

Does competition with monetary prize improve student learning? – An exploratory study on extrinsic motivation.

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ABSTRACT: Student motivation is a key to effective deep learning. This paper aims at exploring competition as key motivating element in teaching of SCM at master level. The paper reports on our experiences from introducing monetary prizes for student group works as a measure to increase extrinsic student motivation. A main question is to investigate how monetary prizes and other rewards mechanisms affect the learning outcome and how this differ for individual vs team rewarding. The data was collected through observations and surveys of logistics students at Lund University and at University of Vienna. The competition itself was on a case study, carried out as a group assignment (Vienna) and individual assignment (Lund, Campus Helsingborg).

The key findings of our study is that competition with monetary prizes have highest motivation factor on already motivated students. The measure did not affect less motivated students in the same way. Even though, our study show that competition is a difficult phenomena to study, competition is a powerful tool to increase extrinsic motivation and enhance learning for ambitious students. The level of engagement in these assignments exceed that of the engagement of the same students in our course assignments. For future research, we need to investigate how less ambitious students could be motivated, as they seem to be unaffected by extrinsic motivation other than passing the courses.

1 MOTIVATION OF STUDENT LEARNING

Student learning depends on many factors, with motivation being one of the key factors. Jones (2007) state: “In conclusion, what seems to emerge is that effective education at heart must proceed from engagement (p.403)”. Despite this, Gärdenstam (2010) showed that motivation is often missing in the educational system. Competition-based Learning (CnBL) is a methodology where learning is achieved through a competition. The learning result, however, is independent of the student's score (Burguillo, 2010). To the author's best knowledge, all samples of CnBL in the literature can be found in engineering teaching, where several lecturers have indicated that CnBL can contribute to improved learning (for example Li et al. 2009). Existing literature has not addressed prizes in competition but rather outlined the usefulness of Competition-Based Learning in combination with Project-Based Learning (PrBL) (Burguillo, 2010).

Considering the lack of motivation in the education system and both the promise and complex challenge of improved learning through competition (Reeve and Deci, 1996), this paper explores competition including rewards as a method of increasing student motivation, engagement and ideally, learning. Measuring learning is a complex task and though it would ideally have been the focus, this paper focus on student perception of the competition.

1.1 Context of the paper

The context is teaching of Industrial Management, including courses on Supply chain management, Information systems and Logistics on Master's level. As the overarching subject of Supply chain management is taught in in both engineering and business, using competition in this context is different to engineering teaching where the aim of the competitions have generally been to produce an artefact. What is produced by the students is a report and a graphical presentation, which is somewhat more difficult to measure.

1.2 Structure of this paper

This paper is structured as follows. First a narrative review of student motivation is given. That is followed by a brief methodological description and the primary data collected for the purpose of this paper. Finally a concluding discussion is given.

2 STUDENT MOTIVATION AND LEARNING

Every student is an individual with different learning styles (Kolb, 1984, Mumford, 1997) and different factors motivating their learning. Both intrinsic and extrinsic motivation has to be considered. Motivated students strive to learn beyond the course content, experiment and come up with new ideas that benefit society and/or the industry. Some ways to motivate students are to explain both the importance for their future careers (extrinsic), the fun of the subject (intrinsic), winning prizes (extrinsic) and the opportunities of contributing to industry, society and in particular the environment (intrinsic).

Over the past years, following Kolb's model on experiential learning (1984), the usage of serious games and gamification of processes increase as a pedagogical tool to improve learning (Ariffin et al. 2014, Baalsrud Hauge et al., 2014). The game becomes an experience that enhances learning (Kolb, 1984), since real-life inspired games help the students to gain relational understanding (as in the Structure of Observed Learning Outcomes (SOLO) taxonomy (Biggs and Collis, 1982)) which in effect is true value for the students (their time being used for valuable learning).

Competition can make learning playful and can add an extra element of extrinsic motivation to a large portion of the students. Reeve and Deci (1996) however outline that there are some obstacles related to competition. They state (ibid, p. 32):

“The results of this study indicate that winning a competition may not undermine intrinsic motivation if the interpersonal context does not add undue pressure to win. Unfortunately, it seems that the unyielding focus of our society on winning – whether in athletic competitions or in school performance, for example – may be creating a pressuring context that can have quite negative effects on individuals' experience and motivation“.

3 METHODOLOGY

The methodology used for this paper is an exploratory survey carried out with two classes at Lund University (Sweden) and Vienna School of Business (Austria). SurveyMonkey was used to carry out anonymous surveying. Among Lund students, response rate was 91% (10/11), whereas in Austria the response rate was 46% (11/24). We did not attempt to investigate non-response bias for Austria.

We acknowledge this is a very limited approach to a very complex phenomena, yet considering the lack of knowledge in the area of competition relating to extrinsic motivation and student learning, we do believe this paper makes a modest contribution to the field.

3.1 Experimental setup

The experimental set up was based on the first author's experience from Supply chain management information systems course at Chalmers from 2008 to 2010. A competition with prizes was introduced in 2010 as an idea to tackle the “good enough” mentality displayed by strong students when carrying out an individual assignment with where the only grades available were pass and fail. The competition turned out very well and the quality of the assignments raised, as did student satisfaction.

Starting 2014, the first author started with monetary prizes sponsored by an external road haulage association in the course Service Logistics, Lund University, Campus Helsingborg, a course given within the Logistics Service Management Master. In 2015 the first author started surveying student perception of the exercise.

3.2 Survey logic

The survey first aimed at student self-assessment – is the student a competitive person? A competitive person is more likely to enjoy the competition, whereas a non-competitive person might feel pressured by the competition (Reeve and Deci, 1996).

Secondly, the survey tried to find out how the student perceive their *class mates* were affected by the competition, followed by how they themselves found that the competition affected them.

Finally, the students were given opportunity to write their thoughts about the competition.

On each choice question, mainly three alternatives were given.

3.3 Vienna School of Economics (WU)

The students of the Logistics Master program at Vienna School of economics are a mixture of Austrian/German students (70%) and students from other parts of Europe/World (30%). Their education program is ranked as Europe's best Master of its kind and many students are aiming for high grades. Students are trained in analytical skills and have bachelor's degree in related fields.

3.4 Lund University (LU)

The Logistics Service Management is given by the Social science faculty of Lund University. It's a hybrid between service management (social science) and engineering logistics. Many students do not have an analytical background and have bachelors from fields such as humanities and arts.

3.5 The assignment – “Where does the money go?”

As a part of the courses at Lund University and Vienne School of Economics, the students had to carry out an assignment called “Where does the money go?” The task involved breaking down the cost structure of common products, in order to understand the monetary shares (and power relations) between the different actors in the chosen supply chains. Figure 1 gives a sample output from the exercise.

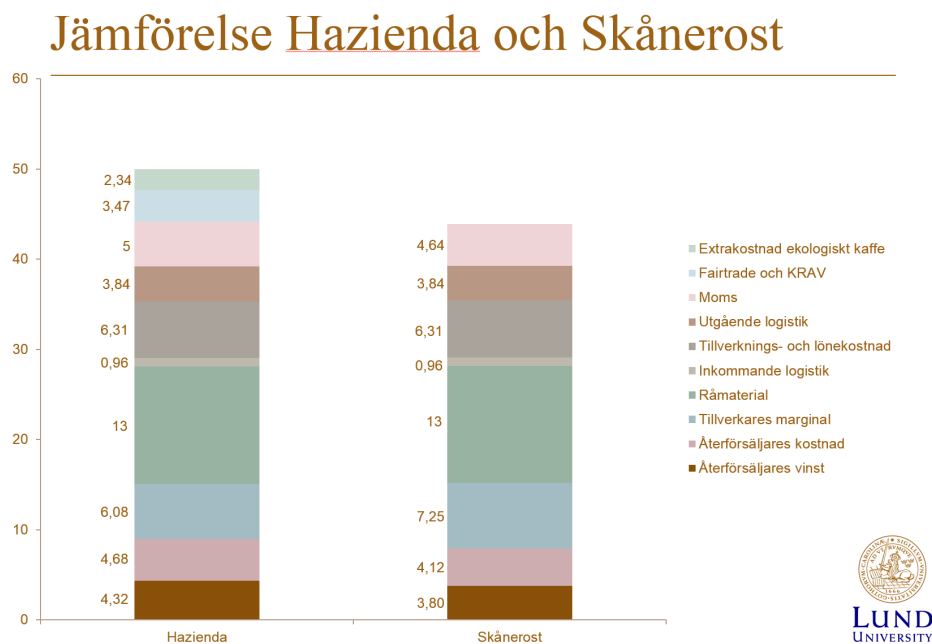


Fig. 1. A sample graphical representation of the assignment “Where does the money go”

Prize structure was 300€ for a winning assignment and 50€ to each other assignment with a high usability.

4 STUDENT PERCEPTION OF COMPETITION

This section outlines the results from the survey.

4.1 Competitiveness and motivation

The analysis of the surveys shows a clear difference between the students in Vienna and Lund (see fig. 2): Whereas the students in Vienna had a clear competitive attitude (73% try hard to win, 27% try to

win), only every third Swedish students answered that they tried hard to win, and 10% was not interesting in winning.

The question “How does competition affected your classmates?” (fig.3) reveals even more significant differences between the WU students and the LU students. WU students state their class mates worked much harder, whereas LU students mainly think the competition makes no difference.

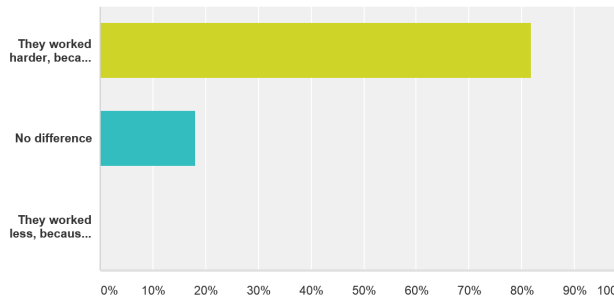


Fig. 2. WU students results for question 1

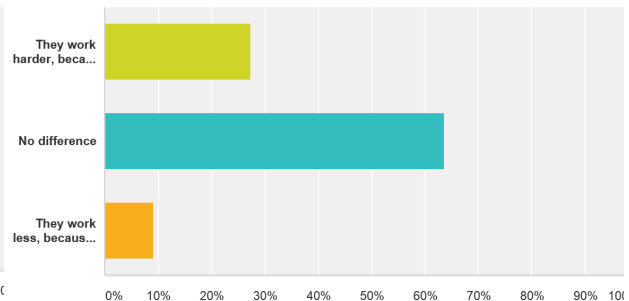


Fig. 3. LU students results for question 2

4.2 Effect on learning

Next, the question was “Has the competition had any influence on how you learn about where does the money go in supply chains? Please write as freely as possible about what you think.” Some selected representative comments were:

- WU: Yes.. due to the competition, we really got more serious about finding actually where the money goes, for the product we chose. We wanted to present the results as accurately as possible to reality, though we are limited by the sources that are available to us.
- WU: Honestly, I think that I would have put the same effort into the homework as if there would have been no competition, because anyways it would have influenced my grade!
- WU: Yes and no. It was a good training and helped me see certain things differently, however, there was also a small amount of luck involved at some points.
- WU: yes, for sure the competition affected the work of the group as nobody wants to be the worse and we all want to win
- LU: actually there is no influence, because no matter if there is a competition or not, i will try my best to complete my work. I study for myself and for the knowledge, not for the prize.
- LU: This is master's level, so I believe that students should work as best as possible even without competition. So this competition puts more pressure on me, because I'm not sure in my strengths and if I fail, I might feel that I'm a loser. But on the same time I don't want to fail on purpose. So I'm in conflicted situation. In any case I will try my best to complete assignment as best as I can.
- LU: For me the competition doesn't have much influence. I feel motivated because of the product I chosen, I am interested in it. However, with the limitation of getting in-depth information, sometimes it can be demotivated as well. So, generally I would say competition is not the key drive for me, but of course I still try my best to have a good quality of the findings and winning the competition is like a "bonus" for me.

4.3 Postive and negative about competition

Finally, students were asked to give their comments, both positive and negative on the competition. Some selected representative comments were:

- WU: positive: some students might have a bigger incentive to put effort into the homework - higher degree of Teamwork negative: none
- WU: Positive: You can win money for an assignment that would have to be done anyways. Negative: -
- WU: positive: better achievements and higher motivation negative: higher stress
- WU: most positive: of course it is nice to not just get a good grade on a case study, but also a price

- WU: don't see any negatives. positive is that it pushes you to do it better. and when you are working for the case you have the feeling you work for you and not just to satisfy some course requirements
- LU: positive: could be an incentive for people with this kind of spirit. negative: stressful and could put off people that don't have the completion spirit
- LU: You could have additional prize for doing something mandatory is the main advantage. On the other hand, it is really hard to get the needed information so you can be easily stressed especially if you are not use to that feeling when you loose
- LU: Negative- performance anxiety Positive- the winning
- LU: one tends to strive more to reach up to the mark which helps one grow as a better professional. but a competition is never a fair competition as everyone has different aptitudes and competencies which lead them to lay low against those who have better experience and knowledge.in the field.(especially in an international and diverse group as ours).

5 CONCLUDING DISCUSSION

Competition has a potential to improve student learning, but clearly not all students are positive about it and some students felt stressed and anxious about the competition. Stress and anxiety does not contribute to learning (Reeve and Deci, 1996). Consequently, in the Swedish class, competition does not seem to be an adequate tool for increasing the extrinsic motivation in order to get a better learning outcome. The use of open questions makes it difficult to get a statistical relevant distribution, since each answer is different, but the answers reveals, that the attitude towards learning is different among the Swedish students than the Austrian. The Swedish students are all reporting that at this level of education they expect that all students are responsible for their learning and thus the effect of an external motivated competition does hardly have any impact.

The Austrian students seem to have a much higher effect on their motivation. These are all positive, eventhough some say that it does not really affect how hard they work. Interesting is from our perspective specifically the reason for why they work harder- the group dynamic as well as that the students felt it motivating not only to work for a course grade but something in addition. I.e. it seems that some students in Vienna did not have the same intrinsic motivated learning attitude as the Swedish one.

The sample of this study is far too small to draw any generally conclusion, but in a second step, it would be interesting to analyse the differences in the school systems and cultural differences affect the competitive element. Currently, for the Swedish students, we would like to repeat the experiment, but also set up a control group carrying out a more collaborative task among all students in order to see if that would have a more motivating effect.

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