Networked Learning in the Knowledge Economy - A Systemic Challenge for Universities

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Abstract

Der Artikel geht auf die Herausforderungen für Hochschulen ein, die mit einem sachgemäßen und umfassenden Einsatz von e-learning verbunden sind.

Das Innovationspotenzial von e-learning wird immer noch nicht so ausgeschöpft, dass es seinen Beitrag für die Anfordernisse der Knowledge Economy leisten kann. Insbesondere im Hochschulbereich treffen wir auf Anwendungsformen, die e-learning lediglich zu den etablierten Lehr-/Lerninstrumenten hinzufügen, ohne die methodischen und organisatorischen Möglichkeiten voll auszuschöpfen. Es gibt immer noch zu wenig Bereitschaft, neue Vernetzungsformen innerhalb der Hochschulen, aber auch darüber hinaus (horizontale Vernetzung), zu testen und die Organisation entsprechend anzupassen. Der Artikel stellt e-learning in diesen umfassenderen Kontext und untersucht die Situation insbesondere am Beispiel der Bereiche Wissensproduktion und –verbreitung.

The aim of the following text is to discuss the current challenges for higher education institutions in high-industrialised countries stemming from modern economic developments which are best characterized by the term 'knowledge economy'. The term is currently widely applied to the high-industrialised countries. The core element of knowledge economies or societies is their ability to innovate their economies and their societies in a permanent way[1].

One of the main issues in this context is a paradigm shift regarding education and training which are on their way (again) to become totally wrapped up in functional purposes, mostly determined by economic requirements. When I say 'again' I mean, that there was always a direct link between education and an individual's professional perspectives and life itself. However, over the past two centuries, after the introduction of compulsory education in nearly all Western countries, these links have become weaker and it was then more important for a society to educate *personalities*. This agenda has changed over the last 30 years, mostly because there is an increasing demand for a highly skilled and specialised workforce, which can deal immediately with the multidisciplinary challenges of a global economy. And one important aspect is the pressure for innovation, namely to develop new products and production processes. This development has raised educational institutions' awareness that they have to deliver not only personalities but also the "human capital" in order to deal with the challenges of a knowledge economy.

In my opinion, it might be a good idea to look for a moment through the eyes of an economist at the term innovation, since the term has only been used as a metaphor within the community of educationalists. For example, 'eLearning' has been welcomed as an innovation for teaching and learning in a more or less general way; however, to my knowledge its role has not been analysed within modern growth theory.

This is astonishing since the new growth theory tries to integrate 'knowledge' as an important factor into economics. Whilst the classical theoretical approach has only dealt with capital, labour and land as the decisive factors of the economy, the new growth theory also considers knowledge as a key factor for economic growth. New knowledge is the last reason for innovation and without innovation there will be no growth. Knowledge appears in two forms, as new skills and experience to be acquired by workers as well as the outcome of a process of research and development. The first one is related to the so-called "human capital", the second one to "innovation" as the basis of technological progress. However, it is evident that both strands are interdependent. Skilled workers at all levels of a society need access to innovations relating to newly produced knowledge. This process mostly takes place within education, both formal education at schools or universities as well as lifelong learning. "The rate of innovation and hence of economic growth can be increased by appropriate industrial and government policies that increase expenditures on knowledge creation, research and development, and such human capital formation as education and training." (Gilpin, 2001, pp. 115) All major industrial countries are acting accordingly and invest in, R&D as well as education and training and are thereby applying the findings of the new growth theory. It is expected that these investments will safeguard not only the competitive advantage of a nation by being innovative, but will also increase this advantage compared with those countries investing less in the knowledge economy.

In a very recent article, the EU-Commission talks about the "knowledge triangle of research, education and innovation" (EU-Commission, 2005, 3). The actual policies express, that the perception of this triangle goes far beyond an attitude where the fields of education and training are more or less separated from the actual economic developments; on the contrary "the European Commission is putting the knowledge economy centre-stage in many EU financial programmes". (ibid.) That means "introducing fiscal incentives for research and innovation, revisiting state aid rules to foster research and innovation, improving and adapting intellectual property rights regimes, facilitating risk capital operations at the European level and strengthening links between universities and industry." (ibid.) In other words: more than ever the educational sector is seen as a conveyor for the economy. This explains why processes of quality control are now widely applied within educational systems and that studies like the OECD *Programme for International Student Assessment* (PISA) are a typical current approach to update these systems for the knowledge economy. However, it should not be forgotten, that the OECD is a club of the richest countries of the world which proves how important quality issues in education have become for these nations. One of the logical consequences of these activities is a further investment in advanced educational and training programmes.

Crucial roles within this wider environment will e-learning play. E-learning is a multi-dimensional phenomenon which needs to be understood not only in intrinsic terms but as it relates to the societal environment within which it is applied. There are various ways of defining the term but, for the purposes of this paper, Rosenberg's three-fold categorization has been adopted:

I. online Learning is networked, which makes it capable of instant updating, storage/retrieval; distribution and sharing of instruction or information, can also follow instantly.
II. It is delivered to the end-user via a computer using standard Internet technology. It can be arranged as a stand-alone or hybrid solution (embedded in a traditional context).
III. It focuses on the broadest view of learning – learning solutions that go beyond the traditional

paradigms of training (Rosenberg, 2001).

Hence it is difficult to separate online learning (which applies more the technical background as the core of the definition) from networked learning (which is implicitly covered by the above definition) or from technology enhanced learning a term now used by the European Commission (which starts from the assumption of "blended learning" approaches). Bearing in mind Rosenberg's definition, for the purposes of this paper, the term networked learning is also used as a synonym for online and/or e-learning.

Although the intention is to focus on e-learning as an educational tool, it is also necessary to deal with its other dimensions. It is precisely because of the multifaceted character of the term that meanings need to be established at the outset. The sense varies depending on the context to which it is applied.

1. The *political meaning*, covers more or less the idea of modernising the whole range of education, from kindergarten to continuing vocational training, in order to keep a society and its workforce competitive, to fight unemployment and therefore also to contribute to social cohesion. And apart from national governments, the EU in particular is pushing this agenda in order to promote a more dynamic and innovative educational system (The Commission of the European Communities, 2002).
2. The *economic meaning* defines e-learning as a sector of e-business. "Myriad new products, services, and providers are entering the e-learning 'market-space'" (Oblinger/Katz, 2000). The notion of added value not only applies to knowledge production; but it also relates to knowledge distribution across national borders and therefore an international perspective is introduced.
3. The *educational meaning*, which places e-learning in an environment of teaching and learning as a particular approach for designing new instructional environments or new areas for research. In this context e-learning refers to the use of Internet technologies to deliver a broad array of solutions that can enhance knowledge and performance.

It continues to be the case that, in the literature of current usage, the term is not always applied with precision; it oscillates between the various areas. On the other hand, it is also instructive to see how far the structural impacts and requirements of e-learning are underestimated. For example, we have come to appreciate that higher education and its methodologies as well as its' bureaucracy are by far more durable than assumed. Even when we use e-learning products and services, these are adapted to the usual habits and structures. Most faculty staff still teaches as they have experienced teaching themselves, namely standing in front of a classroom giving lectures, which mainly deliver the basics in their discipline and are in line with their expectations as far as the examination procedures are concerned. The learning platforms are organised accordingly, which means they are more focussed on the distribution of materials than on teaching itself (Zemsky & Massy, 2004). This conclusion coincides with the finding of the same authors that around 80% of the clients for eLearning are students who are enrolled at their home institution, using the new ICTs mostly for material delivery or to have the advantages of white boards. So, where is the innovation? It is a key term, as we have seen, to stay in line with the requirements of the knowledge economy.

To make a long story short: e-learning is still often used only as a buzz word, and its deep impact on educational institutions is not seen. Alternatively, it is regarded as a simple educational tool and, as such, is just one among many.

Between these two poles, I want to develop the following argument. e-learning cannot be limited to a single function (e.g. delivery mode), for when consciously applied, its impact goes beyond the ramifications of teaching. It causes systemic challenges for the organisation in which it is deployed. Thus, the relationship between e-learning, academic environments and academic teaching is of a complex nature because of the ambiguous meaning of the term as well as the variability of its consequences.

Academic Teaching and Academic Pedagogy

To take these deliberations further, it is also necessary to distinguish between the treatment of e-learning in academic pedagogy as a discipline and in academic everyday life. In respect of teaching there is a growing pressure, in nearly all societies, to improve its quality, e.g. in order to deal with the challenges of mass education where the ratio of lecturers/tutors to students is worse than in the past and is deteriorating. Politicians, in particular, regard the new ICTs as a cheap and innovative device for the improvement of both the quality and the quantity of teaching. Hence some of the discussions about new ICTs are inter-mixed with concerns about teaching quality within our institutions for higher education. Taking a realistic view, teaching, whether it be face-to-face or e-learning, is not always numbered amongst the most beloved tasks in our universities. And it is worth reminding ourselves that there is also a huge gap between the methodological potential of face-to-face teaching and the actual reality. Collaborative learning, group work, peer learning etc. are approaches which are not restricted to e-learning; but in our institutions we tend to observe the dominance of teacher-centred lecturing modes spiced with student presentations in seminar situations. Therefore it may makes sense to locate e-learning in a regular academic environment (bottom-up approach) instead of discussing it separately, but to raise awareness of the requirements necessary to support its organic development.

Another way of considering the issue is to reflect on the nature of academic pedagogy. Pedagogy, as an academic and research-orientated discipline, has to be innovative in order to advance. Problems emerge when new findings are pressed into immediate service, while the academic routines on which they depend remain unchanged. This is particularly valid in the case of e-learning, since its impacts are manifold, both for the individual teachers and the institutions overall. (Banks & Powell, 2002; Ayers & Gisham, 2003) The gap between pedagogical research and everyday life in institutions of higher education is not new. However, over the last three or four decades, the rhythm of pedagogical innovation has become faster due to technological developments, like TV and video or new ICTs. If colleagues have to run in order to keep up, the resulting breathlessness may lead to the following conclusion: stay with the ancient remedies so as to avoid the treadmills of change.

Further enhancement of our teaching/learning abilities with respect to the academic routine is a problem of a better fit between theory and practice. This is also an aspect of the so-called systemic challenge, namely to apply theory to practice in our institutions but to evaluate the innovative practitioners more along the routine parameters than the theoretical.

Also a brief reference to ICT-based educational innovation and its often grandiose claims supports this statement and can be illustrated by personal anecdote. The first European conference dealing with the new ICTs for teaching and learning I attended was in 1986; it was dedicated to the DELTA programme. It was hardware-orientated and the spatial potential of the new broadcasting, satellite- supported facilities was the new attraction. It was projected as politically sensible, economically desirable and educationally sound; and

of course it came to nothing. Since then, if an academic/teacher had pursued all the promised blessings of ICTs, he or she could now be visited either in a museum (stuffed) or in a mental asylum!

Paradoxically, what has brought some stability to the scene of routine academic teaching is, and this may seem surprising and even controversial, the Internet. The WWW, conferencing and e-mailing make some fundamental academic skills easier, namely exploration of knowledge fields and communication as a form of academic exchange. The success story of the Internet - after it was given away by the Pentagon – derives from the fact that academics in the late 60ies discovered its communication potential.

The above comments provide a context in which to view networked learning. e-learning is a pedagogical innovation, one element within a series of ICT-based innovations over recent decades, but the first one with a certain stability because, it picks up the academics from their natural starting place. These core elements are also the more successful features of web-based e-learning, whilst others, like simulations, exploring learning environments or collaborative learning, where additional designing or methodological efforts are necessary, remain very much at the experimental phase. This correlates with the situation in face-to-face teaching.

And, additionally, there is a further split in our awareness about e-learning. Due to the fact that pedagogy as a social science is to a certain extent more focused on social science disciplines, there is the danger that activities of e-learning outside these areas, e.g. in natural sciences, are disregarded or underestimated. But it remains the case that e-learning is applied in the natural sciences with a greater matter-of-factness than in other fields (Keeble, 2000). Hence the theoretical discussion is not only in danger of widening the gap regarding practice, but also of imposing a restricted view on what is going on in reality.

Networking in Practice

Rosenberg has stated that e-learning will widen our picture of education. It focuses on the broadest view of learning – learning solutions that go beyond the traditional paradigms of teaching and learning; up-to-date overviews confirm this view (cf. Paulsen, 2003). To appreciate such a proposition we need to reflect on the reach of the term "networked", both among universities and within individual institutions.

Regarding the process of networking beyond a single institution the aspect of horizontal networking is of particular interest. Horizontal networking could serve as a source for offering more adequate e-content since the traditional institutions are obviously not in a position to cope with this growing demand in any systematic way (see below). The production of e-content requires an inner-institutional organization which is at the moment very far from the disciplinary-orientated model (e.g. faculties) we meet at most institutions. However, apart from this aspect, horizontal networking is in particular necessary to put together the knowledge-producing sources in an economy urgently depending on synergies in knowledge creation. Well known success stories in horizontal networking are from the development of open source software (e.g. Linux) or the NASA Mars Clickworkers project. These communities of experts are good examples of how this form of a globally organised knowledge creation could work by applying new forms of incentives:

Most interesting of all [...], however, are new forms of information production, management, and dissemination in both the private and public sectors that are based on non-market, non-corporate, and non-proprietary principles. Referred to generally as "peer production" of information, these approaches make use of the distributed interconnections on the Web and alternate incentive motives that are not dependent upon direct economic returns or intellectual property protection for success. Instead, they are based on non-economic incentives or indirect economic returns, and on volunteer, community-based actions that operate as intellectual commons, rather than as closely guarded property. (Hippel, 2002).

It is necessary to find ways of applying these models to teaching and learning that go beyond the usual type of institutional thinking. However, there is still a lack of appropriate and sustainable incentives for lecturers and teachers who want to build horizontal networks which would go beyond the usual intrinsic motivation. With regards to US colleges, the situation is described by Zemsky:

In fact, the colleges discovered that they constantly had to give professors extra incentives to sustain their interest in e-learning. When the incentive programs became too expensive, the institutions dropped them and witnessed a general decline of e-learning adoptions and experiments. All but forgotten, by then, was the idea that e-learning might lead to a general reformation of both teaching and learning styles. (Zemsky, 2004)

Relating this to the European situation means that a lot of politicians and administrators have encouraged lecturers and teachers to deal with eLearning but they did not relieve them of their usual workload; rather, they have in particular tightened up the formal requirements of traditional educational processes like accreditation or other formalities. Hence, the current situation is characterized by unsolved tensions between public administrations pushing for new forms of technology-based education and their unwillingness to prepare the legal and organisational ground for innovations, because new horizontal forms of teaching and learning would mean having less control. Thus new approaches remain limited to pilots with a limited impact on the actual situation.

Within a university setting there is a lot that can be networked: e.g. within a single course, within a faculty, within a research group and between academics, institutions or corporations outside. Taking all this together it will become evident that the term is layered with meaning, and that is why in use it is seldom free from ambiguity. On the other hand, it needs to be recognized that while, networking is having an impact on all aspects of university life, the corresponding changes are having an influence on networking itself. For this reason focusing on e-learning only as a new teaching tool is misleading.

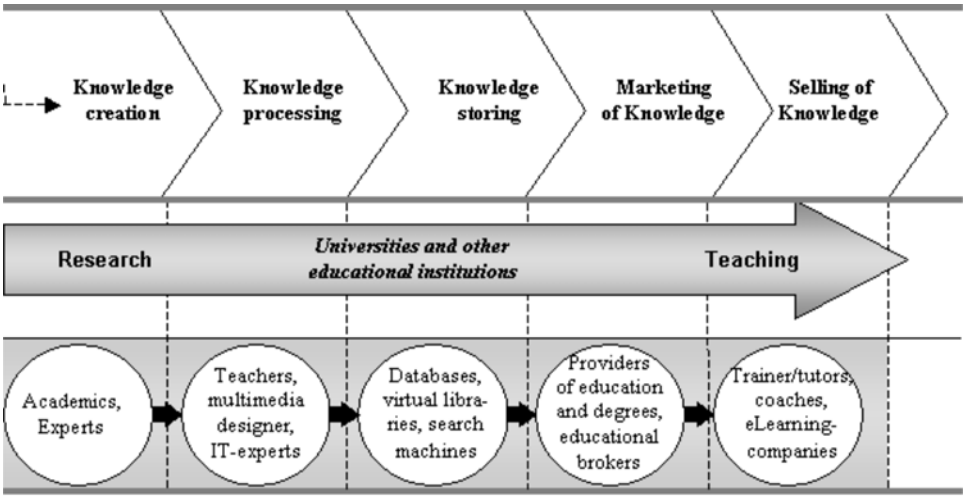

Figure 1. Value chain of knowledge management (Hilse, 2000; translated by HPB)

While networked learning is making its appearance in universities, its overall impact is, as yet, rather limited. It would seem that providing e-learning is used in a sporadic or piecemeal fashion, internal university systems can cope. However any deployment of e-learning in a thorough-going, systematic way will pose significant structural challenges for universities – a point which is taken up by Hilse (2000). The model developed by Hilse addresses the question as to how Business Schools should prepare themselves for the international challenges to come. Those who want to attract students and scholars on a global basis have to improve their delivery modes and their respective working structures, both on the level of a faculty and at the level of the university. He postulates a five stage model that breaks up the traditional continuum of knowledge processing where one academic is still mostly regarded as being responsible for the whole process, from generating the knowledge (usually by personal research) to its distribution either by teaching or in the form of printed material such as books or articles. Due to the growing use of new ICTs, this method of knowledge processing needs to be revised to take into account the present market situation and the increasing global competitiveness in which higher education finds itself.

Though it will not be developed here in any detail, Hilse's argument illustrates the top-down pressure on individual academics from the effects of the political and economic meaning of e-learning in times of borderless education; therefore his argument can be applied beyond Business Schools since it exemplifies the actual systemic challenges facing academic institutions as a whole.

Drawing on Hilse I will focus my analysis on the first three stages, namely *knowledge creation*, *knowledge processing* and *knowledge storing*: It should be clearer at the end that we have to develop new organisational models for handling knowledge[2] processing within a university.

Knowledge creation

The traditional view of knowledge creation and acquisition is through individual academic research. Ideally the researcher connects his/her own results with those of other colleagues and an overview about a certain area of a discipline is composed, digested and communicated. In this way students always have access to the newest knowledge and at the same time they become familiar with research methodologies. The inner constitution of a university, as traditionally understood in Europe, has to safeguard this long-established form of knowledge creation. It guarantees the independence and freedom of research and teaching.
Good old times!
Traditional knowledge producers (universities and research institutions) and storers (e.g. libraries,) no longer occupy their unique positions. As long as knowledge production and application could be seen as a linear process from basic research to product application they held a nearly unrivalled position. Since the second world war, and especially from the late 1980s, the landscape within which knowledge producers operate has become more fragmented. The scene is now populated by several groups of competing players. The first group, operating in the arena of publicly funded or purposefully organised research, includes:

- leading individual experts
- universities
- R & D of private institutions (in-house or contracted research)
- independent, public funded research institutions (both, basic and applied research)

The second area is less structured: "On the other hand, one might regard the creation and diffusion of knowledge as rooted in and emanating from routine activities in economic life, such as learning by doing, by using and by interacting" (OECD, 2000). A modern knowledge society is very much dependent on an unhindered and fast knowledge flow among these players; the modern process of knowledge creation is already mostly a networked one.

There is a problematic side to this development. As knowledge becomes an indispensable resource for innovation in a knowledge economy, it becomes more and more a commercial, and therefore protected good, and tends to loose its status as a public good. Whilst in the past, the results of research have been publicly accessible via publications, these commercial imperatives are now serving to restrict accessibility (Miyoshi, 2000). Those who make costly inputs into networked research, like private corporations together with individually contracted academic researchers, are not interested in giving the public access to the results as long as they can get revenues from licences or other forms of charging. Additionally, the networking approach to knowledge creation is having a strong effect on the intellectual property rights of individual academics[3].

The consequences for the academic/teacher are obvious: the access to new knowledge, the raw material for teaching, is becoming more restrictive. Instead of relying on personal research or doing a library search, it is necessary to gain an entrée to networks carrying protected knowledge. This makes it difficult to re-assess the field of enquiry and prepare up-to-date lectures. The actual situation on the ground serves to highlight the deceptive promise of the Internet as a fountain of knowledge. There may well be vast reserves of sedimented knowledge, but new knowledge, which creates the societal role of a university, is not always accessible. Insofar as the term "knowledge society" is concerned, it is misleading. The most topical

knowledge is not freely available but is subject to private exploitation. For example, to get access to up-to-date figures on how far e-business has already penetrated our economy, it is necessary to get hold of very expensive reports from consultancy firms. And this whole development is not limited just to the economic field.

Although the unity of research and teaching has for two centuries been a fundamental dogma of European universities, the influence of networked knowledge production on current teaching, i.e. e-learning, is hardly discussed; or, if it is discussed, it is presented as a choice between academic independence on the one hand or market orientation on the other. (Collini, 2003). But in reality the academy and the market place are no longer self-contained territories. Universities and individual academics are, in various ways, connected with the economy and its research activities. New service institutions or broker institutions, e.g. spin-offs from universities, are grouped within these new types of research networks. Professional agencies looking for funding of R&D activities (and thereby more backing for their mainstream market activities) are also entering the picture. These new types of interactions in networked research and innovation processes create new challenges for organisations: "They comprise the 'rules of the game' which influence the behaviour of organisations by constituting constraints on or incentives for learning and innovation to take place" (OECD, 2001b). But the new players are not involved in teaching, nor are the networks as such. Thus, discussing e-learning means taking into account these new forms of knowledge production. There are, of course, differences between the various disciplines, but taken as a whole, it is difficult to resist the conclusion that the new situation of networked knowledge creation constitutes something of a barrier to the free flow of knowledge and imposes some serious constraints on our teaching. The challenges stemming from this development stretch beyond the capacities of a single academic to resolve. Safeguarding the quality of teaching makes it necessary to go up a level and endeavour to preserve and enhance access to knowledge in a climate where the "law has also extended the scope of copyright protection, creating what critics have called a 'paracopyright', which prohibits not only duplicating protected material but in some cases even gaining access to it in the first place" (Boynton, 2004).

The long-held dogma of the unity of research and teaching in European universities may still hold sway but the actual reality is very different from the ideal.

Knowledge processing

When it comes to teaching, the task of knowledge processing is crucial. It requires skills of information gathering, the weighing of evidence, the structuring and re-ordering of ideas/material and assessment design.

E-learning has widened the possibilities of information packaging and this is reflected in Hilse's model with the reference to specialists such as multimedia designers and IT-experts. These specialists are on hand for the realization of the potentials of ICTs for, let's say, visualising, simulating or simply storing designated material. But the existence/deployment of such specialists raises a number of boundary questions with regard to institutional policies towards teaching. Though Laurillard believes (Laurillard, 2002) that the re-application of standardized multimedia tools is no longer a major issue, it nevertheless requires some basic skills in programming and handling of even standard software. Whether sufficient numbers of university teachers have the competence to act as their own IT facilitators remains a moot point. Team work is seen by some as a possible answer to the problems inherent in using ICTs but, in truth, most conventional universities lack the course team structures that have made such an impact in distance education provision. Typically, cross-sectional units/interdisciplinary groupings are under-staffed and are even seen as unwelcome competitors for scarce resources. Although all universities have their own central computing unit staffed by experts in the fields mentioned by Hilse, there is no organisational model to adapt such an agency to the tasks associated with e-learning, not to mention incentives for lecturers to branch out in this field. Much still depends on the initiative of the individual academic.

How to escape from this dilemma is an open question. As mentioned before, universities are not streamlined private corporations. Within universities there are individual academics with undoubted expertise in organizational theory and practice, but the inner logic of e-learning tends not to be applied to the working structures of the universities themselves.

There are, however, encouraging initiatives that offer some pointers for the future. One such is the experience derived from international projects where bottom-up approaches have been applied to networking. This has involved academics forming themselves into an international online network for the purpose of providing mainstream teaching provision. They have been free to choose subject matter according to their own syllabus requirements, negotiate mandatory course readings for the virtual seminars on offer, decide on trans-national tutor pairings and settle on a preferred communication platform. Such an arrangement enables the individual academic to draw directly on the teaching experience and associated materials which other colleagues have already tested with regard to quality and suitability for particular target groups. Although this kind of collaborative arrangement cannot be elevated into a networking strategy at the institutional level, such simple type of networking for the preparation of raw material for teaching and the sharing of teaching obligations is a great plus of international e-learning. (Vasconcelos Rodrigues et. al., 2000) And, not a minor issue, it need not necessarily raise workload - an issue that will be picked up later within the context of knowledge storing. Furthermore, the flexibility of this model allows for each participating institution to keep hold of its own assessment and accreditation policy. Students can engage in international online exchange but it is their home teachers who set and mark their assignments.

This kind of networking comes very close to traditional academic teaching routines. The emphasis is placed on communication and builds on a familiarity with e-mailing and a knowledge of simple learning platforms which have now become part of the armoury of the typical university teacher. It enables academics to gain practical experience of online teaching without educationalists breathing down their necks and it also allows practitioners to reflect on the consequences of such networking arrangements for a university's organisation (Johnes, forthcoming).

Furthermore, in times of mass education, when the old ideal of research-based teaching (mind you: own research) is not always upheld, networked preparation of teaching is an appropriate and practical way of navigating the rocks of protected knowledge and sailing the vast seas of Internet information; although this collaborative approach requires new views on organisational behaviour and communication, in particular in cross-cultural settings (Johnes, forthcoming; Williams, 2000).

Those familiar with distance education may say that the above description is not untypical of the teamwork required to plan and present a course. But this type of network has two significant differences: it is a voluntary exercise and it does not lead to a standardized curriculum. It does, however, bring back the term "mixed-mode" into university discourse although with a shift in the meaning to embrace not just a delivery mechanism, but the whole working structure of a university, albeit in microcosm. Not only cross-units co-operation within a university can be mentioned here, but also the integration of experts from outside

the university in planning and delivering teaching, as they are already integrated in some research activities. Another example would be the provision for guest lecturers within a course. However, before we jump too hurriedly into more sophisticated applications of e-learning, we have to align its potential with the everyday attitudes of regular academics.

At the same time e-learning does not dispense with the need for good teaching. As LaMonica (2000) has reported, undergraduate students do not distinguish between traditional teaching and e-learning as far as standards are concerned. They expect the same, namely, clearly outlined aims and objectives, structured content and frequent communication or feed back. But they have been critical with regard to features like organised collaborative learning. Here it is worth noting LaMonica's view that the experienced face-to-face lecturer has less difficulty than the novice in setting up an e-learning environment. E-learning is as difficult to apply as any other teaching tool.

Knowledge storing

E-learning opens new opportunities regarding knowledge storing and - within certain limitations - knowledge management, but at the same time the effects of such moves show, in a nutshell, why we face the difficulties with e-learning described in the literature (Ayers & Grisham 2003). New approaches to knowledge storing requires the individual academic to engage in activities which go beyond the usual norms and it call into question traditional organisation patterns within a university.

Knowledge storing was and still is the crucial task of a library. But the range of what has to be stored has widened. The key terms mentioned by Hilse indicate a new direction. Sources with a broader range of origin (compared with just printed ones) have to be stored in databases and rendered accessible by search machines and this has to done in co-operation with libraries. Geleijnse (2002) reports on cluster building in some US universities, where all activities concerned with information and knowledge storing are concentrated under the direction of a chief information officer.

Beyond the question of storing sources e-learning has also stimulated a discussion about the re-usability of teaching and learning contents, which, as a consequence, brings up the term knowledge management within an educational context. The way that libraries are having to handle digital data hints at the organisational changes to come. But it does not do justice to the complexity of the inter-dependent and inter-related activities that will be required to make the new possibilities work. These range from inputs to be made to a database, to new systems of storing and categorizing, to the mapping of meanings, concepts and knowledge. The ongoing discussion on LOM or international standardizing processes gives a clue to this complexity. The overarching aim is to bring the storage closer to what is described as individual knowledge, also referred to as tacit or implicit knowledge and thereby enhancing the potential of e-learning. Whether this is achievable or desirable (Wilson, 2002), the underlying processes have already started in most of our universities, as those who are following the discussion on metadata for educational or teaching resources will be aware.

But even if we do not want to go that far, we are all becoming used to working with search machines and databases; even in the Humanities there is not a discipline which is not working with such tools. We are all interested in the output, but who is making the input? In the Dec.Knowl project[4] we attempted to construct an electronic resource base for the purpose of supporting an online seminar on Globalization. Accordingly the lecturers involved in the project were asked to categorize source material within the four chosen seminar themes using a simple metadata referencing structure covering sixteen items. In the event the lecturers balked at this request on the grounds of workload. While they are happy to use data bases compiled by others in search of up-to-date teaching material, they are less than willing to engage in metadata classification themselves. They see themselves as academics not information brokers. Ultimately, such a stance will limit the potential of data bases as a teaching resource; and it was this reticence on the part of the academics that prompted us to turn back towards librarians as information specialists. Teaming up with libraries in a systematic way would facilitate the use of the new ICT tools. Libraries could not only manage storage, but specialist librarians could be involved in the classification and the handling of data working alongside their academic colleagues. Such a clustering approach appears to make sense, though it is dependent on a shift of traditional academic attitudes in the direction of team work. Any such movement, however, would not only have resource implications for universities but would raise boundary questions with regard to traditional teaching roles.

This example offers only a very accidental view on what is involved in knowledge storing. The question of academic reputation could also be cited. While every publication contributes to our academic standing, the filling in of metadata sheets certainly will not. Nonetheless, storing has an educational significance that goes beyond the technology itself. Such potential has already been amply demonstrated in the world of distance education where the storing of reusable teaching material has been an important factor in the maintenance of quality standards.

We have concentrated on the first three stages of Hilse's model because they highlight the current challenges facing higher education as far as e-learning is concerned. Our understanding of a university as a corporation of individual members implies that there is a tension between the organisational and individual requirements relating to e-learning. Meanwhile e-learning is embedded in various teaching applications using the new ICTs which further suggests that e-learning is not an isolated teaching tool.

Conclusion

The core tasks of universities involve the creation, processing, storing and public dissemination of knowledge (not to mention the more recent consideration of marketing knowledge) and it is these prime functions which are challenged by the knowledge economy and the new technologies. Traditional university structures worked well in times of elite education when pure face-to-face teaching was the accepted norm and when the ethos of the organisation was built around the notion of a community of scholars.

But with the emergence of

- the requirements of the knowledge economy and its permanent pressure for innovations,
- the breaking-up of the research monopoly of universities,
- international mass education,
- ICTs as tools for both, research and teaching as well as
- sophisticated models of networking research and teaching (e.g. by public-private partnerships or contracted research)

strain is placed on the traditional organisational model, though this pressure is not always recognized within the institutions themselves. (Willke, 2002). The effective deployment of new ICTs, e.g. for

e-learning, goes beyond the standard academic literacy of reading and writing. Horizontal networking and more bottom-up approaches will not only help to raise the awareness of the individual lecturer to new requirements, but could also help the organisation to adjust organically to the new situation.

As organisations, universities have to overcome their notorious inability to harness their academic knowledge to the improvement of their own working structures. Better horizontal networking, e.g. through teaching in combination with other organisations and experts, requires a minimum of organisational standards and division of labour, though it does involve a re-examination of the current workload of lecturers. Thus these are tasks for all those involved in the organisation of education.

Within all this we have to separate out discussions about teaching quality. Teaching quality has been a bone of contention for years. And e-learning will not improve the quality *per se*. But international competition for the best brains may change overall attitudes to teaching; and the advantage could rest with those institutions that invest in better organisational models for e-learning *and* in the residual individual skills of their staff. To leave either one or the other out of the equation is unlikely to deliver the desired results.

Finally, there is the question of all the issues under discussion meshing together; this is why it is called a systemic challenge.

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[1] The text is a revised and updated version of a presentation given at the *Networked Learning Conference* at the University of Lancaster in 2004. It has profited a lot from my exchange with my colleague Kevin Wilson from the Open University.

[2] The term knowledge used in this text is not exactly related to its psychology. Knowledge in that sense is a complex process where new data and information are integrated into the pre-experiences of an individual or organization. I understand knowledge here also as an outcome of this processing, expressed by symbols (eg. natural or artificial languages), storable and available to all those who are able to understand the respective symbolic systems. The perception and new processing of this already recorded knowledge can lead to new knowledge. I am fully aware that there is a complicated ongoing discussion on knowledge management (Wilson, 2002). But for the purpose of this article I stand back from this debate.

[3] A more systematic discussion about the changes in intellectual property rights: McSherry, Corynne (2001). *Who Owns Academic Work? Battling for Control of Intellectual Property*. Cambridge, MA.: Harvard University Press.

[4] As far as results of the just finished EU-funded project "Dec.Knowl" are concerned I rely on the provisional evaluation report prepared by Ellie Chambers, Simon Rae and Kevin Wilson from the Institute for Educational Technology of the OU.