily lives. Innate structures describe the way our body is built, and basic general skills are skills we learn through our bodies. Cultural skills describe our learned interactions not directly tied to the way our bodies are built. In order to understand users and interact with them as ready-to-

hand participants and tools, computers should view them as embodied agents in the world with communicative and cultural skills specific to their embodiment. Natural language technologies capture a part of those communicative skills, but fail to take into account the embodied aspects of communication. We acknowledge that the natural body gives us extraordinary means of interacting with each other and with the world. It is a phenomenology of how we come to find our way about in the world, whether it be the world of jazz, discourse, typing, tennis, or getting on or off the bus.

Phenomenological views on language and communication emphasise actions associated with our speech, which are ignored by pure natural language systems. Dourish describes Wittgenstein's view of language as socially shared practices "consisting of language and the actions into which it is woven" (Dourish, 2001). These actions into which language is woven are inseparable from communicative meaning. Thus, language has an extra dimension associated with social conventions and actions, such as gestures, pointing and body language. Winograd and Flores describe language whereby "words correspond to our intuition about 'reality' because our purposes in using them are closely aligned with our physical existence in a world and our actions within" (Winograd & Flores, 1986). Thus, natural language systems' attempt to strip spoken language from its phenomenological correlates and actions is somewhat misguided, yielding an incomplete means of human-computer interaction. "We inhabit conversations as embodied phenomena in the everyday world."

Human-Computer Interaction (HCI) is concerned with the design, implementation and evaluation of interactive computer-based systems, as well as with the multi-disciplinary study of various issues affecting this interaction. The aim of HCI is to ensure the safety, utility, effectiveness, efficiency, accessibility and usability of such systems. In recent years, HCI has attracted considerable attention by the academic and research communities, as well as by the Information Society Technologies industry. The on-going paradigm shift towards a knowledge-intensive Information Society has brought about radical changes in the way people work and interact with each other and with information. Computer-mediated human activities undergo fundamental changes and new ones appear continuously, as new, intelligent, distributed, and highly interactive technological environments emerge, making available concurrent access to heterogeneous information sources and interpersonal communication.

One of the most important purposes of technology is to produce and use certain instruments to free ourselves from various kinds of work. However, it is also well known that the meaning of technology cannot be reduced to the role of instrumentality. For example, during the process of the production and use of technology unintended consequences sometimes arise, which are considered to be not only the source of creativity but also the origin of failures and accidents. This aspect of technology could be called the "otherness" of technology, as it demonstrates the unpredictable and unmanageable character of technology. Japanese philosopher of technology Junichi Murata tells us that the kind of philosophy of technology we have, depends on how we characterize this "otherness" of technology, or on which facet of the "otherness" of technology we focus. A number of philosophers of technology conceptualize technology as a *mediator* of human experience. In these views, a technology comes between a user and the world and significantly alters the relationships between them (e.g. Ihde, 1990; Rosenberger, 2008). According to Rosenberger, the use of a technology is always non-neutral; a technology changes how the world is approached, understood, perceived, and acted on by its user (Rosenberger, 2008).

Drawing from the traditions of phenomenology and hermeneutical philosophy, the first program of Don Ihde (1990) analyzes the diversity of human-technology relations and shows the extent to which technology is nonneutral. The second program takes up the issue of technology as a cultural instrument, in part through a discussion of indigenous technologies, technology transfer, and neo-colonialism (Ihde, 1990). The philosophical tradition of phenomenology provides a perspective through which technological mediation can be productively explored. "Phenomenology" refers to an effort in philosophy to describe the nature of human experience, in all its bodily, perceptive, and conceptual (or preconceptual) facets (Ihde, 1990; Rosenberger, 2008).

According to Robert Rosenberger, everyday users of computers come to embody their devices in significant ways; "These embodiment relations often become deeply transparent and deeply sedimented. When a person uses the computer to perform everyday tasks such as typing, reading emails, or surfing the Internet (of course which tasks qualify as "everyday" depends on the individual), she or he may grow barely aware of bodily interactions with the device. The bodily, conceptual, and perceptual habits this person has developed enable

conscious attention to be directed to the tasks being performed with the computer, rather than on the technological mediation that makes those tasks possible" (Rosenberger, 2008).

Rosenberger explains the affective role of sedimentation in computing world, which would enhance the educational aplications of computer use; "The everyday user also shares a hermeneutic relation to many aspects of the computer. Onscreen icons, buttons, and cursors appear as symbols that convey information. The cursor itself as it is used, controlled by the mouse and keys, changes into different shapes, such as arrows, pointing fingers, swirls, and hour glasses. The user must be familiar with the meanings of these different symbols—the language of onscreen interface. If accustomed to interpreting these symbols, a high level of transparency develops and interacting with these encoded icons, buttons, and ever-morphing cursors comes as second nature. Their meanings are conveyed in perceptual gestalts. Refined habits of perception and interpretation enable the user to attend more to what she or he is doing than to interpreting symbols" (Rosenberger, 2008).

II. Educational Perspectives of Human Technology Inter-relations

North American phenomenologist philosopher of technology, Don Ihde deals with non-neutrality of technologies. Don Ihde asks us to consider the technology as part of the field of our experience and to pay close attention to what aspects of experience are selected, amplified, and reduced through interaction with various forms of technology. Technologies are subject to the philosophical reflection.

Ihde characterizes technological mediation is in terms of three different categories of human relations to technology: embodiment relations, hermeneutic relations, and alterity relations. These three kinds of relations point out different manners in which technologies figure in human experience. In this section I apply a kind of relations to human-computer interaction, what Rosenberger refers to as "sedimentation."

According to Rosenberger, *Sedimendation* refers to the level of habituation that accompanies an individual's relationship with a technology use. On the issue of "Sedimentation" in his paper *Habitual body and memory in Merleau-Ponty* (in Man and World 17, pp. 279-297(1984)) Edward Casey has described the phenomenological importance of sedimentation and habitual body. One's present experience of the world depends on one's past experience and activities through a process of sedimentation. Sedimentation is a crucial in the genesis of

intentionality and functions as a horizon for all present experience of the world. It becomes reawakened in the individual acts, and it is revisable. The human body is playing a keyrole in the sedimentation.

Casey writes "Sedimentation is implied by my very being-in-the world, which must be as continually resumptive of acquired experience as it is pro-sumptive of experience still to come. In fact, sedimentation is the necessary complement of spontaneity, since these form the two essential stages of all "world-structure" for Merleau-Ponty. It is revealing that in discussing sedimentation Merleau-Ponty mentions character as a leading example and describes in some detail the experience of knowing your way around a house. Both are aspects of "acquired worlds" which precipitate themselves into my ongoing experience. Even if sedimentation typically begins with a particular person or place, its main tendency is toward depersonalization and generalization (cf. Phenomenology of Perception (PP), 137, p. 142)."

Sedimentation is directly related with experience, which has a common point with Pragmatism. Casey further elaborates "What sedimentation teaches us, therefore, is that even at a moment of human experience when we might be most tempted to employ terms connoting sheer passivity - e.g., as in the locked-in formation of sedimentary rocks, where depth signifies merely greater age or mass - an element of agency is at work, a factor of what Husserl would call "activity in passivity." And if habit memory is a main means of effecting sedimentation, and thus of giving a depth that is not objectively determinable, it cannot be through the working of the strictly habitual in the sense of the routinized: a routine is nothing but an inert pattern of behavior."

It seems to me the sedimentation has something to do with habituation (of body) here takes its most concrete form in the body's inhabitation of the world, its active insertion into space and time: “we must therefore avoid saying that our body is in space or in time. It inhabits space and time” (PP, p. 139).

In fact, the habituation which such inhabitation accomplishes involves a delicate dialectic between the implied passivity of enclosure (for space and time undeniably act to contain us) and the activity of getting to know our way around in a given circumstance. This is why it is true to say both that "I belong to [space and time]" and that in turn "my body combines with

them and includes them" (PP, 140). Inhabiting, taken as a paradigm of the bodily expression of habit memory, is at once "wholly active and wholly passive" (PP, 428), in the world and of it. It is made possible by sedimentation even as it carries sedimentation itself to new depths.

In the words of Rosenberger, sedimentation is the level of force of one's "force of habit." If a person encounters a familiar technology and is strongly inclined to experience it in a particular way, this person's relation to the device is deeply sedimented, says Rosenberger. To explain this phenomenon of sedimentation, Robert Rosenberger (2008) illustrates the phenomenology of human relations to technology (which can be significantly applied to the educational aspects of human-computer interaction).

III. Phenomenology Application of Computer Use in Education

The application of the phenomenological concepts to the experience of ICT (information & communication technology) use draws out particular features of our interactions with these devices such as human-computer interaction; As described by Rosenberger (2008) "this 'phenomenological' account is useful is that it highlights the importance of the habitual aspects of our everyday experience of this technology *use*."

It can be seemed that some users have found some of their interactions with the computer to be unbeneficial or even unhealthy (Rosenberger, 2008). Some spend time using the computer or Internet when it might be better for them to engage in other activities (for example, fulfilling work obligations or getting exercise and co-curriculum activities, for example engaged in craft works and sports). College campuses offer support groups to aid students and school children that are addicted to the Internet, spending too much time on the computer. Bowers (2003, 2000a & 2000b) has done some good works on how the computers can be used effectively in learning and education by school children in schools and colleges. Bowers (1988a, 1988b) argues in the terms of Don Ihde (1990) to consider how experience is mediated by the technologies we use. Bowers (1998a) asks us to consider the microcomputers as part of the field of our experience and to pay close attention to what aspects of experience are selected, amplified, and reduced through interaction with various forms of technology. How the use of a particular technology mediates and transforms the nature of experience can be understood, to start with the simplest example, by looking at what aspects of experience are amplified and reduced when we use a pencil; "Use of a pencil amplifies the ability to express our thoughts in written form, and because of the

characteristics of this technology we have the time to reformulate our thoughts in the process of writing them down" (Bowers 1988a). By facilitating written expression, Bowers says, the pencil amplifies a whole series of characteristics that have social, cultural, and political consequences: "a privatized form of communication, a decontextualized form of thought, creation of a text that takes on an independent existence thus allowing for critical analysis, and communication with an anonymous public." (Bowers 1988b, p. 42)

To take another example, Bowers says, we can ask what the use of the telephone amplifies and what it reduces. It is a powerful technology for communicating voice over great distances, and as it reduces other aspects of the communication process it sharpens our tendency to listen carefully. But it reduces our ability to use context, body language (including facial expression) as part of the message system. In learning to think of how different technologies -automobile, fork, book, calculator, flute, etc. -amplify certain aspects of experience while reducing others, it becomes less strange to ask what a microcomputer, given the current state of software, amplifies and reduces (Bowers 1998b). But in order to understand the educational significance of this line of questioning, Bowers comments "we need to put in focus a more complex view of experience -one that takes account of the cultural aspects. Thus before we can examine what the use of microcomputers amplifies and reduces we need to situate this technology in terms of how culture is transmitted and experienced in the classroom. This will enable us to see what is being amplified and reduced and how this selection process (which involves the microcomputer acting on the student) reinforces a nineteenth-century mode of thought" (Bowers 1998a & 1998b).

One of the characteristics of the computer that contributes to its existential and cultural amplification characteristics is that it carries forward the culture patterns associated with print-which many scholars have associated with a modern form of consciousness. The spoken word cannot be recovered with the same accuracy as the printed word and thus does not lend itself as easily to critical analysis which, along with the act of reading, is an individualized activity (Bowers 2000b): "In effect the printed word (which is always separated from context) has been represented by Western thinkers as a more accurate representation of reality than the spoken word-which is dependent upon context and interpersonal accountability." This privileging of print over the living reality of the spoken word has been an important source of Euroamerican oppression of Native peoples in the past, as explained by Chet Bowers in (2000b). Computer-mediated thinking and communication further

exaggerates the cultural patterns inherent in print technology. It does this partly by the way in which advocates of computers treat oral and print-based communication as identical, and by their emphasis on associating computer-mediated communication and thought with participation in global networks-as though the participants share an identical cultural epistemology (Bowers, 2000b).

Students must also be taught "non-cyber logic," to research in an old-fashioned library, with all the social and high level thinking skills that go along with it. They need to have their fingers "walk through" school with pen and pencil as well as with a mouse. Teachers should motivate and facilitate learning on all levels. Higher level thinking skills can only be honed, if one has something to relate to personal experience. The "what if" (if / then) expression is a necessary component of life, as well as a program. The Internet makes it possible to locate information in seconds, but it does not provide the human connection a simple smile from a teacher brings to the face of a struggling student. The social skills gained from a simple spelling bee last a lifetime. The human connection is a crucial element of the learning process. If not, then why is it mimicked in programs with question responses and module completion comments with motivating expressions. As described in „Teachers and Machine: The Classroom Use of Technology Since 1920“ (Teachers College Press, 1986) Larry Cuban defined instructional technology as „any device available to teachers for use in instructing students in a more efficient and stimulating manner than the sole use of the teacher's voice. Hardware and software, the tool itself and the information the tool conveys, define the technology.“ Every time new technologies were introduced, claims were made that revolutionary changes would occur in teaching and learning.

Just as books changed the way we stored and retrieved information and enabled us to invent the modern schoolhouse, Internet will change the way we think of learning and teaching. Digital technologies will change the way we store, use and retrieve information. It is because of these changes that digital technologies are very different from others in education. I also caution against thinking that the technologies alone will bring about the change. The technologies only allows us to think of new ways of learning. Just as books require good authors, the new technology will require new kinds of learning design engineers. Professionals will evolve who can take the research from learning theories and blend it with the technologies. It is not a simple or inexpensive task, but we already see some glimpses of what the future may bring (Tripathi, 2001).

Bio

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