

ACTIVE LEARNING IN HIGHER EDUCATION: SMALL GROUP WORK LEARNING APPROACH

Azuin, Ramli¹, Rufaizal, Che Mamat²

¹Politeknik Ungku Omar, Malaysia
azuinramli@gmail.com

²Politeknik Ungku Omar, Malaysia
rufaizal_cm@yahoo.com

ABSTRACT

Small group learning is one of the active learning approaches that helps student in developing their learning skills through the problem solving process. Current research shows that the ability of students to apply the skills learnt during statistics classes into their daily lives is still at a poor level. This working paper seeks to discuss the framework of active learning methods in teaching and learning (T&L) which has been applied to students of statistics at the Department of Civil Engineering at Politeknik Ungku Omar. The approaches used are small group learning, problem-based learning, problem solving, oral presentations and reporting. In this method, the problem solving process is done according to specific, systematic and organised steps. The discussion in this paper shows that several aspects especially in the implementation and evaluation of active learning methods can be reviewed and improved to increase its effectiveness during future implementation. In addition, the lecturers also need to understand the roles of a facilitator in supervising students during the learning process.

Keywords: problem-based learning, active learning, small group work, statistic.

1. Introduction

Mathematics is taught largely as a basic education whether at the school or higher education level. Although a number of abstract mathematical concepts are taught, the concepts and skills taught are largely the ones needed in our daily lives. It means that the teaching and learning in educational institutions highly influence students' understanding of the subject. An unsuitable teaching method will lead to a passive learning process, leading to students' inability to relate and apply the basic knowledge in mathematics in their daily lives. According to Shamsuddin et al., (2014), current teaching methods' emphasis on content create students proficient in the subject but unable to apply the values embedded in the subject into their thought process, action and roles as a member of the society. The teaching and learning of the subject that is heavily content-oriented are seen as separating mathematics from real life. This in turn will portray mathematics as a subject that has little applicability in real life and makes any discussions in this subject dull and dry, not to mention stifles student's creativity and separates learning from reality (Ismail & Atan, 2011; Storch, 2005).

A proposed alternative to develop students' creativity in this subject is the use of active learning methods. According to Bonwell and Eison (1991), active learning increases student engagement with learning materials and are aligned with student learning outcomes. Students are engaged in more activities than mere listening. They are involved in dialogues and debates, writing, problem solving and higher-order thinking. The various approaches and strategies in active learning are shown in Figure 1.



Figure 1: Active learning Approaches (Bonwell & Eison, 1991)

Figure 2 shows how students begin active learning through formation of small group work and various methods such as problem-based learning. According to Surif et al., (2013), problem-based learning encourages students to study the problem and subsequently improves knowledge and skills and enhances attitudes, enabling them to apply the theoretical knowledge in day-to-day problem solving.

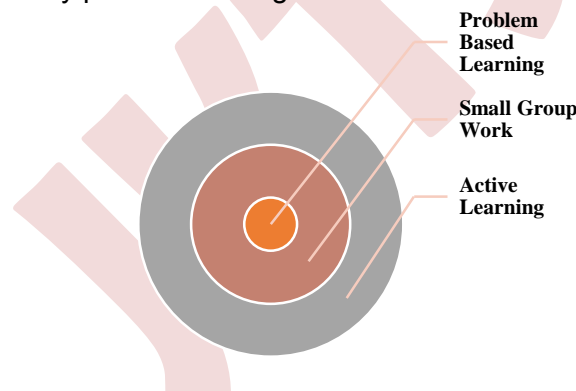


Figure 2: Active learning implementations

2. Implementation method

The small group work method is one of the teaching methods used during classes. It is an experience-based teaching and learning process that entails active thinking (Tosun & Senocak, 2013). Active learning through small group work was executed using the approach as shown in Figure 3.

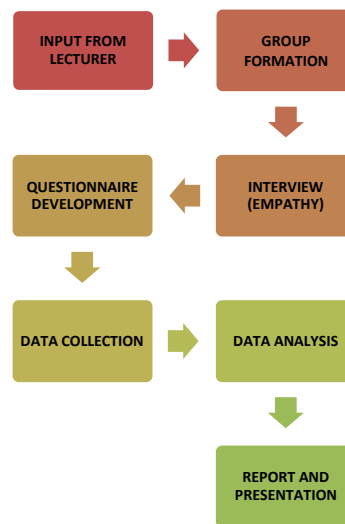


Figure 3: Method of active learning implementations

The subjects of this study are the civil engineering students in the Statistics class. The course consist 7 topics entailing basic concept of statistics covering data collection methods and presentation of data, numerical description measures, probability, correlation, regression and application of statistical software. One of the intended learning outcome is the ability to demonstrate the skills related to knowledge of statistical concepts through teamwork tasks. It gives students an opportunity to apply the knowledge obtained during classes into their daily lives.

The students were divided into several small groups and were assigned with a problem solving task. The tasks entail scientific investigation that begins with the process of identifying the problem(s), followed by gathering information related to the problem(s) at hand. The students were tasked to investigate the factors that encourage students to use e-learning in teaching and learning. In groups, the students began planning their research strategy including determining the sampling and data collection method, presenting the data, analysing the data using statistical software and reporting the findings.

The students conducted interviews with their friends to obtain feedback on the issue/problem that they were solving (Figure 4). The approach is useful as students probe further into their issue to complete their task. The students then used the findings from the interview sessions and literature review to develop a questionnaire to obtain quantitative data.



Figure 4: Interview session with students

Upon completion of the questionnaire development, the students began their data collection to test the accuracy and correctness of their questionnaire and thereafter find the solution to their task (Figure 5). This required students to cooperate in a group to achieve the required sample size and provided the students with a valuable experience. It is a good exposure to the students to experience the problem solving process on their own, especially

in the statistics course, and subsequently to apply the knowledge into any field they pursue in future.



Figure 5: Distribution of questionnaires to students

The final stage of their assignment was data analysis using a statistical software involving data clean-up, input and analysis, which was again required to be completed in a group. Students were required to relate to the theories that were taught in class and apply them during data analysis. A complete report of the activities was prepared and the outcome of their project presented in class to be shared with other groups (Figure 6).



Figure 6: Presentation session in the class

3. Conclusion and recommendation

The above illustrates the problem-based teaching and learning method which requires students to actively work in small groups and carefully solve the problem given. Problem solving is a pedagogical method which has been in use since the early 1970s and has been widely used in the teaching of medicine. It has since been adopted in the teaching of other fields such as dentistry, agriculture and health sciences (Simone et al., 2014; Graaff & Kolmos, 2003). By adopting a problem-based method, active student participation is clearly visible during the teaching and learning process, providing students with valuable opportunities to apply the concepts, principles and theories learnt in class (Jalani & Sern, 2015). It in turn encourages critical, analytical, logical and rational thinking, in addition to building confidence and self-esteem and equipping students with problem solving skills (Etherington & Etherington, 2011; Ismail & Atan, 2011; Surif et al., 2013). In short, the problem solving process is an education process that allows students to demonstrate their critical thinking skills in a particular assigned topic.

Despite the benefits limited lecture hours poses a challenge in the development of critical thinking and soft skills among students. Lecturers need to complete all topics in their syllabus within the time allocated in the teaching plan and are thus short of time to devote to developing the subjects' abovementioned skills. The researcher also found that the subjects

require some time to familiarise the method and for their critical thinking and problem solving skills to become visible. It implies a need for continuous implementation not only in mathematics but in other subjects as well before we can witness a general improvement in students' skills.

Active learning approach increases student confidence in executing and reporting their work although some hesitation could be sensed at the start, perhaps because the subjects are used to traditional lecture styles. Students spend more time on their studies when working with active learning than with traditional models. As such greater focus should be placed on the roles of the lecturers in implementing this approach. Lecturers should first embrace this approach and enrol in related training courses that would improve their ability to implement active teaching and learning methods. An effective facilitator would provide inputs that assist students to solve the problems without influencing their decision or answers.

3. References

- Bonwell, C., & Eison, J. (1991). *Active Learning: Creating Excitement in the Classroom. AEHE-ERIC Higher Education Report No. 1*. Washington, D.C.: Jossey-Bass.
- Etherington, M. B., & Etherington, M. (2011). Investigative Primary Science : A Problem-based Learning Approach, *Australian Journal of Teacher Education* 36(9).
- Graaff, E. D. E., & Kolmos, A. (2003). Characteristics of Problem-Based Learning. *Int. J. Engng Ed.* Vol. 19, No. 5, pp. 657-662
- Ismail, S., & Atan, A. (2011). Aplikasi Pendekatan Penyelesaian Masalah Dalam pengajaran Mata Pelajaran Teknikal dan Vokasional di Fakulti Pendidikan UTM, *Journal of Educational Psychology and Counseling*, volume 2, 113-144/ISSN: 2231-735X
- Jalani, N. H., & Sern, L. C. (2015). Perbandingan Kesan Pembelajaran Berasaskan Contoh-Masalah Dan Pembelajaran Pemusatan-Guru Terhadap Pemerolehan Pengetahuan Pelajar. *Jurnal Kurikulum & Pengajaran Asia Pasifik. Bil. 3 Isu 1*.
- Simone, C. D., Lussier, J., & Hall, L. (2014). Problem-Based Learning in Teacher Education : Trajectories of Change Faculty of Education, *International Journal of Humanities and Social Science*. 4(12), 17–29.
- Storch, N. (2005). Collaborative writing: Product, process, and students' reflections. *Journal of Second Language Writing*, 14(3), 153–173. doi:10.1016/j.jslw.2005.05.002
- Surif, J., Hasniza, N., & Mokhtar, M. (2013). Implementation of Problem Based Learning in Higher Education Institutions and Its Impact on Students' Learning. *The 4th International Research Symposium on Problem-Based Learning (IRSPBL) 2013*
- Shamsuddin, S., Tek, O. E., & Desa, S. (2014). Kesan Penggunaan Pembelajaran Berasaskan Masalah Terhadap Pencapaian Biologi Dalam Kalangan Pelajar Tingkatan 4. *Jurnal Pendidikan Sains & Matematik Malaysia Vol.2 No.1 ISSN 2232-0393*
- Tosun, C., & Senocak, E. (2013). The Effects of Problem-Based Learning on Metacognitive Awareness and Attitudes toward Chemistry of Prospective Teachers with Different Academic Backgrounds. *Australian Journal of Teacher Education*, 38(3). <http://dx.doi.org/10.14221/ajte.2013v38n3.2>