

PROBLEM-BASED LEARNING: “HELPING ME TO FIND THE ANSWERS FOR MY PROBLEMS ON MY OWN, I WILL NEVER FORGET THE ANSWER”

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Introduction

In Sri Lankan schools, students in the GCE ordinary level follow science as a compulsory subject. Earlier it was integrated but from 2007 according to the new syllabus it was compartmentalized. For the past few years, the pass rate in the G.C.E. ordinary level science subject is rapidly declining.

(<http://www.doenets.lk/statistics>)

Students and teachers were complaining that the syllabus was covering a vast area and impossible to complete. Throughout my career as a science teacher, I have noticed that students seldom apply what they have learnt in the classroom in their day-to-day lives and after the examination they forget everything. Thus, I have always wondered whether a solution exists for these problems. I was enthusiastic to find out the effectiveness of the Problem-Based Learning (PBL) as a remedy for these problems.

Methodology

The study was conducted in three steps. As the first step, it was necessary to select a unit from the grade 10 science syllabus. That is, it should be a unit which is considered as difficult to understand by the students and a unit which the teachers also think difficult to teach and in which the students show low

performance. To carry out this research, I selected fifty teachers who were then teaching grade 10 science classes, one hundred students who have studied in the Grade 10 classes in the previous year and conducted interviews. Seventy eight out of one hundred students and thirty eight out of fifty teachers had chosen unit 4 as the most difficult.

For the second step to identify the specific problems faced by the students and teachers, a questionnaire and a diagnostic test were developed.. These were administered to hundred science teachers and three hundred grade ten science students. Based on these results, difficult areas were identified and problems were crafted to help students learn the difficult sections. By gathering responses from all the questionnaires from the teachers and students for the diagnostic test, I found some problems and misconceptions within the unit. Considering these lesson plans were developed with activities to overcome the difficulties and misconceptions of the teachers and students. Before using these for research work some of the activities were piloted to some other classes to identify places where revisions are needed. In the third step, I selected a boys' school and a girls' school with parallel grades considering easy

access. I used the PBL methodology (Karunaratne et. al., 2009, Markar et. al., 2006) to teach in one class while the other class was taught in the normal way. Made descriptive field notes of observation how teaching and learning happened in the four classes. Informal interviews with teachers and students and also collected students worksheets as documents.

Results and Discussion

While observing the non-PBL class, the majority of the students were not active participants as they only listened to their teachers' explanation without asking any questions. While the students were like this, the teacher was mainly concerned with completing the lessons for the day and stuck to the '*chalk and talk*' method. At the end of the observation, I noticed that the teacher did not finish the lessons within time allocated for that unit and the lesson dragged on for more than 20 periods. In the PBL class teacher completed the lesson within the required 12 periods and the students showed a higher achievement level in the activities. The teacher paid attention to how students were involved and provided feedback whenever necessary. In a sharing session students expressed their opinions. For example, "*By helping me to find the answers for my problems on my own, I will never forget the answer.*"

This was one of the main objectives which I wanted to achieve through the application of the PBL methodology as the students will never forget what they have learnt and will apply it to their day-to-day

lives. At the beginning of PBL application, one student openly expressed his displeasure in doing activities. But after going through a few lessons, he changed his views and was completely happy with the new method. Another student stated that by doing group activities, the unity amongst students is increasing and that collaborative working was very productive. At the beginning, most of the students were not capable of working on their own and finishing their tasks on time, but at the end, were able to work without much supervision and within the allocated time. Another problem at the beginning was that only 2 out of 40 students brought textbooks, but after I connected the activities to the textbook, almost everyone started using the textbook. One teacher who used PBL methodology said, "*At the beginning, I never thought that it was possible to finish this lesson within 12 periods. But for my great pleasure, I was able to complete the whole unit successfully within that time*". The other PBL teacher stated, "*Even the students who do not usually participate actively in the lessons showed great development in doing activities. Therefore, I have decided to apply this to the other classes as well*".

Analysis of the diagnostic test results showed that there was no difference between mean values of non-PBL and PBL groups (Boys', 20.80 & 21.70, Girls', 26.20 & 26.75). Using the two sample t-tests, it was found that there was no significant difference at $p=0.05$ between non-PBL groups and PBL groups. Analysis of the final test

results showed that there was a difference between mean values of the non-PBL and PBL groups (Boys'-26.06 & 62.56, Girls'-28.66 & 62.21). Using the two sample t-tests, it was found there was a significant difference at $p=0.05$ between non-PBL groups and PBL groups.

Conclusions

One of the main problems put forth by the teachers in Sri Lanka is that the activity-based learning cannot be applied to the education system because the syllabus is too heavy. I understood that if we can find out the areas which the student knows and doesn't know at the beginning of the lesson, more priority can be given to the areas which the student doesn't know. Rather than giving the direct answers to the problems faced by the student, creating an environment where the student finds the answers by adopting the "learning to learn" method can be facilitated. I believe that the problems mentioned above can be solved by adopting the PBL methodology. Therefore, I am confident that if we can include PBL methodology in the teachers' guide then we can attain a higher success rate in our education system. It will be further enhanced if PBL is used not only for Science subjects, but also in all the other subjects.

References

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