CAN BLOGGING ACTIVITIES AND PEER-REVIEWING IMPROVE LEARNING OUTCOMES?

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Abstract

Increasing students' motivation for study and improving their results at the university this way is a big challenge. To face this challenge, we decided to take the advantage of Web 2.0 tools, especially blogs, in teaching and learning activities. Several years ago we have integrated optional blog-based assignments into our courses, in which students posted blog articles about course related topics. With the aim to improve the organization of the blogging activity, and in addition to motivate the students not only to write articles but also to follow and react to their colleagues' work, we have introduced peer-reviews into the assignment in the last course run. During the trial semester we conducted research on students' motivation and study achievements. The outcomes of our research confirmed that not only the students' engagement with the blogging exercise improved but this innovation also positively affected the exam results as well as final grading.

Keywords

Blog, peer review, education, motivation.

Introduction

Recent experience at our faculty shows general decrease in students' motivation – students are not willing to carry out any additional course activities (i.e., activities with no influence on grading) or study any extra information resources, much less to search for them. When it comes to examination, students show little interest in excellent grading instead they tend to prepare with minimal efforts required to pass each course. The lack of students' interest often results in poor grades or even in the necessity to enroll in the same course repeatedly. Therefore we started to look for possible ways how to motivate students to engage and to improve their study outcomes.

Inspired by educational theories, such as social constructivism, constructionism and connectivism (von Glasersfeld 1995, Papert & Harrel 1991, Siemens, 2005), we searched for tools and activities approaching the learning as a social process in which the knowledge is constructed in cooperation with others using the network technologies. As confirmed in many publications (Mosel 2005, Owen et al. 2006, Razmerita et al. 2009, Homola & Kubincová 2009b) the Web 2.0 tools and services correspond well with the essential features of these educational theories. They support creative and collaborative work focused on social construction of new knowledge and even have potential to make the learning process more attractive for the students. Moreover, as it is clear from published studies (e.g., Popescu 2010) students welcome their use in the educational process.

As blogging, as one of the Web 2.0 means, offers a number of benefits when employed in education (Mosel 2005), we integrated blog-based activities into our courses already some years ago. Our experience from the initial runs pointed out that blogging was motivating for

the students (Homola & Kubincová 2009a), but next years' experience showed again a decrease of students' interest, especially in reading and commenting on colleagues' articles. As discussed in several papers (Lin et al. 2001, Liu et al. 2001, Sterbini & Temperini 2012, Wu 2006, Popescu & Manafu 2011, etc.), the reciprocal reviewing of colleagues' work not only contributes to the development of high level thinking skills but can also become an effective strategy promoting the students' learning motivation. This moved us to amend the blogging in our courses by peer review activities in the last course run.

During the trial semester we also conducted a study of students' engagement and performance in the course activities and evaluation. We observed that the students, who participated in blogging scored better than average and earned better grades in the end when compared to those who did not. After the peer-reviews were introduced and organization of the exercise was improved, we observed a remarkable increase in participation but in addition the exam results and the grading of the participating students further improved.

Based on these observations we came to the conclusion that this a well-organized blogging activity has a strong potential to boost students' motivation to study. But, more significantly, it may bring also benefits related to the students' learning outcomes, better quality of students' course work, higher scoring of students on exams, and finally improved overall grading of the students.

Motivating students with blog-based activities

In our search for ways how to motivate students we have reached for the social learning paradigm and decided to incorporate blogging activity. In this section we first describe the general approach that we undertook and afterwards we look in more detail at the recently introduced peer-review process.

Blog-based assignments

Among the courses where we have employed blogging assignments were two courses of the applied informatics study program: (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 2009–2010 and in 2012 (see our previous report (Homola & Kubincová 2009a) 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. In the MAWD course the students could still pass the course and earn D even if they did not participate in the assignment, while in the ADS course the assignment was even less mandatory and the students could still earn A if they did not participate. The assessment methodology was slightly adjusted each year. The implementation of the assignment differed in each course. In the MAWD course, students received a certain amount of evaluation points for each article (depending on its quality) together with teacher's feedback, as soon as the article was published. In case of the ADS course we took a slightly different approach. The blogging activity was divided into three monthly phases. In each phase the students had to publish articles, and only after the phase they received feedback together with overall evaluation points for the phase.

We hoped that students will be motivated by the informal environment offered by the blogging tools, and they would engage in blogging but as well they would comment upon the colleagues' work, thus increasing their involvement with the course topics and facilitating also other benefits of social learning activities. However it turned out that only a small share of students participated: on average 36.2 % in case of MAWD (2007–2011) and only 15 % in case of ADS (2009–2010). When looking specifically on the learning outcome, we were able to observe that the students who participated in the assignments scored better on average, then those who did not. However, the difference was not striking, and it could also be possibly explained by the fact that in general the better students were more likely to choose to participate in the additional assignment. These results are presented in greater detail further on.

Introducing peer-review

To improve students' motivation and especially to encourage students to actively participate in reading others' postings and providing comments, i.e., the activities essential in order to achieve the desired learning outcomes, we have, starting from 2012, incorporated peer-reviews into the blogging assignments We have also improved the organization of the whole activity and 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.

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?

A screen shot of the form showing Question 2 is shown in Fig. 1. The students had to answer on the scale from 1 to 5 points (worst 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.

Fig. 1: Example of the usefulness assessment

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

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 grade at best.

Results

We were interested if the blogging activity as described in the previous section improved student's motivation and whether the improvement can be traced also in the students' achievement and evaluation in the courses. Specifically we were curious if the peer-review process introduced in the last year influenced these results.

We have compared the data collected over the course of the years when the blogging activity was employed in the courses (2007–2012 in case of MAWD; 2009–2010, 2012 in case of ADS). An important factor to consider here is the students' engagement in blogging (percentage of students who participated). In the past years this was 36 % on average in case of MAWD and 15 % on average in case of ADS. However, after the peer-reviews were introduced in 2012 the engagement jumped 2.5 times, to 93 %, in case of MAWD and more than 4 times, to 67 %, in case of ADS. While this increase by itself documents a significant improvement in students' motivation, it also has to be taken into account when interpreting the results below.

Points earned in the blogging exercise

The first factor that we compared is the amount of evaluation points scored in the blogging exercise. Recall that in the previous years, points were solely awarded for the submitted articles while in 2012 part of the points were awarded for the reviewing activity as well. We considered also the points for peer-reviewing in this comparison. Specifically, in the ADS course the total amount of points one could score was the same in all three years (15 points), hence we have a look on this course. Figure 2 captures the increase of average number of points per blogger – in ADS course in 2012 it was 2.7 times higher (9.68) compared with the average from previous years (3.55). This again indicates that there were certain benefits of the peer-review process.
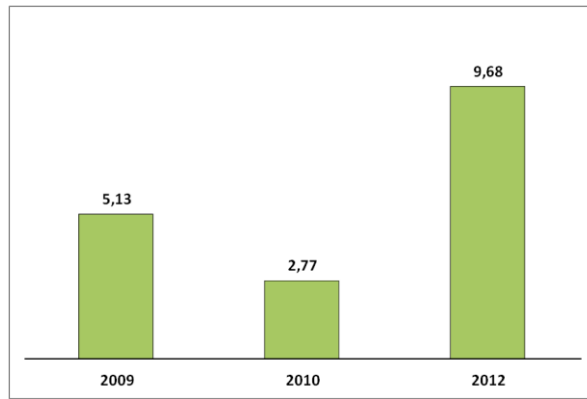
Fig. 2: Average amount of points per blogger in the ADS course

Relation between blogging and examination results

Both courses feature the final written exam which is a compulsory part of the evaluation. The positive influence of blogging on the students' performance in the exam was observed already in the previous years. The significant part of students who blogged usually got higher score in the final exam than the average student (calculated as an average value of the final exam score of all students). The results in both courses showed that students who blogged were more successful in the exam than the others; this was the case in all investigated years (Fig. 3).

Specifically, in the MAWD course 64–86 % of blogging students scored higher than average in the final exam, compared to 46–54 % of students who did not blog, which was the case during 2007–2011, see Fig. 3 (a). This latter number dropped even more significantly during 2012, however it has to be noted that during this last year the number of students who did not participate was too small (only 7%), so this result is less conclusive.

In the ADS course the percentage of students who performed better in the final exam was more than 70 % every year for the blogging students, and it was less than 65 % for the students who did not blog (Fig. 3 (b)). However, the trend was adverse between 2009 and 2010, while in 2012 there is a noticeable change in tendency of both observed groups – the percentage of bloggers who scored higher than average rose by more than 10 % and the percentage of students who did not blog and scored better than average dropped. The results are relevant because contrary to the MAWD course the percentage of non blogging students was still quite high (about 33 %) for this course in 2012.
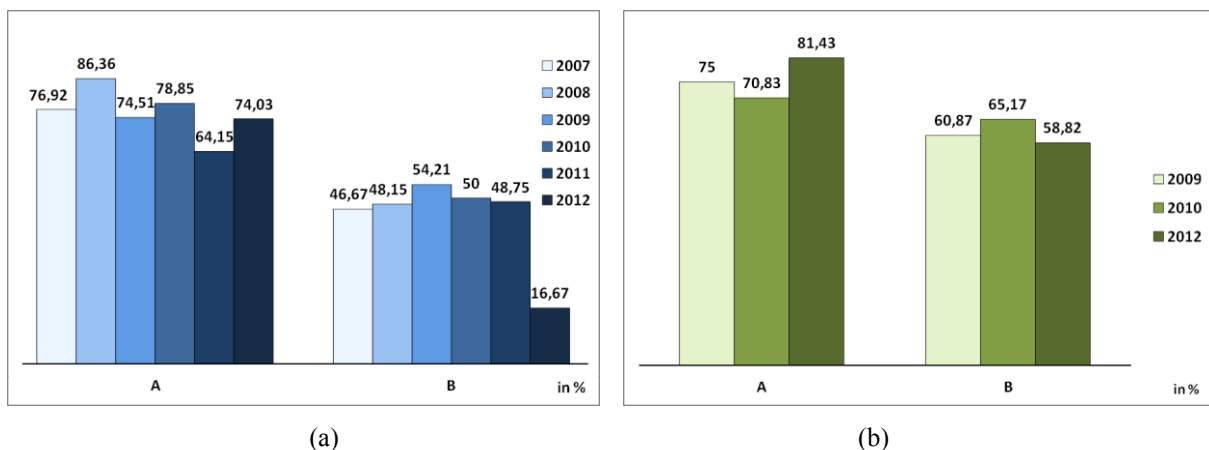

(a)   (b)

Fig. 3: Relation between blogging and good exam score in (a) MAWD course and (b) ADS course
A – students who blogged and got higher score on final exam than average student
B – students who did not blog and got higher score on final exam than average student

Improvement in grading

The average value of overall grading can be taken as a relevant indicator of the students' knowledge gained in the course. However, it must be noticed that the points earned for blogging activities also made up a part of the final student's assessment. In ADS course they contributed by 12 % to the overall grading, in case of MAWD it was 25 %. To compute the average value we transnumerated the grades A–Fx[1] into the numbers 1–6 in respective order. In both coursed the average grade in the last course run was the best compared with all previous years (Fig. 4).
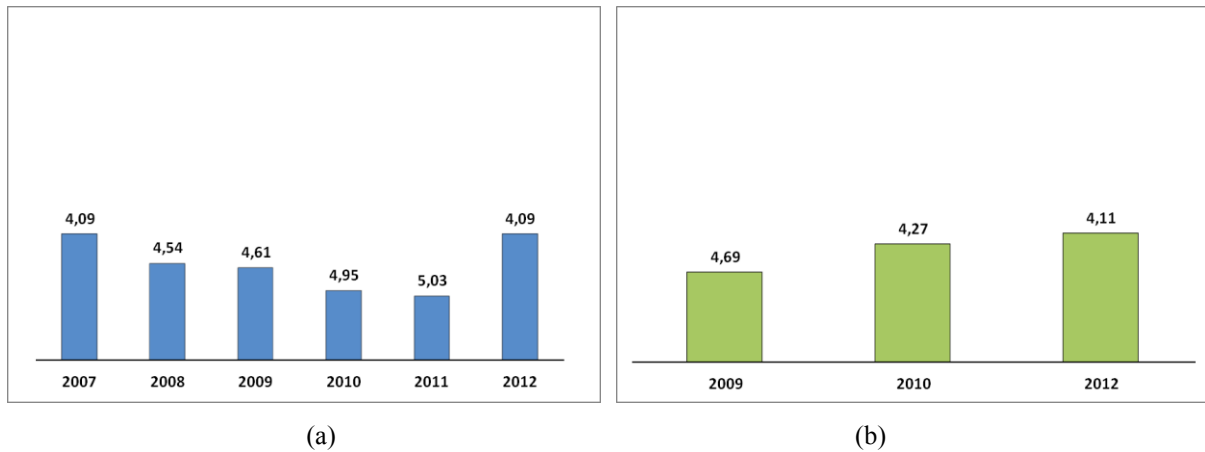

(a)   (b)

Fig. 4: Average value of overall grading in (a) MAWD course and (b) ADS course

For example, in the MAWD the average grading was falling down step by step over the monitored years and in 2011 it reached the value 5.03 (i.e., worse than the E grade). In the last year, however, the average grading improved by almost one grade to 4.09 (Fig. 4(a)).

In both courses, we also noticed an increased number of students who gained the "A" grade and a decreased number of those with "Fx" grade in the last year (see Figs. 5–6).

Although we are aware of the fact that there are many factors with an impact on the students' grading, in our opinion these positive changes could be at least partially attributed also to the boosted students' motivation for studying, and to the social learning outcome from the blogging activity especially after the peer-review process was introduced.
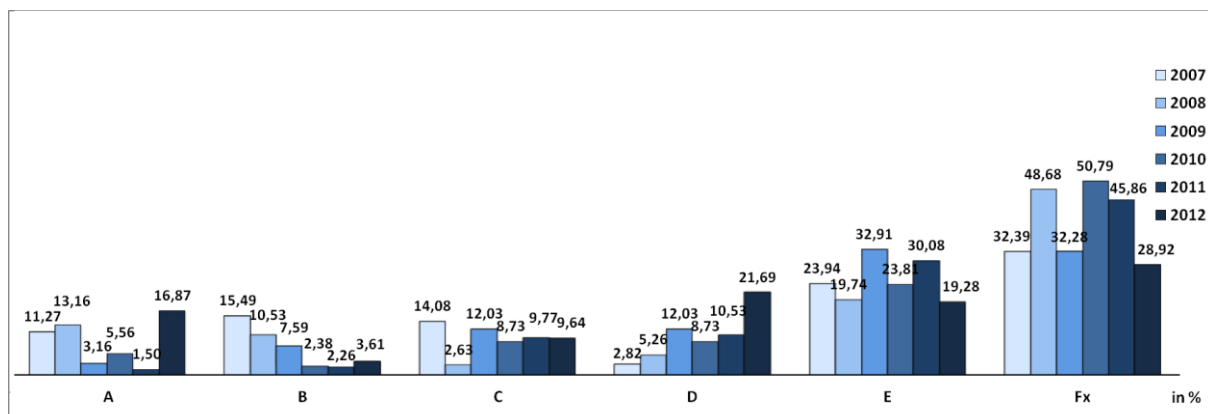

Fig. 5: Percentage of students who gained grades A–Fx in years 2007–2012 in the MAWD course

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[1] The grading used in our study programs comprises scale A-E (from the best to the worst grade) and the grade Fx for "failed".
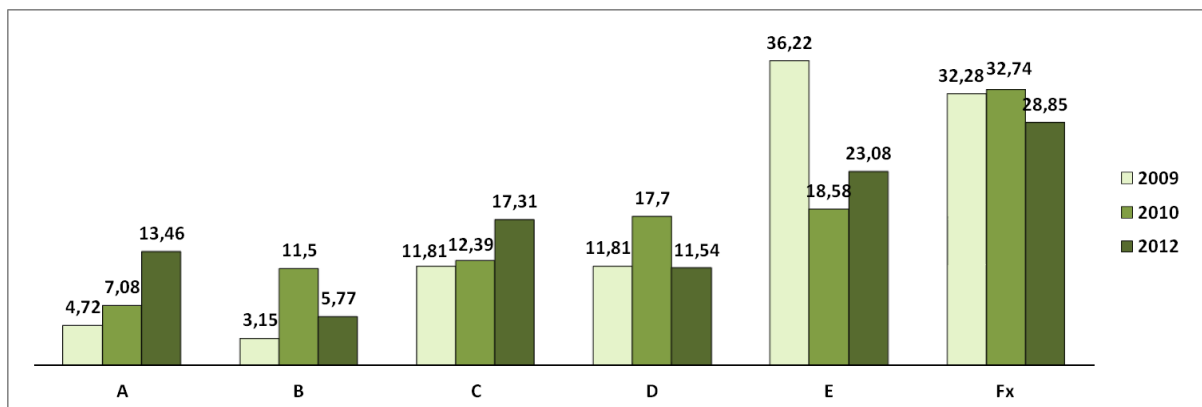
Fig. 6: Percentage of students who gained grades A–Fx in years 2009, 2010 and 2012 in the ADS course

Correlations

To get a better insight into the influence of blog-based activity on the overall learning outcome and students' performance in the course, we calculated Spearman's correlation coefficient (Owen et al., Gibbons 1985) between activity and performance in the blogging exercise on one hand and the exam results and grading on the other hand. This statistical measure expresses the strength of the relationship between two data values. We report the results for the MAWD course:[2]

The results visualized on the Fig. 7 record the correlations in MAWD course:

A – correlation between student's exam score and number of her articles, and

B – correlation between student's exam score and amount of points assigned to her articles.

We see that there indeed is some correlation between these values. Specifically, this correlation is higher (between weak and moderate correlation) in 2007, 2008 and 2012, and it is only weak in 2009–2011. The first two values correspond to the first two monitored years and support our statement about success of these activities in the initial runs. In next three years the students' interest about blogging decreased and hence also the outcome of the activity, but finally there is a remarkable increase in 2012 when the blogging activity was innovated with peer-reviews.
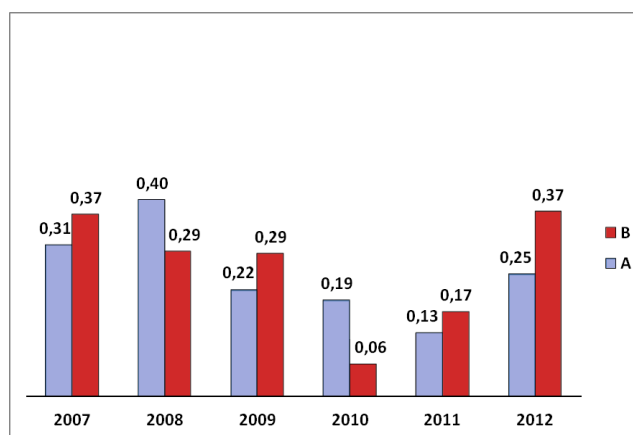

Fig. 7: Correlations related to exam scoring in the MAWD course (options A and B as described above)

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[2] In case of the ADS course the results were similar, however the sample of participating students was too low to pass the Spearman's significance test and hence the correlations are not statistically relevant.

We further looked at the final grading and evaluated the correlations:

A – correlation between student's final grade and number of her articles, and

B – correlation between student's final grade and amount of points assigned to her articles.

The resulting correlation coefficients are depicted in Fig. 8. Note that in this case, numerically, the desired correlation is negative.[3] With the exception of 2009, the results confirm at least moderate correlations. An interesting increase of the correlation between the final grading and the article evaluation points is observable in 2012 – the value -0.69 indicates strong correlation. Note especially that the gap between A and B correlation values significantly broadened in 2012. We hence conclude that the introduction of peer-reviews not only increased students' motivation to participate in the blogging activity (almost all students participated) but in addition those students who put more efforts to this activity (i.e., they earned more points here) earned better grading in the end. As also the data in Fig. 7 agrees with this observation, we may also conclude that the learning outcome of these students was higher and the blogging exercise amended with peer-reviewing positively contributed to the quality of students' knowledge.
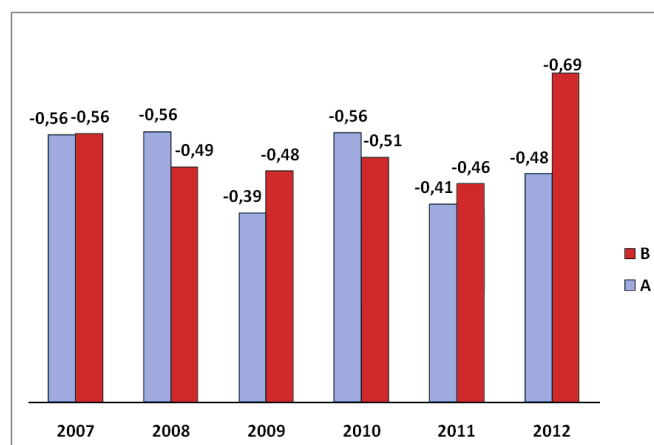

Fig. 8: Correlations related to final grades in the MAWD course (options A and B as described above)

Conclusions

Decreased students' motivation to study in the past few years forced us to search for new tools and educational activities. One of such activities that we incorporated into our courses several years ago is blogging. After some initial good results we again experienced a drop in students' interest, particularly in the context of reading and commenting on colleagues' articles. Due to this fact the blogging activity did not fulfill several of its goals any more. Therefore we decided to enhance the blogging activity by peer-reviews.

During our experiments with blogging and peer-reviews we conducted a wide research on students' motivation and study achievement. We collected, evaluated and interpreted a large amount of data and obtained interesting information about the students' attitude and expectations related to blogging as a course activity, the benefits of the activity perceived by the students, about their progress in blog writing during the semester, etc. (Bejdová 2013,

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[3] The correlation coefficients are negative, due to the fact that the numerical value of the grades increases from best to worse. In other words, higher blogging involvement and evaluation results are associated with lower (i.e., better) grades.

Bejdová et al. 2013). The results were positive, particularly after the peer-review process was introduced the students' interest tripled or even quadrupled in case of one of the courses.

Besides for the increase in students' participation, we were also curious if the effect of the exercise can be measured by students' evaluation results, especially in terms of final exam results and the overall grading. We present these results in this paper. We observed that the amount of points earned by students in the blogging exercise rose significantly in the last year, after peer-reviewing was introduced. This again points out to improved engagement, but it also marks certain improvement of the quality of students' work thanks to the social learning through the peer-review process.

We have further focused on the student's performance in the exam, and final grading. Already in previous years a larger percentage of students who participated in blogging scored better than average in the exam when compared to the remaining students. After peer-reviewing was introduced this indicator further increased. When it comes to final grading, we have observed that especially in the final year the average grading significantly improved, in one of the courses the improvement was by one full grade, while in the immediately preceding years the average grading was falling. Finally, certain positive influence of the participation in the blogging exercise on the exam performance and the final grading was also confirmed by statistical correlations which were weakly or moderately favorable.

The outcomes of our research confirmed the assumption that blogging activities may be beneficial for boosting students' motivation and engagement, and may have positive effects on the learning outcome. However we have also learned that proper organization of the activity together with suitable evaluation methodology are essential to achieve the desired positive effects. Particularly the peer-review process seems to be very useful in this respect; we conjecture that this is due to it creates space for engaged reading and reflection on the peer students' work, which is essential in the social learning process.

Acknowledgements

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