A Cost-effective Approach to Produce eLectures: Experiences from a Pilot Trial

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Abstract— **In autumn 2011 we developed a concept for a new service to be offered for our teachers in connection with virtual lessons: eLectures. eLectures in general are defined as recorded lectures, where as we offer two kind of services: InfoSnippets and InfoCasts. InfoSnippets represent short videos visualizing practical skills to be learned by medical students such as measuring the blood pressure or how to make a surgical fissure. InfoCasts are recordings of entire lectures. Here we offer voice recording in combination with the synchronized slides. Video is offered only in form of short sections where e.g. practical skills or experiments are shown. The concept for eLectures was finalized 2011. With begin of summer semester 2012 we started with four pilot projects of lessons which were fully virtualized. In this paper we will present the concept for our eLectures, the selection process of the production software, the realization of the four pilot projects and the evaluation results of the students.**

eLearning, streaming lessons, virtual classroom, new learning applications, multimedia applications

I. INTRODUCTION AND BACKGROUND

The Medical University of Graz runs for more than 10 years its eLearning platform VMC (Virtual Medical Campus) [1]. In 2010 the third software platform – the open source system Moodle [2] – was installed and serves more than 4300 students a year. From the very start of the eLearning platform we used a blended learning concept with a mixture of presence and pure virtual lessons, in 2005 even a full semester was virtual [3]. With begin of SS2012 9.8% of the curriculum human medicine is offered virtually, which corresponds to approximately 29.4 semester hours. The execution of virtual lessons is fully automated by means of a special add on module (called MOMOS) developed for VMC/Moodle. MOMOS automatically generates tasks of virtual lessons for registered students and transmits at the end of the course a mark to our central administration system [4], [5], [6].

In autumn 2011 we developed a concept for a new service to be offered for our teachers in connection with virtual lessons: eLectures. eLectures in general are defined as recorded lectures. We offer two kind of services: InfoSnippets and InfoCasts. InfoSnippets represent short videos visualizing practical skills to be learned by medical students such as measuring the blood pressure or how to make a surgical suture. InfoCasts are recordings of entire lectures. Here we offer voice recording in combination with the synchronized slides. Video is offered only in form of short sections where e.g. practical skills or experiments are shown. Since it does not add any additional value (and to save storage space) the video of the teacher speaking the lesson is not offered.

The concept for eLectures was finalized 2011. With begin of summer semester 2012 we started with four pilot projects of lessons which were fully virtualized. Next to the concept of eLectures we used for three of the projects also our virtual microscope. A virtual microscope offers the same functionality than a physical one, however, needs digitized objects for display. It enables the access of hundreds of students in parallel 24/7 and dramatically reduces costs in comparison to buying physical devices. A new software for the virtual microscope was introduced in 2011 [7], [8].

In this paper we will present the concept for our eLectures, the selection process of the production software, the realization of the four pilot projects and the evaluation results of the students. In order to avoid misunderstandings regarding terminology to be used within this paper we clearly distinguish between the following terms:

- eLectures: recorded lectures which are permanently stored and can be watched by students at any time via access to our eLearning platform. Content cannot be downloaded for off line viewing.
- podcasts and vodcasts: like eLectures, however, content can be additionally downloaded to PC and/or mobile devices, hence the student does not need a permanent Internet connection for watching the lesson.
- streaming content: live broadcasts of lectures which can be watched synchronously to the presentation of the teacher by students via a standard web browser with an appropriate streaming plugin. The content is not permanently stored for later usage.

II. STATE OF THE ART

On a national level (Austria) at least twelve universities are actively involved in the realization of eLectures and streaming content [9] as stated in a publication of the working group

"streaming technology and learning innovation" from the forum for new media Austria (FNMA) [10] including the Medical University of Graz. The development stages range from pioneer phase, expansion stage to operational phase. The only university in Austria having a fully automated recording workflow is the University of Vienna. Their solution involves fixed mounted cameras within the lesson rooms, in combination with a self developed software solution. The software allows teachers easily to start the recording service right before the start of the lesson. Teachers have the choice between streaming content (live broadcast), eLectures (recording of the lesson) or both. When the recording of the lesson is finished a link to the media file is distributed to the teacher, which can be directly incorporated in the eLearning platform so that students have from now on permanently access to the eLecture.

On an international level a vast number of universities and education institutions provide eLectures. Many well known universities such as MIT [11], The Open University [12] and the Yale University [13] provide their eLectures also free for the general public - which is better known under the term "open educational resources (OER)" - under creative common licenses.

In the full paper we will also provide an overview of typical hurdles and motivation factors for eLectures at universities.

III. SELECTION OF THE PRODUCTION SOFTWARE ENVIRONMENT

As stated in chapter I we distinguish between eLectures, pod- and vodcasts and streaming content. For the latter the technical requirements – especially in connection with available bandwidth – are very high, however, the Medical University of Graz currently has no need to provide streaming content (live broadcasts) due to its limited number of students per year. Streaming content is mostly needed at universities who have huge and unpredictable amounts of students a year hence problems with available lesson room capacities.

So we decided for a first pilot trial to go for eLectures to be produced by a mobile recording solution in combination with an appropriate software production environment. For the pilot trial we went for a format which combines audio recording of the lecture with synchronized slides. The abandonment of a video of the teacher speaking the lesson within the eLecture format can be argued that such a video will not contribute to increase the learning curve of the students but will result in the need of much more disk space. For visualization of the teacher a photo is sufficient, which safes a lot of storage space. In case medical skills or experiments are shown by the teacher we insert short video sequences into the eLecture. In Figure 1 an example of an eLecture is given.

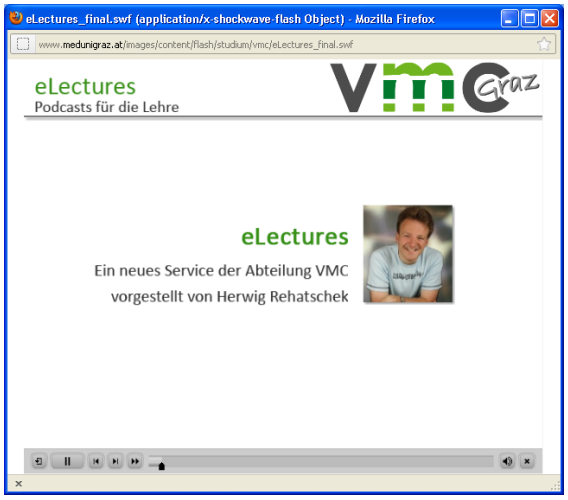

Figure 1: **example of an eLecture**

After the definition of the format we defined criteria for the eLecture production software environment in order to perform an appropriate market overview. All in all we defined 14 criteria including licensing costs. Within the market overview we identified the following software environments suitable for us: Lecturnity, Lecturio, Presentations2Go, Camtasia Studio 7 and Adobe Captivate. Adobe Captivate was the winner meaning it fit best our requirements and was also within our budget limits.

In the full paper we will present the detailed results of the market overview with all criteria and the evaluation results of the different products.

IV. REALIZATION AND EXPERIENCES

Within the summer semester 2012 we realized four eLecture pilot trials on the following medical subjects: histology-pathology exercises (2 eLectures), pathology of endometrial cancer and oral surgery. All these projects are a combination of eLectures, learning documents, videos and interactive elements such as virtual microscopes. In Figure 2 the realization of one of the two histology-pathology exercises is visualized. On the left side a virtual microscope with two training markers is given, indicating areas of special interest for the students. These areas are explained in more detail within the eLectures coming along with this virtual lesson. One page of such an eLecture is given on the right side of Figure 2. Students can control the player and listen to the audio explanations given by the teacher combined with slides synchronously displayed.

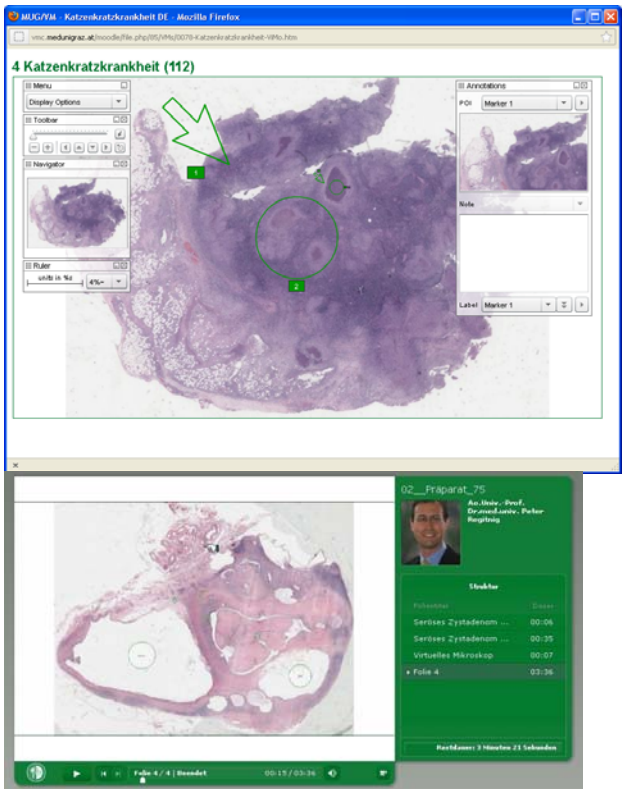

Figure 2: **example of one of the four eLecture pilot trials – a virtual microscope combined with an eLecture within the histology-pathology exercise**

Within the full paper we will discuss the technical realization of the four pilot trials in more detail. Furthermore we will present experiences and evaluation results from the currently ongoing survey amongst the students performing these eLectures.

REFERENCES

[1] Smolle J, Staber R, Jamer E, Reibnegger G.: „Aufbau eines universitätsweiten Lern- Informationssystems parallel zur Entwicklung innovativer Curricula - zeitliche Entwicklung und Synergieeffekte“. In: Tavangarian D, Nölting K, editors. Auf zu neuen Ufern - E-Learning heute und morgen. Münster New York München Berlin: Waxmann, 2005: 217-226. Ref ID: 9019

[2] Moodle - Modular Object Oriented Dynamic Learning Environment, open source LMS, <URL: http://www.moodle.org>

[3] Smolle J, Staber R, Hye F, Jamer E, Macher S, Neges H et al.: “E-Learning in the First SEMESTER of an Undergraduate Medical Curriculum.”, 2006. EDEN conference proceedings. Ref Type: Electronic Citation Ref ID: 9210, <URL: http://www.eden-online.org/contents/conferences/submit/upload/Smolle.doc>

[4] H. Rehatschek, G. Hölzl, M. Fladischer: "The set-up and implementation of fully virtualized lessons with an automated workflow utilizing VMC/Moodle at the Medical University of Graz". In proceedings of the 14th conference on interactive collaborative learning (ICL), pp. 5 – 9, ISBN 978-1-4577-1746-8, 21 – 23 September 2011, Piešťany, Slovakia.

[5] H. Rehatschek, G. Hölzl, A. Hruska: "The seamless integration of virtualized lessons with a fully automated workflow into the LMS VMC/Moodle of the Medical University of Graz". Online Proceedings of the MoodleMoot 2011 conference, 24 - 25 February 2011, Vienna, Austria.

[6] H. Rehatschek, R. Staber, H. Neges, G. Reibnegger, J. Smolle: "The blended learning concept of the Medical University of Graz and its technical realization". In proceedings of the 13th Interactive Computer Aided Learning conference, pp. 54 - 59, ISBN 978-3-89958-541-4, 15 - 17 September, 2010, Hasselt, Belgium

[7] Herwig Rehatschek, Florian Hye: "The introduction of a new virtual microscope into the eLearning platform of the Medical University of Graz". International Journal of Online Engineering (iJoe), ISSN 1868-1646, Volume 7, Issue 4, November 2011, pp. 36 - 41

[8] H. Rehatschek, F. Hye: "A new virtual microscope at the Medical University of Graz ". In the proceedings of the 17th international conference on technology supported learning & training (online educa), pp. 193 - 197, ISBN 978-3-941055-13-1, 29 November - 2 December 2011, Berlin, Germany.

[9] A. Lorenz: “Universities on Air”. In the proceedings of the 14th international conference on interactive collaborative learning (ICL 2011), pp. 656 – 664, ISBN 978-1-4577-1746-8, 21 – 23 September 2011, Piestany, Slovakia.

[10] Forum for new Media Austria (FNMA), homepage. <March 2012 / URL: http://www.fnma.at>

[11] MITopenCourseware, Massachusetts Institute of Technologyn (MIT), homepage. <March 2012 / URL: http://ocw.mit.edu/courses/audio-video-courses/>

[12] Learning Space, The Open University, homepage. <March 2012 / URL: http://openlearn.open.ac.uk/>

[13] Open Yale Courses, Yale University, homepage. <March 2012 / URL: http://oyc.yale.edu/>