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# Designing and application of E-portfolio for teacher training

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## Abstract:

*Portfolio is not just a magic word but it is mandatory for everyone in today's free market. Some companies started their own portfolios for employee assessment. Other has them for optimization purposes or even education. Each of us first encounter portfolio in schools. Big books with grades and other useful data were in them. In the teacher education we also have portfolios and the most important is teacher training portfolio. Based on this portfolios employees decide who to hire or not. With the introduction of Learning management systems and their application in the teacher training we find that we need them for e-portfolios for teacher training. In the article we will explain how we have managed to upgrade existing LMS (Moodle) with the e-portfolio module and our experiences using this software module in practice.*

## 1 Introduction

Educational institutions have different kinds of portfolios for students' evaluation. In the area of the teachers' education we need more elaborate portfolios. These portfolios have to incorporate the teachers' training. The theory itself is not enough for students to become teachers. Therefore an elaborate system of training was developed in the past. The main principles are the same all around the World. But now we are in the new development of educational system - Bologna declaration [1]. The benefits or drawbacks of the changes in the educational processes will be shown in the future [5].

The teacher training inevitably requires a support system [4] [6]. Each student has portfolio filled with the documents until the training is complete. Traditionally this was done just on paper and was subjected to the logistical problems. This was one reason that we started the project to develop the web application - e-portfolio. We need to develop the system specifications; and organizational and normative changes in the teaching practice according to new specifications. The e-portfolio was not meant to be stand alone application but incorporated into LMS (Learning Management System) as module [2]. This enables us broader functionality and better incorporation into other type of TSL (Teaching Study Learning) processes.

The aims of the e-portfolio are: []

- Elevation of the effectiveness and quality of practical pedagogical training; and achieving better students' competences.
- Improvement of computer supported document infrastructure for designing, monitoring and evaluating practical pedagogical training.
- Upgrading of current portfolios.

- Enhancement of pedagogical practical training model in the new Bologna study programs.
- Improvement of communication between students, didactics specialists and mentors in the area of pedagogical training.
- Broadening the quality of computer assisted education processes and elevating the computer literacy level of the pedagogical workers.

In our case we use LMS Moodle and we use Moodle's user authentication and additional tables in Moodle's database. This approach enables us to upgrade Moodle without the fear of losing our data. Since mentors also have access to the learning materials we prepare this builds a horizontal virtual community and strengthen the bond between different levels of education [3].

## 2 Requirement specifications

In our specific task we need to prepare the requirement specification for web application. With the team of didactics specialist from different scientific areas we manage to prepare the consensus and unify the procedures for teachers training. In this small scale test we tried three different types of teachers training. Therefore we cover computer science, geography, German language and we also have observation practice work for general pedagogy. In the beginning we find out that our work has slight differences but we could manage to make a common ground in our training procedures.

Teacher training in our country begins in third year of study. This is done in special didactics which present the students' learning specialty. Despite the differences in the preparation of the training and amount of ICT used in the training the general idea is the same. Students work under supervision of special didactics in schools where they start with the observation of the mentor. Mentor prepares the lecture for their pupils and our students observe how mentor carries out the lecture process. Later students prepare their lectures and have to present their work in the classroom full of pupils. Other students observe their schoolmates and in the end special didactics conduct a didactical analysis of the students' performance. Didactical analysis is done in three steps:

1. The first is the student who performs the lecture. He presents his observation of his work. What he thinks it was good, what was not good and what he would do if he needs to do the same lecture again.
2. The second is the student who was assigned to log the lecture and present his view about the performance of the teaching student and also present the topics he would do if he would be in the same situation.
3. The last one is the didactics specialist that makes the final assessment of student's performance and highlight the attending students what they might miss during the observation. He also encourages students to make creative solution about unforeseen situation that occurs in the classroom during the lecture.

Each student needs to be present on three observation and prepare one lectures.

Students can insert data about the observation of the lectures performed by mentor or his fellow student. But when student present the lecture special didactics specialist is the one who enters data to the web application because he is the one which assess the student's performance.

The second stage in student training program is practical work for two week per year. Students are assigned to different school and they work with the mentors. Because students have two subjects they have two week practice. One week for each studying subject of their specialty.

During the second stage didactics specialist's role is only observing the process of training. Only students and mentors are active in the second stage. Mentor assigns students different tasks and student needs to perform these tasks if he wants to get positive grade of the training. Student therefore needs to do observations, lectures and other educational activities. At the end mentor prepare the final assessment of student's performance in the practical training. Training is concluded when didactics specialist provide the combined assessment of student. The report of the training is signed by mentor and didactics specialist and deposit in the student's portfolio.

This was a short description of the procedures that needs to be followed in the teachers training. In the third year students have practice in primary schools and in the fourth year they have practice in the secondary schools. Description of these procedures was the basics for our software development. But the real aim of the software development was the ease of communication between students, mentors and didactics specialist. Until this project has shown some results all procedures were done in paper form. Forms were sending by the Post or students carried them in their portfolios. Sometimes (even not rarely) some documents can get lost and additional resending is needed.

### 3 System analysis

The description we receive was good for start. We could identify all involving objects in the process. There are three types of users involved in the process: didactics specialists, mentors and students. We have identified the attributes we need for each of them and then prepare the UML diagram (Fig. 1).

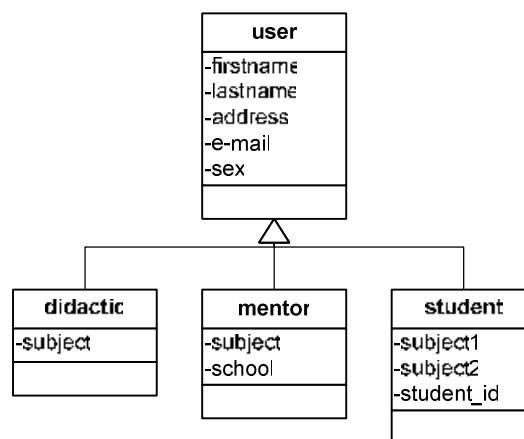


Fig 1: UML diagram - participants

As we can see in the Fig. 1 there are some reasonable constraints. The didactics specialists can cover only one studying subject. The same applies to the mentor but students can have two different studying subjects. How to deal with the exceptions? If a didactics specialist is for two studying subject then he will be treated as two different didactics specialists with one studying subject. This principle can be applied in mentor and student as well.

Student training consist of two stages. The first stage is general observation under supervision of the didactics specialist and the second is practical training in schools (Fig. 2).

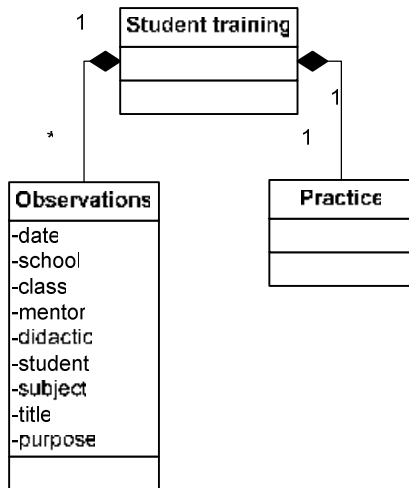


Fig 2: UML - Student training

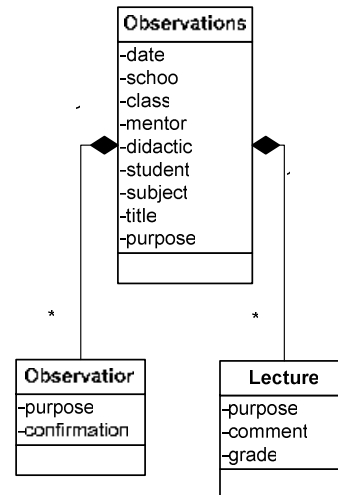


Fig 3: UML - General observations

As we can see student need more than one observation and only one practice training during one year. The required attributes in the observation are date when the observation was performed, school, and class in which the observation was performed. Mentor, didactics specialist and student are needed for data accessing purpose. Didactics specialist can see data about all his students and mentors. Mentor can see only his students and student can see only his data. The title is required and is in the accordance with the curriculum. The purpose of the observation is different depending on type of observation.

In the Fig. 3 we can see two types of observations. Observing the diagram we can see that the observations consist of observations and lectures. Why are the lectures included into observation? This was something that was very confusing in the first place for us to. But when didactics specialist explains us that student observe lectures either performed by mentor or by their fellow students this seems reasonable enough. Confirmation in the object "Observation" means didactics specialist's confirmation that students actually participate in observation. When student perform the lecture he is also graded (using three grade level insufficient, good, very good).

During the practical training in the schools under supervision of mentors students need to perform different tasks (Fig 4). With the interviews we reach the agreement that practical training starts with the initial meeting where mentor prepare the plan for student. From our perspective we need only the date. Didactics specialists suggested that they do not need additional information. Mentors only task is therefore to select a student and confirm that he did have meeting with the student. Student's training is completed on the date when he has the final meeting with the mentor. At that time the mentor confirms the event and prepares the analysis.

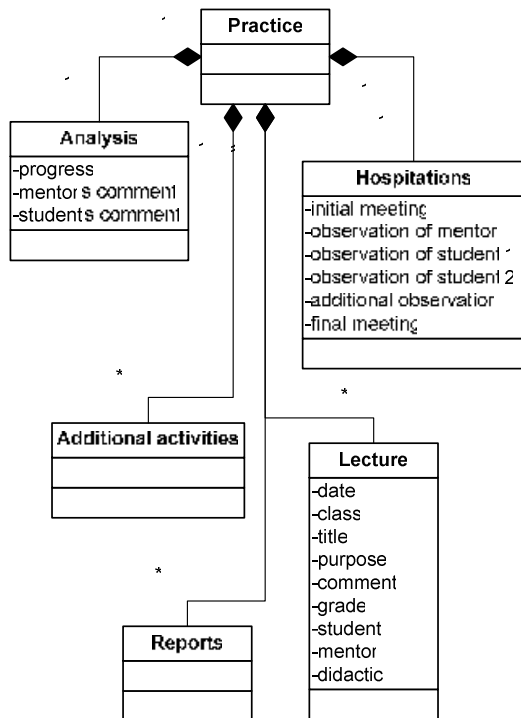


Fig 4: UML - Pedagogical practice

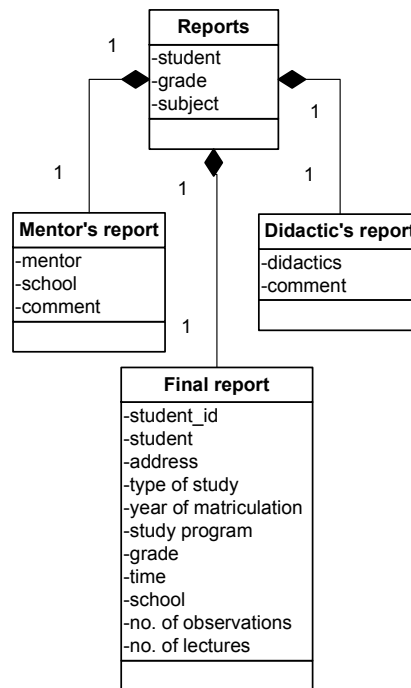


Fig. 5: UML - Reports

Student needs three observations during his training in the school and up to six lectures. The lecture resembles the structure of the lectures in the first stage of the teacher training. The difference is that mentor grades the student. In the analysis the mentor assess student's progress with values (yes, partially or no). In the comment field the mentor prepare short commentary text about the overall student performance and gives some guidelines to the future student's work. Student has the possibility to comment his performance. The "additional activities" are grouped into different segments where student need to fulfil at least five of additional activities.

There are three types of report: (Fig 5)

- Mentor's report
- Didactics specialist's report and
- Final report

Despite the number of attributes we have in the final report all these data are already present in the system

Student training consist of two stages. The first stage is general observation under supervision of the didactics specialist and the second is practical training in schools.

The dynamic of the application can be best shown with the sequence diagram. For the purpose of this article we will not prepare sequence diagrams for all application but only for those that are in the mainstream of the application. We will omit in our diagrams actors which can only review data. In the Fig. 6 a sequence diagram for observation is presented. The sequence diagram for lecture is even simpler as shown in Fig. 7.

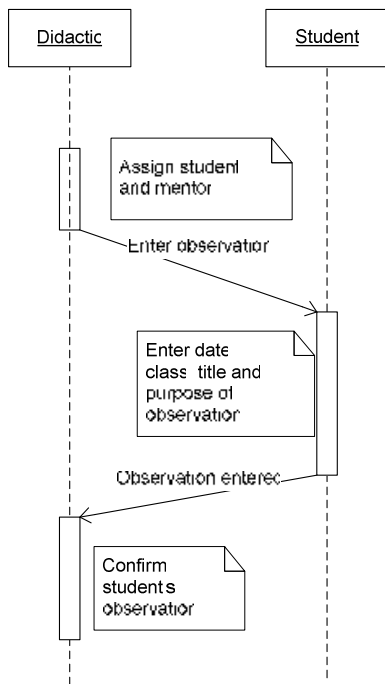


Fig. 6: Sequence diagram for student observation

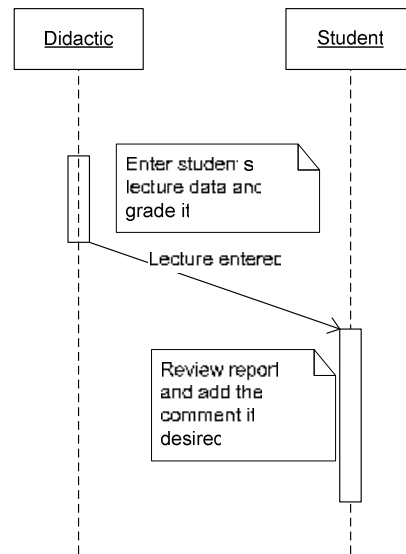


Fig. 7: Sequence diagram for lecture

In the second stage - practice training in school we see that all parties are involved but most work is done by the mentor.

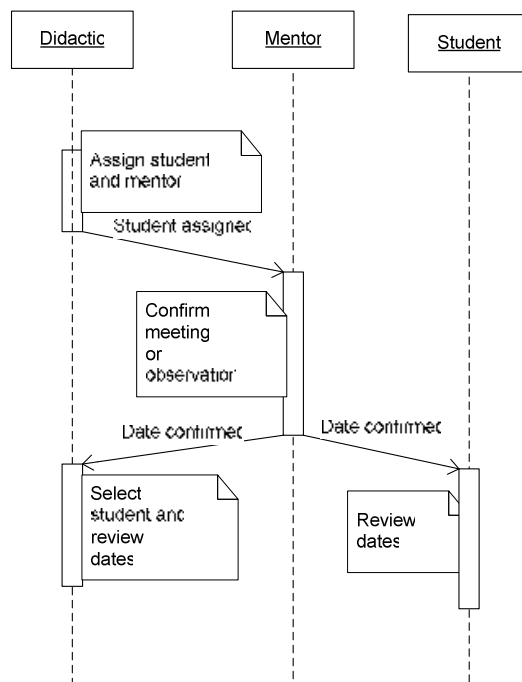


Fig. 8: Sequence diagram for observations and meetings (Class Hospitations fig. 4)

The same procedures are true for the lectures, other student's activities and student's analysis.

## 4 Results

When the application becomes functional and successfully passed series of tests we prepare workshop for involved mentors and students. In one day workshop all grasp the concept of the application and acquire knowledge to work with it. In the pilot project 6 university lectures and assistants were involved, 13 mentors in primary and secondary schools, and 24 students from 3<sup>rd</sup> and 4<sup>th</sup> year of study.

At the end we send the questionnaire to all involved students and mentors. We received response from 15 students and 10 mentors. We present only those questions that are addressed to the e-portfolio.

Question 1: How would you grade the e-portfolio?

| answer    | #  | %  |
|-----------|----|----|
| good      | 18 | 72 |
| very good | 6  | 24 |
| undecided | 1  | 4  |

Question 2: Why do you think e-portfolio is good?

| Proposed answer       | #  | %  |
|-----------------------|----|----|
| instant communication | 15 | 60 |
| simplicity            | 12 | 48 |
| usefulness            | 2  | 8  |

All participants agree that this approach is very economical and should be used in the future. Some mentors who cover two teaching subjects but were involved in the project with just one express a disappointment because they wanted this approach in both of their teaching areas. One mentor said that the e-portfolio have a major flaw because it does not allow to enter multiple activities at once. He stress that three mouse clicks is not practical in entering one activity. We were aware of this problem which should not be a problem if mentor would enter data regularly. But if he enters data at the end of the training period then this is a problem. We change the behaviour of the program and now only two clicks are needed for entering additional activity.

We also got suggestion how to change the e-portfolio. One mentor suggested extending additional activities with projects where the schools participate. Second mentor suggested that mentors should enter comment only once. These two suggestions are taken in the consideration but we are relented to make changes. Not all schools participate in the projects and the other comment of the mentor is the final comment of the teacher training.

We have also found that most problems were caused by the fact that users were allowed to enter the data only once. But they could always report mistake and administrator would enable them to reenter data. But in one single case we have mentor who said that she won't participate any more. This seems to her as huge additional work and she did not have time for such work. We did not expect this but it happens. We have also gain good lecture from this example and could be summarized in one sentence: "Never use 'old' teachers in pilot project".

## 5 Conclusion

Development of software modules for open source LMS is sometimes needed if LMS does not support educational needs. Teachers training e-portfolio module was very useful in many ways:

- It provides better understanding between involved parties.



- It speeds up the communication.
- It provides a good example for computer science teachers.

At the end of pilot test project we find out that it was very good accepted between ICT aware teachers - mentors and in all participating students. The initial response shows us that we need to continue our development. We expect that more functions of the e-portfolio module would be needed when we put the application into the wider use. Nice side-effect of this module is the creation of the awareness that information technology is important and should be used in all topics of educational process.

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