

L L i n E

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A JOURNAL WELL ON LIFELONG LEARNING IN EUROPE

IS OUR LEARNING IN LLINE

'Public control of knowledge and public recognition of correct learning lay in syllabi, examinations and qualifications.'

Jarvis
SEE PAGE 10



FALLING OUT OF LLINE

'If he is pushed into a treadmill of continued education, which is contrary to his nature, then something satanic is taking place in society.'

Linkola
SEE PAGE 21



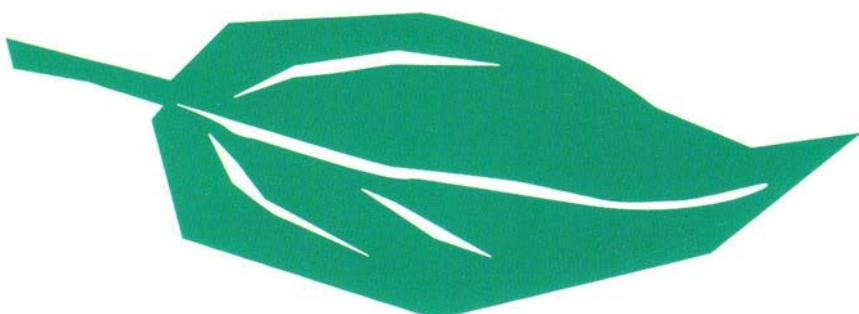
OR FOR OUR OWN BENEFIT?

'Everybody can decide what they want to learn, when they want to learn it, and how they want to learn it.'

Trantallidi
SEE PAGE 51



DRAW
THE
LLINE
FOR
YOURSELF



‘Lifelong learning, with and without new media’



The paradox of learning is that what we learn now is soon useless. The benefit from learning escapes us. Yet it is vital to learn all the time. The key is to incorporate the new learning with our prior knowledge by elaborating the new on the basis of the old.

What is a good learning environment to support our own learning activities? It should be directly connected with the learner's own learning goal and life situation, not only for adults but also at schools. Learning should start with experience not mere words. It should happen as a continuous construction of reality, our own reality, in relation to others, a continuous construction of meaning, since there is no ultimate, shared reality, but a process, uncertainty.

Gellof Kanselaar

There is a kind of a paradox in the popularity of the concept of lifelong learning. The paradox goes like this:

The less we benefit from our prior or previous learning, the more learning is something we need to do continuously.

Business and the government tell us that lifelong learning is more important than ever, and at the same time we are told that the effects or results of learning last shorter and shorter. So what we learn today is useless within a couple of years or even months. When this is true, there is no end of this race against time. Have a look at *Figure 1*.

On the Y axis is the duration of the effects of learning in time: short – long. On the X-axis is the amount of learning we need: little – a lot. There is a negative slope in this graph and that is not good. This is contrary to the idea of learning. Learning is by definition an activity that results in behaviour potentials that last longer than a couple of months. Some learning theories even state that we cannot forget things we learned, they only can be changed by processing new information. Or as mentioned in Longworth and Davies' book (1996) on lifelong learning:

And the most crucial activities in this whole process – from the design of a teaching process to the end product of the learning process – are the learner's own learning activities.

*'When planning for a year – sow corn.
When planning for a decade – plant trees.
When planning for a lifetime – train and educate men.'*

These are words from Kuan Tsu in the 3rd century BC.

So, what are the interests of people who tell us that lifelong learning is so important? I am a

little bit suspicious. To find an answer I read some reports on lifelong learning. In one of the papers (White Paper, 1996. See special article on pp.46–51) there is a comparison between education and lifelong learning. One of the differences is: education is a financial investment for nations and organisations, whereas lifelong learning is a social, personal and financial investment in and by people for the benefit of nations, organisations and society. Somewhere else I read: The challenge for lifelong learning mainly applies to an individual. Or, I quote: 'Increasingly, the individual needs to take responsibility for his or her own learning'. So when I am a cynic, my conclusion is, that as a person you are responsible for your own learning because, nowadays, no one else wants to invest in your learning after you have left school. So lifelong learning could mean, that you are left on your own and you have to pay for your own learning and when you don't learn, you lose your job. We sell this idea by telling people that learning is fun.

Is it a coincidence that the name of the two most powerful persons in the world, and especially the second one, is Bill? Let us get back to talking about learning instead of money.

Learning and the construction of meaning

What is *learning*? When you look at schools and also at training institutes and you try to find out what learning is, the main idea you will get is that learning is repetition or memorisation. When you fail as a student you have to do it over and over again until you pass the exam. But repetition or rehearsal is the worst form of learning. The levels of processing theory of Tulving (1972) even states that mere superficial repetition does

Learning: WHO PAYS?

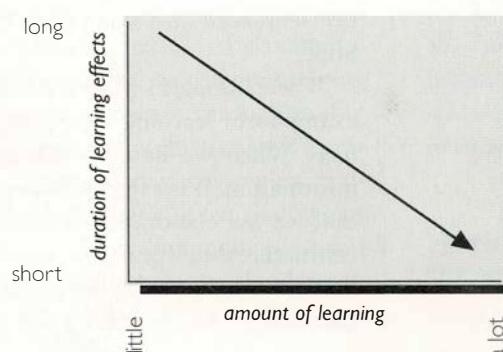


Figure 1
The investment in and duration of learning

not lead to learning. When you rehearse a phone number that you have to dial and you don't look for regularities between the digits, you forget the number as soon as you stop rehearsing this number. So, only rehearsing information that is in your working memory will not transfer this information into your long term memory (LTM), which is the place where it should be if you are to be able to use this knowledge later on.

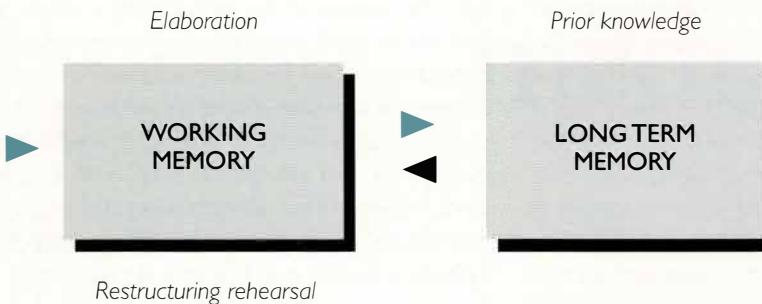


Figure 2
Learning and memory

So learning is not repetition, but it does require our *elaborating on incoming information* to get the information into our long term memory. I will give you a small example: When I present the numbers: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29; it is easy for you to recall these numbers without memorising them, although the amount of numbers is larger than we can keep in our small, short term working memory. Why? Nearly autonomously you found a certain pattern in the numbers. So you only have to remember that it is a series of odd numbers that begins with one and ends with 29. And so instead of remembering 15 numbers you only have to remember three pieces of information. The same holds for the sentences I used on these two pages. You don't remember the exact sentences but you reformulated my sentences into your own ideas, I hope.

The examples I gave you were not examples of learning something really *new*. When we have to process *new* information, it is even more important that we use elaboration techniques to restructure the information, to integrate the new information into our prior knowledge. And it is the prior knowl-

edge of the learner – and *not* the quality of the teacher or trainer, or even of the computer and the educational software – that is also the best predictor of the learning outcome. So a better definition of learning is:

learning is an active, constructive process in which the learner uses his or her prior knowledge and external resources in a strategic way to integrate the new information into his or her knowledge base in LTM.

And the most crucial activities in this whole process – from the design of a teaching process to the end product of the learning process – are the activities in the last phase: the *learner's own learning activities*. These will determine the result of the learning, and of lifelong learning too.

To better understand the consequences of this definition of learning, we have to elaborate on two concepts in the definition. One is the word *knowledge* and the other is the word *strategic*. *Knowledge* is not the other side of the coin of information, nor is it simply the information received and stored in memory. It is the result of learning in which the information and experiences of the learner are transformed into (new) *meaning*. And thus, learning is the construction of meaning. Or in other words: a subjective, individual construction of reality. This holds for physics too: the world of Galilei is different from the world of Newton and his world is different from the world of Einstein. And so it is with each of us: each of us *construes* his/her own world. A world in which we are part of our own construction, and whose form will be (partly) structured and determined by our own self-image. And since as a person we do not live in a vacuum, we have to *negotiate* this meaning – *our construction of reality* – with other people. The learning environment must therefore include space for this negotiation.

The aspect of learning as the *construction of meaning* is so important in recent learning theories that we speak

of constructivism as a movement in educational psychology. In this movement/ these theories there is no ultimate, shared reality, but rather, reality that is the outcome of constructive and socio-constructive processes. There is always uncertainty, no matter how often you tell the other person 'I understand you' or even when you tell the other person 'I love you'. There *should* be some uncertainty – it is the basis for interaction and communication. This component of socio-constructivism is also important to *computer supported collaborative learning*, a topic we will address later in this text.

A second aspect about *learning* in these constructivist theories is that learning has to take place in authentic or realistic situations, corresponding to the learner's own needs and experience. Meaning is seen as rooted in and indexed by experience. Each experience with an idea – and the environment of which that idea is a part – becomes part of the meaning of that idea. The experience in which an idea is embedded is critical to the individual's understanding of and ability to use that idea. Therefore, constructivists emphasise 'situating' cognitive learning experiences in authentic activities.

An example of an instructional strategy that is particularly appropriate to providing authentic experiences is *cognitive apprenticeship*, a learning situation in which an expert reflects upon his activities. Regarding the use of new media, this movement of constructivism challenges us to design and create powerful learning environments in which some of the advantages of apprenticeship learning can be simulated in order to stimulate meaningful learning processes. Such environments will need to be based on a theoretical framework that emphasises the importance of anchoring or situating instruction in meaningful, problem-solving contexts which are relevant to the *learner's own learning-goals and life-situation*. This is of importance not only for the design of school-based learning environments, but even more so for the learning processes taking place outside 'in the real world'

throughout one's lifetime. The *lifelong learner* has to (learn to) be in control of her or his own learning process and be able to organise the learning process and resources to meet her or his needs. Returning to our constructivist definition of learning, this is what is meant by *strategic*.

To summarise:

- learning is the construction and the socio-construction of meaning
- to promote meaningful learning we have to start learning in realistic situations
- learning should be based on experience and not only on the transmission of words. Of course, I don't mean that we do not have to reach the level of abstract, more verbal knowledge, but we should not start with it. This approach will also benefit those whose verbal skills are not yet strongly developed.
- new media can be very useful in providing realistic situations for meaningful learning.

Design of learning environments

An example of how these ideas about learning are being integrated into new media is Vanderbilt University's (in Nashville, Tennessee, USA) 'Adventures of Jasper Woodbury' program (Cognition and Technology Group at Vanderbilt University, 1992). The adventures of Jasper Woodbury are depicted in a series of 12 episodes. The stories are organised as pairs around three thematic and mathematical content areas: complex trip planning involving distance, rate and time; constructing business plans, involving the use of probability and statistics; and way-finding relying on the use of geometry. Through quality video dramas on interactive VLP's, students are presented with complex, realistic problems that call for the type of mathematical thinking required in real life. The adventures of the character of Jasper Woodbury are not meant to re-



IN THIS HYSTERICAL WORLD OF OURS, there has been more and more talk lately about a phenomenon called adult education. I am reminded of a glaring newspaper headline I saw recently: 'Even adults have the right to education.' Could there possibly be an assertion more flawed, unpsychological and unbiological? What, after all, does a balanced, ordinary person want from life? He wants to have relatively hard work that is challenging enough, but that he nevertheless feels adequately manageable; he wants to love a person of the opposite sex and his own children and to devote time to them; he wants to enjoy good food and evenings with good friends around coffee, tea or a bottle of vodka; he wants to sense the coming of spring, the scent of pinewoods or sea, to wander in forests or parks or the harbour looking at ships and sunsets. He wants perhaps some excitement, too, and an appropriate amount of entertainment that he draws from music, sports and the media.

What about learning new things, then? It is one of humankind's biological needs, but is by no means among the most powerful basic needs – the youthful curiosity always ready to tackle new obstacles wanes rapidly and steeply. What, then, does a balanced person not want? He does not want, even when still young, to study pantingly exhausted and under the constant fear and threat of being a loser in the contest. And after reaching middle age, he does not want to start learning all over again, but would rather live peacefully and utilize the knowledge and skill capital acquired when young – expecting more and more respect from his surroundings as life experience coming with advancing age is added on to that capital. But if he at forty feels strangled by the fear that younger people will push them out of the labour markets, or feels incompetent or obsolete, or if he is pushed into a treadmill of continuing education or retraining, which is contrary to his nature, then something satanic is taking place in society.



PENTTI LINKOLA, fisherman, writer, ecologist

Translation from Finnish: Kimmo Absetz

place the curriculum, but rather instead to provide a realistic context for problem-solving. The design principles implemented in this series are:

1. Video-based presentation format.
2. Narrative, story-telling format.
3. Generative learning format. Students have to generate the ending of the story to solve the problem.
4. Embedded data design. All the data needed to solve the problems are embedded somewhere in the video.
5. Problem complexity. For example, the first episode on buying a boat contains a problem with more than 15 sub-problems. The students have to find and define these sub-problems. And as you all know, posing the right question is very important but also very difficult. Students normally don't learn to find and formulate problems in school.
6. Pairs of related adventures.
7. Links across the curriculum. Real-life problems don't stop at the border of the domain specific subjects presented during schooltime.

I introduced this example to you, because I think it is very important that schools change the way they teach children. To become lifelong learners, children have to learn how to learn. These meta-cognitive and cognitive learning strategies also have to be learned in school. It is hard to change learning strategies after a person leaves school. When one has the *wrong* ideas about what learning is, then one will also use the wrong learning strategies. So let's *get it right*, at least for the children currently being *formed* in our elementary schools – let us try to spare them the hard task of *unlearning* ineffective strategies. But what about those learners who are further along in their 'learning lives' and in their progression through our learning institutions?

In the Netherlands we are trying to change the curriculum in upper secondary schools in a fundamental way:

- students have to become active,

- independent learners
- they have to attend certain lessons with several classes together, part of the time they have to work in small groups and part of the time on their own
- the teacher is a *coach*, instead of an instructor who speaks about 80% of the time.

We call this type of school a 'house to study'. To our surprise, most of the teachers are in favour of this idea of *school as a place to learn* instead of as a place to teach; and in sharp contrast to earlier innovations in education in the past fifty years, schools are now moving much faster toward implementation than we expected a year ago. Teachers tell us that not only the students but also they themselves have been dissatisfied with their own classroom behaviour. Secondary schools too are becoming *learning organisations*.

A truly daunting challenge is posed by the *lifelong learning needs* of the masses of adults who completed their school-based learning *some time ago*: What programmes can be developed to support their benefiting from these new learning strategies? What programmes can be developed to support the active involvement of adult learners in the transformation of our communities to *learning communities*? Perhaps more fundamental questions are:

What organisations/institutions will we need to grow to support these learning objectives? What training do we need to develop for those adults working in our institutions of learning – those adults who will need to be major participants in developing and implementing these new learning strategies?

Computer supported collaborative learning

Until now we focused on *learning as an active, constructive process* and on the *possibilities of new media to present a realistic learning situation*. But what are the characteristics of new media to support learning as an active process?

Or stated in another way, how can we use new media to make learning an (inter)active process?

Before we discuss new media, I would like to think with you about technology.

You can look at technology in different ways. The way I prefer is to look at technology as an externalisation of human possibilities or human functions. So, we use a hammer instead of our fist; we use a bicycle instead of our feet to move from one place to another. The movements of the muscles change a little but are still in some way comparable with walking. Even driving my car has some similarity with walking. But I do not need to use my legs to go by bus, train or plane. I just have to buy a ticket and take a seat. So the activity of walking is replaced by the activity of earning money to buy a ticket. This replacement may cause some feelings of alienation.

Computers are a major step in our possibilities to externalise some of our functions. With a computer I can externalise my thinking. The computer programme is an externalisation of my thinking. This is different from writing. Because as soon as I write down my thoughts on paper, these thoughts are 'dead'. But in a computer programme my thoughts can be reactivated. So the computer can use my reasoning somewhere, sometimes in an active manner. This possibility of proceduralisation at the symbolic level is new in history. That is why a computer is called an interactive machine. The question now is, what kind of thinking or intelligence do we, as teachers or designers, have to put into the computer to make it an *interactive learning machine*?

When learning is seen as a constructive process, we have to look at the processing characteristics of the computer (Kozma, 1991). With a computer I mean the possibility to present and to process text, numbers, sound, speech, graphics, video, etc. I don't care about the place where the information is stored or the device that is used to store the information. So the Internet is also the computer. However, be aware of the bandwidth of the computer from the point of view of the learner. Most of the

time he can only click the mouse or type in characters on the keyboard. These things will change, but slowly. Video conferencing is nice, but that has nothing to do with computers as interactive machines that can process information at a symbolic level. Video conferencing is a two-way television.

So what processing characteristics are important for learning?

Two aspects are important: one is the representation format: text, graphics, sound and video. The other aspect and the most important one, is the processing capability of the computer:

- is the information processed linearly or can you criss-cross the cognitive landscape (Spiro, 1992);
- is the information processed in a dynamic way as in simulations;
- is the information processed in parallel representations? For example, when you have to learn a foreign language can you read the words, hear the pronunciation and see in a video the same information at the same time?
- is it possible to transform the information from one representation format into another, for instance can you transfer a table with numbers into a graph, etc.

I will not go into the details of all those aspects when we use different learning media, but you can imagine that the different symbol systems and the different processing characteristics can have different effects on the learning activities of the learner. Let me just make some remarks on the difference between using the computer and watching TV. In our culture watching TV is seen as an easy thing to do. The amount of invested mental effort when we watch TV is less than when we read a book or when we learn at the computer. So the learning results when we watch TV are often less compared to learning at the computer. Watching TV is less interactive than learning at the computer. Interactivity is an important aspect of a medium. However, it is hard to make good interactive programmes that support the learning

process as an interactive, constructive process. We worked for more than ten years to develop a computer programme that could simulate the conversation of two students who solve a problem. You have to build a lot of intelligence into a programme to make it interactive. Most of the media are better in presenting information than in bi-directional processing of information interactively.

Until now, I have talked about the *computer as an interactive machine*. However, we are not only talking about information technology, we are also talking about communication technology. A fascinating

development in technology is the almost simultaneous advance of multimedia, networking and telematics. These systems give the possibility to distribute the cognitive tasks between the participants as well as the possibility to share and use resources simultaneously. Advances are being made in the development of specialised tools or environments in order to facilitate the co-ordination of communication between people. Groupware is the buzz-word for this type of software tools.

The question is under which conditions co-operative or collaborative learning will profit from this new technology. In co-operative learning we assume a process of mutual co-ordination to facilitate the acquisition of cognitive, social or communicative abilities in individual participants. In my opinion (Kanselaar & Erkens, 1995, 1996), the critical features of *co-operative learning* in contrast to other social activities in work and education seem to be:

1. group-work instead of competition at the individual level
2. common task- or goal-orientation
3. shared responsibility, but also individual accountability
4. distributed cognition and resources

So when I am a cynic, my conclusion is, that as a person you are responsible for your own learning because, nowadays, no one else wants to invest in your learning after you have left school. So lifelong learning could mean that you are left on your own and you have to pay for your own learning and when you don't learn, you lose your job. We sell this idea by telling people that learning is fun.

5. co-ordinated action
6. change in knowledge and skills
7. mixed control and mixed initiative. These are essential to distinguish collaborative learning from hierarchically organised working situations which also involve a group process of co-ordinated work.

Several theories try to explain the positive effects of co-operative learning on cognitive abilities and social attitudes. Different theories emphasise the need of a shared meaning between the partners in co-operation. For co-operation to succeed, agreement between the partners needs to be achieved on the representation of the task and the necessary steps to solve the task. This agreement and mutual understanding are negotiated by the partners in their dialogue during their co-operation on solving the task at hand. We assume that one of the driving forces for learning in a *co-operative learning context* is precisely this communicative process aimed at the construction of a common representational ground for the partners on the basis of which the problem-solving task can be completed. When you can still remember my definition of learning as a constructive process, you heard the same words here, but this time in the context of collaborative learning.

While *groupware* obviously offers companies a great many technical capabilities, it is the possibility of transforming organisational behaviour – something groupware can facilitate – that deserves the most attention. David Coleman (1996), a groupware consultant puts it this way. Groupware divides into two words: group and ware.

A lot of people focus on the software side or, at least, initially they did. What they are finding is that it is the group issues – the people issues – that are more critical and more difficult. The focus is turning toward how to deal with these organisational and social issues. Unfortunately, many groupware enthusiasts are only now beginning to see that the most promising benefits the technology offers do not revolve around the effi-

cient distribution of information.

What is most striking about the technology is not its ability to disseminate existing information, but rather, its potential to facilitate the creation of new knowledge in a collaborative context and help companies better manage their intellectual assets. Such capabilities, say close observers, are the keys to highly effective organisational learning.

Let me summarise my last point with *Figure 3*. Until now we divided the world of learning into two different learning paths. The one is learning by listening to other people (teachers, instructors) who tell you what to learn. The other way is by using learning media, such as books, computers. Now there is a third possibility in which we integrate the use of the media while learning together with other people.

To develop this third path effectively, some measures have to be taken. We should create intranets for learning. I use the word intranets in the sense that I can log on with my intelligent card into my own learning group. We should define an interface to write the results of the learning process in a database. The British Educational Suppliers Association (BESA, 1995) together with Microsoft already defined such an interface between courseware programmes and the management information system. The security of the system has to guarantee the validity of the certificates you receive after you fulfilled a certain task or learning project. Educational publishers will not only sell books, but they also lease learning materials, which they update constantly via a secure intranet, so that arrangements can be made about who has to pay and how much. These

arrangements can be made between the publisher and the employer or the employee.

Although expectations about the use of various telematics facilities have been (and still are) rather high, the results of some studies have been rather disappointing, for example the fact that students do not spontaneously use facilities like e-mail very often (Bakker, 1991; McLoughlin et al. 1992). With respect to synchronous collaboration, results are also inconclusive (Issroff, 1993). The most important requirements for collaborative software can be summed up as follows: the software should provide constantly updated visible information not only about the common project, but also about the participants identity, their ongoing contributions within the context of the overall goal, the current evolution of the ongoing task and the social group dynamics at work through co-operation and collaboration (Linard, 1994). The concept of interactivity is central in this approach. Interactivity, taken as *reciprocity in learning processes*, is the *core quality* of new media, because mere presentation of information hardly leads to any learning, but in my view this core quality is still poorly exploited.

As a researcher I would like to suggest some questions:

- What is the added value of synchronous vs. asynchronous communication? Why did we not use the telephone between for instance, Finland and the Netherlands, to practise communicative skills in learning Finnish as a foreign language? Also in computer

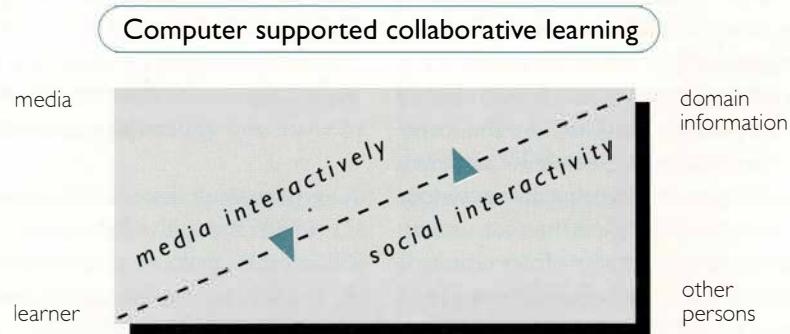


Figure 3 Media and social interaction

supported collaborative learning, synchronous communication is not a prerequisite for learning.

- What is the added value of multi-medial information? When does a video really add something important to the learning environment, or does it merely distract attention from the learning and draw it instead to unimportant aspects of the picture?
- What is the role of the tutor in the management of interaction?

While these questions have been addressed in various contexts, there have been few comparisons and experimental tests between applications that allow clear answers. Learning effects of new technologies have been virtually assumed rather than actually shown. It is imperative that experimental evidence is collected on the real benefits of new technologies, from the perspective of the users. In the R&D programmes of the European Union there has been, regrettably, more attention for the D or development component than for the R research questions. Fundamental research into learning processes in collaborative, co-operative environments is a prerequisite for the development of effective pilots and programmes in lifelong learning for these environments. ■

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