Peer Learning in the Context of Republic Polytechnic – Problem Based Learning

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ABSTRACT

Learning is said to take place all the time. In our daily lives, we are constantly seeking new information during our interaction with the people around us, especially our peers. Often, this form of peer learning is ad-hoc and informal. It is not structured or designed with specific learning outcomes in mind.

Problem Based Learning is a structured learning environment where the learning outcomes are specific. Students working as part of a group have more opportunity to interact and to learn from their peers and depend less on the teacher as the key knowledge provider. The Republic Polytechnic is a higher education institute in Singapore that practices PBL across all its modules. The students are grouped in teams to work through problems hence, RP-PBL provides a good platform to examine how peer learning takes place and to what extend peer learning is helping students achieve the desired learning outcomes.

Through an examination of students self and peer evaluations, I would investigate how peer learning (students exchanging and processing ideas) takes place within the RP-PBL environment and the relationship between the quality of peer learning and overall achievement

KEYWORDS

Peer learning, problem-based learning, peer evaluations, daily assessment

INTRODUCTION

Peer learning and teaching have offered many benefits to the learners, especially in higher education. Peer learning is regraded as an important element in higher education, wherein

learners informally reflect and share ideas and their experiences in order to better understand the curriculum.

This paper will look at the significance of peer learning in Problem Based Learning (PBL) and how peer learning takes place within the Republic Polytechnic's PBL environment. I will argue that peer learning is taking place within the RP-PBL learning environment, and that this is evident in the relationship between peer assessment and daily grade. I will also comment on the implications of this relationship between peer and self evaluation and the daily grades awarded in the RP-PBL learning process.

WHAT IS PEER LEARNING?

Peer learning can be defined as students learning with and from one another in which interaction with peers can result in an increase in cognitive development, knowledge as well as intellectual skill (Falchikov, 2001). It has been argued that an individual learns best when they articulate and explain concepts to others and then receive feedback about their conceptions. (Anderson,G & Boud, D 1996) Thus, peer learning is an *interdependent* form of learning.

Peer learning itself can take many forms. It can be students learning in informal study groups, sharing ideas or working as a team to solve problems. The level of interaction and cognitive development can also vary depending on the complexity of the tasks that the students are expected to perform. These tasks can promote skills ranging from simple reviewing of facts, to peer analysing, critical thinking and problem solving skills. (King, A, 2002)

REPUBLIC POLYTECHNIC PROBLEM BASED LEARNING (PBL) & PEER LEARNING

PBL is a learning environment where complex real world problems are used to trigger learning. Students are expected to identify learning issues which required further investigation; this inquiry helps students to achieve their objectives of understanding and ultimately "resolving" the problem. This learning methodology provides a good platform for peer learning to take place as students are usually required to solve problem within a team context. As a team, students are required to "bring together collective skill in acquiring, communicating and integrating information" This is a quote? Where did it start? (Duch, B 2001) which is a process of learning and acquiring knowledge from one another within the team - peer learning.

The Republic Polytechnic's PBL process is developed to meet the requirements of students who need to develop specialised technical skills. (O'Grady and Alwis 2002). The one-day-one–problem methodology requires students to work in teams of five to solve the problem given to them for the day. Students are expected to engage in investigating the problem, researching on new concepts, discussing and exchanging ideas with one another. The role of the facilitators is to act as a guide or resource person to the class, and not the key provider of knowledge or

information. Hence, students are expected to learn from other sources of information such as peers and to build upon their prior knowledge, without the presence of a facilitator.

The description of the RP-PBL process is as described as below.:

Brief Description of the Daily Routine at RP

- ***Students (in teams 5)of receive a problem as a trigger for learning. Students examine the problem and clarify what it is they know and don't know and formulate possible hypotheses***.
- ***Groups identify learning issues they will investigate and develop to collect relevant information.***
- During the middle of the day the groups of five meet individually with tutor to briefly discuss their progress.
- ***Students continue in their group of five to review resource materials and peer teach what it is they have learnt from their research.***
- Groups discuss, defend and justify their outcomes.
- Students reflect on the way they have learnt in their groups assessed individually for their learning and record key learning milestones in their learning journal.

Adapted from Alwis, W & O'Grady,(2002) One day one problem: PBL at the Republic Polytechnic

The RP-PBL methodology provides an ideal platform for peer learning to take place as its design allows for almost equal amount of time for peer learning as it does for classroom sessions with the facilitators. During this time that peer learning takes place through sharing of ideas, brainstorming, evaluating of resources etc. The peer learning activities that take place during the RP-PBL day is highlighted in bold in the box in the previous page.

In order to create an environment where students are motivated to share ideas with their group, each individual's performance is closely linked with the performance of the team. The daily grade is given to the students based on their contribution to team learning and individual understanding of the learning objectives. Hence student's grades are also influence by their peers' evaluation and by the student's own evaluation of their contribution to team learning.

EVALUATION OF PEER LEARNING IN RP-PBL

For the purpose of this paper, peer learning among students at RP is assessed based on the daily evaluation of their own contribution to the team's learning and peer's feedback on the individual's actual contribution. These two components of the assessment were selected because they best represent peer learning as a two-way process. One must not only acquire new knowledge from their peer in the team but they must also contribute to their peer's learning. It is this interaction and exchange of ideas and interdependence among learners that is essential to peer learning. Therefore, an individual's daily grade reflects the interaction or peer learning that has taken place within the teams.

The peer and self assessment questionnaires were designed using research on behaviours that are required for student centred discussions to take place. In the same research, it was identified that these behaviours are essential for "meaningful collaboration" to take place. (O'Grady 2004)

METHOD OF ANALYSIS

10 first-year students were monitored for 16 weeks. Each student has four peers in their team who would evaluate their contribution and each student will also do a self evaluation each day.

The data was analysed in two ways to investigate the correlation between peer and self evaluation with daily grade, as well as the weightage of the peer and self evaluation as a predictor of the daily grade. The full analysis and a sample questionnaire can be found in the following website http://discovery.rp.edu.sg/home/CED/Default.htm .

Correlation Analysis

The correlation between daily grade and self evaluation is .186 while the correlation between daily grade and peer evaluation is .221, which shows a moderate correlation of peer and self evaluation with the daily grade (where moderate correlation is less than ±0.5). These results also indicates that **the relationship between daily grade and the two variables are statistically significant, as both $p<0.05$.** Hence, we can conclude that both peer and self evaluation have a moderate positive correlation and statistically significant relationship with the daily grade. This implies that the better peer and self evaluations individual students have, the better the daily grade.

Multiple Regression Analysis

In the second analysis, the values of peer and self evaluations are taken together, and examined for their contribution towards the daily grade. The two values are taken as predictors for the daily grade. The results shows the relationship between the predictors (peer and self evaluation) and the dependent variable (daily grade) . Using the same data, we can see that both peer and self evaluations are weak predictors for the daily grade. **Only 5.2% of the daily grade can be explained by contributions from peer and self evaluations**.

IMPLICATIONS FOR RP-PBL

1. Peer Learning does take place within the RP-PBL Context

Peer and self evaluations shows that peer learning is taking place within the RP-PBL context as there is a positive correlation between peer and self evaluation with the daily grade. In peer evaluation, students are to assess team members' contributions to their learning, and in

self evaluation, students are to asses their contribution to the team's learning. A combination of both evaluations will indicate the presence of peer learning within the team.

In the analysis done for this paper, we can see that there is a positive moderate relationship between peer and self evaluations and the daily grade. From here, we can deduce that learning among the peers does take place, and this interaction of ideas, discussions and investigations are reflected in the daily grade attained by students. This is encouraging as the students are attending their first year at the polytechnic that have only started to practice PBL and peer learning for a relatively short time. It is expected that this relationship between peer and self evaluation and the daily grade will get stronger as the students become more familiar with peer learning and the students become more proficient in their evaluations.

2. Quality of Peer Learning

Although we can see that peer learning is taking place within the RP-PBL, we are unable to determine the *quality* of the peer learning that has taken place. One reason for this is that the students who were assessed in this paper have experienced at least 10 years of traditional instructor lead classes. Their mind-set tells them that knowledge comes from instructor and not peers. This can be seen in students' behaviour such as seeking affirmation from the facilitators on their research and students seeking "answers" from facilitators rather than investigating the problem. Hence, the evaluation of peer learning in this instance may reflect more of their social relations within the team than the amount of cognitive development that has taken place through interaction. Further studies of the same group of students in the second and third year may indicate a change in the student's evaluations of peer learning.

3. Contribution of Peer Learning to daily grade

Holistic assessment involves the judging of student's understanding of the learning issues according to how best the student is able to demonstrate this understanding. (O'Grady 2004). This process involves looking at various aspect of student's learning in which peer assessment is only one component. Add to that, holistic assessment at RP does not put a weightage to each component of the assessment. Facilitators have a range of "tools" to access the student's ability to understand the topics including peer and self evaluation. While we can see that peer learning has taken place during the RP-PBL process, we are unable to access the quality of the learning, as student's evaluations may be influenced by the social relations in the team. By comparison, it would appear that the facilitators are giving students a lower grade and facilitators may be focusing individual performance in quiz and reflection journal and neglected the peer and self evaluations.

In order to encourage "quality" peer learning to take place, facilitators can provide students with a list of questions that will encourage quality discussions and investigations. Once the students are more competent in their evaluations, facilitators can be encouraged to put more weightage to student's evaluations and to value peer evaluations by spending more time to observe the interactions within the team.

CONCLUSION

Peer learning certainly has an impact on the students' learning, as demonstrated in the correlation between peer and self evaluation and the daily grade. This relationship demonstrates that students do acquire knowledge from their discussion with their peers, and that cognitive development does take place. Although the weightage of peer and self evaluations are low in their "contribution" to the daily grade, this does not negate the fact that peer learning is taking place during the RP-PBL process and it has a contributing role in the student's learning.

In the RP-PBL process, whereby students spent half their time learning from one another, this is important affirmation that learning does take place, even if it is not from the facilitators. Students are learning to leverage on one another for new knowledge rather than just relying on the facilitators to provide the solution to the problem.

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