A fascinating aspect of teaching is that no two days are ever the same. Such variety makes teaching an exciting and interesting profession, but can also generate problems. Apparently small changes in the way two lessons, supposedly similar, are conducted can result in very different lessons. How this occurred for one Year Seven student during two science lessons using discrepant events is explored in this paper. Her responses to each of the lessons were similar in some respects, but quite different in others. Differences between the lessons are examined, and possible reasons for the differences in the student’s responses are explored.

INTRODUCTION

Concern has been expressed about the restricting effects of classroom discourse in many lessons which prevents students from asking questions, and formulating their own hypotheses (Barnes, 1976; Biddulph, 1982). It was this concern, amongst others, that motivated Biddulph and Osborne (1984) to suggest an alternative teaching approach for science, the Interactive Approach, which included an inherently different form of teacher-student interaction that would allow students to raise questions and formulate hypotheses. Other teaching approaches, such as suggested by Baird and Mitchell (1986), have been proposed for science lessons, which also attempt to encourage students to engage in question-raising and hypothesis formulation. However, is changing the teaching approach and hence the interaction pattern sufficient for students to engage in these behaviours? Fleer and Beasley (1991) would suggest not, but contend that the actual interaction that the teacher engages in with the student is crucial for higher cognitive learning to occur. Another consideration is the student’s responses to the teaching approach, interaction pattern, and actual interaction available. To what extent are students’ responses to lessons context dependent? This study examines a student’s responses in two science lessons that were designed to encourage students to ask their own questions, then propose and test their own hypotheses (Suchman, 1966), and identifies some of the factors which appeared to influence the student’s behaviours in the lessons.

THE STUDY

As part of a study of students’ responses to teaching approaches in science, two science lessons were observed. The lessons were conducted in a large primary school in a provincial city in Queensland, in a Year Seven class. The same teacher taught both lessons to a small class of about fifteen mixed ability students. Where possible the same students were used. Each lesson was the first lesson of a topic, and essentially followed the procedure suggested by Suchman (1966) for presentation of discrepant events. The lessons were held about three weeks apart.

The teaching approach involved a demonstration designed to present a discrepant event, or puzzling situation which was counter-intuitive. The demonstration was conducted with little explanation or comment. The students were then invited to ask questions about the demonstration and materials. The teacher answered questions with either a “yes” or “no”, or
repeated the demonstration to provide an answer. Questions which sought the confirmation or rejection of an idea (theory) were not answered, though students could test theories by phrasing questions as thought experiments involving the materials. For example, the question "Does it matter if the lengths of the two pendula are different?" would not be answered, whereas the question "If the second pendulum were half as long, would it be moving in the same way as the first one after three minutes?" would be answered by a "No". Students were free to discuss ideas amongst themselves whenever they wished. Each of the lessons was intended to serve as an introduction to the topic, and would be followed by subsequent lessons. Suchman (1966) insisted that at no time should the teacher confirm or deny a theory, but that the students should decide when an adequate explanation for the demonstration had been arrived at.

Two key differences in teaching approach occurred between the lessons during their implementation. The first was the nature of the discrepant event chosen for the demonstration. The second was whether the students expected the (scientifically) correct answer to be revealed. The first discrepant event was adapted from *The Diving Bottle* (Suchman, 1966). A small glass bottle was upturned in a tall glass cylinder of water, and adjusted so that it only just floated (see Fig. 1). A sheet of rubber was fastened over the top of the cylinder, and pushed gently. The bottle sank to the bottom of the cylinder, and remained there even when the rubber sheet was removed. When the rubber sheet was pulled upwards gently, the bottle rose to the surface. During the lesson, the procedure was repeated with an eye dropper partially filled with water. However, the eye dropper did not sink. At the beginning of the lesson, it was made quite clear that the students would not be told the answer, and would not have theories confirmed.

![Fig. 1 The Diver](image1)

![Fig. 2 The Double Pendulum](image2)

The second discrepant event was adapted from *The Double Pendulum* (Suchman, 1966). A thin wooden rod was rested across two metal rods supported by stands about seventy centimetres above the desk-top (see Fig. 2). Two identical pendula were attached to eyelets fastened to the wooden rod, about twenty centimetres apart. The pendula were made from