HOW TO MOTIVATE STUDENTS IN PROJECT BASED LEARNING

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ABSTRACT

Educational thinking in higher education has undergone a rapid change. The ability to remember facts loses importance whereas the capability to solve problems becomes more and more the main focus of teaching. At the Technikum Wien Project Based Learning (PBL) was introduced in various subjects of our IT course. The basic approach of PBL originated from the University of Maastricht in the Netherlands where it is reported to be highly successful [1] [2] [3] [4].

The specific problem the authors tried to solve, deals with the motivation of students. The main motivation of students is – of course – to achieve good test results and only the lesser focus lies on the specific contents of the subject. The authors tried to develop a method, which allows the students to focus their intrinsic motivation onto the study project itself and not onto the extrinsic motivation, namely test results. [5]

1. INTRODUCTION

In the past decade, university teachers have begun to move away from traditional didactic instruction to a more student-centered approach to learning. An increasing number of academic institutions throughout the world recognized that Problem-Based Learning is an instructional method that challenges students to develop the ability to think critically, analyse problems, find and use appropriate learning resources [2].

One of the key success factors in PBL at the Technikum Wien turned out to be the selection of the problem type. The more the problem suited the student interests the better the results were which they achieved [5].

2. THE CONTOUR OF THE PROBLEM

Every year millions of highly motivated students enter universities all over the world. Many of them had to work very hard prior to being allowed to enrol in a course of studies that interested them very much. Some of them, the ones with less luck in their lives, are there because someone told them that they had to study.

Both groups are faced with a well-known problem. Some versions of the problem are very specific for some countries, other versions are equally distributed over almost all universities in the world.

The problem itself comes in many flavours. It is well known in business life as well. The name of the problem is, generally spoken, “efficiency”. In business life, it is common that persons who are able to achieve a result with less effort than others do indeed have an advantage.

3. EFFICIENCY – A STUDENTS POINT OF VIEW

In student life this is not equally clear. The efficiency problem many times is expressed as, “How can I reach a given goal with minimal effort”, or “How can I achieve the maximum result with a given effort”. Most teachers assume that the efficiency problem, expressed in student terms, reads more or less like, “How can I learn the given subject with minimum effort”. However, if one talks with students informally, in many cases the point of view is quite different. Many students find out that it is most efficient to ask, “How can I get the best result in that subject by just investing the absolute minimum work” Or, in other words, “What do I have to do to easily answer Dr. Pucher’s questions?”. This turns out to be the case in the majority of subjects. And it is clear that much energy lies in the invention of methods to easily pass difficult exams.

As we know now, there is only one exception. Subjects in which students are really interested are generally treated in a different way. In such subjects its more important to learn than just to fulfil the various criteria of teachers for giving marks.

4. MOTIVATION

Where does the motivation to study come from? Basically there exist two different forms of motivation.

4.1 Intrinsic motivation

“Intrinsic” means innate or within; hence intrinsic motivation is the stimulation or drive stemming from within oneself. In relation to learning, one is compelled to learn by a motive to understand, originating from one’s own curiosity. Intrinsic motivation is often associated with intrinsic rewards because the natural rewards of a task are the motivating forces that encourage an individual in the first place

4.2 Extrinsic Motivation

Extrinsic motivation is encouragement by an outside force; behaviour is performed based on the expectancy of an outside reward, such as money or praise. Extrinsic rewards can be abused to bribe or coerce someone into doing something that they would not do on their own. Unfortunately, these types of reward systems are most commonly used in our university systems.

The problems with these types of extrinsic motivators are numerous:
Extrinsic rewards do not produce permanent changes

First and foremost, studies have shown that extrinsic rewards do not produce changes that are permanent. Thus, changes in behaviour, as a result of extrinsic rewards, are due to an external motivator, not to an innate desire. Token economies, a system of providing money-like tokens for correct behaviour, have been proven to be ineffective [6].

Extrinsic rewards reduce intrinsic interest

Many studies show that rewarding children with extrinsic rewards can actually reduce their intrinsic interest in something. This observation seems to be valid from pre-school up to university level. Researchers randomly selected pre-school-children and asked them to draw something, promising rewards for the best participants. Another group of pre-school-children were asked to do the drawings without the promise of a reward. Two weeks later, the drawing behaviour of the children was observed and the researchers found that those who had been rewarded before drew less, but those who had never been rewarded still drew at the same rate. Hence, the rewards had reduced the children's interest in something that they had previously enjoyed. [7]

Studies at university level show the same [8]. Deci found similar effects with using money as the extrinsic reward. He offered college students money for solving problems, while another group of students just solved the problems without any external reward. Unpaid students were more willing than rewarded students to solve problems later on in the study.

Furthermore, if teachers bribe students with extrinsic rewards to do something at the university, then what does that say about the activity? It tells them that the activity must not be very important if one has to be coerced into doing it; the activity must not be exciting on its own. By motivating students with extrinsic rewards, the intrinsic value in the task is undermined by the task-contingent reward [8].

And that is exactly what we frequently observe in the behaviour of our students.

Extrinsic rewards can be controlling

The very nature of extrinsic rewards should also be addressed. By promising a reward for behaving in a desired way, the teacher is essentially controlling students by tempting them with external factors that do not even relate to the task itself. Kohn explains, "In the classroom, it is a way of doing things to children rather than working with them" [9] (p.784).

This view certainly disregards a student's ability to think and reason on his or her own by not allowing the chance to deeply develop self-determination or independent thinking. It has been found in several studies that qualities such as creativity and cognitive reasoning are diminished when students are working for a reward, as opposed to the task at-hand [7].

5 PROBLEM BASED LEARNING WITH SPECIAL RESPECT TO INTRINSIC MOTIVATION

The question we, the authors had to ask ourselves was:

“What key factors are responsible for stimulating the intrinsic motivation in PBL projects?”

That question is not brand new. Many companies face the same problem every day. How can people be motivated to put their effort, their thinking, their desire into company tasks and not into private tasks [10][11][12].

One of the main objectives is to avoid extrinsic motivation [10]. For PBL that means the instructors need to focus the intention of students onto the project itself and away from conventional tests.

The project itself is the thing to do, not the test.

How can this be accomplished?

There is a very straight and challenging way. Just ask the students themselves what they want to do.

5.1 Students suggest their projects themselves

First of all, tell the students what you want them to do. Then give the students an overview on the amount of work they have to do within the project. And then discuss the necessary formalities.

With first and second year students it is very difficult to break the barrier they have built up during secondary education. They learned for years that there is somebody who knows. That there is somebody who tells them what to do and when, and worst of all that there is someone who tells them what is right and what is wrong in the project.

However, after some hard discussions some of the students will start to express their own ideas. Many of the ideas are not reasonable for the aims of the project. However, if first year students cannot understand the problem, why not simply let them run into the problem? Surprisingly enough, many of them will find solutions for problems teachers could not imagine to be solved that easily. Of course, other seemingly simple problems can bring the project to a rapid demize. But this uncertainty is the only price one has to pay for highly motivated and innovative students.

In higher semesters students understand much more of the surrounding environment. It is easier for them to come up with realistic suggestions.

What if you want students to solve a specific problem? Never force them into that, but try a marketing approach. If the project is interesting probably students will pick it up.
5.2 Coaching Instead Of Teaching

By placing students in the active role of problem-solvers confronted with an ill-structured problem which mirrors real-world problems they learn a new way of problem oriented thinking.

Therefore, direct teaching in PBL projects should be avoided. Students should be coached and no prepared answers or solutions should be given. Intrinsic motivation seems to be high if three factors can be combined in a single person [10] [11].

1. Planning of the project
2. Doing the project
3. Looking onto the results and being proud of them

If these three factors can be realised by all of the group members the motivation to really solve the problem will remain high throughout the whole project.

That exactly means that one never answers direct questions of how something can be done. It is better to show ways how to obtain the necessary knowledge and allow the students to do that in their individual way.

In that way PBL simultaneously develops problem solving strategies, disciplinary knowledge bases, and skills.

6 BENEFITS OF THE METHOD

The benefits of the method are numerous.

6.1 Ability to use the gained knowledge in real world situations

Students tend to remember the things they learned in the project much longer. Furthermore, they tend to be able to use what they have learned more easily. However, it is quite obvious that things one learns because the specific persons knows she or he needs that knowledge to solve an interesting problem is acquired in a different and better way.

6.2 Faster progress of students

At the Technikum-Wien, the content of several subjects of the IT - curriculum had to be adapted in order to attract the interests of the students. Many students asked to have introduced new elements into the course, because they wanted to learn about that specific issue now. This was especially true in areas where the students lack an a priori realization that it is necessary to know solutions. we normally teach before students see the necessity to know the solution. One major example for this is the field of "management methods for software projects".

6.3 Project Management

It was easy to introduce methods for software project management. Students insisted on asking how they could get their project into a better condition. However, it was first necessary to allow them to do a project without any management methods. The rapid development of severe problems forced them to look for alternatives.

6.4 Social skills

The students developed a better understanding of social factors which do have a significant effect on project outcome [11].

7. RISKS OF THE METHOD

The method carries one relatively high risk. It stems from the simple fact that the PBL coaches do not have thorough knowledge of the specific problems the student groups solve. Therefore, it is quite difficult to discover the contribution of individual group members. Even if the contribution is clear it often turns out to be difficult to judge the necessary effort by the individual student.

Sometimes students are identified who successfully pretended to work. Usually they hid behind team leaders.

Sometimes it is even not discovered until late that one of the team members did not do any significant work at all. The authors do not have a simple, elegant solution for this problem at the present time.

8. CONCLUSION

In conclusion we want to summarise the following:

- Project Based Learning is a new and we believe suitable method for teaching in the field of Information Technology.
- The PBL approach to teaching has to be broadened to include the intrinsic motivation of students.
- Extrinsic motivation of students has to be avoided in teaching. This is a difficult task because our whole university system relies on testing and marks, which is a clear extrinsic factor.
- If students are able to choose the content of their project, the intrinsic motivation is high and the results are better as in other cases where they have to do a prepared task.
- There is one great risk in the method, namely, if students do not really want to study at all and put all their effort into hiding that fact.

9 REFERENCES


10 AUTHOR(S)

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