REMOTE LEARNING SYSTEM IN PREPARING STUDENTS TO BECOME TEACHERS

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Abstract: *The educational training preparing students for teaching natural sciences should be placed in the school environment. In this article, the authors describe the usage of a blended learning method, utilizing an e-learning platform for students' educational training. The authors also studied how the usage of this method influences the frequency of the communication between students and tutors and the efficiency of their cooperation and social interactions. The authors also described the attitude of these groups towards the implemented new technologies, which should assist educational training.*

Keywords: teachers' training, blended learning, science experiment, teaching practices.

INTRODUCTION

Students preparing to work as teachers of science subjects must conduct lessons in natural conditions at school. For this reason, they must work closely with experienced teachers, playing the role of school tutors. The course of this cooperation, however, is sometimes different. This is connected inter alia with a different perception of how to implement the practices by teachers and the different ones by students, especially in terms of using modern styles and methods of communication.

Teachers and school tutors in elementary schools, secondary schools and high schools, accepting students for the practical teaching of science subjects, assume that they already possess the necessary skills that allow them to conduct lessons in the classroom under natural conditions. However, students in theoretical and laboratory exercises at a university acquire certain detailed messages about teaching, in our case, teaching science subjects. They practice well and take on appropriate skills related to the learning process. They achieve these skills, however, when conducting

parts of or whole class lessons during classes at the university, during which other students, their colleagues, act as students. Therefore, their knowledge and special skills are not complete. Why? Because they are achieved in unnatural conditions and, as a consequence, the further abilities of trainees should be developed when conducting a lesson in natural conditions during school practice (Darling-Hammond 1998).

This problem is perceived differently by students. They expect, both from a teacher and a school tutor, the pedagogical guidance of a teacher teaching science subjects. Feeling that the knowledge and skills, especially those related to the implementation of the educational process gained at the university, are insufficient, students require from school tutors a greater commitment in their cooperation.

On the other hand, students that get practice at school bring into the educational process skills associated with a very good understanding of the ways to use modern information technology (IT) to increase the quality of the lessons and to facilitate the conduction of the lessons.

During the students training, a triple system of cooperation is created between university teachers and students. Each participant brings defined benefits to the collaboration: teachers give students the information and teach them specific tasks, and students use both new ideas during the practice for conducting lessons as well as their ability to use modern multimedia teaching aids. The university supervises the proper conduct of a so described cooperation, leading to technical, methodical and formal advice ("Best practices for effective schools", nd.).

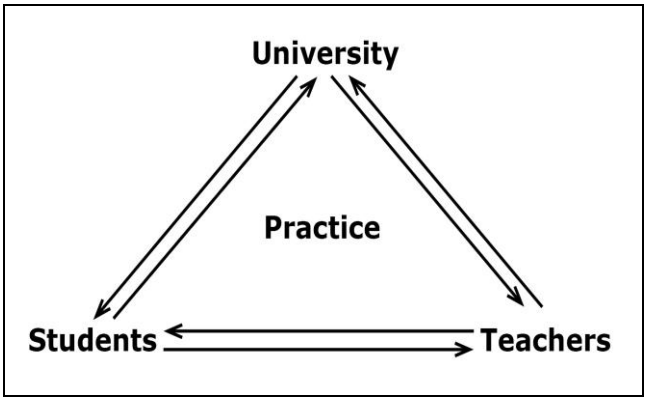

Figure 1. Information flow between teachers, students and university staff during the educational training

Source: authors' own resources

While studying, students and trainees are required to participate in many activities such as lectures, tutorials, and laboratory classes, of which the number is truly large. Also, teachers and school tutors, when performing their daily duties, are involved in the implementation of the educational school process, which also consumes a lot of

time. For these reasons, the cooperation and communication between the students and the teachers was insufficient. For these reasons, both the students engaged in the practices and the teachers taking care of the trainees were not fully satisfied with the final practice results.

We decided that, in order to solve the existing problems, to the process of practices implementation should be introduced a system of remote learning. It should improve the exchange of information between the participants of the practice in these relationships: teacher - student, student - student and teacher - teacher.

HOW DO WE IMPLEMENT THE PEDAGOGICAL PRACTICES OF SCIENCE SUBJECTS?

Professional teaching practice takes place in two stages - interim practices and continuous practices. The aim of the interim practices is auditing and, then, conducting lessons by a trainee on topics indicated by the teacher at different times. These practices are held during the academic year and are an integral part of the curriculum. In contrast, continuous practices are held at the end of the academic year, while in the first month, September, of each new school year. The aim of continuous practices is auditing and conducting lessons while learning about the functioning of the school by every trainee in educational and administrative terms, which is possible thanks to the continuous cycle course of these practices.

After the start of the third year (bachelor) of every profile teachers course, students participate in lectures and exercises about teaching science subjects. After completing six weeks of classes at the university, they take part in a three-week interim practice, the aim of which is only auditing each lesson. Students are divided into small groups. Each group has a designated guardian of school practices and observes the course of a few lessons that he has conducted, analysing by observation during the lessons: applied teaching methods, teaching aids, the most important goals of the lesson. In the further course, students return to the university for a two-week series of classes, during which they plan lessons scenario, which they then carry out in trial lessons. Those speeches are held in a micro mode of teaching (microteaching). The method is based on the video registration of certain parts of the lessons given by students, including their specific teaching skills (Mellon & Dence, 1971; Bush & Allen, 1964). In the next three weeks, students continue to practice in schools, in which they not only observe lessons but also conduct lessons on the subjects designated by the school tutor. The classes are recorded and, then, their video is played and analyzed in terms of its merit and methodological content by all the students in the group. In this way, they can analyze different instances, which is instructive from the didactic point of view. These footages are placed on the remote learning platform. This allows each trainee to observe himself, friends, and colleagues (with their consent) in practical action. During the II semester of the course, students (divided as in semester I) implement again interim practices in schools according to the scheme: 4 auditing lessons and 3 lessons conducted in cycle

2 x for three weeks of the classes. After the completion of the interim practices, in which students gain specific skills, practice is carried out continuously. During this time, students carry out 10 classes on a given subject from science topics that are selected by a teacher, auditing 62 hours of the remaining lessons, which corresponds to the full-time job of a teacher.

PLACE OF THE REMOTE LEARNING PLATFORM IN THE IMPLEMENTATION OF PEDAGOGICAL PRACTICES

During the implementation of practice, inter alia to improve the communication between students and teachers, we were supported with a distance learning model using a learning platform. Training on the platform is conducted by a blended learning method during which the following are used in the educational process, e-learning methods of work as well as traditional classroom training methods, and, in our case, this applies to student teaching practice. Under this method, classes are implemented in an alternative way, namely, stationary sessions that take place in groups are interspersed with work on the platform (McGinnis, 2005). This educational model requires appropriate conditions for its implementation, that are strictly associated with the use of information technology tools. In this case, access to educational materials is via the Internet, so it allows people to use them anytime and anywhere. Practical activities, complemented by the work in the web, allows the maximum use of the time that students can allocate to the planned practices (Graham, 2005; McCullough & Aimard, 2006; Jagodziński & Wolski, 2011). Thanks to the platform, trainees can quickly consult with tutors while preparing to conduct a new lesson. Via the platform, trainees practices are also conducted, during which issues are discussed related to the profession of a teacher (Boyle et all., 2003; Christensen, 2003). In the discussed system of remote learning, there are also available presentations, multimedia materials, remote simulations and lectures online. These materials significantly enhance the individualization of the learning process. An important value of such an action is the ease to make changes and update the content of the training materials by the authors of these materials (Catley 2005, Jagodziński & Wolski 2012).

OpenOlat PLATFORM DESCRIPTION

The Faculty of Computer Science at the University of Zurich began in 1999 to create an educational platform of remote learning. It serves to conduct courses on the online system or to support the traditional teaching process, and the OLAT name comes from the first letters of the words Online Learning And Training. In 2011, the designed software of the platform began to be under an open source license, and the project changed its name to OpenOLAT. The OpenOLAT platform is a web application, and most of it is written in the Java programming language. This platform also uses the standard server applications such as Apache - web server,

Tomcat - Web application server, MySQL database and another database can be used, XML - universal formal language, designed to represent different data in a structured way. The platform user interface is intuitive and includes technologies developed for Web 2.0 websites. OpenOLAT is not a CMS (this acronym is derived from the first letters of the words Content Management System), which is a content management system. It is a platform which allows managing materials and teaching students through the creation of courses and the dynamic management of these courses. This system also allows for an efficient flow of information between lecturers and learners while adapting courses to the needs of their customers ("User Manual", nd.; "Olat history", nd.).

It is an application that runs in the window of any web browser on a student's or teacher's computer, supporting e-learning standards such as IMS Content Packaging, IMS Question and Test Interoperability or SCORM, which makes it a management system of learning process category LMS (Learning Management System). The advantage of this software is that the app is free, downloadable from the Internet and can be installed on your own server, and, then, used and modified as needed. Because the system is based on JAVA, it may be used on different operating systems such as Windows, Linux or Solaris. The system can be expanded according to the needs of the users, without having to modify its basic elements. This makes it easy to update the software of the platform and its integration with new possibilities of constantly developing information technology ("User manual", nd.; "Features", nd.).

The basic idea of the platform is the use of different functions and rights assigned to the users. So, we can distinguish four basic functions allocated to the users:

- guest - anonymous, unregistered user with limited access rights that can familiarize himself with shared in public curriculum, but he cannot actively use some elements of the platform, such as discussion forums.
- registered user - has his own "username", can use the learning content and all items related to this teaching, and change the main page of the system, adapting it to his needs, create a group of people in the project and participate in courses.
- author - apart from having the rights of a registered user, he can also create, import, copy, archive or delete educational resources within his course.
- system administrator - the main task is taking care of the efficiency of the entire system.

Platform users can be assigned additional rights, for example, to allow a registered user to supervise the other groups of participants. In addition, you can attach to your course authors of other courses while, at the same time, giving them the right to edit the appearing contents ("Features", nd., "Development", nd.)

TOOLS OF THE OpenOLAT PLATFORM USED IN GROUP WORK

The OpenOLAT platform is software that enables the collaboration of people in different places far from each other, the exchange of opinions or the sharing of tasks. The tools include: discussion forum, wiki portal and file folder.

On the platform there are folders assigned to each user separately. These folders may contain, for example, work sent by people conducting courses or files containing a solution of tasks performed by the participants of the courses and the files returned by the teachers after completing the necessary adjustments.

An important element of the courses is to enable efficient communication between the participants in order to effectively exchange opinions and information. This is served, among others by: contact form, calendar, chat and survey ("Development", nd.).

The above described features of the OpenOLAT platform will be used to assist in the implementation of training future science teachers. For this reason, the platform should meet the requirements of a useful tool in information technology, supporting the execution of practices.

THE USE OF THE PLATFORM BY THE TEACHERS - SCHOOL TUTORS

During the implementation of practices, students are divided into appropriate groups. Each group works with the its assigned teacher – the school tutor. This cooperation takes place mostly through the platform. Students perform tasks that provide them with teachers. Within these tasks, they plan lesson scenarios on the chosen topics, which they will present in person at ~~the~~ school. These teachers supervise the proper conduct of the work, make merits and a methodological analysis of prepared scenarios, provide the necessary consultation and, together with the students, make the final adjustments. All of these activities take place remotely, using the above-described features of the platform OpenOLAT. This means that the school tutors have continuous control over the process of preparing the trainees to conduct the lesson. The teachers have direct contact with the students during class inspections, the conducting of lessons and when analyzing any lesson conducted by the students.

PREPARING TEACHERS TO WORK WITH THE PLATFORM

In contrast to the students for whom work with Web applications is generally known, the majority of teachers involved in the implementation of practices had their first contact with this type of software. Therefore, before the teachers began to work on the platform, it was necessary to carry out proper training. It included the

theoretical and practical issues of operating the platform, creating new contents of training and updating it, information and file sharing, and handling mailing lists. Teachers became familiar with the methodology of creating distance learning courses and preparing appropriate materials in the form of ready-made courses on topics of their choice, which then benefited students preparing for their practice. After the training, those teachers without problems used tools available through a platform, which helped them to work remotely with students.

OpenOLAT PLATFORM CAPABILITIES IN THE PROVISION OF INSTRUCTIONAL MATERIALS

Through the platform OpenOLAT used in the implementation of the practices, it is possible to share instructional materials in various formats such as Word, PowerPoint, pdf, mp3, and mp4. It was used for the preparation of materials including issues relating to the implementation of teaching in the natural sciences, developed in the form of courses designed to work independently. These include:

- Preparing teachers for science nature lessons,
- How to use different methods of teaching during science nature classes,
- Activating methods for pupils during science nature classes,
- Problem teaching of science nature,
- Experiment during science nature classes with an emphasis on teaching demonstration,
- Student experiment with an emphasis on students teamwork projects,
- The use of models during science nature classes,
- School science nature classes circles interested in nature in school practice,
- Different methods for conducting field activities in science nature classes,
- Variations for using a whiteboard during science nature classes,
- Scenarios of science nature classes - an outline of a good lesson.

In addition, registered trial lessons taught by students in the school during practice were placed on the platform. Students can, thus, observe the course of lessons conducted by them or lessons conducted by other members of the group to make the necessary comparisons as well as go through platform discussions and polemics concerning their speeches and the presentations of other students, using the above-described functions of the groupware platform.

Figure 2. Screenshot of course materials about the organization and the importance of fieldwork placed on remote education platform

*Source: Project materials POKL 03.03.02-00-006/11**

Figure 3. Screenshot of course materials on extra-curricular activities for students especially interested in science objects placed on remote education platform

*Source: Project materials POKL 03.03.02-00-006/11**

Films are also placed on the platform to show selected teaching situations and the discussing aspects of merits, the methodological and formal preparation of the teacher for the lesson. These materials are useful in the selection of teaching methods, enabling an optimal implementation of a specific lesson topic. In addition to this, there is also a library of instruction films, presenting chosen natural experiments. This makes it easier for students for the appropriate preparation when conducting trial lessons.

Before conducting the lesson, students are obliged to familiarize themselves with the aforementioned materials placed on the platform.

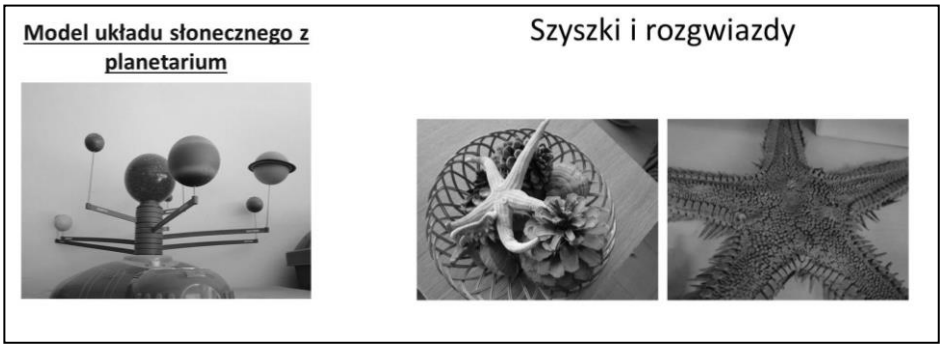

Figure 4. Screenshot of course materials about how to use the models in the classroom science placed on a platform of remote training.

*Source: Project materials POKL 03.03.02-00-006/11**

In the film, the title: "Teacher's demonstration" has showed a suggestion on how to conduct a science nature class, where the previous method of teaching was used. The teacher presents experiments at the demonstration table.

In the film titled "Teacher getting ready for the lesson", we present three stages of teacher's work before the lesson that is merit, methodological and formal preparation.

SUMMARY

The use of the remote learning platform OpenOLAT in preparing students for teaching natural science subjects in the context of pedagogical practices turned out to be the right choice. Both the user-friendliness of the platform and the ability to put on it various types of educational materials designed to conduct specialized vocational courses helped to improve the course of apprenticeships and support them with modern multilateral strategies to prepare students for the teacher profession. Thanks to the social networking functions of the platform, interpersonal communication between students and school tutors has increased. In our research, we found that in the initial stage of the preparation of students to conduct lessons, during which a large number of consultations is necessary, it is better to interact with a tutor from a distance. This is caused by the fact that students may at a convenient time fully describe which issue or encountered problem is interesting for them, and the guardians, in turn, at a convenient time for them may discuss the matter or help to solve the problem. It makes it easier in further stages of any cooperation while having direct communication between students with teachers, since most of the problems have been previously discussed and resolved. This allows students to look more positively at a tutor, especially when sharing their considerable age difference. It turned out, however, that undergoing courses by teachers - school tutors concerning the functioning and operation of remote learning platform, has led to tangible results. Teachers are able to effectively use the tools

provided on the remote learning platform. They efficiently design courses for the remote learning platform, manage them and communicate with the other users. In this way, teachers have broken their concerns regarding the use of new information technology tools in education. Studies have shown a more systematic work of students as well as teachers. This contributed to a better organization of student's working time while achieving better results in preparing students for teaching natural science subjects.

All of our studies and activities are aimed at the development of new standards for the implementation of pedagogical practices to prepare students to work as teachers of natural sciences and were carried out in the framework of an EU project on improving the quality of learning.

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Autors of figures:

Figure 1. Piotr Jagodziński, Robert Wolski

Figure 2,3,4. „*Nowoczesne strategie wielostronnego przygotowania studentów do zawodu nauczyciela, wspomagane internetowym systemem kształcenia. Przyroda w praktyce szkolnej.*" POKL 03.03.02-00-006/11 Project participants: Grażyna Rydlewska, Katarzyna Brzezińska, Jolanta Zakrzewska

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