Specialist science teachers' classroom behaviour in 12 primary schools

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1. Introduction

Science education is regarded as an essential part of the academic curricula in Brunei. One of the major recent developments in science education has been the inclusion of science in the elementary curriculum.

Professional Development in Science Teaching

In October 1994, a program was launched for the training of Specialist teachers in primary science (Zaitun, 1999). Twelve schools from the main city district were selected for special professional development in primary science. These schools were supplied with extra laboratory equipment to enable students to conduct practical investigations. The 17 selected teachers attended a unique, four-week, in-service course at the Universiti Brunei Darussalam and regular school-based workshops. Non-traditional teaching methods, such as participatory practical activities, were taught in the in-service course. It was hoped that teaching methods would become less teacher-directed as classrooms were commonly characterised by teacher-centred and procedural approaches, with little development of thinking or communicative skills. Also, it was anticipated that rote learning and memorisation would be reduced, and that the ability of participants to use questioning techniques to probe students' understanding would improve (Zaitun, 1999). The course promoted teachers' use of strategies that incorporated active teaching and learning (Zaitun, 1999) and student participation in practical group work in science lessons (Ferrer, 1996). Some principals allocated one room as a Specialist science room. Mostly, non-Specialist classroom teachers were not scheduled to use this room but many took advantage of the resources and expertise of their colleagues. Investigating teacher-student interaction would determine if the professional development impacted on teaching approaches and changed teachers' communication style within the classroom.

2. Methods

Selection of a Learning Environment Instrument for This Study

An interest in the Relationship dimension of teachers' classroom interpersonal behaviour (otherwise called their communication style) led to the selection of the *Questionnaire on Teacher Interaction* (QTI) as the most suitable learning environment instrument for this study. The QTI was used to measure students' perceptions along two dimensions (Dominant-Submissive and Cooperative-Oppositional) in eight typical behaviours of their teacher: Leadership, Helping/Friendly, Understanding, Student Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Strict. Teachers' communication style would be expected to change from highly dominant to more submissive and from more oppositional to more cooperative as they changed their teaching approaches from more

teacher-centred to student centred. Also teachers' behaviour would be expected to change from more strict and allowing less student responsibility and freedom to being more helping/friendly, less uncertainty and more understanding as they organized students to participate in "hands-on" group activities and learnt more science concepts related to the syllabus. At first, more admonishing, dissatisfied and uncertain behaviours may be revealed and indicate that teachers and students struggle to make changes in their classrooms before becoming familiar with the modern techniques.

Previously validated for secondary students in several countries including Brunei, the QTI scales had been used as predictor variables revealing associations between students' cognitive achievement, enjoyment of science lessons, and particular aspects of teachers' classroom behaviours. Already modified for use with primary school students and validated in Singapore, the Questionnaire on Teacher Interaction (Primary) [QTIP] was chosen from the family of QTI versions for its simple language for translation into Standard Malay to measure upper primary students' perceptions.

The Sample of Students' Perceptions

The Malay translations of the QTI (Primary) and the Enjoyment of Science Lessons scale were administered to all Years 4, 5, and 6 primary school students in the 12 government schools in Brunei Darussalam that were involved in the Specialist science teaching Project. In order to make comparisons, the same questionnaire was also administered to all year 6 students in another 13 schools in the same geographical district of Brunei-Muara. In total, the sample consisted of 3,104 students in 136 classes. A pilot study revealed that students in Brunei are not commonly asked for their opinions and are not familiar with many teaching strategies. So it seemed appropriate not to seek responses from these young primary school students about their ideal teacher behaviours, preferences, their expectations or what teaching strategies they would appreciate.

Teacher Interviews

Three male and three female Specialist science teachers, experienced and less experienced, were chosen from various Project schools for interview. Four teachers from Project schools, who were not involved in the Specialist science teaching Project were also interviewed.

3. Results

When analyses of variance were calculated for the Project school sample only, there were statistically significant differences on two of the nine scales. Specialist science teachers in the Project schools were perceived to be more helping/friendly and understanding than were the non-Specialist science teachers. Levene's analyses of variance were calculated to determine the statistically significant differences between students' perceptions of teachers' classroom behaviour in the Project schools with data about Specialist and non-Specialist science teachers analysed separately in the Project school sample. Comparisons revealed a salient difference in variance. Students enjoyed their science lessons but this scale was not correlated to the eight teaching behaviours.

Teacher interviews revealed that the Specialist science teaching Project assisted in the improvement of teaching, student learning, and student enjoyment. The

opportunity for teachers to learn new teaching skills and methods during a course that also enabled teachers to collaborate with other primary science teachers was greatly appreciated by several Specialist science teachers.

4. Conclusion and Implications

Thus, it could be argued that the professional development program had been of some value to these Specialist science teachers, but further situational analysis could be expected to illuminate some possible reasons for these differences.

The Specialist science teaching Project assisted in the improvement of teaching and student learning. It enhanced Specialist science teachers' enjoyment and enthusiasm. Teaching and learning benefited from the provision of a Specialist science room, the supply of appropriate resources. Several relevant issues shedding light on the quantitative results became apparent throughout interviews.

5. Bibliography

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