e-Learning
Ideas, Intentions, Illusions vs Status, Strategies, Stakes

Thomas Risse
Institute for Informatics and Automation
Hochschule Bremen, Flughafenallee 10, D28199 Bremen

Abstract

The state (of the art) of e-learning at universities and polytechs is presented, both on a local level, i.e. at Hochschule Bremen, as well on a more global level, e.g. in Germany. Immanent problems of utilising the underlying technologies are sketched, some solutions outlined. Tendencies and the direction of ongoing developments are revealed.

This article hopes to show that and how the hype about technologies is to be substituted by didactic concerns for the learner and the learning process.

1 Ideas & Status

The term e-learning comprises all sorts of CAX-technologies supporting learning as the prevalent terms and acronyms, cp e.g. the IEEE glossary [5], distant or tele learning, learning on demand, computer aided teaching, CAT, computer aided learning, CAL, computer managed instruction, CMI, or the maybe oldest notion computer based training, CBT indicate.

The idea was to use the computer as an instructional tool, e.g. to learn high speed typing (on a mechanical typewriter or a computer keyboard), to learn basic algebra, to learn to speak a foreign language or even for dyslexics to use the computer to learn to read etc. It is by no means an new idea as examples like IBMs multimedia learn system, IBM 1500 marketed 1965, Computer-unterstützter Hochschulunterricht der Universität Freiburg, begun 1969 or the CBT activities of Deutsche Lufthansa at that time show.

1 Reinhard Werth: Am Computer lesen lernen; s. www.uni-muenchen.de/lmu-32006100/htdocs/p_details.cfm?news_id=558
Since then, the computer technology developed in many dimensions: networking for example made access to remote databases possible, the personal computer handled multimedia data comfortably, and computer know how became a necessary basic skill in more and more jobs.

The rapid spread of the Internet offered to publish all sorts of learning materials. Especially the World Wide Web allowed to provide a wealth of hyperlinked documents, tutorials, animations, visualisations and learning applications in addition to access to databases and encyclopedias.

The networking infrastructure, e.g. high bandwidth networks, rapidly developing techniques to produce courseware, e.g. authoring tools or tools for authoring on the fly, learning environments or platforms to organise communication and collaboration of groups of learners, together with developing standards for content and formats represent the state of the art.

Given these means to support learning by means of the information and communication technology it was near at hand to provide teaching and learning materials in nets, to design, build, organise and offer online courses in networks, or even to set up virtual universities in the Web.

1.1 Lifelong Learning Anytime Anywhere

Distant learning is attractive especially for part time students or professionals who want to extend their skills or to adapt new skills after working hours at home. Appropriate courses are often developed in federal projects or in public-private partnership, e.g.

- Virtuelle Hochschule Baden-Württemberg [www.virtuelle-hochschule.de](http://www.virtuelle-hochschule.de)
- Virtuelle Hochschule Bayern, [www.vhb.org](http://www.vhb.org)
- Virtueller Hochschulverbund Karlsruhe (ViKar), [vikar.ira.uka.de](http://vikar.ira.uka.de)
- Virtuelle Universität OberRhein (VIROR), [www.viror.de](http://www.viror.de)

There are some examples of virtual universities offering several internet based degree courses, mostly in the fields of Information Technologies and Economics, as master degree courses based on bachelor degree courses, e.g.

- Virtuelle Universität der Fernuniversität Hagen, [vu.fernuni-hagen.de](http://vu.fernuni-hagen.de)
- Virtuelle Fachhochschule Lübeck, (economics/business and engineering, media informatics), [www.oncampus.de](http://www.oncampus.de)
• Teleakademie Furtwangen der FH Furtwangen, (tele-learning, informatics, economics/business, media design), [www.tele-ak.fh-furtwangen.de](http://www.tele-ak.fh-furtwangen.de)

The German Bund-Länder-Commission for Educational Planning and Research Promotion, BLK operates a portal "Studieren im Netz" (Study in the Web), [www.studieren-im-netz.de](http://www.studieren-im-netz.de) which offers up to date information on online degree courses offered in Germany, news, congress calendar, newsletter, links etc. The "Deutscher Bildungs Server" [www.bildungsserver.de](http://www.bildungsserver.de) (German Education Server) manages data bases with extensive information on all topics of education, from elementary school, colleges or universities to vocational education, comprising materials, institutions, persons, events, jobs etc.

In the end, right now there are about 2000 entries in the data base describing very heterogeneous e-leaning facilities in Germany ranging from simple or elaborate multi media learning units to about a dozen purely virtual degree courses targeting regular or part time students and professionals asking for further education.

### 1.2 e-Learning Initiatives at Hochschule Bremen

As in most German polytechs or universities of applied sciences a high degree of heterogeneity w.r.t. the utilisation of computer support for teaching and learning is characterising the situation at Hochschule Bremen. Some examples illustrate that the spectrum ranges from introducing presentation techniques to planning whole online degree courses:

- At the Department of Electrical and Electronic Engineering and Informatics most staff provides teaching materials on web servers, for Informatics e.g. on a Hyperwave Server, s. [www.weblearn.hs-bremen.de](http://www.weblearn.hs-bremen.de)

- A Hyperwave Server – allowing for distributed administration and thus offering some support for computer supported cooperative work, CSCW – also provides virtual workspaces for students, students projects etc., s. [www.weblearn.hs-bremen.de/projekte](http://www.weblearn.hs-bremen.de/projekte)

- The Department of Engineering together with the Lufthansa flight school offers the International Degree Course in Aviation Systems Engineering and Management (ILST) with some degree of internet based organisation (online material, exeercises, examinations, marking, marks, etc.), s. [www.hs-bremen.de/English/Seiten.asp?SeitenID=348](http://www.hs-bremen.de/English/Seiten.asp?SeitenID=348)

- The Department of General Sciences is about to establish an online degree course "Specialist Journalism", [www.fachjournalistik.de](http://www.fachjournalistik.de)
• More examples like the master degree course ”Master of European Studies” at the Department of Nautical Science and International Business (with exchange of e-modules between partners) or the master degree course ”MBA – International Entrepreneurship” at the Department of Business (with 50% contingent of distance learning modules) are given in [12].

Both the Institute for new Dimensions, InD, www.hs-bremen.de/InD in the Department of Architecture as well as the multimedia competence centre, M²C², www.mmcc.hs-bremen.de in the Department of Electrical and Electronic Engineering and Informatics serve as knots in a network of people working in e-learning projects. Both institutions provide the transfer of know how, expertise and experiences and represent focal points for discussions on the future development of Hochschule Bremen towards a virtual university of applied sciences.

2 Intentions & Strategies

E-learning takes place in different settings, uses diverse materials, utilizes various computer aided services, and addresses various target groups. Thus each e-learning offer can be classified in an at least three-dimensional feature space and in each dimension in order of increasing ambitiousness and virtuality.

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<th>settings</th>
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2.1 Theory, Technologies, Quality, Standards

The ongoing research on different aspects of e-learning can only be sketched by few examples. For more information and links see www.edulinks.de or [8].


Standards are set by different bodies, e.g. IEEE standards [4] with [5], IMS standards [6], ISO standards [7] or standards of the Aviation Industry CBT Committee, AICC, www.aicc.org, which offers also an automated testing program for verifying conformance with the AICC Guidelines and Recommendations for
Computer Managed Instruction, CMI, Systems and Computer Based Training, CBT, courseware.

There are some activities to classify and tag learning objects to provide reusability, e.g. the Shareable Content Object Reference Model, SCORM, of Advanced Distributed Learning, [www.adlnet.org](http://www.adlnet.org), a collaborative effort between government, industry and academia to establish a new distributed learning environment, or the Dublin Core Metadata Initiative, [http://dublincore.org](http://dublincore.org), which is an open forum engaged in the development of interoperable online metadata standards that support a broad range of purposes and business models. ARIA-ADNE and ARIADNE II are research and technology development projects, [http://www.ariadne-eu.org](http://www.ariadne-eu.org), of the European Union pertaining to ”Telematics for Education and Training” which created tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics supported training curricula.

### 2.2 Activities at Hochschule Bremen

Just a few examples may illustrate the diverse activities at Hochschule Bremen – many of them taking place at the Computer Science of the Department of Electrical and Electronics Engineering and Informatics.

- Modelling and Simulation, e.g. an animated visualisation of the building at the airport (at that point in time only planned), the *Zentrum für Information und Media Technologien, ZIMT*, s. [www.video.hs-bremen.de](http://www.video.hs-bremen.de)

- Interactive Documents, a means to stimulate active, explorative learning e.g. in mathematics, s. documents like numerics.pdf or epuzzles.pdf etc. in [www.weblearn.hs-bremen.de/risse/MAI/docs](http://www.weblearn.hs-bremen.de/risse/MAI/docs)

- teleVISE, a project with the objective to set up and combine mobile technologies and organisational structure for a tutoring system of mathematics courses at several departments

- The modularisation efforts affect all degree courses in our department. As a side effect partitioning a degree course into learning modules supports to reuse learning objects in different courses and learning contexts.

- DremL, a multi media learning unit how to write story boards for multimedia learning programs, developed by ANOVA, Rostock in cooperation with the M²C², s. [www.mmcc.hs-bremen.de/vorlagen/dreml/DremL.htm](http://www.mmcc.hs-bremen.de/vorlagen/dreml/DremL.htm) or CoBilot, [www.cobilot.de](http://www.cobilot.de), a learning platform developed by ANOVA, Rostock, to be tested in computer science courses at Hochschule Bremen.
In autumn 2002, Hochschule Bremen decided to support only Ilias as university-wide learning platform.

3 Illusions & Stakes

The governmental and private bodies supporting or sponsoring projects developing e-learning and its applications aim at

- cutting educational or instructional costs
- establishing know how at universities and polytechs or companies
- increasing the market share in local, national and global markets

This engagement is spurred by analysts claiming an growing market for e-learning applications. In this rapidly evolving field there are also the first loosers in the game, e.g. Cardean University, one of the precursors in the nineties, now with very uncertain future.

On the other hand, there seems to be a common misconception of both the official public bodies as well as the students 'in spe': the more virtual courses a real university offers the more up to date and thus innovative and attractiv it seems to be.

This misconception takes place on the background of some well known inherent problems of e-learning.

3.1 Problem Areas

At the same time, e-learning offers an attractive potential to support education and poses new problems as well, namely

- technical problems, e.g. networking, communication bandwidth and standardisation
- organisatorial problems, e.g. licensing, quality control and assurance,
- didactical problems, e.g. interactivity, consideration of different learner types,
- management problems, e.g. establishing bodies to coordinate the collaborative development of e-learning applications

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2Della Bradshaw: A sector falling short of predictions; Financial Times, October 21st, 2001 career.ft.com/ftgx.cgt/ftc?pagename=View&c=Article&cid=FT3Y5UGWYSCE&live=true&tagid=FtfDZSR3X1IC
• financial problems, most of all high costs to produce e-learning applications

3.1.1 Cost Benefit Ratio

The cost benefit ratio of multi media online learning objects is very poor due to immense development and maintenance costs. For example, it took the virtual polytech, VFH two man years or about 150 000 US$ to develop a standard course corresponding to 5 ECTS credit points. And, annual maintainance costs about one fifth of the initial development.

By the way, at Hochschule Bremen assistant lecturers are poorly paid and thus could be hired to teach such a course a hundred times.

The idea to record lectures and thus generate multi media learning units, called authoring on the fly, AoF and heralded by the University of Freiburg, Germany, http://ad.informatik.uni-freiburg.de/aof/ has to cope with many inherent obstacles: diversion by technicalities when lecturing, necessity of postprocessing, and most of all reluctance of students to interact.

Some examples of authoring on the fly at Hochschule Bremen can be found on our streaming video server www.video.hs-bremen.de. According to our experiences it is not feasible for a lecturer to just record (and postprocess!) his or her lectures in order to produce reasonable teaching material for the Web, on the fly.

3.1.2 Interaction

Interaction in exercises, tests and examinations is limited to computer friendly tests like multiple choice, fill the gap, matching or sorting schemes. It is an open question whether this restrictive question/answer scheme is adequate to test skills like modelling, solving problems of unknown type etc. After all, marks are immediately available.

Interactive Documents at least claim to support explorative and (inter)active learning.

And, interactions with teachers, coaches or tutors are cumbersome, tedious, laborious and by no means immediate as in traditional classes: learners have to wait for answers by e-mail, in the chat about math they have to use some formalism like offered by \TeX{} to represent formulas, help asked for in newsgroups or mailing lists is unpredictable etc. In contrast, enough bandwidth, appropriate peripherals, and only few participants are mandatory for videoconferencing to offer real time interaction.

![debated e.g. in Thomas Risse: E-tests – What Can be Assessed in E-learning Applications; Proc. of the ICL2002, Villach 25.–27.9.02 (to appear) for mathematics and computer architecture, s. www.weblearn.hs-bremen.de/risse/papers/ICL2002](image-url)
3.1.3 Organisation

The local organisational structure has to be adjusted to the needs of e-learning (cp teleVISE). The work of involved staff shifts from classical classroom teaching towards coaching and tutoring students. Additionally, some new obstacles have to be coped with, e.g. to agree on a learning platform. There are more than 140 products to choose from, there are lists of relevant criteria with some 300 entries. In the end, the decision for a learning environment turns out to be a highly political one.

There are numerous licensing problems or questions how to reward authors.

Also co-operation on a global scale takes organisation, e.g. to share the high development costs between several partners as can be seen Baltic Sea Virtual Campus project, s. [www.fh-luebeck.de/bsvc_brochure.pdf](http://www.fh-luebeck.de/bsvc_brochure.pdf).

4 Conclusion

1997 David Coleman observed [2]: we have the technology, but we lack an appropriate organisational structure and a appropriate teaching/learning culture. Obviously, this is still true. Experiences show that multi media technologies are no substitute for engaged teachers, they do not guaranty engaged learners as well. Due to high maintainance costs even heavy governmental funding does not guaranty sustainability of applications and of organisational structure.

Every university has to decide judiciously which degree of virtuality to aim at. Online degree courses will sharpen the profile of only few universities in a for them profitable way.

References


[2] David Coleman, (Ed.): Groupware – Collaborative Strategies for Corporate LANs and Intranets; Prentice Hall 1997 – for more links s. e.g. [www.skyrme.com/insights/7gw.htm](http://www.skyrme.com/insights/7gw.htm)


[8] Jörn Loviscach: Neue Medien in der Lehre – Thesen zum mediumentstützten Lehren und Lernen (with link lists to authoring tools, to didactics, assessment and evaluation, to learn software and to projects); www.weblearn.hs-bremen.de/home_loviscach/Public/medlehre.


