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The effectiveness of science videos as supplementary aid for students rewriting the Senior Certificate Physical Science examination

Mackechnie, Louise Elizabeth

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ABSTRACT

This study investigated how successful videos were as a supplementary aid when watched in the same way as a television broadcast, for students rewriting the Senior Certificate *Physical Science* examination. It also aimed to identify strengths and weaknesses of these videos from both an educational perspective and from the perspective of the students.

A pragmatic design was used, and data was collected in two stages. The bulk of the data was collected during the first stage when a quasi-experiment that used a "pre- and post-test" design was performed. Three topics were investigated, namely *electrochemistry*, *acids and bases* and *titrations*. The relative improvement in the post-tests by the treatment group (who watched the videos) compared to the control group (who did not watch the videos) was evaluated. Additional data about students' reactions to the videos was collected using questionnaires and by observation. The data gathered was triangulated during the second stage of the study when the videos were reviewed.

The results obtained from the quasi-experiment showed there was no significant difference in the mean scores obtained for the tests by either group. Differences were detected, however, in the way individual questions were answered by the treatment group. Large gains were made in the post-tests for a fifth of the test questions (6 of the 30); however, about one eighth of the questions (4 of the 30) were answered incorrectly.

The use of analogies was one aspect that was considered to have helped students answer questions successfully, and they were used to explain the theory for half these questions (3 of the 6). Two of these analogies made links to simplified versions of the science. In one instance, the science had been simplified by using vocabulary from the analogue in place of scientific vocabulary, and in the other, the scientific concepts themselves had been simplified. For the majority of the questions (5 of the 6) the use of anthropomorphic and teleological explanations to describe chemical characteristics was considered to have aided students' recall of these analogies and of the theory. The exposure to tutorial questions in the videos could also have helped students answer these questions successfully.

Of the questions that were incorrectly answered, half (2 of the 4) of the wrong choices could have resulted from oversimplified explanations coupled with inappropriate or inadequate use of scientific terminology in the videos. The incorrect answers to the remaining questions probably resulted from students' misinterpretations of the visual footage and accompanying verbal text.

From the students' perspective, a large percentage (over 80%) reported that the language used by the video presenter was acceptable, and the majority (70%) stated that the explanations used were "very good". Just over one third (36%) cited the quality of the explanations as being their reason for choosing these videos in preference to other videos. However, some students (28%) commented that they were confused about specific aspects of the information presented. Anecdotal evidence collected during the study supported their comments, and showed that aspects of the footage in the videos were not understood.