COMBINING SYNCHRONOUS AND ASYNCHRONOUS ELEARNING TOOLS IN DISTANCE EDUCATION – EXPERIENCES FROM A COURSE FOR DEVELOPING COUNTRIES

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ABSTRACT:

Distance learning requires a specific effort of addressing the students: Students motivation has to be kept up high throughout the course via interesting and diversified teaching material and methods. Experiences from distance courses held in asynchronous teaching mode showed that this is difficult over a longer period. Adding live online interaction using a virtual classroom system for synchronous teaching generated positive effects in terms of student's motivation and engagement. An already established eight weeks distance course using Blackboard learning system has been brushed up with live online interaction using Elluminate *Live!*, a real-time virtual classroom that allows live interactions. Scheduled at strategic moments throughout the course, these live sessions help to cover important topics in detail and to keep the motivation of the students high throughout the course. The share of drop outs during the course was considerably decreased compared to previous courses. Technical problems related to synchronous approach with developing countries in terms of limited internet access or low bandwidth could be alleviated by modifying the pedagogical approach implemented.

1. INTRODUCTION

Distance learning always requires a specific form and effort of addressing the students. In absence of a teacher motivating through face to face contact motivation of the students has to be kept up high throughout the course for instance through self-activating teaching and diversified learning material and methods. A major key to motivated distance learning lies in enabling continuous interactions between students and lecturers/instructors as well as among students. Various "studies indicate that interactions between students and instructors as well as student-to-student interactions enhance education at a distance by improving attitudes, encouraging earlier completion of coursework, improving performance on tests, allowing deep and meaningful learning opportunities, increasing retention rates, and building learning communities" (Schullo et al. 2007).

The aim of the paper is to report about an eight weeks distance course for students in developing countries based on asynchronous teaching using the Blackboard learning environment. This asynchronous distance course has been brushed up with live online sessions in synchronous teaching mode using the virtual classroom system Elluminate *Live!*. After some introductory reflections on benefits and downsides of synchronous and asynchronous distance teaching the structure and concept of the relevant ITC distance course "Spatial Decision Support Systems" is explained. In the following section the Elluminate *Live!* virtual classroom system is introduced briefly in its main functionalities. The live sessions, added to the existing course, are described and evaluated based on both students performance and their feedback. Finally some conclusions are drawn regarding the combination of synchronous and asynchronous eLearning methods and tools for a successful distance education and regarding the suitability of the Elluminate Live! to be used in such a "blended" distance learning setting.

2. SYNCHRONOUS AND ASYNCHRONOUS DISTANCE LEARNING

Since the advent of the World Wide Web distance learning in higher education has become more and more popular. In 2005 "about 88 percent of 2-year and 86 percent of 4-year public postsecondary institutions offered distance education courses" (Schullo et al. 2007). According to Rovai et al. (2008) "distance education delivered mostly asynchronously via the internet using internet based learning management systems is the most popular distance learning mode used in higher education today."

The advantages of asynchronous learning in distance education are obvious. Students are increasingly autonomous in terms of time management, i.e. they are more or less free to choose when to do the lessons and exercises each day and whether to start with the course early in the beginning or at a later stage. This is especially an important argument when students live in different time zones, e.g. in developing countries. Furthermore this flexibility also allows reconciling professional, educational, and other duties e.g. taking care for a family while working and still doing vocational training.

Asynchronous distance education also allows students to study at their own pace; those who are faster in learning can go quickly through the material while others who like to repeat certain issues or generally prefer to proceed at a slower pace through a lecture are also served. Asynchronous teaching mode also works as a leveller in terms of participation, i.e. everyone is able to contribute to the course, where in real class room

situation those who tend to talk much could be sometimes dominating the course. Again this is especially relevant when working in a multicultural environment with students from developing countries as their language capabilities are often unequally developed resp. differences in cultural behaviour influence a determine a more or less active participation. Finally asynchronous distance courses are technically not so demanding, e.g. in terms of quality of the internet access and bandwidth, and a large number of students can be served in one course, even though input in time and resources on the instructors side, e.g. for commenting on individual exercises, can increase quite immensely.

The major downside of giving distance courses in a purely asynchronous mode is that it is quite difficult to maintain motivation of the students throughout the course, especially in longer course for about a few weeks. While the motivation to follow the distance course is usually high in the beginning some decrease can be observed over the weeks and in the end usually not all who have started finish the course. This usually goes along with problems of keeping the specified time schedule of the course. To provide an utmost flexibility for the students, hardly any deadlines are given except for allocated exams, which in combination with a decreasing motivation could lead to time problems in the end, sometimes even up to request to extend the duration of the course. Another disadvantage of asynchronous courses, regularly mentioned in course evaluations is that students sometimes miss a straight feedback by the lecturers on exercises or problems. Last but not least, as mentioned above already, teaching asynchronous distance courses, even when they are fully developed, are everything else but timesaving for the instructor.

Synchronous distance learning on the other hand, where students and instructors/lecturers meet virtually in the web, has become very popular in the last years enabled mainly by the almost ubiquitous accessibility to broadband internet connection nowadays. It allows lively interactions, which can create a social atmosphere among students and instructors. The participants can have informal text chatting, as well as audio and video conversations. This type of informal interactions, builds a virtual community, which increases students' motivation in a distance learning process. Furthermore learning can be much more instructed be lecturers when teaching in synchronous mode and students can get immediate feedback. Another benefit of synchronous learning is that external experts can be invited, even on a quite ad hoc basis, to join single sessions on specific topics.

Negative aspects to be named for synchronous learning lie mainly in logistics and time constraints: Participants all have to be online at the same time, and sessions hardly can last longer than 60 to 90 minutes (Clark 2005). Being online at the same time can be especially difficult when learning in multicultural context with students living and studying in different time zones. Furthermore technical aspects in terms of internet access and speed could be a bottleneck for students in developing countries, as synchronous eLearning tools (video, voice stream, etc.) usually require excellent internet quality which is not yet given everywhere.

An self-evident solution lies in taking the best of both worlds, i.e. combining synchronous and asynchronous learning tools in distance education courses (Rovai et al. 2008). Lister et al. (1999) sketch the Rensselaer 80/20 Model as a kind of conceptual framework for this. "About 80 % of a student's time

would be spent on self-paced engagement of online materials and about 20% in interactive, synchronous learning sessions with the instructor and other students (Lister et al. 1999). Schulmeister (2006) describes the alteration between synchronous events, where students for instance discuss and develop ideas together, and subsequent asynchronous phases, in which the students further develop and elaborate the ideas, as a very prolific learning environment. In the following section a tool for synchronous distance teaching is briefly described in its main functionalities.

3. ELLUMINATE *LIVE!* VIRTUAL CLASSROOM

Elluminate *Live!* (http://www.elluminate.com/) is a virtual classroom system for synchronous distance learning that allows live interactions between students and lecturers resp. instructors. Main components of Elluminate *Live!* that facilitate interactions are a whiteboard tool, a chat tool, and a audio tool (see figure 1). Next to this the participants window (figure 1, 2) enables students to engage in the session and to give feedback. It also allows instructors to monitor student's activities and the quality of their internet access. An optional video tool supporting multiple video feeds for up to six participants can be activated if required.

Figure 1. Elluminate Live! interface

More key features of Elluminate Live! are application sharing, handing over of desktop control, interactive whiteboard, PowerPoint import, polling, indexed recording and playback, and working in break out rooms (see Elluminate Inc. 2007). Two roles are assigned during an Elluminate session: The moderator who directs the session is in full control of all functions of Elluminate. Participants follow the session and can interact with other participants in various ways described below. The moderator can grant moderator privileges to other participants. They gain then same control over all available functionalities as the instructor (Pei 2009).

An advantage of the tool for teaching in developing countries is that Elluminate requires a relatively low bandwidth. If the internet speed is low at a certain moment the system buffers the audio and plays it later again at a slightly higher speed (Elluminate Inc. 2007). To join an Elluminate session a Java application (Java web Start) needs to be downloaded. The whole process to initiate or to join an Elluminate session takes about 15 minutes without any prior registration. Furthermore the systems allows to record full sessions which can be downloaded form the Elluminate server and watched if required.

The most important benefit of synchronous learning is the opportunity to enable a high level of interaction between students and instructors as well as among students and to keep students engaged in the teaching process. Elluminate *Live!* provides various functions to support this, which are controlled and visible via the participants window (see figure 2): During the session students can virtually raise hands for questions which is heard and seen by the instructor who can stop teaching and let the students ask a question. In order to quickly respond during the session, e.g. to clarify whether a certain topic is clearly understood, four different emoticons can be selected by the students for giving feedback. The students can express agreement or disagreement (applause or thumbs down icon) and can choose between a smiley (☺) and a frowney (☹), depending whether they are fine with something or not (e.g. have finished a task or not yet.) Finally polls can be organized by the instructor for fast feedback, e.g. assess the quality of this lecture on a five scale rank.
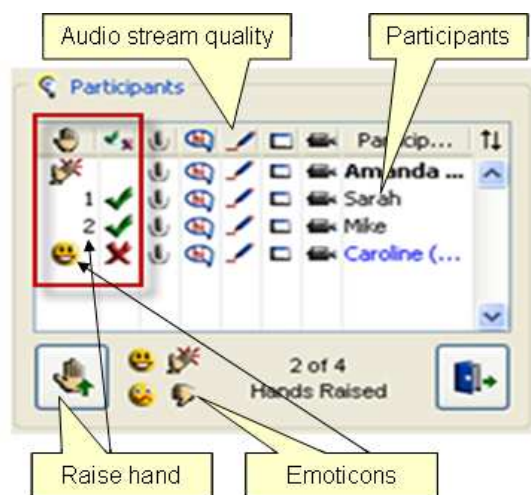

Figure 2. Elluminate *Live!* Participants window

The Elluminate *Live!* virtual classroom has become popular since a few years and is used by several different US-American universities. In 2008 also the Open University UK (OU, http://www.open.ac.uk/) one of the pioneers in Europe in large scale distance learning, has chosen Elluminate Live! as their enterprise synchronous collaboration (Schlusman et al. 2008). Schullo et al (2007) analyzed that Elluminate *Live!* meets quite well the pedagogic needs of instructors and trainers involved in distance education.

4. DISTANCE EDUCATION AT ITC

The International Institute for Geo-Information Science and Earth Observation (ITC) is developing and implementing distance courses in the field of geo-information science and earth observation since 2005. Nowadays ten different courses are offered, covering topics like Principles of Geographical Information Systems, Geostatistics and Open-Source Statistical Computing, Sustainable Agriculture or Environmental Impact Assessment and Strategic Environmental Assessment (http://www.itc.nl/education/programmes/default.aspx). All courses last for six to eight weeks and have a workload of approx. 20 hours per week. Each course is held once a year usually for a group of 10 to 25 students from various developing countries.

The general approach in all ITC distance courses is task-based learning that blends theory and practice. The courses combine self study with online support by ITC staff. All distance courses are conducted as asynchronous distance courses using Blackboard Learning System, through which material (video- and e-lectures, exercises) is provided for students. The communication between students and lecturers as well as among students usually is organized predominantly via Blackboard discussion forums and sometimes email. Synchronous forms of communication and interaction between students and instructors are included relatively limited so far using Instant Messaging (chat) and VoIP communication such as Skype, etc.

4.1 The distance course Spatial Decision Support Systems

The ITC distance course Spatial Decision Support Systems (DE SDSS) introduces participants to techniques for selecting and processing data to improve decision making in various sectors of spatial planning. The necessary tools, techniques, models and decision-making procedures can be integrated in a user-friendly information processing system called a spatial decision support system (SDSS). Participants in the course learn how to structure and implement decision making processes as well as how to facilitate these using SDSS.

The eight weeks course is structured into six lessons of different length (figure 3). While the first three lessons cover mainly theoretical frameworks and concepts of spatial decision making, the lessons 4 to 6 focus on practical applications of SDSS in form of hands on exercises and case studies. Each lesson consists of various e-lectures in form of recorded PowerPoint slide shows annotated with streaming audio, selected papers as pdf-documents, and exercises the students have to work on.

The course is conducted since three years now. Each year the course was taken by 10 to 15 students, who were located in various African countries (Tanzania, Namibia, Egypt, Ghana) in Latin America (Brazil, Guatemala, Colombia) and in Asia (India, Nepal), as well as occasionally in some European countries (Greece, Sweden). The students receive a CD-Rom with all the course material, which they could access through Blackboard, prior to the course start. Communication and interaction is organized through discussion forums in Blackboard. Students have to upload their contributions (exercises) here and receive comments from the lecturers involved. Students as well are requested to comment on contributions of their fellow students. But this only happens occasionally, primarily because they hardly worked parallel on the same exercises.

The evaluation of the distance course by the students was predominantly positive in each year. Students appreciated the content of the course as well as the way the course was delivered. Further positive aspects mentioned were that the students were in control of the learning process and students had intensive discussions with the lecturers (Boerboom and Groenendijk 2007). Negative aspects mentioned in the regular evaluation were mainly technical (Blackboard, internet access) as well as resource problems (not enough time to finish the exercises) but also issues like a lack of communication or scarce feedback from fellow students.

Further problems in the course evolved out of the fact that the students worked at their own pace. This led to a situation where some students were still stuck in lesson 2 while others already worked on lesson 5. This can partly explain the limited

interaction between students, because students who are already busy with another lesson usually don't reply to upload of slower students. On the other hand the front-runners didn't receive comments on their contributions either, because the other students neither had the proper understanding already nor the time to respond in a qualified manner. Finally some students didn't allocate sufficient time to work on the material properly, but only increased their input shortly before the exams, which led to a low quality of their contributions.

In the long run the distance course revealed some of the typical problems that go along with asynchronous distance teaching over a longer period (see above, cf. Rovai et al. 2008): All students were highly motivated to work on the course material and to interact with each other in the beginning, but the motivation gradually decreased during the course. Consequently in each year a certain number of students did not finish the course, but dropped out before, either quite early after two or three weeks or during the second half of the course. Even though only a detailed ex post evaluation could reveal motives for drop outs from the course, a relationship with decreasing motivation cannot be dismissed.

4.2 DE SDSS 2008 with Elluminate *Live!*

The DE SDSS course, held for the third time in October to December 2008, had nine participants from Egypt, Tanzania, Kenya, Rwanda, Brazil, Guatemala, Jamaica, Colombia, and Sweden. To improve the interaction between students and instructors and thereby the performance of students in the course synchronous learning sessions were added to the course as described above using Elluminate *Live!* virtual classroom.

In total three sessions were scheduled strategically throughout the course (figure 3):
1. One week after the course starts to get in touch with the students, to see whether problems have occurred during the start phase and to introduce the students to Elluminate *Live!*. The session was also used to discuss a short text students had to produce and upload at the end of lesson 1.
2. During lesson 5, in which important concepts of spatial decision support were practiced by the students in two comprehensive exercises. The session was organized as a question & answer session.
3. Two days before the final exam to tackle open questions and to discuss problems students ran into while preparing for the exam. The session was also an open question and answer session.

Each session was scheduled for one hour duration. In the beginning of the first session participants were introduced to basic functions of Elluminate *Live!* for about 15 minutes. In the session 2 and 3 this introduction was repeated within 5 minutes. After the introduction the students were sufficiently enabled to participate and interact in the sessions. They used mainly the chat and audio tools as well as functions to engage in the learning process (raise hand, emoticons). For discussing the text in session one the application sharing functionality was used for collaboratively working in a word document. All sessions were conducted with two lecturers.
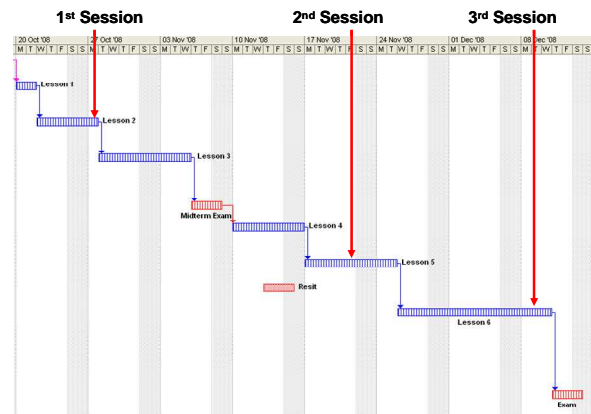

Figure 3. Scheduling of Elluminate *Live!* sessions

For the question and answers blocks in sessions 2 and 3 questions from the students were collected in the beginning of the session using chat and whiteboard tools as well as prior to the session via email. This procedure was implemented because during the first session the audio stream from some student's location (especially in Africa) was sometimes heavily discontinuous due to interrupted internet access. In contrary the answers to the questions from the instructors (Netherlands) transmitted via audio stream was understood in all places quite well.

The participants easily understood how to use basic functions of Elluminate *Live!* and quickly adopted the various forms of engagement and interaction like hand raising, writing chat or using the emoticons to express agreement or disagreement (Pei and Flacke 2009). During this login phase students already started using chat tool to communicate and socialize with each other. Recorded sessions where used by students who missed a session or wanted to prepare for the final exam.

The evaluation of the combined distance course showed that the motivation to follow the course could have been kept almost constantly high throughout the course. Especially shortly after the single live sessions students were stimulated to work for the course. The share of drop outs during the course was considerably decreased compared to previous courses.

5. CONCLUSIONS

Collis (1996) outlined four equally compelling advantages of synchronous distance learning in an instructional context.
- "Motivation - synchronous systems provide motivation for distance learners to keep up with their peers.
- Telepresence - real time interaction fosters development of group cohesion and a sense of community.
- Good feedback - synchronous systems provide quick feedback and support consensus and decision-making in group activities.
- Pacing – synchronous events encourage a discipline in learning, helping students to prioritize their studies." (Collis 1996).

Looking at the experiences made with the DE SDSS course in 2008 in which synchronous learning events were added to an existing asynchronous course all aspects mentioned by Collis can be confirmed. Regarding **motivation** it is quite obvious that

the engagement of the students could have been kept more constant throughout the course, compared to previous years. This observation is substantiated by a lower drop out quote from the course.

Also a **sense of community** was created among the distance course students. Students started to reply to each other during the live sessions and used the chat tool to discuss different topics prior to the start of the sessions when already logged in. During the 2nd live session it was agreed among the students that everybody would notify in Blackboard on which of the case studies in lessons 6 he or she plans to work (4 different case studies were offered) in order to enable an exchange during the case study work.

The opportunity to provide **good feedback** in synchronous mode was in particular used during the question & answer sessions. For instance problems raised by students regarding the final exam could have been resolved instantaneously. Finally also **pacing** of students was improved to a certain degree. Most of the students tried to finish lectures and exercise ahead of the scheduled live sessions.

Concluding it is to adhere that through the inclusion of synchronous learning sessions to an existing asynchronous distance course an added value could have been created; bearing in mind the postulation that "good" elearning is supposed to provide an added certain value to face to face (cf. Glowalla 2005, Schulmeister 2006). Furthermore the tools included in Elluminate *Live!* virtual classroom offer suitable possibilities to implemented synchronous sessions easily and thereby can increase the benefit of distance courses.

When designing and implementing synchronous events the following issues should be considered:
- Schedule the live sessions strategically in the existing course agenda to make full use of its advantages.
- Elluminate sessions should preferably be held best with two lecturers resp. instructors, e.g. one teaching while the other one at the same time is tasking care of chat and other devises.
- Make sure that all students have a reasonable internet connection, when scheduling the sessions.

Finally it is to be mentioned that the Elluminate *Live!* tool can potentially be used not only for teaching, but also for remote MSc or PhD supervision or for virtual project meetings. Problems in distance MSc supervision as described in Groenendijk (2007) could thereby alleviated.

The development of multi-user courseware, which is courseware that can be used in different teaching modalities like face to learning, distance and education (ten Dam 2006), can also be supported by using Elluminate *Live!*. For instance when index recorded Elluminate lectures are used as self studying material by students in an original class room situation.

6. REFERENCES

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