

ABSTRACT

Student Conceptions in Science

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The purpose of this research was to identify the conceptions held by Caribbean secondary school students in selected areas of science, with the emphasis on ideas which differed from orthodox science. Based on a student survey, the observation of existing classroom climate, and an analysis of the outcomes of attempts at concept change, the study sought to suggest implications for teaching and learning.

Data were collected in Barbados and Dominica, using interviews and a survey questionnaire for the conception study, an observation schedule for study of classroom climate, and a simple pretest posttest design for analysis of learning outcomes. The samples involved were 874 students surveyed, 10 teachers for the observation phase, and one teacher for attempts at concept change in two topics--Acids and Alkalis, and Animal Classification. Constructivist strategies were also observed in the teaching of photosynthesis.

Divergent conceptions were found in all topics, most of them persisting to Form 5 level. Classroom climates were predominantly convergent, concerned with imparting "correct" ideas. Considering the level of divergent conceptions found in the survey, it did not appear that convergent teaching methods were generally highly effective, even for convergent purposes. Methods that encouraged divergence often did not produce lasting concept change either, but in two topics significant posttest gains were achieved and the incidence of "correct" ideas was higher than obtained in the survey results. These methods also appeared to generate greater student self-reliance and critical thinking. The critical elements of strategy appeared to be careful diagnosis of student ideas, devising strategies appropriate to particular ideas, and extensive application of the idea to be learned. However, such studies would need to be replicated across various topics and classes.