Motivational Effect of Peer Review
in Blog-Based Activities

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Abstract. Use of blogging activities in university courses has been showed to improve the primary learning outcomes while additionally reinforcing important professional communication skills. In order to fully use the potential of blogging lack of students' motivation to fully engage in the process may pose a major obstacle. It is not sufficient just to publish a few blog articles; instead, following the classmates' blogs and active participation in the discussions is vital to achieve desired results. In this paper we show that incorporating well organized peer review rounds into the process significantly increased students' participation, and in addition the benefits of such an exercise were perceived positively by the students.

Keywords: Blogging, engagement, motivation, peer review, social learning.

1   Introduction

Blogging has a well recognized potential as a learning activity [7]. As confirmed by a number of publications (e.g. [7,12,8,4]), together with other Web 2.0 tools it is well aligned with the essential features of educational theories such as social constructivism [2], constructionism [9], and connectivism [13] that perceive learning as a social process in which the knowledge is constructed in cooperation with others using the network technologies. These novel approaches in learning foster creative and collaborative work focused on construction of new knowledge, and they have potential to make the learning process more absorbing and even amusing for the students [10].

Encouraged by these findings, we have started to integrate blogging assignments into university courses as of 2006 [3]. It turned out that combining blogging with organized curricula and integrating it into course work is not a trivial task. Students are not always willing to undergo additional assignments just "for free" without any evaluation reward, while other students may object including such non-traditional assignments into their evaluation. In addition, involving students in active follow up and commenting on their colleagues blogs, which is an integral part of this activity, may be even harder task to accomplish. In our experience ill-organized blogging assignments may easily turn into write-only activity, negating most of their goals.

Aiming to overcome these issues, we have resorted to peer-reviewing process, which was found beneficial by other researches in the field [6,5,15,14,11]. Our main goals

were to boost students' motivation and to increase their engagement in the blogging assignment. With help of our master student we have developed a dedicated tool for article submission, reviewing and organization of the process. The activity was well planned, with alternating writing and feedback rounds spread throughout the semester. Our first results after the first semester in which the system was applied are presented in this paper. We have observed a significant increase in the participation, and also in the overall engagement of our students. Apart from these observations we also saw improved grading, and we have conducted a questionnaire survey of the students' opinions in which the majority of students find the new reviewing process beneficial and useful.

2   Past Experience

Among the courses where we have employed blogging assignments were two courses of the applied informatics study programme: (a) Modern Approaches to Web Design (MAWD), which is mandatory at the master level however a number of bachelor students take it as optional course each year, blogging was included already as of 2006; and (b) Algorithms and Data Structures (ADS), a mandatory course of the bachelor level, which included blogging in 2009–2010 and in 2012 (see our previous report [3] for some more details on how blogs are used by the MAWD course). Both courses implemented so called *professional blogging* assignment where students are asked to publish blog articles on topics of their choice in order to share interesting additional information related to the course, their experience, and opinions.

The activity was extended throughout all semester, and it was not completely mandatory though it contributed to the grading by certain amount of points. The assessment methodology was slightly adjusted each year. The implementation of the assignment differed in each course, as we shall explain.

In the MAWD course, students received a certain number of evaluation points for each article they published (depending on its quality) together with teacher's feedback. Since we quickly learned that students tend to be ignorant of such voluntary assignments, save for the final part of the semester when they realize they could use some additional points, we gradually limited the number of articles allowed per week and even tried a decreasing maximum score per article in some years with moderate improvement in the students' publishing patterns.

In case of the ADS course, we took this experience into account and tried a different approach. The blogging activity was divided into three monthly phases. In each phase the students had to publish articles, and after the phase they received feedback together with *overall* evaluation points for the phase. The importance of regular publishing was stressed and reflected by the evaluation but most students tended to publish the articles towards the end of the phase anyway.

The didactic goals of the assignment, such as obtaining deeper insight into the course topics, improving learning outcome by social construction of knowledge, development of digital competencies, presentation and writing skills, and encouraging collaboration between students, require continuous and regular involvement of the students, which, besides for article writing, must also include active participation in reading and commenting on the others' work.

Despite for various strategies that we employed to boost students' motivation to participate in the assignment, their participation was rather low in the past years. The average overall participation rate was 36.2 % in case of MAWD (2007–2011) and only 15 % in case of ADS (2009–2010). See Fig. 2 for more details. Note that in the MAWD course the blogging assignment contributed to the grading in a higher degree, which partly explains the higher (albeit still small) participation rate. What is more, students mainly posted blog articles, we observed that they were not as willing to read others' postings and comment on them. We observed a decreasing trend in comments especially in the last years and it can be said that it was mainly the teachers who read the articles and provided feedback, which we did not find satisfactory at all.

3   Introducing Peer-Reviews

To improve students' motivation, and especially to encourage students to actively participate in reading others' postings and providing comments we implemented a number of changes in both courses as of 2012. Specifically, we incorporated peer-reviewing into the process but also improved the organization of the whole activity. We have also reserved some of the evaluation points for reading and feedback.

The whole assignment was split into two-week rounds with exactly defined deadlines, out of which the first week was dedicated to article writing and the second was entirely reserved for reading and feedback. Only the students who actually submitted an article in the given round were allowed to review in it and for this sake they were randomly assigned three articles submitted by their peers for review. Five of these rounds were planned spanning for overall 10 weeks, during which the students were supposed to produce 5 articles (one in each round) and to review 15 articles of their colleagues.

In addition to structuring the activity into consecutive rounds, the reviews were carried out in structured form using a predefined set of questions:

1. Was the article interesting for you?
2. Was the article useful for you?
3. To what extent was the article understandable for you?
4. To what extent was the article related to the course subject?
5. What is your overall assessment of the article?

The students had to answer on the scale from 1 to 5 points (worse to best). In addition they had to justify this assessment by a written commentary which was required and limited to at least 100 and at most 300 characters. A screen shot of the form showing Question 2 is shown in Fig. 1.

There were also significant changes in the evaluation of the exercise. While in the past we had solely rewarded students for article writing, now the evaluation points were split between writing and feedback. In case of the ADS course articles and reviews were evaluated and points were awarded after each round, together with teachers' feedback. Out of 15 evaluation points, the students could earn up to 5 points for the submitted articles (up to 1 point each), while the remaining 10 points were reserved for the feedback they provided to their colleagues (up to 2 points each round). Altogether the blogging

Was the article useful for you?

Have you learned anything new that you can utilize in this course, e.g. working on the project?
If not, put why (e.g. where do you know already this information from, possibly another
reason...).

Amount of points from 1 to 5: Select value

Select value
1 - insufficient
Justification: 2 - weak

Although this article is related to 3 - mean cture in practice I can
not use this information directly, 4 - good t nor preparing for the
exam. It is an additional informa 5 - great riginal, the sources
were cited.

Fig. 1. Example of the usefulness assessment

assignment contributed to the grading by 12 % and was optional: the students who did
not participate could still earn the A grading.

In the MAWD course we took a slightly different approach. The available share of 30
evaluation points was split into 3 even parts, first 10 points reserved for article writing,
second 10 points for reviews, and the third 10 for any additional discussions under
the submitted blog articles. In addition, while the students received verbal feedback
after every round, the points were only awarded after the whole blogging exercise was
over. For the submitted articles and for the reviews full 10 points were awarded if the
student's contribution as a whole was found sufficient, otherwise 0 was awarded. For the
comments a value between 0 and 10 was awarded. The reason for this rather specific
methodology was to prevent the feeling that "I have still time to get some points,"
and to postpone the activity from round to round. Altogether the blogging assignment
contributed to the grading by 25 %. The students who did not participate could still
pass but they could earn the D grading at best. Taking such two different approaches
will allow us to compare them in the next section.

4 Results

During the semester we were able to observe significant improvements in students par-
ticipation in the blogging activities. To obtain deeper insight in the students' motivation
and their overall opinion on the peer-review process we surveyed the students using
questionnaires. We present the most interesting outcomes and we also add some of the
teachers' observations in the very end of the section.

4.1 Participation Outcomes

While in the previous years the participation rate was 36.2 % for MAWD and 15.0 %
for ADS in average, after implementing the peer-reviews as described in the previous
section, these rates rose to 92.8 % and 67.3 % respectively (more details in Fig. 2). The
improvement is therefore immediately apparent. We remark that given the blogging
was completely optional in the ADS course, the resulting participation rate is strikingly
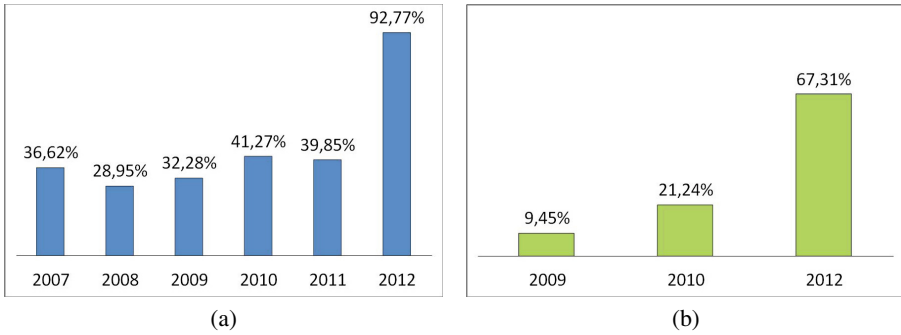high, especially if compared to the previous years.

Fig. 2. Students' participation in course blogging activities: (a) MAWD (b) ADS

Besides for the participation rates we were also curious whether the new format would encourage students to engage in the activity regularly, during a longer period. From the MAWD course data we are able to see that this was indeed the case – Fig. 3 (a) shows the average number of submitted articles per student who submitted at least one (i.e., per blogger). We can see that in 2011 this was 3.11 articles, while in 2012 it was 4.68. This means that in 2011 the students were engaged for 3.11 weeks on average (as the one article per week rule was in place), but in 2012 this was 9.36 weeks (one article per two-week round, counting in the reviewing periods as well). For comparison Fig. 3 (b) plots the averages per all students (even those who did not blog).
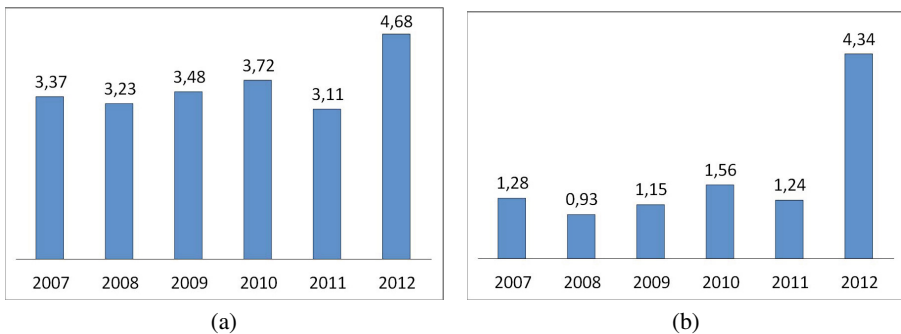

Fig. 3. Average number of articles in the MAWD course (a) per blogger (b) per student

4.2   Questionnaire Outcomes

In order to get better insight into students' motivation we surveyed their opinions on the blogging assignment and other course activities, and the utility perceived from these activities. We used our own questionnaire, which comprised of multiple questions in the following main areas: (a) attitude towards blogs and web information sources (even

outside the course); (b) attitude towards course activities, the amount of required work, and the evaluation; and (c) experience and perceived utility of the blogging activity. For the lack of space we solely focus on (c) in this paper. The questionnaire was anonymous and consisted of closed-ended questions (many with the open last option "other"). It was administered after the blogging exercise was over and the sample of 65 MAWD students (78.31 %) and 90 ADS students (86.53 %) participated in it. Let us first have a look on three questions related to the students' perception of the reading and reviewing activity:

Question 1: In what respect the reading, evaluating and commenting on the blog articles connected with the course was useful to you? Answer options (multiple select):

- A. I have learned new information.
- B. It helped me to understand the course subject better.
- C. I was able to see how problems are viewed by my classmates.
- D. I have learned to give constructive criticism.
- E. I have learned to express my own opinion.
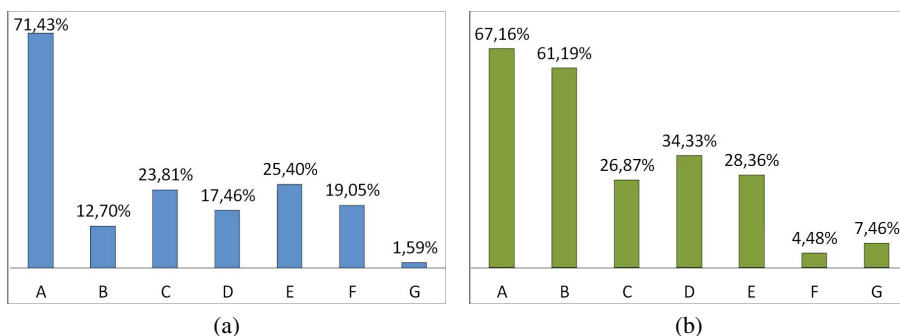- F. It was not useful at all.
- G. Other.

Fig. 4. Perceived utility of reading and reviewing others' articles: (a) MAWD (b) ADS

From the results plotted in Fig. 4 we find that only a small part of students did not perceive any utility of the activity (F), specifically in case of ADS, only 4.48 %. In case of MAWD this value was higher (19.05 %). We expected that most students would answer that they learned new information (A) though the values are strikingly high. The biggest surprise, and definitely to the positive side, is that 61.19 % of the ADS students indicated that the activity was useful to understand the course subject better (B). Values for (D) and (E), still rather high particularly for ADS, are also encouraging.

Question 2: In what respect the reviews received from your colleagues were useful to you? Answer options (multiple select):

- A. It helped me to write better articles in following rounds.
- B. Thanks to the feedback I have understood the subject of my article better.
- C. I received feedback on my writing skills.

    D. I received feedback on the quality of my articles.
    E. Errors in my articles were pointed out.
    F. I learned other related information I did not mention in my article.
    G. It helped me to improve my English (for articles in English).
    H. It helped me to correct grammar errors in Slovak (for articles in Slovak).[1]
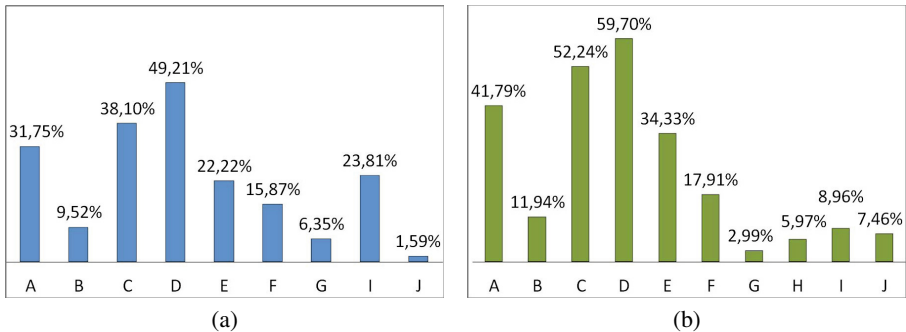   I. It was not useful at all.
    J. Other.

Fig. 5. Perceived utility of received reviews: (a) MAWD (b) ADS

From the results in Fig. 5 we again see that only a small part of the students declared the feedback they received as completely useless albeit the values are slightly higher then above. We may conclude that the students themselves perceived the activity of giving feedback to their colleagues important (slightly more useful then the actual feedback they have received). The students of both courses appreciated the colleagues' reviews mostly as a source of feedback about quality and the form of their writing and claimed that this feedback helped them to improve their next articles.

Question 3: In what respect the reviews received from the teachers was useful to you?
Answer options (multiple select):

    A. It helped me to write better articles in next phases.
    B. It helped me to choose better article topic in next phases.
    C. It taught me to work better with resources.
    D. It raised my awareness of copyright issues.
    E. It helped me to formulate better the reviews of the other students' articles.
    F. It was not useful at all.
    G. I did not receive any.
    H. Other.

From the results in Fig. 6 we see that even less students perceived teachers' feedback useless (12 % for ADS and about 14% for MAWD). About 50 % of the students in both courses utilized the feedback from the teachers to improve their writing in next rounds. They also felt the teachers' feedback helped to choose further article topics better.

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[1] As English was strictly required in the MAWD course, this option is missing in Fig. 5 (a).
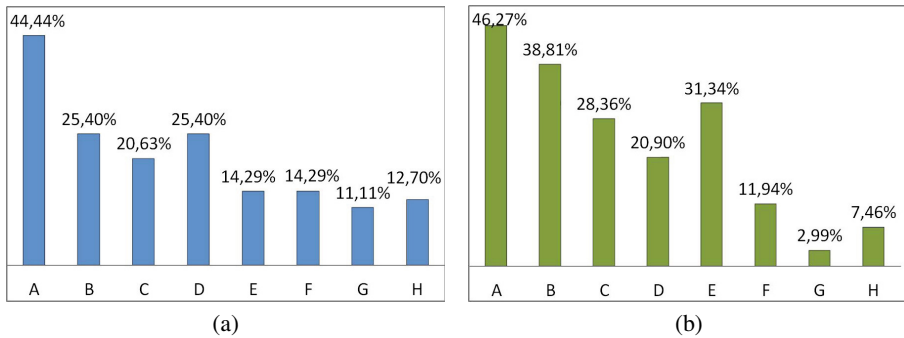
Fig. 6. Perceived utility of teachers' feedback: (a) MAWD (b) ADS

We remark that the students also received feedback on their reviews and especially in case of ADS they perceived it as useful to improve in the following review rounds.

While we also expected some perceived improvement in work with resources (C) and awareness of copyright issues (D) as we stressed this issues frequently in the feedback, the results are not particularly high in this case.

Finally, since the whole blogging activity followed a tight schedule with strict deadlines, we were curious if the students perceived this as useful, or restrictive, to the contrary. The following question was also included:

Question 4: Do you think that the exact deadlines for submission of articles and reviews were helpful in some of the following respects? Answer options (multiple select):

    A. It helped me to better organize/arrange my time.
    B. It helped me to publish a larger number of better articles.
    C. It helped me to pursue the topics related to the course subject continuously.
    D. It helped me to gain classmates' feedback continuously.
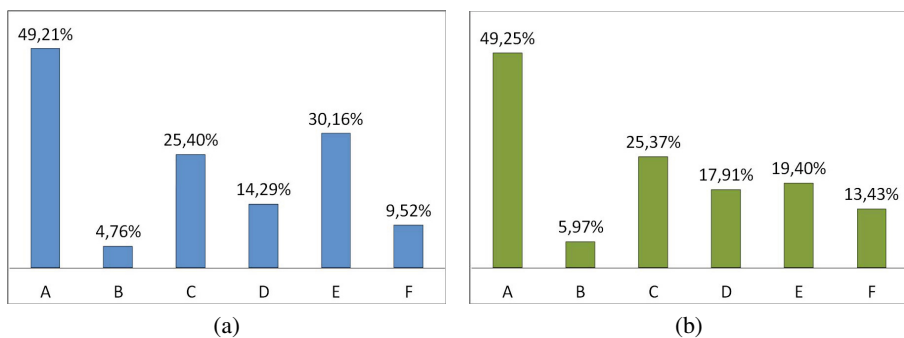   E. I did not like it.
    F. Other.

Fig. 7. Students' view on strict deadlines: (a) MAWD (b) ADS

The outcome (Fig. 7) was similar for both courses. Approximately one half of the students indicated that the deadlines helped them to organize their time better (A), and slightly more than one quarter gave the opinion that it helped them to follow the course continuously during the semester (C).

4.3 Additional Observations

During the semester we have observed that students took the feedback into account and many of them improved in article writing in the following phases. Many also improved in constructive critique, taking into account the feedback from the teachers on their reviews. A number of reviews even pointed out insufficient citation and improper work with sources. As we noted above our students are too often ignorant about these sensitive issues, so we were particularly happy for these comments. Also social learning was certainly in place as students did refer to their point of view on the discussed subject, asked for clarifications, etc. In fact, the average grading improved as well when compared to the previous years, in case of MAWD the improvement was by one grade [1].

On the other hand, the tight course of deadlines students had to follow proved to be a rather hard task for them. Many students missed a number of deadlines and they requested for late submissions, which however was not possible once the submitted articles were assigned for reviews. In the end we added additional rounds as we did not want this to be a major obstacle in the whole assignment. Also, while the 10 or 0 points rule implemented in the MAWD course proved to be motivating the students opinions on this were rather reserved. We can see from the survey results that indeed in case of MAWD the part of the students who participated even if they did not find it very useful was larger (approx. 25 %). This is probably due to the greater contribution of the assignment to the grading – they wanted to be sure that they will pass the course. Since in the end the participation rate in case of ADS (i.e., with less strict rules) was already very high, possibly relaxed rules and lower contribution to grading may still be enough to attract a significant number of students.

5   Conclusions

While blogging assignments can be beneficial for university students, it is not easy to motivate them for participation in this kind of course activity. To address this problem we have designed a well-organized peer review process that we have implemented in our teaching. In this paper we present the findings after the first semester with peer reviews. In comparison with the previous years, the participation of students significantly improved (by triple or even quadruple rate in different courses). In addition the students participated during longer periods of time and not just accidentally. Hence we conclude a significant positive effect on students' motivation.

In addition we have surveyed the students' opinions on such organization of the blogging activity. The students confirmed that the activity was useful as they learned new information from their colleagues' blogs, gained better insight into the course topics, improved constructive criticism and communication skills. The peer-reviews were perceived positively by a predominant majority of students, who took the colleagues' comments as useful feedback which helped them to write better articles in the next

rounds. Students also appreciated the teachers' feedback as instrumental in continual improvement of their work. Although the strict deadlines were restrictive for several students who failed to submit articles and reviews in time, approximately one half of the students stated that the time schedule helped them to organize their work during the semester better. Altogether the deadlines were taken more positively than negatively.

In our research we collected and examined a larger set of data. From the outcomes presented in this paper but also elsewhere [1] we can conclude that the peer-review process raised the students' motivation to study and also to their acceptance of blogging in the educational process.

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