

USE OF CONCEPT MAPS IN TEACHING ATOMIC CONCEPTS FOR GRADE 10 STUDENTS: A CASE STUDY IN A SELECTED SCHOOL IN COLOMBO, SRI LANKA

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Understanding and memorising science concepts are commonly recognised as challenging tasks among ordinary-level students. More studies would be beneficial to evaluate and recognise scientific approaches to promote science education. This study investigated the use of concept maps as a teaching strategy to enhance students' understanding of atomic concepts in Grade 10 classroom in a selected school in Colombo. Concept maps were used as the fundamental strategy in this study to help visualise relationships between key ideas, promote meaningful learning, and improve the teaching and learning process compared to the traditional teaching method for Grade 10 students. Mixed methods were used as the methodological approach in this study. The sample consisted of one hundred and forty students in Grade 10, aged 14 – 15 years, of both sexes in the selected school. Thirty-three boys and thirty-seven girls were included in the control group, and thirty-four boys and thirty-six girls were selected for the experimental group. Pre-tests were conducted among the sample. The unit "Atomic Structure" was taught to the experimental group using concept mapping, while the traditional lecture method was used for the control group. Qualitative data were collected using structured interviews, field notes, photographs, and videos. Pre-tests and post-tests were conducted to obtain quantitative data which were analysed using MS Excel and SPSS software. The results show that the experimental group demonstrated improved performance in teaching and learning process compared to the control group. In terms of standard deviation (SD), the control group had a value of 1.77, and the experimental group had a value of 1.82. There were no significant differences in the SD between the control group and experimental group for the pre-test. In the post-test, the experimental group outperformed the control group. Thus, it can be concluded that the concept map approach to teaching the "Atomic Structure" unit influenced the improvement of students' understanding of science concepts. Moreover, the effectiveness of concept maps in science education supports their suitability for enhancing current teaching and learning processes of chemistry concepts for the young generation.

Keywords: Atomic structure, Concept maps, Science education, Teaching and learning approaches