



Strand 3: Networked Learning For Professional Development

Paper 8:

Human Tortoises on the Net: Taking Account of Learning Speed in Designing Networked Learning for Adults

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Summary

- Human learning takes time. By examining the processes of human learning we see that formal learning programmes must provide time for learning to take place, particularly where adults are concerned. Traditional methods of delivering learning material, face to face and at a distance, have time for learning built into them, but networked learning methods do not. The speed and volume of information available by networked means make learning more difficult, since compared with machines, human beings are very slow at information processing. However, those who are experts in a field can be shown to learn at different speeds from those who are novices. Reviewing the reasons for this difference leads to suggestions about how time for learning can be provided in networked learning for continuing professional development, thereby enhancing learning.

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Introduction

- Human learning takes time. We are all aware of this, from experience of trying to learn a new skill or a new language. We know too how much practice we need, and how often we have to go back and look again at what we are trying to learn. Those facing examinations are frequently painfully aware of how much time is required to learn something, and of how much of what they thought had been learnt slips away under pressure.

The time taken to learn things is popularly supposed to increase as one grows older. It is often said that you cannot teach an old dog new tricks, implying that older people cannot be expected to learn. In the same vein, many teachers expect older learners to take more time to pick up even simple things, and compare older learners unfavourably in this respect with younger learners, perhaps wrongly.

The ways in which human learning processes are related to time are fascinating. They also have important implications for the design and delivery of teaching programmes which are particularly relevant to networked learning. As we shall see, in some cases the speed of human learning may become a problem in the networked arena, in other cases it may be exploited as a strength.

Processes of human learning

- For the purposes of this paper I shall take human learning to be a process in which information is taken in, processed and stored in such a way that it can be used at a later time and in different circumstances. I am aware that this begs many questions, but this view of learning is sufficient to focus on the significant issues I want to raise in connection with networked learning.

Why does human learning take time? On most models of human learning, the learning process has a series of stages. The learner receives new information, assimilates that information to existing frameworks of knowledge, stores the information in short-term or working memory and then in long-

term memory, and makes connections between the new information and other items of information already stored so that the new information can be contextualised and become available for use. This is a very simplified picture, but it helps us to see how human learning is related to time (1).

Clearly the process of receiving the information takes time: it takes time for you to hear what I am saying, to read the words I have written or to take in a visual image. The processes of assimilation and storage also take time, though we are usually not aware of this, because we are not aware of these processes taking place.

Making connections with existing stored information also takes time, sometimes a great deal of time. Some of the connections are immediate and easy: the link between “siren” and “ambulance” is quite easy. But “siren” can also be linked to “police car” and to “seductive person”, while “ambulance” can be linked easily to “air” and to “accident”. The process of making these links is not well understood; but we know enough to say many of these links only emerge as the new information is thought about and used and re-used in different contexts. Sometimes the connections are only made when a particular piece of information is called for in a new context: then we struggle to find the right word, image or concept, and, having found it, note it for future reference. We have learnt something, but it has taken time.

An interesting and relevant question for my purposes is: does the time taken to learn something vary with age? Some studies have been done of the differences in learning speed between younger and older adults. The results suggest that older adults take in and process information more slowly than younger adults, partly because as we grow older our visual and aural abilities begin to deteriorate. We are just not able to absorb information at the same speed. A popular impression is that memory also declines with age, a view often supported by personal anecdotal evidence but a view that is not clearly supported by the results of research.

Even though some capacities deteriorate with age, studies suggest that older adults can be as efficient and effective in their learning as younger adults, because older adults are able more easily to make connections between new information and existing

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stored information and conceptual frameworks. This may be due in part to the fact that older adults are likely to have more information stored. But it is also due to expertise, the ability of one practised in a certain area to pick out quickly what pieces of new information are significant and to recognise and use familiar pieces of information, familiar words and concepts as pointers to the new and pegs with which to associate the new. When older adults have to learn outside their domain of expertise, their learning performance becomes poorer: they take longer to assimilate information, and are less able to re-use it effectively in different contexts.

The implication of this is that formal learning programmes must provide time for the learning process to take place, especially if those programmes are aimed at adults. This is clearly relevant in the area of continuing professional development, where we are dealing with adults. However, it is not something to which we normally pay attention, because traditional or standard methods of programme delivery conceal the problem. Standard programme delivery, whether face-to-face or at a distance, has time for learning built in because information is delivered at a pace with which human beings can cope. With networked learning the case is different. The volume of new information available and the speed with which it is delivered make learning more difficult.

Learning speeds and delivery methods

- To see how computer mediation affects learning speed, let us look first at standard delivery methods, and remind ourselves of some of the basic points of good teaching style found in all the textbooks. A teacher talks and students listen, and take in some of what is being said. No student is likely to take in everything, and no student is likely to recall everything taken in; indeed some studies suggest that as little as a third of what is presented to students will be remembered in any way – and that third will probably be the bits which the teacher regarded as minor. A good teacher will give students a better chance of learning by amplifying the main points, and reinforcing them by

approaching the same point from different angles and by repetition. The old adage of public speaking holds good: tell them what you are going to tell them, tell them, then tell them what you have told them. Through the process of repetition and reinforcement, the student is given time to assimilate the information presented and to make sufficient connections to retain it. The development of other connections can then take place later, as the information is recalled for use in other situations.

Generally in our literary-based systems, oral teaching is supported by written material, and sometimes by visual material as well. When we read a book or article on a particular topic or look at a particular image, we take in some of what we read or see. By reading slowly and making notes and looking very carefully, as we are advised to do in study skills courses, we can take in and retain more information. We can return to the written material again and again for reinforcement or to clarify what we have remembered: and on each occasion we can make fresh complex connections between stored and processed information

Thus in the usual face-to-face teaching situation, oral and written material supplement each other, and the processes of listening and looking allow us time to retain information. But we need to note how slow these processes are. Few of us read very quickly, and when we are reading for learning we tend to read more slowly. Few of us speak very quickly, especially when we are trying to make a point to someone, and the pauses, the hesitations while the speaker searches for the right word, the breaks while a question is asked and answered, other interruptions – all these provide time for the processes of reception, assimilation and connection to take place. Hence time for information processing, for learning is built in to the mechanics and dynamics of the teaching and learning situation. The delivery occurs in such a way that it moves to the rhythm and at the speed of the human learner. Of course in any human group we are likely to have people who learn at different speeds, but even then the speed of delivery can be adjusted to cope with the greyhounds and the tortoises. The range is not so large that it falls outside human competence.

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Things are a little more difficult if we turn to learning on our own, just from reading or from watching a video or listening to an audio tape. Here the speed at which we learn is dictated by our use of the material. It is interesting to note that very few people can read or watch and learn over long periods. It seems that we cannot concentrate sufficiently for long periods – some say twenty minutes is the maximum concentrated attention span for most people – and so we need breaks to refresh ourselves and allow our tired brains to relax a little. Those five minute naps in the library and frequent short breaks for coffee may be as necessary to the learning process as the books and tapes.

For my purposes the significant point to note is that breaks to enhance concentration also allow time for information processing to take place. While we are taking our forty winks or having a cup of coffee, our brains are busily sorting and storing information, assimilating it to existing knowledge and making connections with stored information. The time to learn is given to us by the way in which we respond to the needs of our information processing systems.

It is important to note that in both the face-to-face and the more remote learning situations, the expert and the novice have different needs. For this purpose, an expert is a person who is familiar with a field, a novice is a beginner in that field. An expert in one field may, for learning purposes, be a novice in another field. The expert and the novice are likely to treat learning material differently. The expert may well skim the material, using familiarity with the field to select those pieces which are new or significant. The novice, who needs to build up a framework of knowledge within which information can be organised and assimilated, has to examine everything carefully. The expert can work quickly, just because not every detail matters. The novice has more work to do, because it is not known which details do matter. Hence one gives a different kind of lecture to first year undergraduates and to graduate professionals in a field.

Consider now the networked learning environment. Large volumes of data are available, at speeds limited only by the speed of transfer of our connecting lines – which are much greater than the speeds at which we can read and assimilate information. We can scroll through information very

quickly, skim reading; but much of what we see on the screen will simply pass before our eyes without being read and without being taken in. Sometimes something catches our attention and we backtrack to read it more carefully. Sometimes we print the information, making a hard copy to be read more carefully at our leisure. Note the terminology we use: more carefully, at our leisure. Phrases like these are indications that we are aware that we are not processing the information as we would in other circumstances. Compared with our machines we are information processing tortoises. We work slowly, and we learn slowly.

The speed with which the machines work by comparison with us has another interesting effect. We are much less likely to take breaks from our learning when we are in a networked environment. It is as though we feel we must respond to the machine, as though we must match it in some way. We do not take time off for coffee, or day-dreaming. Even when health and safety considerations dictate breaks from the screen, most people are very reluctant to stop work. But in the context of learning, this means that the necessary breaks for information processing do not occur. We simply do not have time to learn, or, perhaps more accurately, we do not give ourselves time to learn.

Implications for the design and delivery of networked learning

- It seems clear from this very brief examination that the speed of human learning is a factor to be taken into account in the design and delivery of networked learning. The volume of information available to us through computer mediated sources and the speed with which it can be accessed simply overwhelm human tortoises. We cannot process the information in any way which allows us to say we are learning.

One way of solving this problem is to slow the machine down to our speed. We can treat the monitor screen as we would a book or video player, and go through the information presented at a pace which suits us, with breaks. We can also treat the

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network as just a gigantic information pool, taking everything off in hard copy form for study in more traditional ways. In both cases we allow ourselves to learn, but we do so by turning networked learning into a process of information retrieval. This is no doubt useful, but it seems to set aside some of the benefits of networked learning, such as the opportunity to enter different contexts and make connections we should not otherwise have dreamt of, and the opportunity to acquire knowledge and information for use when the machine is not available.

To see how we might begin to solve the problem and exploit the network for learning purposes, let us focus on the field of continuing professional development. Here we start with people who are professionals in a field, who know something about it; in our earlier terminology they are experts rather than novices.

I noted above that experts and novices are able to work at different speeds in standard learning situations. The same is true of networked learning, and perhaps the difference is even greater. As information is scrolled through, the expert is better equipped to notice the cues for relevant or significant passages. The novice must read everything with the same close attention, or risk missing something significant.

If then we are to help the expert learn, we must structure the material presented in such a way that we enhance the cues and clues. For example, in providing continuing professional development for lawyers, we might structure our material to reflect their training and experience in case law. We might then build in a great deal of cross-referencing, forcing the learner to move from one place to another – and thereby providing both time for learning processes to operate and triggers for the connections which need to be made for the information to be available for future use.

This example draws out attention to the fact that in isolating time to learn as a significant factor we must not lose sight of other significant factors such as context and motivation. Attention is paid already in the design of networked learning to the need to actively involve the learner in learning by enforcing moves between pieces of information and by requiring responses to questions which test

whether information has been understood. But while these elements of networked learning provide us with means of checking students' understanding of what is going on, they are not designed with the intention of giving the student time to learn – indeed, we often try to minimise such links in order to speed up student progress through the information!. What I have tried to show in this paper is that rapid progress through information does not necessarily lead to learning, rapid or otherwise.

Attention to the need for time to learn does remind us that learning is dependent on context. I noted above that an expert in one field may be a novice learner in another, and may require more time to learn. The structure of our networked learning material must reflect this. But this is one of the great advantages of networked learning: because so much can be made available so readily, we can provide structures which are almost infinitely open, infinitely adaptable to suit the learning speeds of our students.

We can do it. Of course the temptation is to construct our courses in traditional ways, assuming that the learning time is built in, or that it is the responsibility of the student to make the necessary time, and the necessary connections. We have to remember that in networked learning, as elsewhere, the computer is a tool, and people need training or help in using that tool effectively.

The human tortoise presents us with a series of interesting issues. None of them are new, but some aspects of them are heightened in networked learning environments. In some circumstances the slow speed of the information processing tortoise is a challenge to the provision of networked learning; but in circumstances such as those of continuing professional development, we can use the flexibility of networked material to significantly enhance the speed at which the human tortoise learns.

Notes

1. A good over view of current research perspectives on learning in adults can be found in Sutherland, Peter (ed.) (1997), *Adult Learning: A Reader* London, Kogan Page