ON THE IMPROVEMENT OF MOTIVATION IN USING A BLENDED LEARNING APPROACH
A Success Case

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Keywords: Motivation, Blended Learning, Assessment Methods, Technology Enhanced Learning.

Abstract: Blended Learning approaches combine face-to-face instruction with some type of computer-based education. In this paper, the proposed combination is teaching in class and reviewing after class using an on-line free-text scoring assessment system. In our first experiments with non Computer Science university students, we asked their teachers to motivate them with the possibility of getting more training for the final exam. However, only 5 students (11% of the class) reviewed with the computer after class on a regular basis. Therefore, we studied and applied a set of principles to improve the motivation of using the Blended Learning approach, and to get more students to review after class. After applying these principles 78% of the non Computer Science university students reviewed with the computer on a regular basis.

1 INTRODUCTION

Blended Learning (BL) approaches combine face-to-face instruction with some type of computer-based education (Graham, 2005). In this way, it is possible to combine the advantages of traditional face-to-face instruction and computer-based education while minimising the negative features of each (Klein et al. 2006).

Some advantages reported for traditional face-to-face instruction are keeping the contact with the teacher and thus, having immediate answers to doubts and questions; and removing the isolation feeling reported when using on-line education (McElrath & McDowell, 2008).

Some advantages reported for computer-based education are: temporal and spatial flexibility because students can use the computer application from any place and at any time; the possibility of getting adaptive and personalised training; and, allowing students to review at their own rhythm.

Furthermore, there are benefits inherent to the use of BL approaches such as the ones reported by Singh (2003) and Kim (2007): to reach more students; to increase the learning efficiency; to reduce costs; to improve the teaching methodology; and, to have better logistics.

The literature on BL has focused on the description of BL systems and methodologies. However, up to our knowledge, little work has been published assessing the relationship between blended learning and motivation to learn.

In our previous experiments (Pérez-Marín et al. 2007), we have observed that Computer Science Students are eager to use computer applications as a complement to their traditional lessons.

However, non Computer Science students, albeit not having technical difficulties in using computer applications, are not so eager to use BL systems without external motivation.

In this paper, several principles to improve the motivation of non Computer Science students to use the BL system to review after class are gathered. An experiment in which these principles were used is also described. We consider it a success case because when the principles were applied the percentage of students using the BL system was increased from 11% up to 78%.

The organisation of the paper is as follows: Section 2 briefly reviews the related work; Section 3 provides our proposed list of principles; Section 4 describes the experiment; and, finally Section 5 ends with the main conclusions and lines of future work.

2 BRIEF REVIEW OF THE LITERATURE IN MOTIVATION

Motivation in the educational field can be defined as the attention and effort required to completing a learning task (Moshinskie, 2001).

Motivation is a key factor for learning, irrespectively of the nature of the learning process: traditional learning, e-learning, b-learning, m-learning, etc. (Wlodkowski, 1985; Dick & Carey, 1996; Hodges, 2004; Lynch & Dembo, 2004; Klein et al. 2006; Keller, 2008).

According to Ryan & Deci (2000), two important variables have to be distinguished in relation to the motivation: the level of motivation (i.e. how much motivation), and the type of motivation (i.e. the orientation of the motivation).

The level of motivation is difficult to assess given its subjective nature. Nevertheless, it is possible to use questionnaires (Keller, 2008).

Regarding the type of motivation, at least three different theories and two models can be distinguished (Hodges, 2004), as it is reviewed in the rest of this section.

The attribution theory holds that learners can find controllable or uncontrollable reasons when trying to explain their successes and failures. The motivation stops when the reasons found are uncontrollable. It is because students believe that they are unable to perform the task.

Therefore, **instructors should make an effort to help learners to attribute the learning outcomes to controllable reasons,** and thus to increase the motivation of the students.

The expectancy-value theory holds that students expect certain results for their behaviour. The motivation stops when the students stop thinking that they are going to achieve the expected results.

Therefore, **the bigger the likelihood perceived by the students of getting the expected results is, the bigger their motivation to work in the task is**.

The goal theory holds that establishing goals is the key to keep motivation in the time. In fact, Beatty-Guenter (2001) identified goal orientation as a significant attribute of those learners who completed their distance course; and, Thompson (1998) noted that learners who set clear goals perform better.

Several types of goals can be distinguished. For instance, proximal goals can be achieved in short time, whereas distal goals are to be achieved in a longer future. Furthermore, it should be explained how to achieve the goals. The motivation stops when there are not goals established, there are only distal goals, or students do not know how to achieve the established goals.

Therefore, **several proximal goals regarded by the students as feasible should be established during the course**.

It can be observed that these theories are quite similar. In fact, they share some common underlying concepts, such as the intrinsic/extrinsic nature of motivation. Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable. Extrinsic motivation refers to doing something because it leads to a separable outcome. Student with intrinsic motivation can learn in any situation, therefore **the focus should be placed on students who need extrinsic motivation**.

Regarding the models, the Time Continuum (TC) Model, proposed by Wlodkowski in 1985, claims that the motivation is crucial in three critical points of the learning process: at the beginning (attitude and needs), at the middle (stimulation and affect) and at the end (competence and reinforcement).

The ARCS model, firstly proposed by Keller in 1987 and studied since then (Keller, 2008), claims that 6 categories has to be reviewed.

The first four categories are the original that gave the name to the model: Attention, Relevance, Confidence and Satisfaction. The last two added categories are: volition (Kuhl, 1987) and self-regulation (Zimmerman, 1998).

3 SOME PRINCIPLES OF MOTIVATION

3.1 Explanatory Notes

Students with intrinsic motivation usually do not have difficulties in any learning situation. Therefore, the principles gathered in this chapter are mainly devised for students who need extrinsic motivation.

In order to make the reading of these principles easier, they are presented ordered by its source, according to the previous section. For instance, principles related to the theories are presented before than principles related to the models.

If the same principle is related to more than one theory or model then it is just mentioned the first time that it appears.

It is out of the scope of this paper to create a complete list of principles for improving the motivation, as the focus is on the relevant principles to improve the motivation in Blended Learning approaches.

3.2 List of Principles

1. Learners should attribute the learning outcomes to controllable reasons (attribution theory).
2. Students should believe that they will get the expected results (expectancy-value theory).
3. Several proximal goals should be established during the course (goal theory).
4. The needs of the students should be reviewed before the course starts (TC model).
5. The goals of the course should be clearly stated at the beginning (TC model, ARCS model).
6. The activities provided to the student should be varied (TC model, ARCS model).
7. Immediate and adaptive feedback should be provided during and at the end of the course (TC model, ARCS model).
8. The curiosity of the students should be aroused and sustained (ARCS model – attention).
9. The instruction should be perceived as relevant to the personal values to the students or instrumental to accomplish the expected goals (ARCS model – relevance).
10. Students should have the personal conviction that they will be able to succeed in mastering the learning task (ARCS model – confidence).
11. Students should anticipate and experience satisfying outcomes to a learning task (ARCS model – satisfaction).
12. Students should be helped in applying volitional (self-regulatory) strategies to protect their intentions (new ARCS model – volition and self-regulation).

4 EXPERIMENT

4.1 Settings

In the courses 2007/2008 and 2008/2009, 45 students of the English Studies degree were asked to participate in an experience of using a Blended Learning approach for their Pragmatic course (Pérez-Marín et al. 2007).

The goal was to study the impact of using a Blended Learning approach in a non-technical domain with non Computer Science students. The BL approach was as follows: students could keep attending to their traditional lessons with their teacher, while they would also have the possibility of reviewing after class from any computer connected to Internet at any time.

However, it was decided that the first session of using the BL system would be in class. It is because we wanted to check whether non Computer Science students found any difficulty in using the system.

The mean age range of the students was 22 years old with 1 year deviation, except for the 2007/2008 course in which one student was 45 years old.

The participation in both experiences was voluntary. Students were initially motivated by their teachers in class. The teachers told them that although the use of the BL approach would not have a percentage in the final score of the course, it would help to solve difficult cases (e.g. students with a near pass score who would pass the course).

After that initial motivation was told in the first class of using the BL system, no more reinforcement messages were given to follow the BL approach.

4.2 Application of the Principles

The list principles presented in Section 3.2 was used as the starting point to choose which principles could be applied for our BL approach.

The application of the principles for the 2007/2008 and 2008/2009 courses is shown in Table 1.

4.3 Results

In the 2007/2008 course, 22 students (49% of the total class) attended to the first session of using the BL system in class. Figure 1 shows a histogram representing the frequency of use of the BL system.

In the histogram, each bar represents the number of questions answered each day. As can be seen, after the first days in which the system was used up to the point of answering 38 questions in one day, the frequency of use decreases until stopping at all.

In general, only 5 students (11% of the class) used regularly the BL system during the course to review after class. The rest of the students claimed that they had too much compulsory work to devote time to voluntary activities.

Nevertheless, we thought that it could also be due to the fact that more than half of the principles gathered from the motivation in learning literature were not applied (as shown in Table 1).

Furthermore, we wanted to test if the next year we would obtain the same results. Therefore, we asked the teachers of the course just to make the necessary modifications to apply the rest of the principles, except the last one that is kept as future work (as shown in Table1).

The use of the BL system changed as represented in Figure 2. As can be seen, and although still not all the students used the system regularly, in the 2008/2009, 35 students (78% of the class) used it on a more regular basis.

Table 1: Application of motivation principles in the 2007/2008 and 2008/2009 BL experiments.

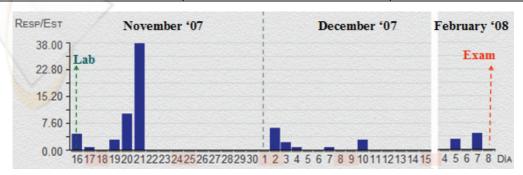| Principle	Application in 2007/2008	Application in 2008/2009
Learners should attribute the outcomes to controllable reasons.	Students were told that using the BL system to review is a matter of practise.	Same than 2007/2008
Students should believe that they will get the expected results.	This principle was not applied.	Students were told that more exercises would appear if they keep using the BL system.
Several proximal goals should be established during the course.	Students could follow their progress in the BL system.	Same than 2007/2008
The needs of the students should be reviewed before the course starts.	This principle was not applied. In fact, the course was created without knowing the students and their needs.	The teachers of the students who knew their needs and the lessons created the course.
The goals of the course should be clearly stated at the beginning.	Students were told that in order to consider that they have passed the course in the BL system, at least half of the questions have to be answered.	Same than 2007/2008
The activities provided to the student should be varied.	This principle was not applied. In fact, many of the questions ask for a definition of a concept.	Although the BL system keeps asking only questions, their type changed (comparison,...)
Immediate and adaptive feedback should be provided in the course.	A model of each student is kept, so that for each question, immediate and adaptive feedback can be provided.	Same than 2007/2008
The curiosity of the students should be aroused and sustained.	This principle was not applied.	Each two weeks new questions were introduced into the course to keep the students' attention.
The instruction should be perceived as relevant and useful.	This principle was not applied.	Given that their teachers have created the course, it was more related to the lessons in class.
Students should have the conviction that they will be able to succeed.	This principle was not applied.	In the first session in class, we assured that all students felt that they could use the system.
Students should anticipate and experience satisfying outcomes.	Students could observe how they progressed in the course in relation to the rest of their colleagues.	As well as the feedback that students could see, their teachers answered more mails and followed their evolution.
Students should be helped in applying volitional strategies.	This principle was not applied.	This principle was not applied.

Figure 1: Frequency of use of the BL system during the 2007/2008 course.
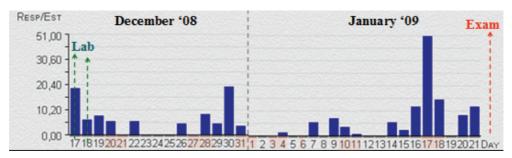
Figure 2: Frequency of use of the BL system during the 2008/2009 course.

5 CONCLUSIONS AND FUTURE WORK

Blended Learning combines the traditional face-to-face instruction with computer-based education. In this way, it combines the advantages of both instructional methods, while minimising their disadvantages.

Many BL experiments have been performed by Computer Science teachers to Computer Science students. Those students are usually eager to use computer applications.

On the other hand, non Computer Science students may feel disoriented without knowing how to organise their time to study or how to navigate in the system. Thus, they may stop using the BL system altogether.

Motivation is a key factor for learning in general, and for computer-based education is particularly relevant.

Several types of motivation can be distinguished. For instance, intrinsic and extrinsic motivation should be differentiated. Ideally, all students could be intrinsically motivated. It would help them to take full advantage of any learning situation.

However, it is not usually the case. Therefore, principles should be applied to provide extrinsic motivation to students.

The review of the literature of motivation in learning provides several theories and models, from which 12 principles can be gathered.

In particular, it was our hypothesis that by applying these principles, there would be an improvement in using a BL approach in which students attend to traditional lessons to learn, and use the BL system to review after class.

An experiment performed during the 2007/2008 and 2008/2009 courses with English Studies university students has provided evidence to support that hypothesis.

While in 2007/2008, from the 45 students enrolled in the course, only 5 students (11% of the class) regularly used the BL system when it was offered as voluntary. In the 2008/2009, 35 students (78% of the class) regularly used the BL system also being a voluntary activity.

It is our belief that the improvement of the motivation was due to the application of the principles. In fact, while in the first year, only 5 principles were applied, in the second year 11 principles (more than the double) were applied.

In particular, the 5 principles applied in 2007/2008 were: learners should attribute the outcomes to controllable reasons, several proximal goals should be established during the course, the goals of the course should be clearly stated at the beginning, immediate and adaptive feedback should be provided in the course, and students should anticipate and experience satisfying outcomes.

The new 6 principles applied in 2008/2009 were: students should believe that they will get the expected results, the needs of the students should be reviewed before the course starts, the activities provided to the student should be varied, the curiosity of the students should be aroused and sustained, the instruction should be perceived as relevant and useful, students should have the conviction that they will be able to succeed, and the principle indicating that students should anticipate and experience satisfying outcomes was improved.

It has been particularly relevant the introduction of the ARCS model with the principles of the 2008/2009 year. For instance, the progressive introduction of the course in the BL system to keep the attention of the students, and the increase of the relevance feeling as the course was more related to the lessons in class.

As future work, we plan to also apply the last principle (Students should be helped in applying volitional strategies) to incorporate the volition and self-regulatory categories of motivation.

A possible strategy to incorporate that principle and keep improving the motivation of using the BL system could be the use of an animated pedagogical conversational agent (Keller, 2008).

The agent could be a student companion in the computer application. Students could ask for their help when they have some doubt, and/or the agent could also recommend some actions to the students when they seem disoriented, or it has been detected that they are having difficulties in completing some tasks in the system.

ACKNOWLEDGEMENTS

REFERENCES

Beatty-Guenter, P. 2001. Distance education: does access override success? Paper presented *Canadian Institutional Research and Planning Association 2001 conference*. Victoria, British Columbia.

Dick, W., Carey, L., 1996. *The systematic design of instruction* (4th ed.). New York: Longman.

Graham, C.R., 2005. Blended Learning Systems: Definition, Current Trends, and Future Directions, *Handbook of Blended Learning: Global Perspectives, local designs*, Pfeiffer Publishing, 3-21.

Hodges, C.B., 2004. Designing to Motivate: Motivational Techniques to Incorporate in E-Learning Experiences. *The Journal of Interactive Online Learning* 2(3).

Keller, J., 2008. First principles of motivation to learn and e³-learning. *Distance Education journal*, Academic Research Library, 29(2), 175-185.

Keller, J. M., 1987. Development and use of the ARCS model of instructional design. *Journal of Instructional Development, 10*(3), 2-10.

Kim, W., 2007. Towards a Definition and Methodology for Blended Learning, *Blended Learning*, Prentice Hall, Pearson Education, 1-8.

Klein, H., Noe R., Wang, C., 2006. Motivation to learn and course outcomes: the impact of delivery mode, learning goal orientation, and perceived barriers and enablers. *Personnel Psychology journal*, 59, 665-702.

Kuhl, J., 1987. Action control: the maintenance of motivational states. In F. Holisch & J. Kuhl (Eds.) *Motivation, intention and volition*, Springer, 279-291.

Lynch, R., Dembo, M., 2004. The Relationship between Self-Regulation and Online Learning in a Blended Learning Context. *International Review of Research in Open and Distance Learning,* 5 (2).

McElrath, E., McDowell, K., 2008. Pedagogical strategies for building community in graduate level distance education courses, *Journal of Online Learning and Teaching* 4(1).

Moshinskie, J., 2001. How to keep e-learners from e-scaping. *Performance Improvement, 40*(6), 28-35.

Pérez-Marín, D., Pascual Nieto, I., Alfonseca, E., Anguiano, E., Rodríguez, P., 2007. A study on the impact of the use of an automatic and adaptive free-text assessment system during a university course, *Blended Learning*, Pearson, Prentice Hall, 186-195.

Ryan, R.M., Deci, E.L., 2000. Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology* 25, 54–67.

Singh, H., 2003. Building effective blended learning programs, *Educational Technology Magazine,* Educational Technology Publications, 43(6), 51-54.

Thompson, M. M., 1998. Distance learners in higher education. In C. C. Gibson (Ed.) *Distance Learners in Higher Education: Institutional responses for quality outcomes,* Madison, WI.: Atwood Publishing, 9-24.

Wlodkowski, R.J., 1985. *Enhancing adult motivation to learn*. San Francisco: Jossey-Bass.

Zimmerman, B.J., 1998. Academic studying and the development of personal skill: a self-regulatory perspective. *Educational Psychologist*, 33 (2/3), 73-86.