Students' Acceptance of Peer Review

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Abstract. Peer review technique used in educational context could be beneficial for students from several points of view. Besides of developing students' writing skills, critical thinking, practising articulation of own knowledge to the others and giving them feedback, it can encourage collaborative learning and boost the students' interest in the course. In our web design course we successfully introduced peer review activities more than 2 years ago. In this paper we discuss the students' acceptance of peer review applied on evaluation of other students' projects.

Keywords: Peer review · Projects · Students opinions

1 Introduction

Peer review is widespread in many professional fields, e.g. science, engineering, health care, etc. In this process a paper, a software, or any other work outcome is assessed by a specialist who is of equivalent expertise level to the author. The goal of peer review is not only to evaluate the work but also to suggest how to improve its quality by adjusting and supplementing the content and the form.

According to the experience reported by several publications [11,13,14], the peer review approach can also be useful also in the educational context. The outcomes of published studies confirm that thanks to the reciprocal evaluation of the colleagues' work the students could better develop their communication skills, critical and analytical thinking, constructive criticism, social learning etc. Additionally, this activity could also boost the students' interest in the course.

Therefore, more than two years ago we started to employ this activity into our course aiming to bolster up students' motivation for learning, course activities and for the course subject itself. At first, peer reviews were integrated with blogging which was also part of the course activities [1] – students evaluated the blog articles of their peers. Based on our previous research results we can confirm that students engagement in blog-based activities as well as their study results significantly improved after peer review was introduced. Despite the extensive involvement and better grading several students expressed their dislike for these activities, especially for blogging. Since we rated peer reviewing to be particularly beneficial for students, we adjusted the course activities next academic year and let students to peer-review their projects. As presented in this paper, after this change the preliminary results for students' acceptance of peer reviews are satisfactory.

2   Related Work

The most common way of employing peer review into course activities is the mutual students evaluation of essays [8] or blog articles [10,15]. As stated in several studies [2,8], students tend to give better rating to their peers than the teacher gives. In spite of this fact, it is possible to identify weaker works based on the students' peer reviews [2].

MacAlpine [12] and Gehringer [6], who deal with the format of peer review, point out the importance of prescribed peer review structure and good specification of all criteria and aspects to be assessed.

Gehringer [5] successfully used peer review also in other educational activities such as annotating lecture notes, collecting sources related to the course topic, creating test questions, making up a problem on some topic, etc. In some assignments, after initial feedback phase students are enabled to correct the errors pointed out by reviewers. Besides the reviewing others work students also evaluate the usefulness of the reviews they got from colleagues to their own work.

The peer review technique was also used to determine the relative contribution of each group member working on a group project assignment [9].

3   Course Description

Our research was conducted on a web design course that is obligatory part of master study program in Applied Informatics. Besides of masters students many bachelor students voluntarily enroll in this course every year.

The course focuses on front-end web design issues including both desktop and mobile websites and concentrates predominantly on web design methodology (such as prototyping, usability testing, and user centered design) and web quality standards (accessibility and usability, content quality standards, etc.).

Lectures and practicals comprised in the course are not mandatory. The main course activity is a project – a full semester assignment that constitutes one of the essential parts of course evaluation. Apart from the project the course evaluation includes written exams (midterm and final) and extra points for activity during practicals. The best grading students can get for the points earned for all these activities is C (on the scale A, B, C, D, E, Fx, where Fx stands for a failure). The best students are allowed to improve their grading at an oral exam.

The main objective of the project is to practise the knowledge and skills the students are supposed to master during the course. Therefore the project assignment for every particular student is to develop her personal blog with typical blog features, both in desktop and mobile version, including sufficient amount of meaningful content. In the past runs of the course, the assignment was only evaluated as one final submission. As we observed that the students only started to work on the project a few days before the deadline, several years ago, we split the project into three phases, each of them evaluated independently. Thus the students had to spend more time working on the assignment what brought about better learning outcomes. For further improvement, in the last semester each of the phases was supplemented with a peer review round.

4   Peer Review

In the course of each project phase students had to meet three deadlines. Firstly they developed their web application according to the current phase requirements. Consecutively they submitted the project for the peer review in a predetermined deadline. Each student, who successfully submitted her assignment in the given phase, was assigned three randomly chosen submissions to review. The reviewing period took approximately 3–4 days (second deadline). After reviews were delivered, the authors were given few days for correcting their projects according to the peers' comments (hereafter, the *project improvement phase*). Only after this phase projects were submitted for teacher's evaluation (third deadline).

Since the students were not skilled in evaluating others work, a structured review form with several questions was prepared to facilitate the reviewing process. The questions in the form were different in each of the three phases and were directed towards the goals of each phase. They more or less covered the evaluation criteria used by the instructors. The reviewer had to answer each question with a rating ranging from 1 (very poor) to 5 (excellent), and in addition had to provide a verbal justification for the given rating. The reviews were blind i.e., the reviewers knew the identity of the authors but not vice versa. More detailed information about this peer review methodology and project phases can be found in [3,7].

5   Research of Students' Acceptance

To find out the level of students' acceptance of peer review strategies used in the course, we prepared an anonymous questionnaire. Although participation was optional, the questionnaire was completed by 54 students (93.10 %).

5.1   Questionnaire Description

Questionnaire consisted of 16 (semi)-closed questions with possibility to choose more than one option in most cases. Questions were divided into two sections: the first one was focused on students' opinions about peer review in their learning and the second one was oriented to the overall course evaluation. In fact, the latter section comprised the same questions as those in the official Student Questionnaire provided by faculty every semester. We used this strategy with the aim to reveal the differences between results in our and official Student Questionnaire, as discussed in our other paper [4].

5.2   Outcomes

Initial question explored various benefits of reviews given to a student by her peers. As shown in Fig. 1, nearly all students chose the option: *to correct omitted deficiencies*. However, more than a third of respondents admitted that the
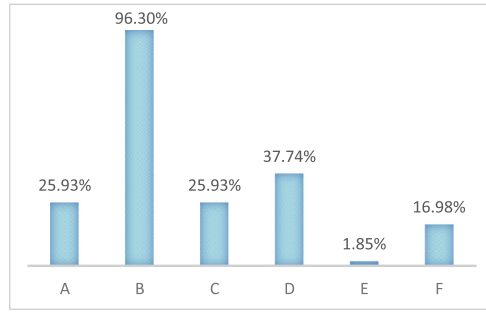
Fig. 1. What were benefits of received peer reviews for you? A: to better understand project assignment; B: to correct omitted deficiencies; C: to correct deficiencies I was not able to solve; D: to improve in my reviewing; E: nothing; F: other

reviews received from their peers helped them to improve their own reviewing skills, and a quarter of them could now solve some issues that they were not able to solve before reviewing. Also, one quarter of students averred that their understanding of project assignment improved after they received reviews.

If student chose the option *other*, she should explain it. In some of these cases students appreciated the possibility to gain another opinion to their work: *I got alternative view on my project*; or *viewing other projects inspired me in my work*. However, there were also a comments like: *I "corrected" stuffs that were correct, according to bad advices of my reviewers*. Since we expected such situations, students were asked to specify their experience with incorrect advices.

At first we asked whether they corrected their projects before final submission according to reviewers' advices. Although there were five options, students chose only 3 of them or did not answer (Fig. 2(a)). Skipped options were as follows: *despite the criticism I did not correct my project* and *I had no criticism*.

50.94 % of respondents claimed that they fixed all shortcomings found by their reviewers and 45.28 % of respondents fixed approximately a half of all deficiencies.

Since we assumed that students would not correct all admonished shortcomings, we also explored their reasons to do so (Fig. 2 (b)). The most often selected option (*I ignored bad advices from my peers* – 66.04 %) indicates that the students are able to distinguish right advices from wrong ones. 15.09 % of students claimed that they did not have enough time to make corrections and almost 10 % of them admitted their laziness to work on projects.

Peer review process could also be beneficial to the reviewer. Therefore we asked students whether they gain some benefits while reviewing others' work. We expected the most popular option would be *I could gain more points*. However, although 61.11 % of respondents chose it, there were even more students (68.52 %) who stated that they realized shortcomings in their own projects thanks to the reviewing projects of their peers (Fig. 3). Also the fact that only 3.70 % of students claimed that peer review was not beneficial to them can be taken for a good result.
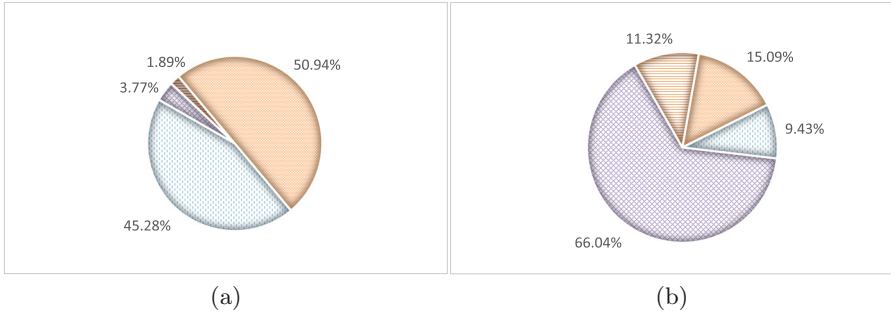
(a)   (b)

Fig. 2. (a) Did you correct your project according to reviews before final submission? ▨ yes, everything ▨ yes, a half ▨ yes, but only a few things ≡ no answer; (b) In case you did not change your project according to reviews, why did you do so? ▨ I did not have enough time ▨ I was lazy to do so ▨ I ignored bad advices from my peers ≡ no answer
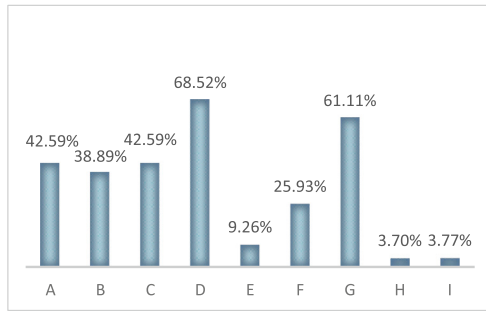

Fig. 3. Do you think that you gain some benefits while reviewing others' work? A: I learned how to test web projects; B: I learned how the project assignment was perceived by my peers; C: I realized how many different types of mistakes can appear on websites; D: I realized shortcomings in my project during peer reviewing; E: I trained my verbal skills; F: I learned how to give constructive criticism; G: I could gain more points; H: nothing; I: other

While many students welcomed the project improvement phase, there were also some who tended to abuse this new option. Reviews they got from their peers did not influence their final grade and therefore some of them had submitted an incomplete project intending to finish it during the reviewing phase. Accordingly to this, we asked students whether projects they reviewed were appropriately finished considering the respective project phase. As depicted in Fig. 4 (a), 3.77 % of students stated that *all* of projects and 81.13 % of students stated that *most* of projects they had reviewed were finished.

In the next question, we explored how students perceived the unfinished projects. 57.41 % of respondents declared that they reviewed unfinished projects that were assembled during reviewing process and it was not a problem for
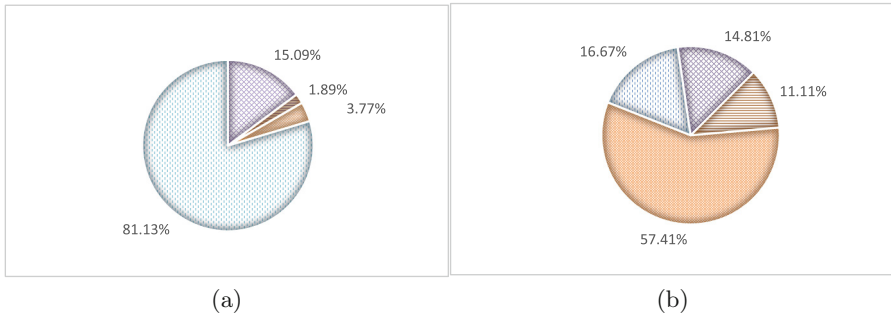
(a)   (b)

Fig. 4. (a) Were all projects you reviewed finished and prepared for reviewing? ▨ all finished almost all finished ▦ almost all unfinished ≡ all unfinished; (b) What was your experience with unfinished projects? ▨ some peers worked on their projects during reviewing, but it was OK for me ▦ some peers worked on their projects during reviewing that caused an obstacle to reviewing ▦ it motivated me to submit my project in next phase more finished ≡ I did not review unfinished projects
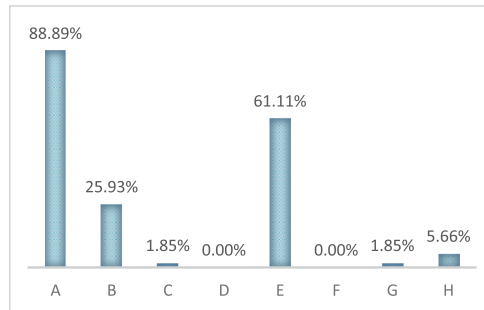

Fig. 5. Do you think that the chance to correct your project before final submission was beneficial to you? How? A: I had a chance to get more points for the project; B: peers gave me advices how to remove mistakes I was not able to solve; C: it helped me, but they gave me also bad advices and I lost points because of it; D: most of peers' advices were bad, it did not help me; E: I got extra time; F: it was not beneficial to me; G: I do not consider submitting projects this way as a fair option; H: other

them (Fig. 4 (b)). On the other hand, 16.67 % of students considered reviewing unfinished projects as a difficult task.

The last question focused on the perceived benefits of the project improvement phase. Definitely the most popular option was the first one: *I had a chance to get more points for the project*, since 88.89 % of respondents chose it (Fig. 5). Students also appreciated extra time they got for final submission (61.11 %) and a quarter of participants welcomed the project improvement phase since their reviewers helped them in eliminating mistakes. The fact, that options *It was not beneficial to me* and *most of peers' advices were bad, so it did not help me* were not chosen by any student, is very satisfying.
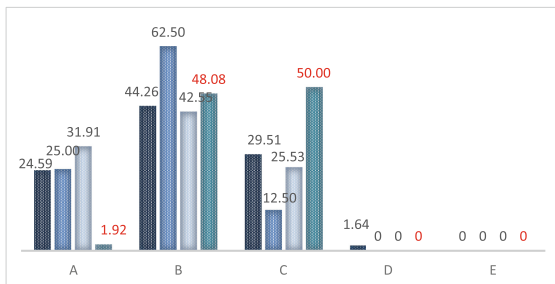
Fig. 6. Was the amount of work appropriate considering the number of credits? A: Absolute killer; B: Too much; C: Just right; D: Too little; E: What work? ▨ 2011 ▨ 2012 ☐ 2013 ▥ 2014 (our questionnaire)

In the end we focused to the amount of work required from students in our course. As the official Student Questionnaire provided by faculty regularly deals with this question we were able to compare results from previous years with the answers from our questionnaire. To answer this question, respondents could choose one of five options (see Fig. 6), where the middle one is the most positive: *Just right*. As it is shown in the same figure this year's results are more positive than those from previous years. While students tended to evaluate amount of work mostly as *absolute killer* (31.91 % in 2013) or *too much* (42.55 % in 2013) and only about a quarter of them considered it as *just right* in previous years, the result from our questionnaire in 2014 is completely different. 50 % of students considered the amount of work as *just right* and 48.08 % of students marked it as *too much*. An option *absolute killer* was selected only by 1.92 % of respondents.

6   Conclusion and Future Work

Peer review is an activity which, combined with an appropriate methodology and suitable educational context, can become a powerful tool bringing numerous benefits to students as well as to teachers.

In this paper we focused on peer review activities integrated into a web design university course. Despite the fact that our previous attempt to combine peer review with blogging activities was attended by higher engagement of students and significantly improved study outcomes as well, students were not satisfied with this activity. Therefore we used peer review in combination with project assignment in the last course run. The aim of this study was to find out the attitude of our students to this educational activity in the changed conditions.

According to the results from the questionnaire conducted in the end of semester, the redesigned activity was positively accepted by students. They considered it not as a task created for its own sake, but as an activity that brought added value in their learning.

In our future teaching activities, peer review will be used in combination with group projects where group members will review each others' work. This approach

can bring benefits not only to students but it can also help teachers in more fair evaluation of individuals.

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