

DEVELOPMENT OF SOL-GEL LABORATORY USING INQUIRY FOR HIGH SCHOOL STUDENTS

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Students often find chemistry is a difficult subject and is not interesting due to its abstract nature and complex contents. The chemistry lessons in Bhutan are still taught through the traditional method, which is more focused on rote learning. Students face difficulties in relating what they learn in the classroom to real world situation and daily activities. Rote learning demotivates students learning chemistry and thus students do not have a good attitude towards the subject. Therefore, this research study is aimed at developing a Sol-Gel laboratory based on the inquiry learning approach for Bhutanese grade 10 students to help them gain more understanding, meaningful learning and a positive attitude when learning chemistry. The Sol-Gel laboratory, based on how to prepare silica gel, was developed using an inquiry learning approach. In this study, 64 students at grade 10 participated in inquiry learning using the Sol-Gel laboratory. The participants were selected by purposive sampling. This study investigated students' conceptual understanding, students' perception and preferences in the learning environment, towards the learning activity using conceptual tests, the CLES questionnaire and an interview. The conceptual tests, CLES questionnaire and interview were conducted prior and after the implementation of the Sol-Gel laboratory. The results showed that students had a positive attitude to learning as evident from the interviews and CLES questionnaire. The activities helped them gain more conceptual understanding and skills such as asking critical questions, predicting, solving problem, drawing inferences, communication, and etc. The inquiry activities provided the opportunity for students to interact verbally with other students to build scientific knowledge within the classroom. This Sol-Gel laboratory helped students to improve their understanding and attitudes towards important aspects of the laboratory including their eagerness to do the activities, their sense of value of the activity and the impact of the activities on their interest, enjoyment and understanding.

KEY WORDS: SOL-GEL/ SILICA GEL LABORATORY / INQUIRY LEARNING/ BHUTAN

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