
The Effects of Problem-Based and Collaborative Learning on Students' Higher-Order Thinking Skills

Siew Nyet Moi¹, Jupri Basari²

¹ *Fakulti Psikologi dan Pendidikan, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia*

² *Sekolah Menengah Sains, Lahad Datu, Sabah*

¹ E-mail: sopiah@ums.edu.my;

² E-mail: jupribasari@yahoo.com.my

Abstract

The Standard Secondary School Curriculum introduced in 2017 places a greater emphasis in Additional Mathematics on applying the elements of higher-order thinking skills (HOTS). However, students showed poor performance in the application of HOTS in solving Additional Mathematics problems. Therefore, this study examined the effects of Problem-Based Learning (PBL) and Collaborative Learning (CL) with the help of Geometer's Sketchpad on the four levels of HOTS of Form Four students namely Applying, Analysing, Evaluating and Creating. A PBL-CL module was developed as a guide for teachers to foster HOTS among students. A HOTS test was developed to assess the level of HOTS of students. This study used a quasi-experimental pre-test and post-test control group research design involving 270 Form Four students in Sabah, Malaysia. The assessment of HOTS involved three intervention groups namely PBL-CL, PBL and Conventional Learning (Conv) group. Statistical analysis employing MANCOVA, ANCOVA, and Effect Size techniques were conducted. The results showed that the PBL-CL group produced a significantly higher post-test mean scores compared to the PBL and Conv groups in all four levels of HOTS. This shows that the PBL-CL method has a positive effect in helping the development of HOTS. Therefore, Additional Mathematics teachers are strongly recommended to integrate PBL-CL in their TL practice to increase the level of HOTS among students.

Keywords: *collaborative learning, form four students, higher-order thinking skills, problem-based learning.*
