Boosted Blended learning in extra occupational training and locally dispersed environment

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Abstract—Boosted blended Learning provides an efficient basis for training for people in part time courses parallel to employment. Consistent and proportioned use of new communication and presentation media allows effective transmission of knowledge. In our pilot studies with over 600 students we qualified people without college degree up to the university entrance level in only two semesters and also used this method of boosted blended learning efficiently in our part time university courses as well as in continuing professional development courses.

Index Terms—eLearning, blended learning, video-conference lectures.

I. INTRODUCTION

The University of Applied Sciences in Upper Austria provides a variety of 2-semester extra occupational training courses for an efficient preparation of students. To facilitate the access to qualification we offer our students eLearning, videoconferencing and face-to-face lectures on four campuses in Upper Austria as well as videoconferences in regional technology centers. So we minimize traveling time and guarantee the high standard of qualification.

This approach implicates the necessity of proportioning the teaching methods and resources as well as the cost of the education.

In this study more than 500 students and 100 teachers were involved. The study began with a pilot phase with the definition of the requirements and a selection process for an adequate eLearning-platform. We decided to use MOODLE and started in the academic year 2005-2006 with a fully operational platform. The system consists of all courses and modules, including electronically course descriptions and supporting documents, self assessment, quizzes, glossary and manuals.

Our course participants are partly adults with manifold work experience, but often unaccustomed to formal learning. Especially these people use the combination of taught lessons, eLearning and videoconferencing very much and give good tips on how to improve the educational efficiency.

II. OBJECTIVES / PERSPECTIVES

Due to the demands of an extra occupational qualification we tried to optimize the application of eLearning, videoconferencing and other communication and presentation media. This optimization has to take into account the very different entrance levels of the students and the limited time schedules of the students. Positive factors are the high motivation of the students, the interest of lecturers and the support of the university management. Basic aim is to guarantee the best qualification, to support lecturers and management, and to enable students from regions further away from the university centers an achievable approach to extra occupational university qualification.

If adequate efforts are not made to match teaching and learning approaches with appropriate educational technologies and the characteristics of specific courses and student groups, then a situation could easily arise where it could be a case of one step forward for technology and two steps backwards for education [1].

The use of the platform provides a task-oriented approach, which emphasizes the students’ activities in discussing and solving problems, gathering information and creating knowledge as a new way of learning for many of the participants. The assignments in most cases required the students to work together to finish their tasks and the students had to share their knowledge and experiences to fulfill the tasks. Graduates must demonstrate such basic skills as analysis, communication, team-work and leadership skills, as desired by future employers.

Nelson [4] defines a sustainable higher education system as value adding, learner-centered, high quality, equitable responsive, diverse, innovative, flexible, cost-effective, publicly accountable and socially responsible.

Producing learning material (texts, lessons) of high quality is crucial for obtaining sustainability and a critical mass of students [3], perfecting the program and attracting future students.

Boosted blended learning can contribute to all of these requirements and optimize the specific teaching/learning environment.

Teachers also had obstacles to overcome in order to fulfill the aims of lectures under the condition of reduced regular lectures and the challenge of the use of new media.

There is a wide variety of methods used by the teachers to deliver their lessons as a combination of intensive use of the eLearning platform and the face to face lectures.

The additional work load of the teaching and tutoring to the teachers’ ordinary duties in the classes was compensated for with a smaller amount of regular teaching hours.
By introducing boosted blended learning as a new tool, both students and teachers gained necessary experience in this new learning environment. Students with high participation in eLearning modules were better prepared for their aspired university study.

Therefore we want to provide appropriate structures and techniques to teachers and students to develop and enable efficient learning environments.

Structure expresses the rigidity or flexibility of the programme's educational objectives, teaching strategies, and evaluation methods. It describes the extent to which an education programme can accommodate or be responsive to each learner's individual needs [5, 6].

The educational challenge of boosted blended learning is a proportionate use of the different structures and methods for every teaching subject. Improvement by adaptation and continuous investigation of the results as well as quality control can grant an adjusted learning environment which satisfies teachers and learners.

III. RESEARCH PROCEDURES

This study presents design, implementation, quality evaluation and further development of an integrated blended learning system with lectures on site, videoconference lectures and extensive use of an eLearning platform for scheduling and reworking actual subject matters. Continuous evaluation of the effectiveness of the training strategies and measure of the learning level is done randomly on the eLearning platform by assignments, quizzes and appropriate statistical techniques.

Attention was directed to assure and even improve quality of teaching and quality of analysis. The concept of change includes the idea of enhancement of teaching and learning performance but not all change leads to improvement. Change includes the process ideas such as transforming, converting, replacing or exchanging and becoming different [2].

By organizing different groups we extensively observed the acceptance, usage and benefits of each group by using questionnaires, polls, choices and last but not least tests and examinations. Most of the observations are incorporated in the eLearning platform accompanying the investigations.

A. Strategies for comparison

For the purpose of this study four groups of students in the extra occupational training program supported by eLearning and/or videoconferencing were identified for the different training strategies:

1. NEL: regular students with no eLearning support (only face to face) (control group)
2. IEL regular students with face to face classes and intensive eLearning (IEL) support (information, tests, assignments)
3. ELV: students in with only videoconferencing lessons + eLearning
4. F2F: students with mainly eLearning and occasionally face to face
5. FDL: far distance learning, scheduling, preparation and reworking by eLearning and videoconference in overseas programs. Lectures held by guest professors for students from universities in other countries were efficiently prepared, accompanied and finalized by eLearning and videoconference-lectures.

IV. METHODS

A. Definition of the program goals

Goal of the project was the optimization of instruments and educational approaches for extra occupational learning according to the factors of time and distance from the university campus and efficient use of videoconferencing and eLearning in combination with face-to-face lectures.

We also used this tool for courses in “very distant learning” for our guest professors and companies in foreign countries, preparing lectures via eLearning and videoconference and combining them with face to face lectures in the guest country or in Austria.

We found differences in efficiency and teaching methods, depending on the focus and the topic of the lecture, and found that a topic-specific combination of different methods is an adequate approach. Explicit and standardized rules for teachers and students are necessary to guarantee good execution and comparable results. Due to specific requirements concerning time and on-the-site availability of people during their scope of work time and location have to be considered.

The access to extra occupational training was facilitated by organizing and adapting the educational environment. During this project we organized, adapted and analyzed following scenarios and strategies in these steps:

1. Balanced relationship between eLearning, videoconference and face-to-face lectures
2. eLearning design and usability
3. Videoconference design and usability
4. Strategies for implementing eLearning
5. Evaluation and adjustment of methods
6. Communication and use of best practices
B. Groups and test scenarios

For comparison we tested different scenarios and control groups:

1. face to face lectures
2. blended learning (eLearning + face to face)
3. eLearning supported videoconferencing
4. eLearning supported videoconferencing + face to face lectures

During the project phase groups were formed according to different topics and applications:

1. Pre-course organization, communication and motivation
2. forming of groups: didactic groups, organizing ride sharing and learning groups – using the following methods: coordination via votes, forums, assignments and chats on the eLearning platform
3. Regular lessons in physics, math and languages
4. Attendance of the 2-semester pre-study program
5. Videoconference- and eLearning -prepared lectures as a visiting professor

V. RESULTS

Forums, chats and other communication were implemented most purposely and were in most cases the basis for an efficient didactic progress. On the other hand there are extensive requirements concerning the quality of education and subject matter.

Comparison and experiences with boosted blended learning:

A. Conventional lectures (face to face)

To estimate the effect of boosted blended learning, the basic species of lectures has to be analyzed separately. Therefore we did polls in pure face to face classes as well as in classes with eLearning and videoconference attendance. Here are the results from the pure face to face classes:

- “feeling of being in school”, of all senses being activated: demonstrations, demonstration material, chalk dust, squeaking of a chalk on the blackboard
- direct contact gives teachers more impression of the capabilities of students
- immediate reaction on queries
- flexibility in the use of the adequate methods (blackboard, oral presentation, experiments, demonstrations...)
- no media- barrier

- social aspect
- often to less time to process the information
- time dissipation due to sometimes long approach ways
- personal sensitivities are ignored
- lack of concentration

B. Acceptance and positive experience with complementary use of eLearning in face to face lectures

All students in the preparatory courses using the eLearning platform showed intensive use of the platform. Especially the test, information and the calendar and “new events”-function was used very frequently. Chat had no importance because of other communication media like audio- and videoconference.

The combination of face to face lectures and eLearning modules was accepted by students and teachers. Both found an essential improvement of their situation.

With the start of the project some teachers only put information in a structured form given by the organization on topics or on a weekly basis to the platform and had no problems in managing this task. The students of the eLearning-classes used the offer for tests extensively and had significantly higher grades than students without platform use. There is a clear correlation between frequent use of the tests and the student’s grades in on the examinations.

The effect of the integrative use of eLearning was the best evaluated topic of our project. A summary clearly shows the benefits for students, teachers and for the management of the courses.
### TABLE I

<table>
<thead>
<tr>
<th>Group</th>
<th>Scope</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (S)</td>
<td>Information</td>
<td>More information structured information, fast information delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Easy information supply</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td>Organisation of learning groups, carpooling, social contacts</td>
</tr>
<tr>
<td>Teachers (S)</td>
<td>Content</td>
<td>Easy upload and structuring, no more copies, emails and emissions</td>
</tr>
<tr>
<td></td>
<td>management</td>
<td></td>
</tr>
<tr>
<td>Pedagogic design</td>
<td></td>
<td>Instant use of adequate resources, best survey on the actual state of knowledge</td>
</tr>
<tr>
<td>Communication T-&gt;S</td>
<td></td>
<td>General common information is easily distributed via news-board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General information for the seminar, announcements, scores, list of participants is done without burden of teachers</td>
</tr>
<tr>
<td>Communication T-&gt;T</td>
<td></td>
<td>Exchange, reuse and conjoint use of course documents, eLearning-modules and student information</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td>Actual announcements, time limits, dates, adjournments, publication of test results and scores could be straightforward</td>
</tr>
</tbody>
</table>

### C. Experiences implementing videoconference lectures

One of the main results of the videoconference poll was the problem of most of the teachers handling simultaneously face to face and videoconference. For the teachers it was an enormous stress factor, the “face to face” students as well as the outward students criticized the attention deficit to every own group, each finding the other group to be privileged with more attention from the teacher.

Considering this fact we changed the concept and offered videoconference lectures with teachers “in their own offices” for different locations and groups over videoconference systems.

### Feedback from the teachers
- interactive discussion
- use of blackboard
- demonstrations (e.g. physics)
- demonstrations also in smaller format (camera magnification)
- good quality communication
- videotaping without additional effort
- harder to recognize the attention of the students
- more preparation effort (screenplay, script)

### Feedback from students
- “almost like real”
- economizing effect = less time needed for driving to and from campus – videoconferences are organized in technology centers around the county
- social contacts

### TABLE II

<table>
<thead>
<tr>
<th>Group</th>
<th>Topic of benefit</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Registration</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Student data maintenance</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Organisation of seminars</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Evaluation</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Up to date information</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Short-dated answer back</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Statistics</td>
<td>+++</td>
</tr>
<tr>
<td>Education</td>
<td>Graduation of students due to their actual knowledge</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Exercises</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Assignments</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Preparation of discussions</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Discussion of specific topics in a forum</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Processing examines with boosted blended learning structure (eLearning platform=videoconference)</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Targeted scheduling of subject matter</td>
<td>+++</td>
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<tr>
<td></td>
<td>Easy material delivery</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Easy to manage feedback</td>
<td>+++</td>
</tr>
<tr>
<td>Students</td>
<td>Easy communication</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Forming of ride sharing</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Social contacts before, during, after class</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Overview on appointments</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Simple registration to specific classes</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Exercises</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Time and space independent learning</td>
<td>++++</td>
</tr>
</tbody>
</table>
VI. Conclusions

Boosted blended learning is an effective and efficient way of teaching in extra occupational training and qualification. Entry of different media and adopted teaching concepts ensure a flexible, open and innovative educational opportunity both for students and teachers. This flexible and adaptive concept leads also to increasing qualification levels. Other benefits gained include better social skills such as teamwork, knowledge acquisition and knowledge management for both, students and teachers. The boosted blended learning project also turned out as an easy way of qualification improvement due to the flexible use of different concepts and media. This was done by persistently surveying the quality and the direct needs and responding by offering the easy to use media and tools like forum, chat, audio conference, videoconference and face to face lectures. This was very useful for adapting courses for specific student groups such as shift workers, mothers with babies and even handicapped students.

REFERENCES


AUTHORS

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