DEVELOPMENT PROCESS OF E-LEARNING AT THE UNIVERSITY DUISBURG-ESSEN: LESSONS LEARNT AND FUTURE TASKS

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Abstract

The paper focuses on the objectives and the initial and further steps of the implementation of e-learning at the University Duisburg-Essen, as well as recent experiences with the projects and their transformation into new e-learning settings. Moreover, future activities will be presented as well as lessons learnt in the overall strategic process, based on evaluation data.

1 BACKGROUND

The University of Duisburg-Essen (UDE) is one of the ten largest universities in Germany and offers about 43,000 students a broad academic spectrum with an international orientation encompassing the humanities, social as well as educational sciences, economics, engineering and natural sciences, including medicine. The rectorate and the universities’ central units – namely the Center for Higher Education Development and Quality Enhancement (CHEDQE), the University Library (UL), the Center of Information and Media Services (CIM), as well as the Center for Teacher Education (CTE) and the Chair of Educational Media and Knowledge Management of the Faculty of Educational Sciences – have a common goal: to build a successful and sustainable digital campus for an increasingly diverse student body and to ensure excellent learning conditions.

With respect to the particularly diverse personal backgrounds and living conditions of students e-learning contributes to individual and flexible learning needs. E-learning at the UDE is based on the idea to offering students a greater flexibility in their studies and thereby supporting them towards the completion of their degree, especially with respect to scheduled completion time of their studies. Furthermore, digital learning creates opportunities for a new and different form of face-to-face teaching. Therefore, it contributes to the quality of teaching and learning as well as educational equality. E-learning also promotes core media proficiencies which are considered essential skills in a digital world.

2 DEVELOPMENT OF E-LEARNING AT THE UNIVERSITY OF DUISBURG-ESSEN

The development of e-learning at the University of Duisburg-Essen already started at the end of 1990s by implementing various externally-funded projects e.g. Notebook University and eCampus. These projects have been acquired via third-party funds. The aim of these projects was the grand scale expansion of e-learning and it’s embedding into the existing infrastructure. Later, the focus had to be adapted to accommodate the increasing popularity of mobile devices. The importance of the consolidation of services and infrastructures increased and additional e-learning projects were established e.g. E-University (2005-2008), RuhrCampusOnline (2008-2011) and E-Learning NRW (since 2008). The latter is an ongoing project, focussing on competence development and networking of e-learning stakeholders at Universities in North Rhine-Westphalia. As opposed to that, E-University was a university-internal project in earlier times fostering innovative teaching by focussing on the didactical concept as well as the technical realization, including financial benefit in form of student support. With the two projects RuhrCampusOnline and E-Learning NRW networking and cooperative scenarios with the regional neighbourhood and the Federal State of North Rhine-Westphalia have been completed. All these projects and initiatives were realized bottom-up, being supported by the
Finally, a top-down process was launched in 2014, accompanied by a two-year project to gain more second wave adopters [1] and to realize a wide-spread sensitization. To promote e-learning at the university, the rectorate decided to establish an e-learning strategy. The draft strategy was developed by the players of the already mentioned units and the management level of the university and has been widely discussed by different university bodies.

The e-learning strategy was established in 2014 and is now being revised with adapted objectives and goals. The objective of the strategy was to support and anchor e-learning in teaching and learning in order to expand the variety of didactical methods and learning scenarios in blended-learning and online-learning designs and to respond to the students’ needs more individually (ad-hoc, time- and location-independent, audio-visual elements, and repeatable content).

To achieve its objectives, the UDE uses established infrastructures and a variety of support structures for students and scholars. The e-learning alliance at the UDE, which was founded in 2012 and includes five institutions (listed above), accompanied a two-year start-up phase (2014–2016) to support comprehensive e-learning elements in each faculty (e.g. flipped classroom, peer instruction, e-assessment), to illustrate the multiple (subject-specific) possibilities of e-learning and to be used for orientation. Furthermore, new projects have already been settled e.g. the targeted support of newly appointed professors.

### Main Objectives of the 1st Strategy Paper

The main objectives of the e-learning strategy are: i) to expand technical infrastructures, ii) to make teaching and learning more flexible, and iii) to expand e-learning to the entire university.

E-learning can be a substantial instrument to support and complement teaching and learning at universities. Within the framework of the strategy, the aim was to make various study courses more flexible by promoting cooperative teaching / learning forms, learner-centered learning and self-directed learning by using e-learning modules. For example, crowded events such as lectures can be made didactically diverse by providing content in the form of e-learning self-learning units; presence phases are used for deepening, discussing, exchanging and cooperating (inverted classroom model). Such a blended learning format combines the added value of presence and online phases, and has been highlighted as a relevant scenario for the flexible design of teaching and learning within the framework of the e-learning strategy. Another goal of the e-learning strategy has been to disseminate e-learning across the entire university and to implement it in each study program in the near future.
3.2 Starting Phase of the E-Learning Strategy

To achieve the above-mentioned objectives of the e-learning strategy, a two-year launch phase was carried out. During this launch phase e-learning projects were conceived and implemented in ten faculties. For this purpose, the e-learning strategy was presented in the different Faculty Councils and the faculties were asked to propose e-learning projects. A dedicated service team supported the faculties in the design and implementation of the e-learning projects. In addition, networking was helpful to exchange innovative ideas among the project partners.

3.3 Further E-Learning Programs and Activities

The e-learning strategy with its launch phase paved the way for further e-learning programs and activities. Since 2016, the UDE has, for example, been offering a scholarship program for new professors to support them in using the diverse potentials of e-learning in their teaching practice. To this end, workshops to exchange ideas, and especially to develop approaches to technology-enhanced teaching, are offered. The professors are supported by e-learning specialists of UDE for the design and implementation of these ideas.

Furthermore, UDE supports lecturers in their participation in a Fellowship program from the Founders’ Association (Stifterverband). The Fellowships for Innovations in Digital Higher Education are a joint program line of the Ministry of Innovation, Science and Research of the State of North-Rhine Westphalia and the Founders’ Association. The aim of the program is, inter alia, to develop digital teaching and to promote an exchange between higher education institutions. In the first application round 2016 the UDE has won three fellowships, a second application round is actually advertised.

In addition, annual network meetings have been held since 2014, in which teachers present good practices, share experiences, and collaborate on different topics.

Lastly, in order to not only incorporate the perspective of teachers into the development of the e-learning strategy, all students of UDE were called upon to develop and submit their own ideas for e-learning formats at the UDE in 2016. Four student projects were recently awarded at the e-learning networking day.

3.4 Good Practices

To get an idea of innovative projects realized at the UDE, we will give an overview about some examples including the following aspects: Interaction, student’s involvement, e-assessment, online lessons and distance education courses. These examples are based on large scale groups from 100 to 1,200 students and are realized using a variety of e-learning tools and systems e.g. the learning management system Moodle and semester collections for realizing virtual classrooms; the E-Portfolio system Mahara, MediaWikis and Wordpress-Blogs are used for joint and collaborative creation of content; e-assessment systems for computer-based exams as well as the software system PINGO as an audience response system; for synchronous communication the system Adobe Connect is used; for the administration and publication of literature and videos the UDE’s publication system DuEPublico is the favourite tool.

3.4.1 Interaction

To involve student ideas and to change the conventional style of moderating a classroom session, interaction is one key element to create a modern and innovative lecture scenario. In some of our departments, the method Flipped Classroom is already established. This method allows teacher to flip the scenario: before each lecture, students listen to podcasts or read excerpts of teaching material to be informed about the topic in advance. During the lesson, the already mediated content can be discussed, using cooperative and communicative settings. This scenario can be realized even though more than several hundreds of students join the lecture.

To involve students’ questions synchronously during the lesson an anonymous forum can be used. In this way, the teacher is informed about knowledge gaps and can repeat a specific part of the lesson. As an alternative, the audience response system PINGO can be integrated involving the students’ mobile devices. PINGO allows the integration of student’ feedback and a knowledge-check in time. PINGO was realized and is provided by the University of Paderborn.
3.4.2 Students Involvement

To promote the involvement of students for collaborative and communicative scenarios in the lesson or during online phases, the use of digital tools e.g. wikis is helpful. To enhance the engagement, the teachers work assignment must be precisely expressed. The assignment may be finished individually or in groups. Students can work together and present their products during the next lesson.

Another example for students’ involvement is the cooperation of student teams producing podcasts on a specific topic. For the content production, a story board is useful. The products can be exchanged and used for future cohorts of students.

A classic learning management system offers lots of learning activities to involve student ideas e.g. using a wiki, a data base, a forum.

For data collection and documentation, the E-Portfolio system Mahara visualizes individual and collaborative group work. Text production and the collage of photos allows a more comprehensive and creative overview about topics.

3.4.3 E-Assessment (Computer Based Exams)

To offset the additional workload caused by exams in bachelor and master degree programs, the demand for computer based exam solutions is steadily increasing. The CIM implemented a computer-test-center (PC-Hall), which allows the execution of 200 computer based exams simultaneously. Here, the experiences of preparing, conducting and evaluating mass exams are collected, leading to suggestions on how to design exam questions, as well as performance and security requirements for other universities. Currently, the exam software LPLUS and JACK are used at the UDE to conduct different e-assessment scenarios. JACK was programmed at the UDE- Institute for Software Technology, while LPLUS is a commercial software, used in the PC-Hall. Furthermore, the UDE is involved in the „E-Assessment NRW“-project, collaborating with the University of Paderborn, the University of Wuppertal, Niederrhein University of Applied Sciences, and Ostwestfalen-Lippe University of Applied Sciences. The project was commissioned by the prorectors and vice-presidents for Teaching and Learning of the Universities of North Rhine-Westphalia. The project is funded by the Ministry of Innovation, Science and Research of the State of North Rhine-Westphalia (MIWF).

3.4.4 Online Lessons, Online Learning Units and Distance Learning

To support students’ learning progress, especially ad-hoc requirements, the digitization of content and the implementation of infrastructure, a wide-range of tools and services has to be provided. The central units have developed concepts for support and implemented a well-equipped infrastructure. Most of the digital tools and services have already been mentioned. Online lessons and online learning units are mostly realized as blended-learning concepts. At UDE, we have also full distance learning degree programs, e.g. Educational Leadership, Educational Media, Electrical Engineering and Information Technology.

4 DEVELOPMENT OF THE 2ND STRATEGY PAPER

As a university with a long tradition and extensive expertise in the implementation of e-learning and, in particular, blended learning formats, UDE is addressing current challenges in teaching, with digital solutions. The university follows on from the first e-learning strategy, which is being further developed into a strategy for digitization in study and teaching.

The UDE recognizes in the trend of digitization an opportunity to further promote the development of university teaching and learning. The digitalization of studies and teaching is a process that goes beyond e-learning. Digital media and technologies are changing the way teaching and learning is done, creating potential for innovation and new opportunities for greater flexibility and networking.

Having in mind that the successful use of technology-enhanced learning not only depends on the didactic design of the teaching events and the learning environment, but also requires a coordinated approach by dedicated teachers, students and the university’s staff who are active in counseling and service, the university calls for strategic goals to unlock the potential that digitalization offers for study and teaching.

The UDE puts the students in the center of this development. Knowing how important the combination of technical, methodological and media skills are for the future graduates, the university promotes the
use of digital tools in a holistic approach, which goes beyond individual teaching events and also includes learning environments and study conditions.

With the e-learning strategy, the university has set a goal in 2014 to anchor e-learning university-wide. Defined as the didactical use of information and communication technologies for teaching and learning purposes, e-learning is pursued with the aim of sustainably improving the quality of courses and making them more flexible.

Through the promotion of pilot projects in all faculties, the continuous exchange and cooperation, the strategy has already shown a wide impact and has encouraged the university to create opportunities for implementing e-learning elements in each course of study.

Within just two years, the UDE has brought together a critical mass of dedicated teachers and employees and generated lots of expertise and preparatory work for advanced teaching activities. In doing so, it is essential for the university to focus not only on the flexibility of study and teaching, but also on a strategic agenda, taking into account the profile and the current challenges of the UDE.

In accordance with its institutional understanding and its regularly updated development plan [2], UDE considers itself as a place of diversity and openness, which has committed itself to the promotion of educational justice and the quality-assured further development of study and teaching:

A. Through the education and training, the university offers opportunities for social advancement, but is increasingly confronted with very different student needs, prerequisites and living conditions. Digitization in studies and teaching can help to shape teaching and learning processes in a diversity of ways and to push the opening of the educational institution further towards new target groups. The need to make study and teaching more flexible due to family or professional obligations of the students plays a role in the development of students’ potential as well as the taking up of differences in pre-university education.

B. As a learning organization, UDE strives to ensure continuous and quality-assured further development of study and teaching. At the level of individual courses, modules and whole curricula, it promotes a data-driven and systematic approach to prevent unnecessary crashes and delays in the course of studies and to identify structural obstacles. Digitization can help expand this data base and create new opportunities for the subsequent development and testing of innovative teaching scenarios. The development of suitable concepts and approaches is always carried out taking into account the specific needs of students, related presence and self-learning phases and taking into account the quality standards of good teaching formulated in the teaching strategy [3].

On the basis of these two general objectives and the experience gained since the adoption of the e-learning strategy, the following sections outline the current challenges, objectives and strategic areas to which the university would like to devote itself in the field of digitization in study and teaching.

The UDE sees digitization as an opportunity to enhance and develop teaching and studying. Digital media changes the way of teaching and studying, while creating new ways to network in flexible ways. Here are the six strategic goals of the second e-learning strategy to unleash the potential of digitization at the university.

4.1 Extension of the Service Portfolio

To meet the steady demand of technical and didactical support, the various activities in the field of e-learning will be coordinated comprehensively. To achieve this, the service portfolio will be overhauled and made available for every member of the university. Coaching, fellowships and certificate programs will ensure further upgrades of the teachers’ qualification.

4.2 E-Assessment

For years, the university has been engaged in the field of e-learning and e-assessments and acknowledged the potential of systems that continuously accompany students in their learning process, provide feedback, and which improve the support procedures. In the framework of various initiatives this will be fortified, specifically to support students flexibly in large lectures with accompanying self-learning phases. While further developing these systems, the focus will be on new types of tasks, as well as the individual competencies of the students. A higher adaptivity will provide the students with the opportunity to complete individual learning paths, which are offered via the analysis of their already acquired abilities.
4.3 Flexibilization of Curricular Modules

Larger curriculums will be realized more flexible by involving digital media formats. To facilitate an easier compatibility of family life, career and studies, a selected number of modules or curricular structures will be overhauled to provide better access. Especially in practical and transitioning phases students should profit even more from e-learning and blended-learning formats.

4.4 Enhancement of Cooperative Formats and Development of Digital Content

To strengthen the identification and motivation, new ways of collaborative digital learning will be created, for example by jointly constructing and editing of teaching and studying material. In addition to that, tutors are systematically intertwined into the learning process.

4.5 Open Educational Resources (OER)

With open educational resources materials created by the teachers will be made available to a broader audience with a low threshold. This way, educational resources can also be used beyond a lecture or a seminar to further aide in a professional orientation and qualification. At the same time, the exchange within professional communities is enhanced, and new target groups will be reached.

4.6 Learning Analytics

Due to digitization, more and more learning processes take place online and could therefore be accessed by using analytical means to better understand these processes. The data obtained by these systems will be used to improve the studying and teaching environment as well as to give feedback. The UDE aims to advance the scientific understanding of learning analytics through sophisticated data analysis. The UDE understands learning analytics and the potential that is connected with it, as a chance to permanently improve the conditions of teaching and learning and to respond sensibly to the individual needs of its students. This should enable students to evaluate their own performance in comparison to reference groups and therefore will be able to react early when improvement is needed.

5 EVALUATION

The University of Duisburg-Essen was recently awarded with the Arbeitgeberpreis für Bildung 2015 (employers’ price for education 2015). The UDE was granted special honour for the strategy to establish an e-learning culture.

Concurrent evaluation gives evidence about how the e-learning strategy contributes to the improvement of quality in teaching and learning as well as to a sustainable integration of e-learning at the UDE. First evidence gained from comparative evaluation in a previous project on the implementation of an inverted classroom model at the Faculty of Economics proves a positive effect of e-learning elements on the learning success by the students [4]. Not only was the pass quote in the exam raised from 48% (2011) up to 79% (2013), also the grades achieved by the students were improved significantly. In addition to that, students reported that they would like to have more online exercises and self-tests as well as digital class notes and learning videos.

E-learning has also a positive effect on the dynamics of classes from the lecturers’ view. Lecturers are given not only an immediate but also more feedback by the students with e-learning tools that indicate the students’ current learning status. This information might be used to optimize teaching continuously.

6 LESSONS LEARNT & CONCLUSIONS

In the overall picture, the experience at the University of Duisburg-Essen shows that the development and broad implementation of an e-learning strategy is a long-term process. This is all the more true as it is not just a top-down initiated and controlled process, but developments are also supported bottom-up by different approaches und by the use of different tools within the specific subject contexts. Yet, this seems to strengthen the commitment and ownership of many university members, and the involvement of different players and adopters appears indispensable.
Furthermore, it takes time to develop from the realization of various innovative projects to wide-spread activities of the digitization of teaching and learning across the organization. The different institutional players of e-learning allow a wide-range of services, infrastructures, tools, trainings and offers for systematic networking to support this process, which also means a significant financial investment in the realization of the strategy process including the systematic search for innovation and trend-scouting, but also support for ad hoc questions every day. Strategic cooperation with other universities might offer prospects for a more resource-efficient use of infrastructure and tools. In this context it seems particularly important to operate based on the principle of “one face to the customer” so that users have a single point of contact for the different issues.

Finally, the development and realization of e-learning from a strategic perspective is a clear leadership task of the university management which significantly influences organizational culture, but also the visible profile of an institution in this respect [5]. The integration of newly appointed professors by goal and performance agreements with the rector concerning e-learning activities is one example in this respect, indicating the importance of digitization in study and teaching at university.

REFERENCES


