

Web 2.0 in Educational Practice – A Decade of Experience

Zoran Putnik, Mirjana Ivanović, Zoran Budimac

Abstract: *In this paper, we present our good experiences gained with the employment of the elements of Web 2.0 technology in education. With the help of underlying Moodle LMS at our Department we managed to incorporate all of the typical building blocks of contemporary Internet communication and social services in everyday educational activities. With such a long experience, we also managed to conduct several surveys among both students and professors, and draw inside information about the opinions and feelings of services users. Generally speaking, opinions are positive within both groups of users, yet they differ between services, making some of them favourites, while the others are still left only as a not-so-much-used possibility.*

Key words: *Web 2.0 services; eLearning; Computers in education.*

INTRODUCTION

Present-day eLearning is commonly organized and presented through online courses. As a consequence, learning management systems (LMS) are the prevailing underlying technology employed today for delivery and organization of educational activities. Organization of the learning content is usually given in a course-like form, and only after that courses can be divided into modules and lessons, enhanced with quizzes and tests, supplemented with assignments, forums, discussions, etc. Not rare is the situation that those systems are also integrated into institutions' student information systems.

Yet, as time goes by, it can be noticed that the order of importance of individual elements of eLearning has changed. As recognized in [1], the Web is shifting from being a medium, in which information is transmitted and consumed, into being a platform, in which content is created, shared, repurposed, and passed along. As a part of education, this is realized through the development of elements of Web 2.0, and consequently eLearning 2.0. Those elements deal with promotion of active students' participation in creation and use of educational resources, through open applications and services of Web 2.0. The main reason is the fact that eLearning 2.0 is strongly aiming at collaborative nature of learning, focusing on content merging, its reuse, adaptation, and personalization [4]. More and more eLearning materials are produced and revised by students, in collaboration and with the help of lecturers, who take the role of moderators, mentors, and mediators.

At our Department, we had at least two problems that made the use of electronic activities obligatory. Majority of our master students are already employed, being thus unable to attend regular classes. Varying from year to year, number of such students is usually around 90%, but each year almost certainly above 75%. The second problem is the fact that within the master studies in the "Software Engineering" field created as a part of a Tempus supported project (<http://perun.pmf.uns.ac.rs/msc-se/>), we combine students from two countries and three universities, making it even more difficult to conduct classes.

This paper presents the results of the empirical research based on about a decade of experiences in using elements of Web 2.0 and in particular eLearning 2.0 in the most of the computer science courses at our Department [8]. Our goal was, not only to give students a possibility to learn how to use Web 2.0 services and tools, but also to help them in gaining soft skills, valuable experience, and knowledge to apply teamwork. We estimate that institutions teaching computer science, as well as those that are currently under pressure to incorporate more interactive Web 2.0 tools in their teaching practice could benefit from our experience.

The paper is organized as follows. In Section 2 we give some insight into research endeavors similar to ours. Section 3 presents the experiences gained over the last decade of implementation of Web 2.0 in teaching, at our institution. Conclusions are drawn in Section 5 to foster future research and innovations in online teaching practice.

RELATED WORK

Recently, a lot of discussion about inclusion of Web 2.0 tools into educational environments can be found. In [18], it is said that "Given that people are apparently willing to collaborate, work and spend leisure time engaging with Web 2.0 technologies, it seems likely that educational interests may also benefit from adapting teaching practices, curricula and educational tools to exploit the social process and network benefits provided by Web 2.0." Of the similar opinion are authors in [5] about the influence of Web 2.0 on teaching. They claim that "Technological tools, such as instant messaging, forums and chats, allow students to share each member's unique capabilities and knowledge, bringing the synergetic effect to life." Obviously, it is no longer sufficient to give students an access to their study packs, assignments and assessment, we must also allow them to actively collaborate on a social networking basis says Reynard in [16] and Zdravkova et al. in [19].

Similar in [3] a variety of features linked to eLearning, teamwork, and social networks were analyzed. Authors tried to describe social networks between students, analysing LMS log files, looking for "... latent ties in these collections, which can also be interpreted as social network". On the opposite [11], it is noted that students don't want to use LMS as a social network, and also don't like to communicate with teachers in such spaces.

There is a lot of other reports and articles dealing with the use of Web 2.0 in education, too many to be mentioned here, so we'll give only the brief description of some: analysis in [18] was based on the observation of student access and use of educational tools and anonymous recording of student experiences with use of social software. Another view of educational activities is given in [5], concluding that use of social tools allows students to share capabilities and knowledge, bringing the synergetic effect to learning and life. Finally, paper [1] presents the results of an empirical survey highlighting the benefits of the Web-based social software tools from the student's point of view.

CASE STUDY

From available electronic activities employed at the Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad, some were used with more, others with less success, as we will describe here.

Discussion forums

As a type of assignment within our different courses, students needed to write a joint seminar paper (teamwork of 4 to 5 students). For start, to enable easy communication within a team, we organized forums as a place for discussions about both organizational and research issues. As time went on, students started exchanging ideas within forums, quoted things they found on the Internet connected to their tasks and similar. This later influenced positively their work in solving the assignment. Encouraging consequences that forums brought in our case, confirmed to the ideas found in literature. A significant number of formerly silent and introvert students, never sharing opinions at "live" classes, started discussing, thus adding to the increasing quality of the solutions. At the same time, intrusive students were moderate compared with their standard behaviour.

In several of our courses where forums were employed, they were used generally in twofold manner. The first scheme was to provide a topic for discussion, and sufficient

time to perform a research. Over the next period, lecturers rated each post of each student publicly! The method was welcomed by students, since at each moment they were aware of their grade and status, being able to invest additional work if needed/wanted. As we presented in [7], privacy concerns with the forum use are much lower than what we could expect, and our students preferred “transparency of grading” more than they were afraid of possible misconducts. Even though topics to be discussed were precisely defined, quite often discussions diverged to various directions, touching all of the matters connected to the original, while being interesting for students.

The other method applied was a classical “role-playing game” methodology. Some real life problem was invented and students were given their roles in it. They were required to argue and defend attitudes of their role, to study and explore deeper into articles and books on the Internet, and finally present their results to the others.

Chat rooms

Chat rooms were not such a widely and successfully employed method – at least at our Department. The whole concept of chat rooms somehow goes against some of the very reasons why we employed elements of Web 2.0 in teaching. Namely, students who are not able to attend classes because they are employed are even less likely to attend chat rooms. So, both in practice, where they were not used much, and in surveys, chat rooms were graded relatively negative by students. What is interesting is the fact that it was suggested by several students that it would be better to exchange chat rooms with “asynchronous version of the same thing” as they named it, i.e. discussion forums.

Still, as the main reasons for not being interested to use chat rooms, students mentioned that the great quantity of teaching materials, supporting texts, and links towards state-of-the-art news connected with the topic was more than sufficient to be in line with the lecture. Another “excuse” to avoid chats was that they were not as obvious and transparent as news forums.

Blogs

Situation with the blogs was rather interesting. Originally, they were intended for exchange of opinions and solving of technical problems. Students’ opinion was not only divided, but totally opposed. Part of the students was exclusively against, suggesting news forums instead, while those who were otherwise active in blogging insisted to extensively use them. As a solution, a compromise was invented, to exclude internal blogs from the course, but to value external student blogs as bonus activity.

Wikis

Wiki technology is by far best used and tested at our Department, compared to other Web 2.0 tools. First, let us mention that our students had absolutely no objections to the technical part of wiki use, including even the freshmen students. Consequently, no additional time was spent on explanations or lectures of wiki use; students were simply given the assignment, the deadline and were divided into teams randomly by our LMS.

Technical burden of wikis was solved by LMS Moodle [17], including the possibility to restrict the approach to solutions of other teams. Besides developing teamwork attitude, the best thing achieved was introduction of more fair and honest grading of teamwork assignments. After seven years of assignments followed by the complaints of unfair grading, with wikis all of the students were satisfied! Namely – “history” option allowed insight into who-did-what for creating a solution, and gave us a chance for fair grading, as explained in [12] and [13]. This problem with team assignments is not uncommon, and it was reported from other universities as well: “Overall participation

can be high, but often a relatively small proportion of students perform the bulk of the work and many students' contributions can be regarded as superficial" [9].

Similar as with the discussion forums, wikis were used in two different ways:

- *Independent wikis* – created to be used for analysis of several aspects of a given topics, in which students were required to select a topic and then research and jointly write a seminar paper about it, with the other students who selected the same topic.

- *Discussion based wikis* – where it's not just that teams were defined in advance, but roles in a team were also given (chief, moderator, researcher, editor, and similar).

One more interesting point deserves to be mentioned here, while more about it can be found in [14]. We noticed the fact that with each new generation of students, we have less problems or need for explanation about "how to use wiki". It can be estimated fairly precise that students come to us already prepared and well-informed concerning technical part of use of eLearning, leaving us considerably more time to deal with the real learning.

Quizzes and Glossaries

Automatic, electronic quizzes often raise a discussion whether and how much they can be used in actual teaching. Without a wish to resolve this issue, we decided to use them to raise the quality level of teaching and developed a question database for self-testing within several of courses. Sometimes, we employed our students to help us with the questions creation, as described in [15]. Regardless of mentioned doubts, at some courses we even experimented with actual testing for points and grades, but we still do not have enough data and experiences to talk more about that. Yet, self-testing was accepted correctly, without too much enthusiasm though. In a survey, the main positive thing considering the quizzes were students' evaluations that those are needed to show estimate of the types and difficulty of questions they can expect for the exam. As a second point, ability to recognize the areas they have to study more was also mention.

Glossaries, on the other hand were not as successful as we expected. Our plan was to use them as a collection of less known concept, definitions, or theorems, just an easy method of reminding oneself about the notions used. In practice, glossaries were used only sporadically, while in surveys being assessed as "not important", "not needed", and "not particularly useful".

Assignments

The last electronic activity that was used over the years within several of eCourses was online assignments (including their online grading). As mentioned, participation and posts in discussion forums was graded immediately, but that was not all. Assignments solved through wiki tool were also graded online, with grades being available to students while the courses still lasted. Even for those tasks that were originally solved off-line and simply submitted to LMS Moodle, grades were available within a system.

While this practice is in some articles challenged for the privacy issues, research we performed shows different results. Our students prefer this "public" method, consider it as a way to provide transparent and fair conditions, and do not mind if their colleagues can see their grades, which we described further in [6] and [7].

Customization of LMS Moodle

Over the years, as expected, there were certain features that LMS Moodle didn't cover as we would like it to, and that needed some further development. So, LMS Moodle was enriched with customizations made by our research group members.

The most of the customization was connected with eLessons, and with the method for students to explicitly choose different paths through them, or be directed to different

parts of the instructional material based on their answers to given questions. To perform this, some essential LMS features were required, and consequently developed [10]:

- advanced branching,
- interconnections between learning objects within an eLesson,
- possibilities to reuse some parts of eLessons by connecting them vertically,
- pre-/post-test services and associated sequencing with or without remediation.

As a consequence, students, while going through an eLesson, enter dedicated clusters of questions, give answers, and receive feedback and further explanations, including personalized advices on how to continue their learning paths.

Besides these, programming customization, the basic and more needed one was also performed. A complete translation of Moodle interface, both in Latin and Cyrillic version has been performed. Later on, it was accepted by Moodle consortium as official Serbian language pack(s).

CONCLUSIONS AND FUTURE WORK

During around a decade, our Department have experienced the continual transformation of learning style in our computer science courses from pure eLearning 1.0 towards eLearning 2.0. Social networking and collaborative techniques were progressively launched and established replacing traditional seminal works, or written and oral examinations. There are many apparent benefits of this approach. Undoubtedly, the most important are minimized plagiarism, socialization, common collaboration, effective and objective grading, increased consciousness, and last, but not the least, satisfaction with the implementation of Web 2.0.

Although work on the development of eLearning facilities and their further use requires a lot of effort from both students and lecturers, since its benefits are substantial we believe it is worth the effort. The other gains we recognized over the years are:

- larger participation of students in course activities,
- their improved acceptance and understanding of the material,
- larger percentage of retention of the gained knowledge,
- mastery of soft skills,
- increased enthusiasm for self-directed learning.

It is certain that application of Web 2.0 tools and techniques requires significant additional work and a lot of changes in lecturers' habits, but our research show that those are very advisable. Lecturer was able to distinguish both looking at students' answers in surveys, and by simple observation of students' behavior, which of the Web 2.0 activities have their value and future in education, but also which of them require some additional refinement.

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ABOUT THE AUTHORS

Assistant Professor Zoran Putnik, PhD, Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad, Serbia, Phone: +381 21 458 888, E-mail: putnik@dmi.uns.ac.rs

Professor Mirjana Ivanović, PhD, Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad, Serbia, Phone: +381 21 458 888, E-mail: mira@dmi.uns.ac.rs

Professor Zoran Budimac, PhD, Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad, Serbia, Phone: +381 21 458 888, E-mail: zjb@dmi.uns.ac.rs

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