The impact of elstgeest and alfke's questioning model with manipulatives on physics student teachers' ability to generate productive questions

Abstract

Question-asking is a basic skill required for the development of students' thinking. However, the way in which physics teachers conduct laboratory activities do not usually stimulate student thinking by asking productive questions. This study addressed this concern by investigating the physics student teachers' ability to generate productive questions using the Elgeest's and Alfke's questioning model with a set of manipulative learning (EAM) strategy. The manipulative consisted of simple electrical components that could be explored and manipulated. The study investigated if there was a difference in student teachers' productive questions in terms of number of questions in each category and level of thinking between before and after a lesson using EAM strategy. A further purpose was to find out students' thought regarding their experiences using the EAM strategy in generating productive questions. A total of 34 Third Year undergraduate physics student teachers took part in the study. They worked in a group of 3-4 to discuss and construct questions before and after the instruction. Student teachers' generated questions and written reflections were used as data collection methods. Questions were analyzed and classified according to Dillon's (1984) classification of questions: properties, comparisons, and causal relationships. It was found that before learning using the EAM strategy, student teachers tended to ask questions of the properties category. In contrast, students tended to pose causal relationship-type questions following instruction with the EAM strategy. Overall, the students indicated that the EAM strategy had increased their ability to generate productive questions at higher categories and cognitive levels. Physics teachers who conduct laboratory activities could use the EAM strategy to lead students in the generating productive questions that foster their thinking.