LEARNING IN VIRTUAL WORLDS

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TRADITION IN COMPUTER-BASED LEARNING

If one casts one’s eye over the thirty years of research and development in computer-based learning it is possible to identify three distinct conceptions of the computer’s role in supporting learning — three distinct traditions. (In using the term ‘computer based learning’ what is being referred to here is the application of computers as a medium of learning as distinct from the use of computers in enabling learners to gain computer skills or skills which enhance productivity.)

The first of these traditions had the computer serving as a substitute for the book. Providing access to information is perhaps one of the most obvious ways of conceptualising what a computer can offer and so it is not really surprising to find this function being translated into the context of education. Of course, as a piece of technology supporting education, the computer is not seen simply as duplicating the functions of a book. The computer is seen to offer certain advantages — being able to draw on a large body of information, being able to present it in varied sequences, being able to link pieces of information together more flexibly, and so on. It is these advantages that enable the computer to be a credible substitute for the book. However, notwithstanding these advantages, the role that the computer can play in this capacity is extraordinarily limited, both because of its cost and its constraints, and by-and-large has been acknowledged to be so.

The second major tradition that can be seen in the application of computers to the support of learning has the computer as an infinitely patient tutor. This role represents a substantial advance on the conception of the computer as a substitute for a book. It moves the learner into action in learning rather than limiting the learner to being a passive recipient of information. In that sense it accords with the strongest theories on how people learn. However, in practice, the model has proven more difficult to implement than it was to conceive. Until recently, computers have lacked the power to respond flexibly to the learner in the way that a human tutor can, and so the model has been limited by the degree of sophistication to which software technology has reached. Nevertheless, much progress has been made within the bounds of this tradition in many subject areas and with the development of artificial intelligence technology, the creation of intelligent tutoring systems has given the computer as tutor model a new lease of life (Wyer, 1984; Rominzowski, 1987).

The third major tradition has the computer as model maker, the models in this case being models of the world. This tradition brings together various strands of development: work on simulations (Miller, 1984) on the creation of microworlds (Papert, 1980; Cox and Cumming, 1990) and on intelligent tutoring systems using artificial intelligence techniques. This tradition has found its philosophical base in exploration-based or discovery learning and owes much of its success to the major technical advances that have been made in recent times in computer graphics, animation and sound. It is probably true to say that this third tradition represents the most advanced stage of development in computer-based learning at the present time.

These three traditions represent the predominant ways in which educators have conceived of using computers in supporting learning. However, they have one other feature in common. This is that they exist within the more encompassing logical-scientific tradition which forms the basis of the Western way of thinking.

The logical-scientific tradition represents a particular way of thinking...
which began with Plato and the ancient Greeks. During the Middle Ages it was almost lost. However, it sustained a revival and was re-established during the Renaissance, and it has now become the predominant paradigm of thinking in Western society.

One of the most important distinguishing characteristics of the logical-scientific tradition is that the world in which we dwell is conceptualised as a world 'out there' — a world external and common to each of us and a world which is capable of being known through our senses. It is upon this conceptualisation of the world that the rationale for the scientific method — which is the basis of most science — is built.

**THE OBVIOUSNESS OF TRADITION**

The purpose of introducing this paper with a discussion of the major traditions evident in computer-based learning has been to draw attention to the fundamental role that tradition plays in shaping the way we think, including the way we think about an area like computer-based learning.

Tradition exists as part of the context in which the affairs of humanity are played out. It provides the background against which new ideas must show up. It provides the wherewithal from which new ideas may be formed.

**Traditions fashion the future**

Tradition has another role. It represents the 'safe pathway' to follow in life. It helps to define the bounds of accepted behaviour. To break with tradition places a person at risk of being denigrated, despised or ostracised.

Staying within the bounds of tradition gives one the greatest chance of having one's ideas accepted and gaining acceptance amongst one's peers is one of the most basic goals of human enterprise.

So tradition sets a limit on what is permissible as well as on what is possible. So accustomed are most of us to functioning within the scientific paradigm that it is difficult to conceive of anything else. It never occurs to most of us that operating in any other paradigm might be possible. It is so much part of the way in which people live that they are for the most part unaware of its existence. This is what has been described as the 'obviousness' of tradition (Winograd and Flores, 1986).

**An alternative paradigm**

Whether a computer is seen as a substitute for a book as a tutor or as a device for modelling reality it is seen to function in relation to 'a world out there'. The computer is thought of as describing or teaching about or modelling that world and in doing so is meant to let the learner get a better understanding of what that world is like and how that world works.

We know through our senses and that the sense organs are merely transducers for the energy by which they are stimulated. The world we know is therefore a world which exists as an interpretation and what gives it concrete reality is the constancy which exists as an interpretation and what gives it concrete reality is the constancy which exists in our recreation of that interpretation. Our view of the world is shaped by the logical-scientific tradition within which we live.

On those rare occasions when we notice a disparity between what we believe is there to be perceived and what we perceive we call them 'illusions'. The name implies some departure from the norm — from perceiving a world which is real.

An analysis of the way in which our understanding of the world is distorted by our apparent perceptions of the world has been given by the work of Humberto Maturana and his students (Maturana and Varela, 1987).

**CREATING THE WORLD THROUGH LANGUAGE**

To get some sense of this distinction we need to shift our perspective from that of a person to that of a person experiencing.

As human organisms we make contact with the environment through our sensory modalities — sight, hearing, taste, touch, smell and the less well-known modalities to do with the internal state of the body. However, the interpretation we give to what we perceive is a function of learning.

So greatly has each of us been changed as a result of a lifetime of learning that it is barely possible for us to bring back to mind the world that occurred to us as a small child. Fleeting glimpses are all we can bring back to mind. Yet amongst those fleeting glimpses we catch images of a world which is much less well-organised than the world we know today — a world of colours and shapes and sounds but somewhat lacking in form — a kaleidoscopic melange.

Through the process of learning and in interaction with others we begin to give form to our world. However, it is who we give the world form, it is not the world revealing itself to us. As we grow older we become increasingly accustomed to having the world occur to us in a particular way. We begin to relate to it as an immutable reality rather than a stream of sensory inputs we are interpreting.

By agreement within our speech community — an agreement born of necessity — the world we create is one which largely matches that which those
about us have also been creating. The need to feed and clothe ourselves, to build shelter, to live and work together necessitates that this be so. However, it is not a condition forced on us by the environment itself. To see this we only need to look at the discontinuities as exemplified by the discontinuities that may be found between the languages of different cultures.

One often cited example is the way in which Inuit see snow. Snow for the Inuit is an important part of daily life. However, the appearance of snow correlates with changes in the weather. Inuit acknowledge and make use of this correlation by distinguishing between different varieties of snow in their language. However, the creation of these distinctions in language also gives to the Inuit a particular way of seeing snow. Snow which forms ahead of a blizzard calls the Inuit to take shelter. The distinctions which the Inuit makes between different appearances of snow enable the Inuit to survive and build a culture in such an inhospitable environment.

Each person's world is only and always created through language. Words are the labels by which we construct our internal and external conversation — our thinking and speaking. However, for most of us, words are labels attached to objects or events that belong to a 'world out there'. It is theoretically possible to develop abstract concepts based on the co-occurrence of particular characteristics. (This approach has been used frequently in experimental psychology.) However, in real life learning seldom happens this way.

This process of expanding our vocabulary gives a richness to our world which we do not have and do not have language to maintain it in time. The process of meaning-making and language development are therefore intertwined. Language gives meaning to the world as it appears and the acquisition of new meaning gives a context for new distinctions to be developed and fashioned through language. This process of meaning making through language development is what learning is all about.

THE RISK OF LEARNING

Learning is so much seen as a teacher-mediated activity that thought is seldom given to what learning is like for the learner. This is different from how processes the learner uses in learning. It is concerned instead with how the learner experiences their learning.

For most teachers, that period of their life when they began their formal learning is now so far away that they have lost touch with what it is like to be learning in a field about which one knows very little.

Learning, by its nature involves a step into the unknown. That entails risk. However, for each learner the risk is different.

Risk is a function of experience. It concerns the relationship between the past experience and present experience. It also concerns the emotions attached to past experiences. What one person may experience as a situation of high risk another person may experience as a situation of great opportunity. What enables a person to step into that unknown that is represented by a new field of learning, is being awakened to the possibilities that success in that field of learning may bring. Fostering a love of learning calls therefore for a dual approach on the part of the teacher: awakening the learner to the possibilities of learning and diminishing the apparent risk associated with stepping into a new learning opportunity.

When learning is seen as a process of developing understanding of what the world is 'really like' the potential for failure is high. When learning is seen as a process of inventing new interpretations of an interpreted world, the greatest risk lies in not entering the game.

ANNOUNCING A NEW TRADITION:
THE COMPUTER AS THE MEDIATOR OF EXPERIENCE

What does all this have to say about the way in which computers are used to support learning?

In the tradition of computer as model maker the computer is thought of as providing the student with a new experience, but the experience that is created is seen as being that of a world 'out there' — a world to be represented and understood. When the interaction between the computer and the learner is understood according to the alternative paradigm the role of the computer shifts, it is now no longer a channel but instead a tool. The computer contributes to new experience but the experience is the creation of the learner. The learner is responsible for the experience and the computer helps to provide the context wherein such experience may occur.

Saying this does not diminish the importance of the computer in the learning process. Rather, it alters its role. Now, instead of being seen as the medium through which the experience is delivered, the computer is seen to provide the 'workbench' at which experiences are created. Learning becomes an intensive activity.

Invention isn't a risky activity. Invention is fun. Invention opens new possibilities and opportunities.

TOWARDS MORE CREATIVE LEARNING

In the dominant, logical-scientific tradition, the computer is seen as supporting learning by giving access to information, by enabling the learner to practice and by revealing new worlds. In the experiential tradition of the alternative paradigm, the computer's role is to give context to the learner's own meaning making — it is the learner that is the creator of the experience. When people grasp that they are the creator of their own experience then they gain the ability to take charge of their own learning.

REFERENCE


Continued on page 40
Thus, while the suggestion that ‘writing’ at a computer is a metaphor may stretch our conception of metaphor beyond what is reasonable, it does provide a very useful point of view from which we can examine some of the effects and implications of this new manifestation of written language and its relationship to thought and learning.

REFERENCES

Continued from page 13


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