COMPUTER-ANIMATED INSTRUCTION AND STUDENTS' ACHIEVEMENT GAINS IN ELECTROCHEMISTRY

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ABSTRACT

This study compares the effects of computer-animated instruction (CAnI) and conventional-based instruction (CBI) on students' conceptual change. The subjects, 85 matriculation students from the International Islamic University (IIU), Malaysia were taught the fundamentals of electrochemistry. They were randomly assigned to a CAnI (N=45) or a CBI group (N=40). The CAnI group received lessons through computer-animated presentation and collective discussions, while the CBI group received lessons through the teacher's explanation and presentation using overhead prepared transparencies. A combination of questionnaires, pre-test and post-test scores and interview transcripts was used to analyze subjects' conceptual change and perceptions towards CAnI and CBI respectively. The questionnaire analysis revealed that students in the CBI group considered the teacher's direct transmission approach aided by transparencies with emphasis on explaining simple facts as the most helpful aspect to improve their understanding of electrochemistry concepts, while the students in the CAnI group clearly believed that the systematic step-by-step discrete sequences of animation as the most helpful aspect of their teacher's presentation. The overall pre-test and post-test analyses revealed that the students in the CAnI group experienced stronger conceptual change compared to the subjects in the CBI group. The answers given by the interviewees in the CAnI group improved dramatically in the post-test, thus showing evidence of their stronger conceptual change in comparison to the students who were exposed to the CBI. The findings also revealed that subjects in both groups experienced weak conceptual change as they failed to deeply understand the structure of some conceptually complex questions. However, the overall answers given by the CAnI

group in the post-test and during interviews tended to display more correct logical sequence in their use of concepts, thus showing evidence of their stronger conceptual change in comparison to the students who were exposed to the CBI. These results show clear evidence that the CAnI approach is more successful in the fostering of higher order learning than the conventional CBI, and thus supports the assertion that CAnI is an effective instructional means to enhance students' strong conceptual change and deeper understanding.

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