

Project title: Evaluation of usefulness of reflective summary writing with a mind map to enhance the PBL learning process

Sneha Ravindranath, Warnakula Kusum De Abrew & Vishna Devi Nadarajah

Summary for the IMU-LTIG Report (Please summarize the project objectives, significant results achieved, research approach and team structure)

A modified process of PBL implementation to enable students enhance the learning process in PBL by summary writing with a mind map was evaluated. The objective of the study was to determine the benefits of including summary writing with a mind map on enhancement of learning in PBL.

Semester 2 medical students were invited to participate in this study and given a briefing on the process of mind mapping. Participation in the study was voluntary and 84 students who were interested signed the consent forms and completed the pre-test feedback form on students' perception of reflection in PBL. Following this, the reflective summary template form was provided to capture the reflection process during the PBL discussion.

The reflective summary templates with the mind maps were collected at the end of PBL session 2. Two investigators provided feedback on each student's mind map to improve the mind mapping technique as well as to enable the critical thinking and reasoning in the reflection. This feedback was given back to the students before the next PBL trigger to help them improve their reflection in the following PBL session. This process was carried out for four consecutive triggers in the module.

At the end of the module in course assessment examination, the post-test feedback questionnaire was again provided to all the students who participated in the study to capture their rating on the effectiveness of the PBL reflective summary with a mind map for their learning process. A total of 54 students returned the feedback form.

The difference in the mean scores between pre and post-test for each question in the feedback forms were evaluated using T test. The results revealed that the students perceived a statistically significant ($P < 0.05$) difference on reflection in PBL with the use of mind maps and reflective summary template in the PBL process in the following areas:

1. Critical thinking skills
2. Skills as a self-dependent learner
3. Application of concepts learnt in relevant contexts
4. Evaluation of contribution to team work
5. Assess and improve contribution to team work
6. Improve skills in relating concepts learnt

The student mind maps were graded by two investigators based on criteria of ideas/concepts covered, illustrations, branching and inter-relation of the ideas and clinical reasoning. The scores for the mind maps were evaluated over 4 weeks for the consecutive triggers using ANOVA and significant differences between groups and the various attributes were further analysed using Post hoc test. A qualitative analysis of the comments written by the students in the post test feedback will be done.

This study has demonstrated that reflective summary writing in the form of a mind map has helped in enhancing the learning process in PBL.

Objectives achievement

- **Original project objectives**

To determine the benefits of including summary writing with a mind map on enhancement of learning in PBL.

- **Objectives achieved**

The study has shown that students demonstrate a perceived benefit with summary writing with a mind map in PBL. Statistically significant improvement perceived by students are improved critical thinking skills, assess and improve skills as a self-dependent learner, apply most of the concepts learnt in relevant contexts, evaluate the contribution by other team members, assess and improve contribution to team work and improve skills in inter relating concepts

Benefits of the Project

- **Outputs of the project and potential beneficiaries**

1. An improved process of PBL implementation to enable students enhance the learning process in PBL by summary writing with a mind map

Incorporating reflective summary writing in the form of a mind map enables the student to acquire deeper learning in the form of inter relating concepts and also provides the tutor an understanding of the student's thought process. This enables providing feedback to the students to improve their critical thinking skills acquired in PBL.

2. Developing the skills of summary writing through a mind map during the PBL process

Mind mapping during PBL enables the student to improve their summary writing which can also be applied for retaining contextual information. This also provides a record of the PBL discussion and helps the student in reflection.

- **Organisational Outcomes**

1. Innovative approach to enhance learning in PBL with the help of a mind map.
2. Mind mapping technique may also be taught to students to help improve deeper learning by inter relating concepts and ideas. Mind mapping skills can also be generally applied to improve students' understanding and retention of contextual information as it appeals to diverse learning styles.