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Implementing successful technology-enhanced learning in higher education: two case studies

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Places of higher education are currently enjoying greater autonomy and are clearly emphasising national and international competition in the fields of science and research. In recent years, this process of change has been supported by applying state-of-the-art information and communication technologies. Today, e-learning has emerged as an essential feature of the modern university teaching landscape and is considered to be a profile-relevant performance criterion for universities.

The changes brought about by new technologies in the fields of learning and teaching pose new challenges for today's universities:

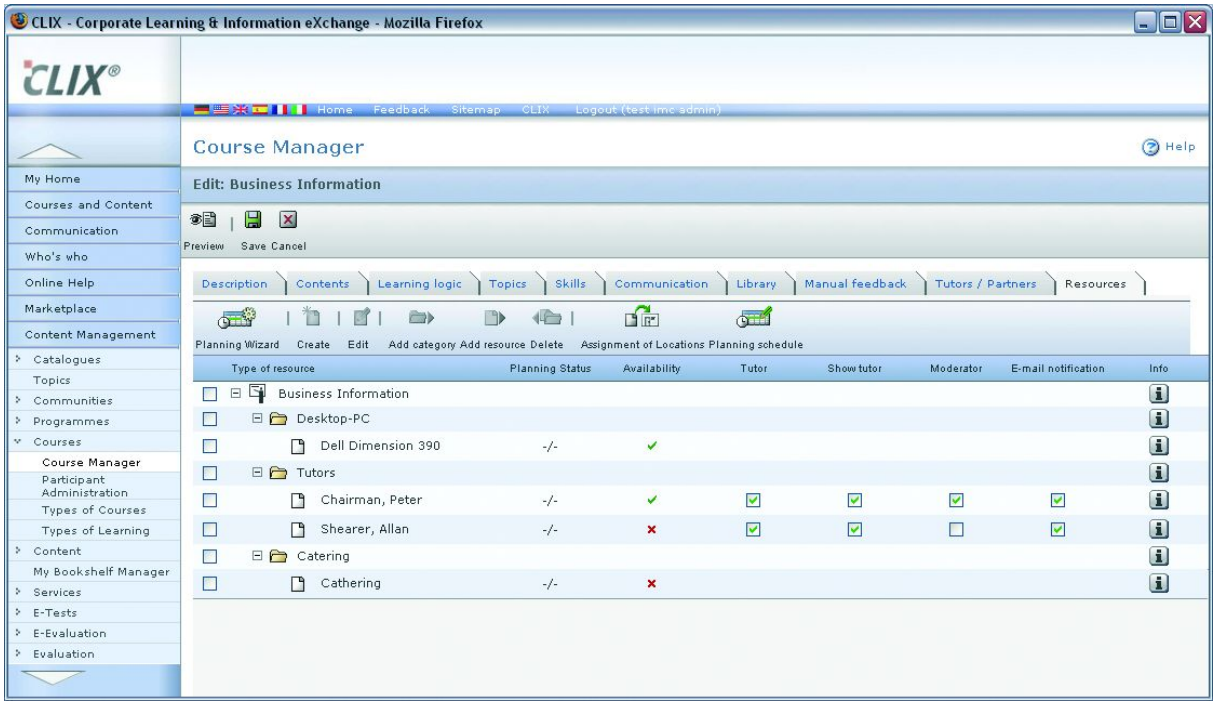
- How do you guarantee the sustainability of innovative e-Learning initiatives at universities?
- Which organisational forms and which technical solutions promise success?
- How can modern technology be used in academic teaching in a cost-effective way?
- How can acceptance be generated for new forms of teaching and learning?

In this paper IMC will provide answers to these and other questions about the use of new media in university teaching. Using the examples of Technical University Munich (TUM) and Stuttgart University this paper aims at showing how to ripe technology-enhanced learning to its full potential.

Introduction of IMC

IMC was founded in 1997 by Prof. August-Wilhelm Scheer and a team of colleagues researching virtual universities at the Institute for Information Systems, one of Germany’s leading research institutes for innovative software technology. Based in Saarbruecken in Germany, and still led by the founding management, IMC has since become firmly established as one of Europe’s leading full service providers of advanced learning solutions. IMC now has further offices in Berlin and Freiburg and also owns subsidiary companies in the UK, Switzerland, Austria and Romania. IMC has more than 120 employees in Europe and is continuing to grow.

IMC’s products and services, which encompass the web based Learning Management System CLIX® and the rapid authoring tool LECTURNITY® are an equal match for the diverse and often individual needs of clients. In addition to these products, IMC offers bespoke e-learning content development and a wide range of consultancy services in the field of learning and training management. Since IMC’s origins lie in business process design, its consultants are experts in all the strategic, conceptual and organisational issues that arise when launching a learning management system in an organisation. In respect of products and services IMC is thus uniquely capable of providing an integrated solution approach for Learning Life-cycle Management for its clients.



Currently, IMC has placed its products and services with over 60 national and multinational corporations and more than 100 colleges and universities. Public sector clients ranging from the Armed Forces, Customs and Federal Border Control, state broadcasting companies and chambers of commerce have added enormous diversity to IMC’s expanding client base. In 2005, IMC was awarded a major project as primary consultancy contractor for a European Commission development aid program in the South Caucasus. IMC has a global partner network including IDS Scheer, Microsoft, Guinti and Adobe.

Products and Services

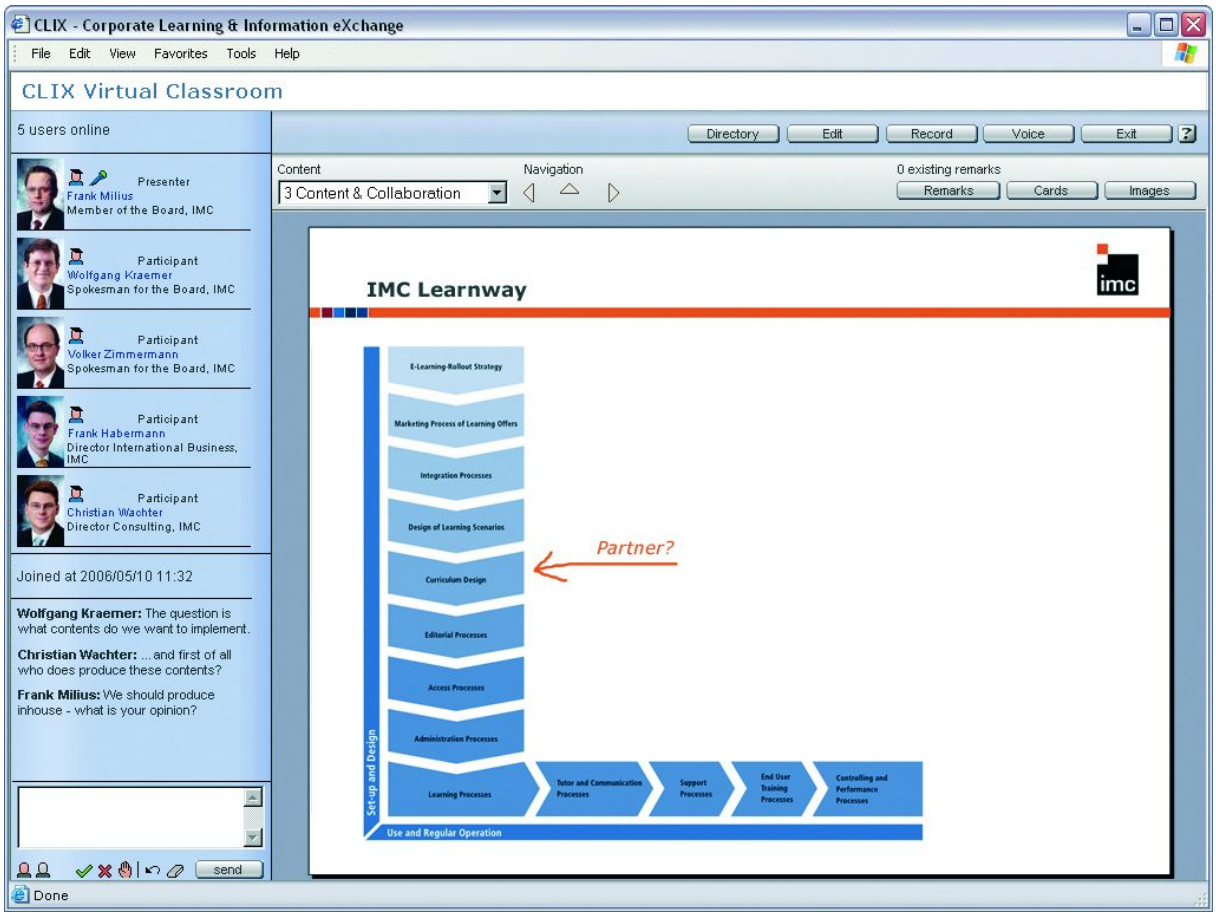
Learning Management System CLIX® Campus

„By putting in place an integrated learning infrastructure with CLIX®, the TUM is making a meaningful contribution to ensuring the sustainability of currently ongoing eLearning projects. In addition, our expandable development environment creates the right platform for future initiatives in this strategically important area“

Professor Dr. Arndt Bode, CIO at the Technical University Munich

CLIX® Campus has been designed to take full account of the special needs of virtual teaching at universities. This state-of-the-art software solution enables decentralised implementation of multimedia-enhanced teaching and learning offers within the framework of centrally coordinated organisational models and university-wide administration structures.

CLIX® Campus supports cooperation across different universities, thus enabling these places of higher education to pool their teaching offerings. A web-based platform, CLIX® Campus supports all processes in the conceptual design and execution of teaching events, including planning of rooms and other resources involved. CLIX® Campus provides options for publishing teaching events in a lecture catalogue, registration for seminars, plus online provision and marking of practice materials. Learners can be mentored individually by tutors. Learning groups support cooperative and collaborative learning scenarios. Moreover, CLIX® Campus provides comprehensive functionality for conducting examinations and tests, including credit point administration, both in academic further education and vocational settings.



CLIX® Campus is a scalable, multilingual software product which is QTI compliant and certified by SAP Netweaver as well as by international learning technology standards such as SCORM and AICC. CLIX® comes equipped with standard interfaces to HR, ERP and student information systems, which enable clients to easily integrate the Learning Management System into their existing IT infrastructure. Its high adaptability allows CLIX® to meet the diverse requirements of companies, universities, schools and training providers.

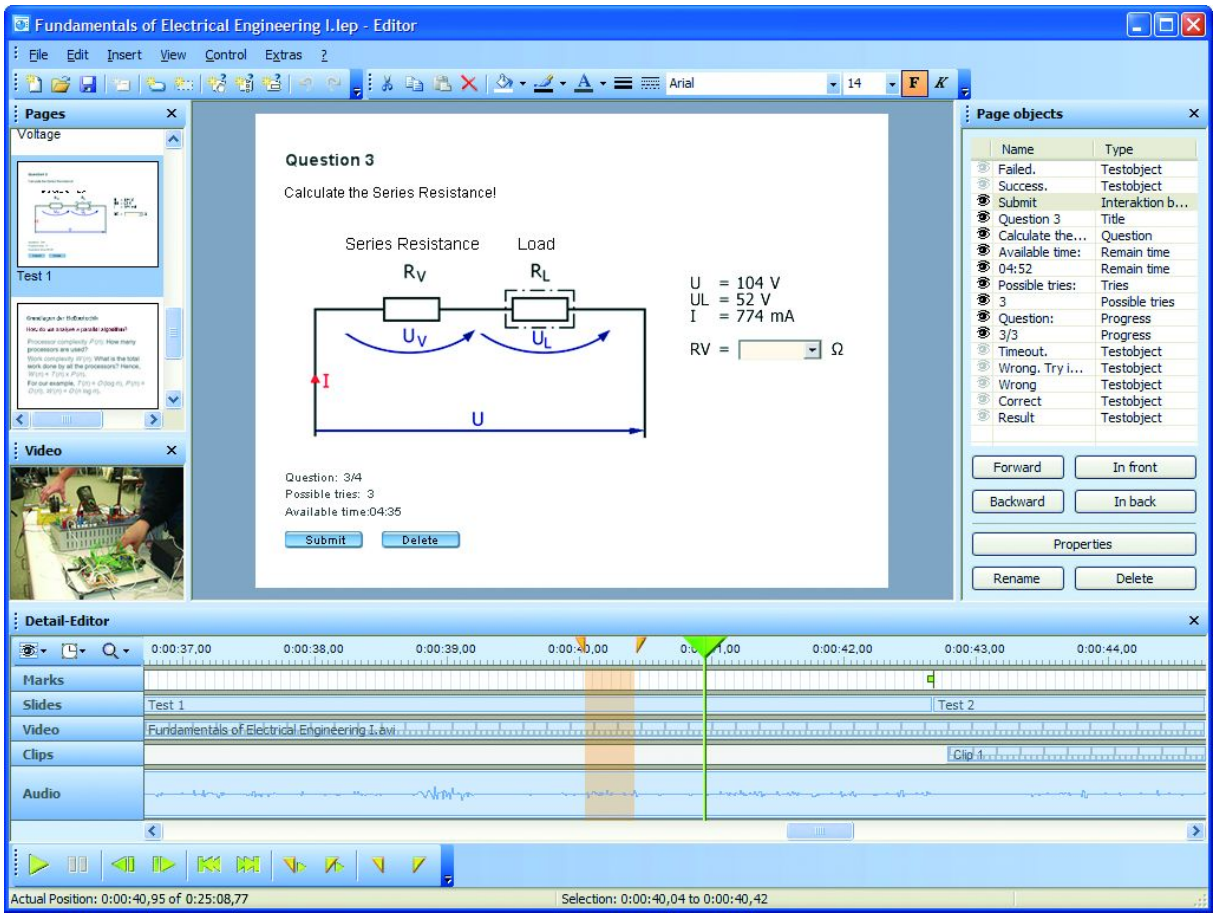
Rapid Authoring Tool LECTURNITY

"All software is more or less replaceable. With LECTURNITY®, I replaced eleven people and complex studio technology that seemed indispensable for my first online lecture."

Prof Hans-Joachim Laabs, University of Potsdam

A rapid increase in the use of Internet materials – especially those provided as assistance to lectures – can be expected in the next few years. According to estimates given by interviewees, 46 per cent of all students use this learning method today and by 2011 it will be 73 per cent. Over the next five years other learning methods will also register sharp increases. The quantitatively widest leap in provision is forecast primarily for those types of learning that support lectures.

Lecture recordings – so-called e-lectures – are already a frequently practised solution to the problem of flexibility in teaching and to the increase in the quality of service in both study and theory. They will also gain importance over the coming years – provided that recordings can be made simply and without significant effort, have a diverse range of uses and that the results are of a high quality both technically and in content.



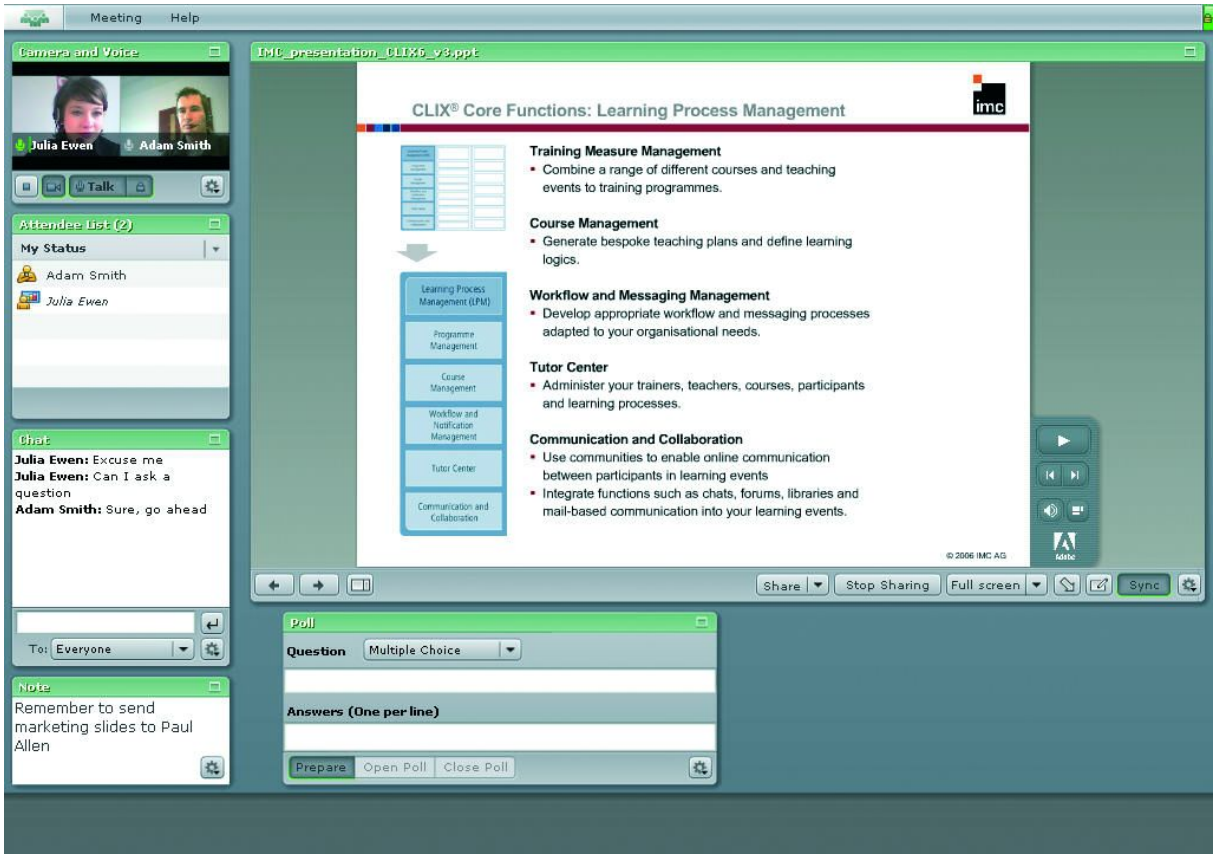
LECTURNITY®, the innovative Rapid Authoring Tool, enables users to create effective multimedia content on the basis of PowerPoint slides. Different media such as text, sound, graphics, video, screengrabs and annotations can be recorded, combined and edited simply, effectively and synchronously. With LECTURNITY®, users can quickly create multimedia content themselves, without help from external experts. The object of LECTURNITY® is to capture the situation in which a presentation takes place as faithfully and comprehensively as possible, namely during the actual presentation.

Creating a continuous and integrated e-learning infrastructure: Technical University Munich (TUM)

The Technical University Munich (TUM) aims at building up an integrated learning infrastructure and thus serves as an example for German university management. The starting point for the development of this unified infrastructure is the building up of a learning platform which delivers performance and adaptability.

The TU Munich has opted for CLIX Campus, the Learning Management System from IMC, currently the most-widely used learning platform among German universities. As cornerstone of the learning infrastructure, CLIX will be supporting the main task areas involved in achieving TUM's academic goals. These include research, the academic field and also higher scientific learning. In addition, the future will see application of CLIX in supporting the university's administration department and in aiding the realization of a newly developed, innovative further learning and human resources development concept. Alongside offerings for classroom training (for degree courses and higher learning), the learning infrastructure will also support the exclusively eLearning offerings for all target groups: for undergraduates and teaching staff, for participants in programs of higher learning and also for the administration staff at the TUM in terms of their internal personal development.

The learning infrastructure at TUM is open for shared projects with external partners: e-learning and service offerings from associated and project partners of TUM are an essential part of the solution. These TUM partners include vhb (Virtual University of Bavaria), GIST (German Institute of Science and Technology in Singapore, founded in 2002), as well as other partner universities both in Germany and abroad which can be connected into the infrastructure. The international cooperative relationships enjoyed by TUM were a further important reason for the decision for CLIX Campus: the ease with which interfaces to external partners (either to other platforms or an own cooperation portal) can be installed as a part of the total solution. The CLIX system architecture is open, interoperable and client-compatible.



CLIX is thus going to become the central e-learning portal for students and teaching staff at the TUM. The platform also provides the infrastructure needed in order to provide a wide range of multimedia

teaching and training programs, expanding these through key service offerings, e.g. communication and collaboration services. This platform provides the central environment for the modeling, administration, execution and validation of network-supported teaching/learning processes, providing the functionality required to support all didactic, communication and organizational scenarios. At the same time, the platform makes available its own resources, which are required both for tutoring and autonomous scientific work. Central resources already available (e.g. the university library) are also interfaced to the platform. However, the essential factor for the successful and long-term establishment of CLIX is its integration into the full IT infrastructure at the TUM.

This requires the realization of interfaces to the user, course and exam administrative bodies and also to the existing SAP-HR system. „With TUM, the launch scenario has more closely resembled scenarios which we are familiar with from corporate launches of CLIX rather than the launch scenarios of projects in other places of higher learning. The requirements which the TU is wishes the system to meet are highly sophisticated and many-sided. So it's all the more satisfying for us that in this application of CLIX Campus we have been fully able to model all the required scenarios", is the comment of Frank Milius, responsible board member for places of higher learning projects at IMC.

Dr Wolfgang Kraemer, spokesperson for the board IMC adds: „We feel that this project has also demonstrated that the need for professional system suppliers in places of higher learning is greater than the heads of universities may currently think. The TU Munich was probably one of the first places of higher learning to create the post of Chief Information Officer (CIO), thus taking on board the corporate model. This is indicative of the highly professional approach of the IT and eLearning team at the TU Munich, while also showing that CLIX and IMC are first choice when it comes to professional and sustainable solutions." The importance of enjoying the support of a professional cooperation partner is confirmed by Professor Bode, CIO at the TUM thus: „Financially, we are in no position to throw resources at developing our own systems and proprietary approaches. Ambitious as the resulting solutions might be, at the end of the day they lead to isolated solutions which are bound to fail. Against this, research and university management demand high-level networking with a whole range of different partners, perhaps from the educational sphere, perhaps from the corporate world, who are both national and international. By working together with IMC, our connection to thirty other places of higher learning in HEEN (Higher Education eLearning Network) the door to being able to realize our own ideas and solutions remains permanently open."

Production of digital content with rapid authoring: Stuttgart University

Stuttgart University, which celebrated its 175th anniversary in 2004, was founded in 1829. From the start, cooperation between the technical fields with sciences and humanities has been one of its special virtues. With this concern it has become a modern, performance-oriented university with a comprehensive field canon and emphasis on technical and scientific disciplines. The programme "self-

study online" is part of a broad e-learning strategy which Stuttgart University has developed with the aim of a broad implementation in university teaching and continuing in scientific education.

Challenge

Initially in the programme "100-online", multimedia-based materials for the use in classroom teaching were produced. On this basis, teaching modules are generated from these existing materials in the following programme "self-study online" which facilitates self-studying for students at Stuttgart University in order to deepen the learning content. The third step aims at marketing online self-study units. For "self-study online" the existing infrastructure at the university is used on one side; on the other, the organisational und technical infrastructure set up within the programme is transferred into the general infrastructure. The programme thus offers the opportunity to build up programme-internal performances which, if successful, can be made available to the entire university. This way, an environment for innovation develops. Innovation can be transferred in the university structures in real-time and thus be made sustainable. The lecture recordings at Stuttgart University are a prototype for such a development

Solution

In the summer semester of 2004 lecture recordings with LECTURNITY® were supported within the "selfstudy online" programme. The premise of the programme . facilitate a broad use . made up the outlines also for the lecture recordings. The professors had to be enabled to execute recordings of their lectures themselves, without a sound studio, without a production team and without the time and effort for post-processing. As not all auditoria and seminar rooms have Internet access and many lecturers use MS PowerPoint® slides, the central computer centre provided the single place-based authoring software LECTURNITY® for which the university bought a campus licence. A recording portal for lecture recording offers the lecturers the possibility of loading their recordings onto the server of the computer centre via a web interface. This way of publishing is quick, simple and does not require any programming knowledge. By means of the recording portal the lecturers may administer their recordings, put them on- or offline, secure them with passwords and copy out links that refer to the recordings. In the end, the recording portal allows for central access to all lecture recordings at Stuttgart University, structured according to study courses, just as lectures appear in the university calendar.

University benefits

In total, 70% of the students confirmed they had used the lecture recordings, 97% of them at their own desk at home and mostly directly via the university websites. On average, the lecture recordings were used between six and ten hours, 20% of the students using a recording instead of the live presentation especially in large events with more than 800 participants. In the case of smaller events (fewer than 100 students), this value is lower (15%), but here it has to be considered that the number of students who weren’t able to hear the live presentation for reasons of time and who would have missed the lecture completely without the recording, does play a role. And finally, half of the students (57%) confirmed a gain in motivation from the use of recordings.

All in all, the lecture recordings found a very positive echo among the students and were used intensely. The approval rate of 84% who want to have lecture recordings provided in the future, speaks for itself. Taking this demand and the rate of use as indicators for the acceptance of the offer, two factors become evident which are decisive for this acceptance: the students. appreciation of the benefit and the easy handling of the technology. On the basis of this positive experience, the Stuttgart University will strongly encourage the use of lecture recording with LECTURNITY® for teaching support.