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Learners' conceptions about astronomical concepts related to the sun and the earth

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ABSTRACT

This research report is based on a study that investigated South African Grade-10 learners' conceptions about day and night, and the seasons, after instruction in these topics. The study was motivated by examiners' reports that learners perform poorly in physical science, and by alternative conceptions that learners have about scientific concepts, as reported in the literature. A motive for conducting the study in South Africa is that relatively little has been published about South African learners' conceptions about day and night, and the seasons.

An open-ended diagnostic questionnaire was used to probe learners' conceptions about day and night, and the seasons. The validity and reliability of the questionnaire were checked by the researchers' supervisor and colleagues. The questionnaire was piloted in a secondary school in the same township as the school that was later used to collect the main study data. Learners in the pilot study were asked to state problems encountered while answering the questionnaire. This resulted in minor modifications on the questionnaire.

The modified questionnaire was then administered to the main study group, and open coding was used to analyze the results. The results show that the majority of learners lacked scientifically acceptable conceptions about day and night, and the seasons, *e.g.* they did not understand the combined rotation of the Earth about its axis, and the revolution of the Earth about the Sun. The results also show that learners could not properly interpret diagrams, and to effectively use diagrams to clarify their answers. Learners lack scientifically acceptable conceptions despite detailed explanations given in their textbooks, which imply that the books were not used effectively in the learning process. Some recommendations made, following these results, are that learners' attention should be drawn to rich information presented in their textbooks, and that some 3-dimensional objects should be used when teaching the topic.

DECLARATION

I declare that apart from the assistance acknowledged, this report entitled

LEARNERS' CONCEPTIONS ABOUT ASTRONOMICAL CONCEPTS RELATED TO THE SUN AN THE EARTH

is my own unaided work. All sources that I have used or quoted have been acknowledged by means of complete citation and referencing. This report is being submitted in partial fulfillment of the requirements for the degree of MSc in Science Education at the University of the Witwatersrand. It has not been previously submitted for any degree or examination at any other university.

……..

Retselisitsoe Mosoloane

28 February 2005

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