A NEW APPROACH TO ENHANCE SCIENTIFIC REASONING ABILITY IN PROPERTIES OF MATTER UNIT OF A/L PHYSICS SYLLABUS

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In teaching physics, teachers must try to help their students make sense of physics concepts and theories and use those concepts and theories to describe, explain, predict, and design real world objects, systems or events. If teachers want to improve their students' conceptual understanding and scientific reasoning ability, then they face a real challenge. Part of this challenge is to develop thoughtful, detailed lesson plans. My goal is to develop lesson plans for a section of physics unit in A/L physics syllabus in order to improve students' conceptual understanding and scientific reasoning ability.

For this purpose, the unit on properties of matter of the A/L physics syllabus was selected because it is one of the most popular units among A/L physics students. This unit consists of three sections named surface tension, viscosity and elasticity. To identify the most difficult section among the above three sections and to test the conceptual understanding and scientific reasoning ability of A/L physics students, a diagnostic test was given to them.

For this diagnostic test, fortyfive simple questions related to the real world events related to each section (surface tension, viscosity and elasticity) of the unit were prepared for the question paper. Fiftyfour grade thirteen physics students of three schools in Kandy district were given this question paper. After evaluating the answer scripts, the questions related to the surface tension were identified as the most difficult section for the students to understand and explain.

To overcome above difficulties of that section, lesson plans were prepared with the basis of creating active and cooperative learning environment inside the classroom. To test the effectiveness of this lesson plans and students' improvements, two equal groups of physics students of grade twelve of Nugawela central college were selected. Same teacher taught for the both groups but for the experimental group, newly developed lesson plans were used and for the control group, traditional teacher centered methods were used.

After finishing the teaching of whole section, same question paper, which was included only surface tension questions of the previous question paper, was given for both groups. Results of the both groups were analyzed after marking the answer scripts and comparing the results, the effectiveness of the prepared lesson plans for improving the scientific reasoning skills was tested.