EXEMPLARY CHEMISTRY TEACHING IN PERTH SCHOOLS

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INTRODUCTION

Several case studies concerning science teachers and their classrooms have been reported in the United States (Mitman, Mergendoller, Packer and Marchman, 1984; Stake and Easley, 1978) and Australia (Tobin and Gallagher, 1986). These studies have tended to highlight negative aspects of science teaching and have emphasised the need to improve the quality of science education in schools. Penick and Yager (1983) proposed a series of case studies which focussed on teaching excellence. They hoped that by identifying aspects of science programmes that were successful other "school programmes could begin building on what was known to work". Subsequently a series of monographs has been published which describe exemplary science programmes in American schools (e.g. Yager, 1983).

The present study was one of a series of studies in the Exemplary Practice in Science and Mathematics Education Project (EPSME) conducted in Perth schools. The philosophy of the project is encapsulated in the following extract (Tobin, 1986).

Since this study will focus on exemplary practice in science and mathematics teaching, it should be possible to avoid the situation encountered in so much educational research in which a depressing set of outcomes highlights the plight of science and mathematics education. The outcomes of this study will emphasise effective practices that can be used as models by other teachers. Documentation will be provided on characteristics of curricula and teachers that enable science and mathematics to be successfully taught in contexts that are pertinent to education in Western Australia. If the study is complemented with an effective dissemination process and appropriate in-service programmes, EPSME should lead to improved mathematics and science teaching in Western Australia. Accordingly, EPSME is seen as an important component of ongoing research on improving the quality of mathematics and science teaching.

The purpose of this study was to observe and document classroom practices of year 11 and 12 chemistry teachers who were nominated as outstanding chemistry teachers. It was assumed that teachers nominated as exemplary would be good classroom managers and would demonstrate particular attributes which facilitated student learning and understanding.
METHODOLOGY

Selection of Teachers

Two teachers were selected to participate in the study, one from a government co-educational school and the other from an independent girls' school. Teachers were identified through a nomination process. State education personnel, tertiary science educators and teachers were asked to nominate outstanding teachers of year 11 and 12 chemistry. The two teachers were finally selected because of the frequency with which they were nominated but also because they were identified as having quite different teaching styles.

Data Collection

The methodology employed was similar to the ethnographic approach to classroom observations described by Hamilton and Delamont (1974) and Harding and Randall (1983). Data were obtained from classroom observations, teacher interviews, and student interviews and questionnaires. Multiple data gathering methods and the triangulation of information obtained from different sources and methods were employed to enhance the validity of the study.

Classroom observations

Teachers and classes were observed by the researcher for at least twenty lessons over an 8-10 week period. Narrative records were taken during the lessons to provide a descriptive summary and time log of the classroom activities. As well, teacher-student interactions and management strategies were carefully monitored and recorded.

Teacher interviews

Participating teachers were interviewed formally to establish their teaching value systems, the curriculum and particular aspects of their teaching style. Informal interviews were conducted, as appropriate, to clarify aspects of particular lessons.

Student interviews

A stratified random sampling technique was used to select six students from each class who were interviewed by the researcher. These interviews were used to establish the degree of congruence between the observer's, teacher's and students' perceptions of the teaching activities and classroom environment. Informal questioning of students during lessons was also employed to ascertain students' viewpoints on various aspects of particular lessons.

Classroom environment measures

Student perceptions of the classroom environment were measured using a modified shortened form of the Classroom Environment Scale (Fraser and Fisher, 1983). The scale consisted of twenty-eight items measuring Involvement, Affiliation, Teacher Support, Task Orientation, Competition, Order and Organization and Rule Clarity.