32 The FernUniversität Hagen - a University in Transition

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Abstract

The University of Hagen (FernUniversität) is the only distance teaching university in Germany. This contribution addresses the university's transition to a fully virtual university. it does not intend to add another paper to the numerous existing ones, but, after some general remarks, to act as a kind of guided tour by presenting links to more detailed descriptions of the addressed components.

Keywords: virtual university, migration, learning elements

1. Universities in Transition

Worldwide, universities are getting more and more involved in a general process of transition:

- Society and economy are changing to a knowledge society/knowledge economy. As a consequence, instead of studying just once a life, students will have to continuously update their knowledge, e.g. by attending state of the art university level education. So far it is not yet clear at all whether lifelong education will be provided solely by universities or by other education providers as well. Universities have to leave their ivory towers and enter a highly competitive market. They should carefully reconsider their programmes and adjust them to this new situation.

- To enter new markets and attract new customers, universities are getting more and more involved in multiple modes of education, e.g. face to face and distance education.

- To meet the demands of a highly competitive market, universities have to sharpen their profiles and become open for co-operation with other universities. Universities that are not open for substantial co-operation will hardly survive the near future. The University of Hagen, e.g., closely co-operates on the one hand with other universities, which leads to international as well as to interdisciplinary programmes; on the other hand it co-operates with industry and professional societies, which leads to industry-specific curricula as well as continuing education programmes.

- There exists a transition from faculty-oriented curricula to inter-faculty curricula. A multimedia expert, e.g., needs knowledge from mathematics, computer science, law, design, psychology, and so on, i.e. from a variety of faculties.

- There is also a transition from curricula-oriented degrees to knowledge certificates. When students re-enrol at a university, at the end of their studies they want to get a certificate about their accumulated knowledge in a specific area, not just about a number of successfully passed courses.

- Instead of just offering semester-oriented programmes, in the future universities will have to offer a broad spectrum of programmes, stretching from traditional programmes to, e.g., continuously available learning on demand programmes.

- Finally, there is a transition from linear programmes, where students enrol for a series of courses, to general learning spaces. Such a learning space provides lectures, courses, seminars, assignments, certification, testing, tutoring, monitoring, etc. A student enters the space, where she can either follow a guided tour through the learning environment, or can individually select the learning materials she is interested in; finally she decides to leave the learning space and asks for an appropriate certificate. After a while, a student will re-enter the learning space for some additional education.

2. Virtual Learning Spaces

The concept of a learning space easily leads to the concept of a virtual learning space, which brings *all* its services via electronic communication, independently of time and distance, to the individual user. It provides and integrates all functions and services of a real learning space, systematically uses new media and technologies, heavily supports all kinds of communication and co-operation, and provides low-cost solutions on broadly-available hardware and software platforms. In a virtual learning space, students use their personal computers as learning environments, information agents and communication centres. Students may learn when and where they want to learn, combine traditional forms of learning with new ones, and can learn with personal, professional and social contacts. There exist various examples of virtual learning spaces:

- virtual universities (e.g. the University of Hagen);

- virtual campuses (e.g. the EUNITE network's European Virtual Campus);

- networks of universities and partners from industry (e.g. EuroPACE);

- even the World Wide Web comprises some properties of a virtual learning space.

3. The University of Hagen

The University of Hagen has been founded in December 1974 by act of parliament of the state of North-Rhine-Westphalia. Being the only distance teaching university in Germany, it forms an integral part of the regular public higher education structure. It is fully in line with conventional universities, fulfils the same tasks, functions and responsibilities, has the same rights, and meets the same standards like any other German university; its students have to meet the standard requirements for enrolling; students from other universities can switch to Hagen and back; instead of living in Hagen, they are spread around Germany, Europe, some of them even around the world.

The university comprises six faculties (computer science; economics; education, social sciences and humanities; electrical engineering, law and mathematics), 68 study centres, about 80 professors, about 1700 courses, and about 60.000 students; 80 % of them are fully employed, i.e. are studying besides their full-time jobs; 40 % of them are holding already a university degree.

The university supports a number of study centres, which provide students with face to face coaching and tutoring, and support social contacts between students. Most of these study centres are located in Germany, some of them in other Western and Eastern European countries; they are essential for the success of distance learning. Though their roles will change, all study centres will be fully integrated into our Virtual University concepts

Like a traditional university, the University of Hagen firstly offers programmes like diploma, bachelor of science, bachelor of arts, master; supplementary programmes, postgraduate programmes as well as single course studies, where students can just enrol in single courses and get certificates; in addition we provide a broad spectrum of further continuing education programmes. From the very beginning new technologies were introduced as soon as they became available and as far as they proved successful for teaching and learning. Besides printed course materials since many years we are offering audio and video tapes, are showing up bi-weekly in the public TV, and are using CD-ROMs, computer conferencing, video conferencing, etc. Consequently, we are now in transition to a Virtual University.

4. The Migration Strategy

Already in the mid nineties, from individual initiatives various research and development projects evolved in the area of virtual teaching and learning, three platform projects became widely known, *Virtual University, ET-Online,* and *WebAssign* (numerous papers about these projects can be found via the homepages of the chairs (Lehrgebiete) Kaderali, Schlageter and Six via the FernUniversität's homepage http://www.fernuni-hagen.de). Despite their pilot character the platforms attracted thousands of students and were heavily used for real teaching and learning processes. As a consequence, the university developed the concept of a virtual university as briefly sketched in section 2. The following decisions proved essential for a successful transition:

- The Virtual University development became a direct strategic task of the university's management board, with a Vice-Rector in charge of the transition.

- A *User Group*, chaired by the Vice-Rector, became responsible for all user-oriented decisions; all institutions of the university, academic, administration and service ones, are represented in the user group, which can ask an expert group for device and support; the user group, through its chair, directly reports to the management board; subgroups of the user group concentrate on specific issues like CSCL and report back to the user group.

- A first university-wide standard platform was assembled from the three pilot platforms; its internal and external interfaces became obligatory for all further platform component developments.

- Two new teams for

  - handling and maintaining the platform

  - further developing the platform

  were established in the university's computer centre.

- The management board sets aside a quite significant amount of university money for

  - developing multimedia learning materials

  - developing new components for the standard platform

Based upon the user group's recommendations its chair submits a proposal for funding directly to the management board, i.e. without passing through other university commissions. For details see Berkel (2001).

It turned out that instead of regulations and stringent standards incentives and good examples are the best way to motivate university members, faculties, administration, service units etc. to get voluntarily and enthusiastically involved in the transition process. Meanwhile the whole university heavily supports the goal of a virtual university.

5. The Platform

In the mid nineties, when individual researchers started virtual university research projects, there were no commercial platforms available which even approximately met their requirements. Thus, as mentioned above, three different research platforms evolved, were validated with significant numbers of users and successfully made available to other dual-mode universities as well. When in 1999 the universities management board decided to implement a unifying virtual university concept it also decided to assemble a standard operational platform from components of the existing prototype platforms, called *platform 2000*. At the same time, the virtual university development started to develop a new strongly component oriented *platform 2003* project. By now, the number of worldwide commercially available platforms has significantly increased to about 200, and various projects are trying to classify and evaluate them (see for example http://www.virtual-learning.at/evalplattform.htm http://www.izhd.uni-hamburg.de/pdfs/Plattformen.pdf. for details)

Thus we carefully studied whether to use an existing platform or at least integrate components from existing platforms into our platform.

A platform as a whole has to meet several criteria:

- it has to provide a set of services (catalogue of functions)

- it must allow integrating existing components like, e.g., legacy data bases (whose use, e.g., is enforced by the government)

- it must be component oriented with well defined open interfaces

- it must allow the easy integration and exchange of standard open, of the shelf components, e.g. for communication and cooperation services

- its code and detailed documentation must be available

- it must be extendible, taylorable, adaptable to changing needs and requirements

The platform provider must

- be commercially sound (probably only few of the 200 providers will survive the next years)

- provide extensive local or at least national support

- be open to new user demands (e.g. by providing and supporting a user group)

- guarantee sound and stable financial conditions.

It turned out that for our situation no single platform and/or platform provider meets all the above criteria, thus it seems necessary to integrate components from several platforms, including our own one. On the other hand, because of practical and financial reasons, it does not seem feasible to use components from more than two or at most three different platforms. We will finally decide about our platform approach within the next few weeks. For details see Sternberger (2001).

6. Teaching Elements

As mentioned in section 3., the FernUniversität since its foundation is heavily using a broad spectrum of teaching and learning elements, stretching from CBT courses to face to face seminars, from newsgroups and chat rooms to individual oral coaching in study centres. Even in the new century of hightech mu ltimedia, the FernUniversität still believes in using adequate mixes of media, adjusted to the special needs of the corresponding learning event. In the following, some types of teaching/learning components are sketched briefly:

- **Integrated Learning Environments:** courses are presented via Integrated Learning Environments, which, depending on the needs for a specific course, provide access to

  ▪ the – protected - electronic version of the course, which can be downloaded by the student

  ▪ relevant literature references and Internet links

  ▪ news groups and chat rooms

  ▪ self assignment and testing environments

  Via our homepage http://www.fernuni-hagen.de numerous Integrated Learning Environments can be accessed; e.g. http://www.fernuni-hagen.de/LUWIWI/Teilgebiet/BWL_II -> Zugehörige Kurse.

- **Assignments:** *WebAssign* (Brunsmann 1999) is an Internet based tool which supports all tasks as well as various kinds of assignments/corrections:

  ▪ regularly, via the Internet students submit their assignments; which in case of multiple choice as well as more complex forms are automatically corrected and graded by a central computer in Hagen;

  ▪ in case of more complex assignments the solutions may be pre-corrected by a computer in Hagen and subsequently be sent to the remote corresponding corrector;

  ▪ formula and graph editors in form of Java applets support the submission of complex solutions, to be corrected by human correctors only;

  ▪ WebAssign also supports the whole administrative part of the assignments / corrections process.

- **Virtual Seminars:** In a virtual seminar, students can communicate, co-operate, discuss and present their results via online and offline communications means. Though traditional face-to-face seminars can and should

not be substituted by virtual ones, virtual seminars form an additional type of learning elements, which are very well accepted by students. For experiences with virtual seminars see Heidbrink 2001.

Laboratories: The faculties of Electrical Engineering and Computer Science provide virtual laboratories. As an example, a real robot at the Institute for Control Systems Engineering and Automation Theory can be booked, programmed, run and controlled via the Internet. For details see Lütticke 2002, and
http://prt.fernuni-hagen.de/forschung/pub-de.html
(section Multimedia and Internet) and
http://prt.fernuni-hagen.de/pro/virtuelle_umgebung/paper.html .

- **Co-operative Computer Supported Learning (CSCL):** The CSCL subgroup is presently discussing a set of different CSCL scenarios ant their functional requirements. Their report will be passed via the user group to the faculties for discussing the scenarios' didactical consequences. Based upon the faculties decisions the platform will be realized accordingly. The decision process can be followed via   http://www.fernuni-hagen.de/LVU .

- **Exams:** though most of our oral exams are organized in Hagen, more and more exams are conducted via video conferences between the FernUniversität and its study centres.

7. Co-operation

In the following, from a big number of virtual university related projects some examples for various kinds of co-operations with other universities are given:

Dual Diplomas in Economics

Students with a bachelor degree in economics, who enrol for a full diploma programme at Masaryk University, in addition take selected courses of the diploma programme at the University of Hagen and pass the corresponding exams, get - beside their diploma from Masaryk University - an additional diploma from the University of Hagen. Similar programmes have been established with universities in St. Petersburg and Riga.

European Master in Mediation

The universities of Barcelona, Geneve, Hagen, Leuven, Lyon and Paris, and the Institut Universitaire Kurt Bösch (IUKB) in Sion have established a co-operation for a European Master in Mediation. Students with a university degree in law can study mediation at one of the participating universities for one year and then continue their studies for another year at the IUKB (including joint group meetings, individual study programmes, practical work and thesis) to finally get their master degree in mediation.   For   details   see   http://www.fernuni-hagen.de/OERV/Seiten/mediation.html .

EUNITE

The European University Network for Information Technology in Europe (EUNITE) is a good example for co-operations between European universities; it comprises universities from Aalborg, Granada, Hagen, Helsinki, Leuven, Lund and Twente and Strathclyde. Its main strategic goals are:

- to promote the use of information and communication technology as tools for improving teaching and learning in higher education;

- to capture the market for life-long learning at university level;

- to enhance and develop the co-operation of the EUNITE universities in these fields.

Through this co-operation, the partners intend to:

- make available an innovation potential of ICT for on-campus higher education;

- develop and establish new ways for open and distance learning;

- internationalise their learning programmes;

- enhance inter-university networking in the provision of courses and programmes/curricula, and the production of learning materials.

For details see http://www.eunite-online.org .

CUBER

A huge number of traditional and continuing education programmes is flooding the European market and it is hard for the individual customer to find the best programme for his individual demands. The Personal Curriculum Builder in the Federated Virtual University of the Europe of Regions (CUBER) is another example for a successful co-operation between various European universities and university networks. The FernUniversität is the main contractor of the CUBER project, which. in contrast to EUNITE, is heavily funded by the EU. The project aims at

- finding the best match of vocational demands, academic offers, and individual learning conditions;

- broadening the access to learning resources from diverse providers, such as European Distance Teaching Universities;

- building logically coherent course packages.

The CUBER broker middleware decouples search and delivery systems and comprises

- a knowledge base of standardized course descriptions and domain knowledge;

- a forms - and menu-based authoring interface;

- a user-centred customisable, interactive search-engine.

Of course, beside its technical results, the success of CUBER will heavily depend on whether a significant number of European universities will be willing to closely co-operate and share its potential customers. for details see http://www.cuber.net or

ULI

ULI is a German-Swiss teaching network of 11 universities in the area of computer science; students can enrol at one of the participating universities and can take courses from any university, either face to face lectures or Internet courses. By mutual agreement all credits from any of the universities are accepted for degrees. For details see http://uli-campus.de .

Conclusion

The paper summarized, in form of a guided tour, various aspects and experiences of the FernUniversität's transition to a virtual university. Significant steps have been passed successfully, many others still have to follow.

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Various kinds of information and interesting links in the broad field of Virtual Universities can be found via the

homepage of our Virtual University office: http://www.fernuni-hagen.de/LVU