The effects of guided inquiry laboratory approach on high school students’ mastery concept and generic science skill of solubility and solubility product constant topics

Aritta Megadomani¹, Hayat Solihin², Hernani²

¹PPPPTK IPA Jl. Diponegoro 12 Bandung Indonesia
²Chemistry Education, Science Education Faculty, Universitas Pendidikan Indonesia, Bandung Jl. Dr. Setiabudi 229 Bandung 40154
*Corresponding author: aritta.sedec@yahoo.com.sg

Abstract

The solubility and solubility product constant is one difficult topic for students in high school. The teachers need the learning model with active learning for improving the students’ process science learning. This study is aimed to produce guided inquiry laboratory of solubility and solubility product constant topic; and to get information about application of learning model into students’ concept mastery and generic science skill. The method used in this research is quasi experiment with Pretest-Posttest Group Design. The subjects of the research are 47 students from second grade of High School- in one boarding school Bandung. The instruments used were written test, observation sheets, questionnaires, interview, a lesson plan and students’ worksheet. The increase of study result is counted by the average percentage of N-gain formula. The research shows this learning model can improve sub concepts of solubility and solubility product constant topic and students’ cognitive level significantly to all student,; and generic science skill are understanding of scale, logical consistency, causality, logical inference, symbolic, and abstract in solubility and solubility product constant topic. Based on the study is known that learning model implementation has been done as well as lesson plan and students’ worksheet; the learning model can improve percentage students’ concepts mastery to 57.3 with more details are: solubility sub concept can be improved to the highest percentage 69.5 and dimension cognitive processes of C3 (apply) to 58.3. The result of generic skills was the highest percentage in logical consistency to 73.3 and the lowest in mathematical modeling to 32.5. The students and teachers gave the good responses toward the learning, they were interested and motivated in following the learning using model implemented.

Keywords: Guided Inquiry Laboratory, Generic Science Skill, Concepts’ Mastery, Solubility Product Constant, dimensión cognitive

Introduction

On the whole education process in schools, teaching and learning activities is very important component in the success of student learning. Based on implementation in field schools, there are still many problems are found in the learning process. Today, key issues of learning process in formal education could be identified are: (1) learning conditions are less touched students dimensional sphere, such as the dominance of teachers who provide less access for students to develop independently through discovery, thought processes and self motivation (Trianto, 2007), (2) the subject matter of chemistry is often not associated with their real life, whereas students should be able to connect their learning experiences with the real life in order to obtain meaningful learning is intact, and (3) teachers act more as a giver of knowledge to students, so students are not trained to find the knowledge and developed the concept itself.(Sanjaya,2009).

Based on constructivist theory, the most important principle in learning is the teacher not only imparting knowledge to students, but students must construct their knowledge in their mind. Teachers can give their students the steps that brought students to a higher understanding, provided the students themselves have to climb those stairs (Nur, 1998). The theory constructivist of Piaget and Vygotsky is relevant to inquiry-based learning. In inquiry learning, students are active participants. The concept of Vygotsky about the social interaction role in learning is the relevant concept for inquiry learning, which students work in groups, learning to think and act as a scientist (Rustaman, 2005). Inquiry is defined by Piaget (Sund &Trowbridge, 1973) as a learning situation for preparing children to do their own experiments; to see what is happening; to do something; to use the symbols and to find the answers by questions themselves; to connect their discovery with the other findings; to compare what their found with those found someone else.

Model of learning through guided inquiry labs in this study consists of five stages are orientation, exploration, concept invention, application and