Implementation of blended learning scenarios for training of school teachers

Daniela Tuparova¹
¹Department of Computer Science
South West University “Neofit Rilski”
Blagoevgrad, Bulgaria
dureva@swu.bg

Georgi Tuparov¹,²
²Department of Software Engineering
IMI – Bulgarian Academy of Science
Sofia, Bulgaria
georgett@avala.bg

Abstract— In this paper we present four blended learning pedagogical scenarios for training school teachers in in-service teacher training programs and Master degree programs conducted in the last 3 years at South West University “Neofit Rilski”, Bulgaria. The scenarios are implemented in 3 courses – “Computer games and education”, “Didactics of teaching Informatics and Information and communication technology (ICT)” and “E-learning technologies”. The scenarios are based on combination of different “face to face” interactive approaches such as problem based learning, collaborative and project based approaches and diversity of e-learning activities and resources.

Keywords—blended learning, teacher training, collaborative learning

I. INTRODUCTION

In this paper we present four blended learning pedagogical scenarios for training school teachers in in-service teacher training programs and Master degree programs conducted in the last 3 years at South West University “Neofit Rilski”, Bulgaria. The scenarios are implemented in 3 courses – “Computer games and education”, “Didactics of teaching Informatics and ICT” and “E-learning technologies”.

The scenarios are based on combination of different “face to face” interactive approaches such as problem based learning, collaborative and project based approaches and diversity of e-learning activities and resources. The courses were organized in blended mode with support of e-learning environment Moodle 1.9. We give one scenario per first and second courses mentioned above. For the course “E-learning technologies” we propose two scenarios.

The scenario for course “Computer games and education” is focused on interactive method “Jigsaw” which is implemented both in “face to face” mode and e-learning environment with strong impact of on-line discussions between the learners.

The scenario for course “Didactics of teaching Informatics and ICT” is grounded on the “face to face” group working and project based approach with support of e-learning environment.

The scenarios for course “E-learning technologies” are stressed on the use of SCORM compatible interactive and simulation learning objects combined with practical problem solving in “face to face” mode and development of assignments in online mode.

II. METHODS

A. Target groups

The scenarios were conducted with two target groups.

First target group consisted of 26 part time students – 23 women and 3 men. Average ages of 43 years. All of the students were teachers in primary school. (In Bulgaria primary school covers students from 1st to 4th grade and primary school teachers teach all school subjects.) Before students started working in the e-learning environment all of them have been participate in ICT course. These students participated in the courses with learning scenarios 1, 2 and 3.

In the second target group were enrolled 25 teachers (24 women and 1 man) with different subject background and with diversity of ICT skills. In some cases participants had very limited ICT skills – web browsing and/or word processing.

B. Learning scenario 1. Course “Computer games and education”

The general aim of the course is to form knowledge, skills and abilities about educational computer games and their successful implementation into educational process in primary school level.

Basic topics in the course are:

• Role of the game in the primary school;
• Scope of computer games – classification and characteristics;
• Didactical computer games – characteristics and purpose;
• Implementation of web based and stand alone didactical computer games in primary schools;
• Development of scenarios for didactical computer games for primary school level.

The course was organized in blended mode with support of e-learning environment Moodle 1.9. The students had 15 hours.
lectures and 15 hours exercises in “face to face” mode. During the lectures they learned about mentioned above topics of the course. During the face to face exercises the tutor presented and discussed different Web based and standalone educational computer games.

We have to note that in this course the students met the e-learning environment for the first time. Therefore some time was spent for explanation of basic rules of use of e-learning environment with the student accounts.

During the course each student has to prepare 2 assignments:

- To find a suitable computer game for implementation in determined subject and grade in the primary school in Internet and to describe the game and the possibilities for implementation in the class.
- To develop scenario for educational computer game.

For development of both assignments students were divided into groups with help of the Jigsaw block developed in our e-learning research lab and presented in details in [4].

The Jigsaw method is proposed by Aronson like strategy for collaborative activity management which allows each member of a particular group to work on a defined aspect of the learning content [2]. The Jigsaw method manages collaborative activity in which every participant is extremely important for the realization of the ultimate goal. The learning process procedure is outlined very precisely in [2]. The basic idea of the method is type of grouping of the students. In the first step the students are divided in so called “Jigsaw groups”. The groups consist of 5-6 students per group. The learning material is also divided in 5-6 parts. The students that work on the same part of the learning material form so called “Expert group”. In the expert groups students discuss their part of learned material and prepare the presentation of learned material that they will present in their “Jigsaw group”. Students meet with members of the other groups who have the same task and after they have acquired the knowledge of the particular content, they return back to their first group and explain what they have learned to the rest of it. The method ends with assessment and evaluation of obtained knowledge and skills. The method is effective and has several advantages. It “reduces competition between individual students and provides opportunities for teamwork” [1].

The Jigsaw groups were arranged relevant to 1st, 2nd, 3rd and 4th grades. In each Jigsaw group they were divided according to school subjects – Maths, Bulgarian Language and Literature, Household and Technology, Society studies, Nature studies, Music. Basic learning activities included in the e-learning course were forums with possibilities to publish files and assignment with possibility to upload needed files. Forums have been based on grouping with respect to rules of Jigsaw block.

The students had to develop and publish their assignment in the group forum and to discuss with other “Expert” group members the proposed assignment. After discussions with colleagues the students revised their proposals and published them in the forum of relevant “Jigsaw” group to share their work with other members of the group and to discuss them. Finally each student submitted the assignment for evaluation by the tutor. In this manner the students have a chance to obtain more knowledge about the educational computer games suitable for different grades and subject in the primary school level.

C. Learning scenario 2. Course “Didactics of ICT in Primary School”

The course “Didactics of ICT in Primary School” is implemented in 15 hours academic lectures, 15 hours exercises in “face to face” mode and working on the projects in e-learning environment. The content covers next basic topics:

- Objectives of teaching ICT in primary school level.
- ICT syllabuses and state requirements in 1-4 school grade.
- Basic educational rules and their implementation in ICT education in primary school.
- Implementation of teaching and learning methods in ICT education in primary school.
- Assessment and evaluation in ICT education in primary school.
- Planning of educational activities – development of curricula, lessons preparing etc.
- Implementation of cross-subject relations in ICT lessons.
- Project based approach in primary school through ICT.

The learning scenario structure of the course is presented on the figure 1.

During the offline lectures we conduct discussions about specific content. In example we set questions to the students about identification of rules and methods of teaching and learning in some school cases. We discuss case studies with implementation of cross-subject relationships in ICT lessons.

In the frames of the workshops we apply different interactive offline techniques:

- “Jigsaw” method – students are divided in 4 “Expert groups” each with 6 or 7 people. Each “Expert group” has to develop annual content schedule for teaching ICT in 1st, 2nd, 3rd and 4th grades with respect to state requirements and syllabuses. After development of schedule the students are regrouped in “Jigsaw” groups and discuss schedules. Discussions continue in e-learning environment after “face to face” exercises.
- Group working on the lessons plan development and development of assessment and evaluation resources and materials. The students are divided in small groups – 3 persons per group. Each team under supervising of the tutor develops lesson plan and resources for assessment and evaluation. Representative of the group presents results from the group working in front of the all students. Students discuss works of their colleagues
and every student can suggest own ideas about the lesson plan.

Figure 1. Learning scenario schema of the course “Didactics of ICT in Primary School”

In e-learning environment Moodle are published state requirements and syllabuses for ICT education in primary school, lectures, examples of lesson plans, assessment materials an resources. We continue the learning activities that have being started during offline lectures and exercises in e-learning environment with implementation of diversity of technological tools: we use mentioned above “Jigsaw” block in Moodle, discussion forums and assignments. Students discuss and finish their collaborative annual schedule. Each student has to develop lesson plan, test and tasks for practical assessment of the learners. These assignments they have to send to the lecturer through e-learning environment.

Final exam of the course consists of online test and development of lesson’s plan about topic from the learning content in ICT. The components of final grade are individual assignments, participation in discussion forums during development of annual schedule and achieved results during the final exam.

D. Learning scenario 3. Course “e-Learning Technologies” (Master program)

The general aim of the course is to form knowledge, skills and abilities about elearning technologies and methods and their successful implementation into educational process in primary school level.

Basic topics in the course are:

- Basic technological and pedagogical concepts in e-learning.
- Models of e-learning courses.
- Psychology theories of learning and their implementation in e-learning.
- Functional features of e-learning environment Moodle: Using integrated HTML editor; Working with learning resources – web page, label, link to external resources, link to file or directory etc.; Working with learning activities – assignment, forum, blog, wiki, questionnaire etc.; Students management.

The course was organized in blended mode with support of e-learning environment Moodle 1.9. The students had 15 hours lectures and 15 hours exercises in “face to face” mode and around 30 hours for development of own e-learning course in Moodle. During the lectures they learned mentioned above topics of the course. During the face to face exercises the students mastered basic techniques for development of e-learning course in Moodle. They worked under supervising of the tutor with resource files, prepared in advance by lecturer and used on-line simulations and demonstrations. To master basic skills for development of e-learning course all students followed common tasks.

The tasks were related to:

- Using of integrated HTML editor – including text, images, audio and video, tables etc..
- Using learning resources - web page, link to file or external web resource, label.
- Using and management of learning activities – assignment, lesson, test, forum, blog, wiki, questionnaire etc..
- Management of students – grouping, assigning students to activities and resources.

The students were grouped approximately 5 students per group according school subjects – Mathematics, Bulgarian Language, English Language, Music, Nature studies, Society studies. Each group was assigned to one common e-learning course. During the face to face exercises students used resource materials offered by the teacher to learn basic techniques and functionalities of the e-learning environment. Also they had a possibility to use SCORM based e learning demonstrations and simulations. Each student in role of “teacher” could assign another student in her/his course like “a student”. In this way another students have a possibility to be enrolled in the course with student rights and could observe work of their colleagues.

After face to face meeting students have to develop a part of e-learning course with obligatory components:

- e-learning content in form of web page;
- link to files with, presentation;
- audio and video content;
- test with diversity of test’s items.
E. Learning scenario 4. Course “e-Learning Technologies” (In-service teacher training program)

This scenario was conducted only with 14 hours offline workshop. The content was directed basically to mastering of functional features of e-learning environment Moodle:

- Using integrated HTML editor,
- Working with learning resources – web page, label, link to external resources, link to file or directory etc.,
- Working with learning activities – assignment, forum, blog, wiki, questionnaire etc.,
- Students management in the e-learning environment.

During the face to face exercises the students mastered basic techniques for development of e-learning course in Moodle. They worked under supervising of the tutor with resource files, prepared in advance by lecturer and used on-line simulations and demonstrations. To master basic skills for development of e-learning course all students followed common tasks.

Because learners were teachers in different school subjects it was impossible to apply mentioned in learning scenario 3 interactive collaborative approaches. Every learner had access to the common e-learning course – “e-Learning technologies” and was register in the e-learning environment as teacher in own e-learning course relevant to the school subject that he/she teach in the school. The tasks were related to basic topics mentioned above – learners had to develop part of e-learning course with resource materials given by the tutor. After offline sessions (2 hours per day) learners had to prepare home work for the next offline session related to the tasks performed during the off line sessions but with respect to the specific subject content. Next session began with discussion about home work. The schema of the learning scenario is presented on the figure 3.

Figure 2. Learning scenario schema of the course “E-Learning technologies” (Master program)

Figure 3. Learning scenario schema of the course “E-Learning technologies” (Master program)

III. RESULTS

A. Observation and results from training of the first target group

After the training of the first target group with the learning scenario 1 and learning scenario 2 we carried out 2 questionnaires.

In the first questionnaire (after learning scenario 1) we asked the students to present their opinion about proposed method and used technology. They filled the questionnaire with 9 questions.

Detailed results from the study are published in [3]. The results from the survey show that 96% of the students agree that proposed Jigsaw group working helped them to enlarge knowledge about computer games and 88% agree that method helped them to know more about educational computer games. Around 72% of the students agree that on-line group discussions helped them to improve scenarios for computer games. Some of students (32%) met difficulties during
preparing of assignments in e-learning environment. Moving in Groups in e-learning environment was a problem for 28% of the students. In fact that was first e-learning course for the students.

Most of the students would like to apply Jigsaw method without e-learning environments in their classroom lessons (80%) and 80% of the students would like to apply Jigsaw method with help of e-learning environment.

The aim of the questionnaire conducted after the course with learning scenario 3 was to identify the most efficiency e-learning resources and activities provided in Moodle environment. Also we wanted to investigate student’s choice of the resources and activities in their future e-learning courses for primary school. The questionnaire was sent to all 26 students by e-mail. We obtained 21 responds. Detailed results from the study are performed in [5]. The most signifying tools and techniques according the students’ opinion are multimedia demonstrations, simulation exercises and teacher’s explanations during the face to face meeting.

All of students reported that the course helped them to master basic principles for e-learning content development in e-learning environment - 52,4% answered with Yes and 47,6% answered with Definitely Yes. Most of the students intend to develop e-learning content in the school – 9,5% answered with “Yes and No”, 66,7% answered with “Yes” and 23,8% answered with ‘Definitely Yes’.

Some suggestions that were proposed by the students: “To be included more simulation exercises.”, “More practical sessions and exchange of opinion among students”, “More assignments”, “To be forced communication between students and teachers” etc.

The data shows that students intend to include in their future e-learning courses learning activities such as assignment, test and lesson. They prefer to present e-learning content in form of interactive presentations, links to audio and video files.

In opposite of the data obtained for Learning scenario 1 students put participation in discussion forum at 6th place. We think that in the Learning scenario 1 for the first course “Computer games in education” the students were “experts” in their field – development of scenarios for educational games (nevertheless that games are computer based or not) and scenarios for implementation in lessons of existing educational web based games. They used the forum like a media for expression of their opinion about developed scenarios. In Learning scenario 3 for course “e-Learning Technologies” the students are novices in area of used e-learning environment. They can not obtain a help and more information from their colleagues because all of them are beginners in this field.

About learning scenario 2 we have to mention that students were very active in discussion forums and group working. The learning content was also close to the previous experience of the learners – all of them were teachers in the primary school and they were “experts” in didactics in other primary school subjects. They founded and suggested interesting cross-subjects relation ships and that was in the focus of their discussions.

B. Observation and results from training of the second target group

The training of the second target group was implemented in June 2011. Our observations show that learners with low level of ICT competency met some difficulties in mastering of the functionalities of e-learning environment. They spent more time for preparing of their home works. Nevertheless of the difficulties they succeed to develop basic parts of e-learning course and declared that they will use e-learning environment for publishing of e-learning content, management of home work and assessment. Some of them suggested that the e-learning environment is a good tool for development of web pages of the classes and management relationships with the students and their parents.

IV. CONCLUSIONS

Our studies show that when we plan educational activities in blended mode for teacher training we have to take into account experience of the learners in the content covered by the course. If the content is close to their teaching practice they participate actively into offline and online discussions and group working activities.

If the teachers in the role of students are “novices” in the studied area they need more “face to face” meetings with tutor and prefer explanation of the tutor to be offline.

Especially for the training of teachers to use e-learning technologies we have to mention that good level of ICT competences and previous experience with e-learning environment in a role of students are key factors for effective mastering of functionalities of e-learning environment.

To be forced wide implementation of interactive collaborative methods and e-learning technologies the teachers in primary and secondary schools have to be trained in the same manner that they should apply in their classes. We have not to forget that the teacher teaches in the way that he/she have been educated.

REFERENCES