

# Influence of Monetary and Non-monetary Incentives on Students' Behavior in Blended Learning Settings in Higher Education

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**Abstract.** Previous research shows that blended learning has the ability to increase the learners' motivation and learning success. However, motivational aspects in blended learning have not been sufficiently researched yet. We therefore investigated the influence of non-monetary and monetary incentives on learners' behavior. We selected "likes" as a non-monetary incentive and enabled students to rate other students' posts (similar to Facebook). In a second turn, a monetary incentive (a tablet PC or the cash equivalent, respectively) was raffled among the students of a top 10 "like"-ranking. Based on log-file data and survey results, we observe that both variations ((1) only "likes" and (2) "likes" & tablet PC prize) do not differ with respect of their influence on the overall activity of learners during the lecture. Thus, the additional monetary incentive did not increase activity. We conclude that monetary incentives do not seem to be efficient.

**Keywords:** blended learning, incentives, lecture, higher education.

## 1 Introduction

A well-known problem in higher education is that it is hardly possible to activate all students into learning content in mass lectures. This hampers knowledge inclusion since students can often hardly follow the course content at some point in time. Earlier studies show that blended learning has the potential to increase learners' motivation and learning success [1-3]. Furthermore, the increasing competition among universities forces them to provide better learning conditions. In this sense, support of blended learning could be an enabler to raise the attractiveness of universities for students [4].

Blended learning is understood as a combined approach of e-learning and presence learning. Social media, e.g., discussion forums or blogs, have been identified as appropriate platforms to support learners' interaction among each other or with lecturers

[5,6]. These applications provide lecturers as well as students with new potentials to improve learning success. Students can, for example, discuss lecture content in a forum and solve problems on their own. Blended learning works best when integrated in a vivid community [7]. However, most learning communities only exist for a short period of time (e.g., during one semester) and are rather designed as a community of instruction and not “naturally” grown. Therefore, motivating students to participate in such settings voluntarily is a major challenge.

Despite their high relevance, motivational aspects in blended learning have not been sufficiently researched yet. We therefore address the following question: How do non-monetary and monetary incentives affect learners regarding their participation in blended learning approaches?

In order to contribute to this research question, we conducted a case study on a learning community consisting of 564 students. In this setting, we selected “likes” as a non-monetary incentive and implemented a functionality in a learning platform which allows students to rate other students’ posts (similar to Facebook). These “likes” were publicly visible. Additionally, a public ranking of the students (based on the number of “likes”) was published in the learning system. A tablet PC (or its monetary equivalent) was selected as monetary incentive. Common wisdom would suggest that both types of incentives potentially increase activity. However, monetary incentives may have little or no effect at all. Based on 5 surveys, we were better able to understand the impact of both types of incentives.

The remainder of the paper is structured as followed: First we discuss relevant academic literature in the field. We then explain the methodology we applied to answer our research question. In the next chapter we discuss the results. The article ends with a conclusion and some aspects of further research potentials.

## **2 Literature Review**

### **2.1 Blended Learning**

Over the last decade, blended learning gained much importance in higher education. Reasons for that are improvements of information and communication technology (ICT) solutions and a growing pressure on universities and lecturers to support new learning approaches [8-10]. Moore [11] presented a framework of three types of interaction that influence distance education: a) learner-content interaction, b) learner-instructor interaction, and c) learner-learner interaction.

E-learning systems are aimed at supporting students to interact across time and space, and foster the individuals’ contribution to learning [5, 12]. E-learning systems generally comprise a set of tools to support e-learning such as Wikis, blogs, chats, file sharing etc. [13]. In contrast to e-Learning, blended learning combines face-to-face elements and online lectures/exercises [7, 14]. Heterick & Twigg [15] found that blended learning has the potential to be more effective and efficient than the traditional classroom model alone because students can continue to discuss content between the lectures. As stated above, blended learning works best when integrated in a vivid community of inquiry [7].

Communities of inquiry (CoI) commonly consists of three elements: cognitive, social, and teaching presence [16]. The learning model in CoI is based on constructivism that means that fostering self-education enables learning (i.e., students are able to construct their understanding of the context individually). Blended learning offers the possibility to engage students into CoIs for creating self-determined learning contexts.

## 2.2 Satisfaction and Incentives in E-Learning Environments

Previous research shows that motivating students to participate actively in e-learning environments is a major challenge in large scale lectures [17]. We therefore assess the influence of two types of extrinsic incentives on learners' activity and satisfaction with an e-learning environment. Namely, we assess the influence of a non-monetary incentive type (number of "likes") and a monetary incentive (a tablet PC or 500 € cash equivalent) within a learning contest.

Increasing learners' activity (posting and reading behavior) is our major goal. Moreover, overall satisfaction is another element for students' motivation [18]. Therefore and in line with previous research [17, 19-24], we also assess satisfaction with a lecture to evaluate the incentives' influence.

We selected "likes" as a non-monetary incentive as previous studies showed that such social learning components may strongly influence learners' motivation [23]. "Likes" (similar to those on Facebook) can be interpreted as peer-based ratings and may increase learning environments' efficiency [17]. Additionally, "likes" do not only influence learners' behavior (they are more likely to read texts that received more "likes") but also indicate a certain status of a learner within the community. Thus, "likes" are an option to gain social acceptance from peers [23].

Monetary incentives may also motivate students to participate actively and benefit from a learning environment. For example, cash prizes or products could be raffled among the students. Monetary incentives differ from non-monetary incentives with respect to two aspects. The most obvious difference is in their very nature (their financial value). Moreover, monetary incentives target different student groups. While everybody can get a "like" (i.e., the number of "likes" is "unlimited") only one or very few students can get the monetary incentive (i.e., the number of prizes within learning contests is usually limited to one or very few). While non-monetary incentives are targeted to any student in the e-learning community, monetary incentives are only relevant to very few (e.g., the 10% best) students. The majority of students might not be motivated by this kind of incentive as they might not expect to have a chance of winning the prize. Due to these specific characteristics, monetary incentives may have two opposite effects. They may motivate the best students to participate more actively in the E-learning community and to post more in a forum. Every other student would benefit from this specific knowledge. However, monetary incentives could also have negative effects. For example, students could try to manipulate a learning competition in order to increase their odds of winning the prize. If other students discover such manipulation, overall activity and satisfaction with the E-Learning environment may decrease.

In summary, we expect a positive influence from non-monetary incentives (e.g., social media components such as “likes”) and positive as well as negative effects from monetary incentives on learners' satisfaction within an e-learning environment.

### 3 Empirical Study

In order to address our research question, we investigated the impact of different incentives in a blended learning scenario with 564 students. The lecture (marketing on bachelor level) was held at a major German university in April-June 2012 and consisted of two parts, each lasting for one month (moreover, the exam was one month after the last lecture).

We investigate two types of data: log files from the databases of the learning environment and survey data. We analyzed the number of pages viewed and students “likes” in detail. This quantitative data provides insights about usage patterns of the participating students. Moreover, we conducted five surveys in order to analyze the effects of incentives on learners' perceptions and satisfaction.

We tested the non-monetary incentive (“likes”) in the first part of the lecture (i.e., over a period of one month). The first two surveys assess the effect of this incentive. At the beginning of the second part of the lecture, the monetary incentive was introduced and a tablet PC was raffled among the students from a top 10 “like” ranking from the first part (but students had not been aware of this incentive before this lecture). Afterwards, the lecturer explained that he would raffle a second tablet PC among the top 10 students at the end the second part of the lecture. Thus, from now on we assessed the combined effect of “likes” and a monetary incentive. A survey was conducted after this session to assess the immediate effect of this monetary incentive, followed by two additional surveys (one after the last lecture and one after the exam) to assess its long-term effect.

## 4 Results and Discussion

### 4.1 Descriptive Data

Overall, 564 students registered to the e-learning system. Figure 1 provides an overview of the forum's aggregated weekly number of page views. User activity increased two weeks after the start of the lecture and remained stable for the remainder of the lecture. There is one peak in Figure 1 after the end of the lecture and just before the exam, which might not come as a surprise as students start studying more intently close to the final exam.

The number of “likes” by students are presented in Figure 2. Clearly, we again observe a peak at the end of the lecture. The two peaks (in Figure 1 and 2) are close. However, they differ with respect to their timing. Students' “liking” activity increased in week 7, however, overall student activity (number of pages accessed, see Figure 1) peaks in week 8. Thus, “liking” behavior is not correlated with overall activity in the e-learning community. Figure 2 also shows that introducing the learning contest and

the monetary incentive (that are based on the number of “likes” students received) increases the overall number of “likes” in the community.

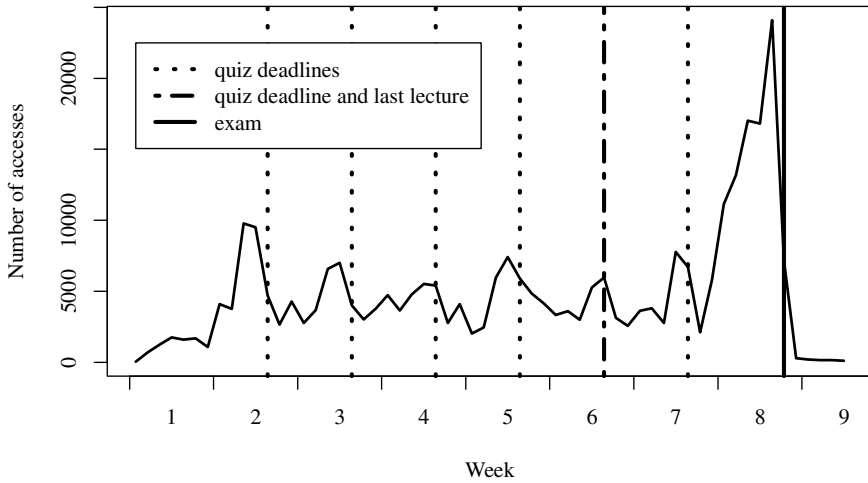


Fig. 1. Daily number of accesses

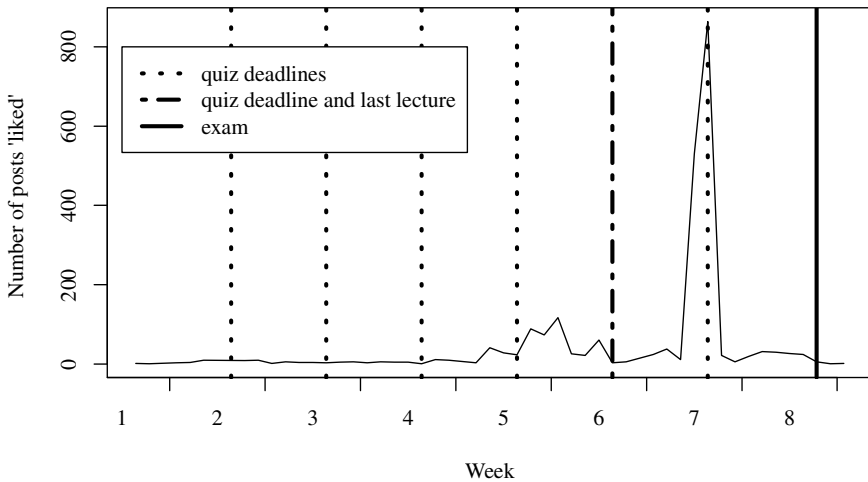


Fig. 2. Daily number of post “likes”

Based on the log file analysis, we conclude that monetary incentives do not increase overall activity in the forum. Moreover, an analysis of students’ “liking” behavior indicates that at least some students were trying to influence the results of the learning contest just before its deadline by excessively “liking” their friends’ posts.

## 4.2 Survey Data

Log file analysis indicates at least some attempt to manipulate the learning contest's results. But does such manipulation negatively influence overall satisfaction with the e-learning system? We analyze survey data to answer this research question. The students were asked to participate in five surveys as described above. An Apple iPod shuffle was raffled among the participants of each survey.

Before presenting and interpreting the survey results, it is important to provide some more information on the timing of these surveys. Survey 1 was conducted in a timeframe between the weeks 1 and 3. We therefore do not assume that students were already able to assess the benefits of the e-learning environment. Thus, this survey measures students' expectations and first impressions of the system. Survey 2 took place in week 4. We expect students already to have gained experience with the e-learning system at that time. Moreover, the monetary incentive had not been introduced to the students yet. Immediately after introducing the monetary incentive, we asked the students to participate in survey 3 (that took place in week 5 and 6). Survey 3 thus measures the immediate effect of introducing a monetary incentive. As stated in the theoretical section of this paper, we expected that some students might try to manipulate the learning contest. Survey 4 therefore started immediately after the deadline of the learning contest (both in week 7). We thus intended to survey the immediate influence of manipulation by some students on overall satisfaction with the lecture. Survey 5 was conducted after the exam (starting from week 8) and aimed at measuring the long term effect of non-monetary and monetary incentives.

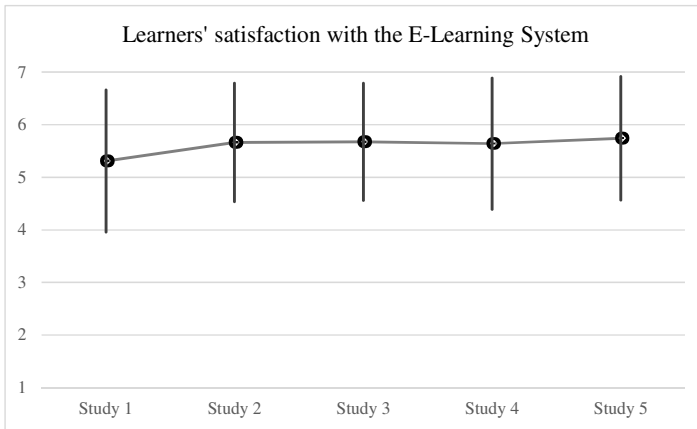
Table 1 provides an overview of the total number of respondents in each of these studies.

**Table 1.** Number of respondents per survey

Survey	Number of respondents
1	298
2	312
3	336
4	281
5	257

Learners' satisfaction with the e-learning system is presented in Figure 3. Each of the five experimental studies was conducted anonymously. We are therefore not able to conduct common tests such as the repeated measures ANOVA. However, based on the reported mean values and standard deviation values, we conclude that differences are minor or non-existent. This is especially important for surveys 2, 3, and 4. By comparing surveys 2 and 3 we intended to assess the immediate effect of introducing a monetary incentive. Our results strongly indicate that introducing a learning contest and a monetary incentive does not have any effect on students' perceptions (mean values and standard deviation almost stay the same, see Figure 3). Moreover, manipulations of some students in order to increase their odds of winning the learning contest (they massively "liked" uninformative posts such as "good", "well done" etc.) did

obviously also not influence students' satisfaction with the e-learning system (we again observe almost identical results, when comparing the mean values and standard deviation of survey 3 and 4). This result is surprising as attempts of some students to manipulate the learning contest were obvious. For example, 25 students complained about their peer's behavior in an open question in survey 4. We conclude that manipulative behavior of some students did not influence overall satisfaction with the E-Learning environment.



**Fig. 3.** Students' satisfaction with the e-learning system

**Table 2.** Statistical data on student satisfaction

Survey	Std. dev.	Mean
1	1.35	5.31
2	1.13	5.66
3	1.11	5.67
4	1.25	5.64
5	1.17	5.74

In survey 3, we also asked students to evaluate the monetary incentive directly on a 7-point rating scale (1 = not favorable, 7 = highly favorable). The results (mean = 4.02; standard deviation = 1.93) reveal that students' evaluations were above average but far from enthusiastic about the learning contest and the monetary incentive. Students' perceptions towards "likes" were also surveyed in survey 3. They were perceived to be more favorable (mean = 4.52, standard deviation = 1.55) than the monetary incentive. A dependent sample t-test reveals that this difference is highly significant ( $p$ -value = 0.000).

In summary, based on an analysis of students' perceived satisfaction with the e-learning system, we conclude that learning contests and monetary prizes are not efficient. They do not increase learners' satisfaction.

## 5 Conclusion

Motivating students to use e-learning systems actively is challenging. We therefore tested two types of incentives that might increase learners' satisfaction with the learning experience. Specifically, we compare a non-monetary ("likes") and a monetary incentive (a monetary prize that was raffled in a learning competition). We analyze log file data as well as results from five surveys to evaluate these incentives.

Our results indicate that students value both types (evaluations are above average); however, they significantly prefer the non-monetary incentive. Moreover, monetary incentives did not additionally increase learners' activity in the e-learning system nor did they improve learners' satisfaction. Instead, there might even be (minor) negative effects of monetary incentives due to some students that were trying to manipulate the learning contest to improve their odds of winning the prize (i.e. smaller groups of learners started "liking" each other's comments; even obviously trivial content got "likes"). As a next step, further research is needed to support our results, e.g., by analyzing case studies on a larger scale.

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