Learning geometry in a large-enrollment class: do tangrams help in developing students' geometric thinking?

Abstract

Aims: 1. To investigate the students' levels of geometric thinking while engaging in in-class tangram activities in a large-enrollment class; 2. To find out the student's perception towards the use of tangrams in learning geometry. Study Design: Case study research design. Place and Duration of Study: The study took place at the University of Malaysia Sabah for a period of three hours. Methodology: The sample consisted of 192 in-service primary school teachers (110 females and 82 males; age range 30-40 years). Student's degree of acquisition of van Hiele (1986) geometric thinking was measured using an in-class tangram activity worksheet and analysed using acquisition scales of Gutiérrez et al. (1991). Questionnaires with closed and open-ended questions were conducted to explore learner's insights and experiences of their learning. Results: The results showed that a majority of student's attained complete acquisition of van Hiele level 1(88%) and level 2(82.3%). However, fewer than half (33.9%) of students could attain complete acquisition of level 3. These findings suggest that students developed through a sequence of hierarchical levels of thinking in learning geometry. Most of the students agreed that the tangram activities fostered their interest and appreciation towards geometry and boosted their confidence and creativity in learning geometry. The majority of them also agreed that tangram activities have enhanced their understanding of 2-D geometric concepts and the 3 levels of van Hiele model. All students hoped to implement this activity in their classrooms and promote it as recreation activities. Conclusion: Tangram activities carried out in a large class helped in-service primary school teachers develop sequentially from the visualisation level through to the informal deduction level. Structuring learners' experiences using tangram and peer assessment not only served as an appropriate in-class exercise to facilitate students' geometric thinking, but also develop confidence, interest and appreciation toward geometry.