PUPILS' PRESCRIPTIONS FOR GOOD SCIENCE TEACHERS

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INTRODUCTION

Improvement Research

Hogan (1980), reviewing types and directions of educational research in Britain over recent years, has drawn attention to the widely-quoted and accepted definition enunciated by Nisbet and Entwhistle (1973) that 'educational research consists in careful, systematic attempts to understand the educational process, and, through understanding, to improve its efficiency'. Whilst these writers make it clear that they recognise the existence of pure and applied aspects of educational research, they stress that 'a definition which includes the notion of "improvement" is increasingly being applied in deciding priorities in educational research'. The giving and withholding of funding determines to a large extent which proposals will be put into effect.

Funding agencies may be attracted by concepts of 'improvement', 'efficiency', and 'effectiveness', but 'improvement' research seems likely to alienate teachers. They often reject the findings of such studies not only because of what they see as threatening and demeaning implications, but also because they feel that the models of teaching employed by the researchers are simplistic and inadequate. The models are seen to be unrelated to the real world of the school and classroom, being based on theoretical constructs in the researchers' minds, rather than on experience and individual cases.

The 'Black-Box' Approach to the Classroom

Most research approaches appear to have a universal quality, as results of similar methodologies and theoretical stances appear in English, German, Russian and French research literature. Almost without exception, research in teaching has largely ignored the richness and complexity of the classroom. It has been seen as a 'black-box' with a mechanism that had little relevance or importance to the research plan. It is not surprising therefore that the past discoveries, answers and conclusions of researchers appear to have been more for each others' consumption via the medium of the research journals, and to have had no significant effect upon the practice of teaching. In fact, some researchers (for example, Hamilton and Delamont (1974), Lamborn (1980) and Dunkerton (1981) have been warning other researchers that the very approaches and philosophies underlying their studies, as well as the methods employed to communicate them, practically guarantee this state of affairs.

Potentially fruitful strategies to overcome the impasse have recently been suggested by Elton and Laurillard (1979) and Lamborn (1980). Lamborn integrated the reasoned contention advanced by Elton and Laurillard that 'much research was essentially irrelevant to practice, i.e., it was intrinsically incapable of linking with the latter, and what was required was a new formulation of both, the problems that research could tackle and the methodology which it should employ', with Harre's analysis of realist
science, and developed what he terms a 'tool-making tool'. An approach is outlined by which a teacher uses his own knowledge and model of teaching to develop a means of examining, elaborating upon, enriching, extending and/or refining it in a feedback research sequence in which the teacher and not the researcher alone is central to the experimental treatment. Such an approach was envisaged as being likely to go some way towards removing the alienating aspects of research on teaching in that the teacher would cease to be conceptualised as a work unit, or uniform cog in a machine, but would be involved with the researcher at the level of his own curiosity.

A PARTICIPANT APPROACH TO CLASSROOM RESEARCH

The Science Classroom Management Project (Butler, Beasley, Buckley and Endean, 1980; Endean, Beasley, Buckley and Butler, 1980) was commenced with the objective of clarifying with the classroom participants the events and interactions occurring in junior science classrooms in south-east Queensland secondary schools. Not only have teachers and pupils seen and commented upon their own videotaped science classes, but also results have been fed back at regular intervals to teachers in forms which they could discuss, explain, and criticise. The teachers in the study themselves suggested the timing of the second phase of the study. This was as a result of a problem enunciated by the researchers that, with the first phase classes videotaped in the middle of the year, there appeared to be many covert rules of interaction between class and teacher which were not readily accessible to the trained observer. Teachers recommended that the early weeks of the school year would provide insight into the negotiations from which spring the classroom dynamics. They stressed certain variables which they said were of critical importance in the time taken to establish the modus operandi and its quality. In particular, their insistence on the importance of teacher 'presence' led to a whole new phase of the study and analysis of non-verbal behaviour in classrooms.

Pupils as 'consumers' of the science classroom offerings have also been consulted, and following the methodology of the trained observers, have rated teachers from other classrooms on non-verbal characteristics, the detail of which is reported in another paper (Wilson and Butler, 1982) appearing in this publication. When asked to describe the characteristics of the ideal junior science teacher in the same non-verbal terms, the pupils were readily able to do so, and their 'ideal' bore a close relationship to the upper group of observed teachers. Both the teachers rated as being in the top group and the 'ideal' teachers displayed behaviours which made sense in terms of the teachers' own concept of 'presence'.

THE IDEAL JUNIOR SCIENCE TEACHER THROUGH PUPILS' EYES

The picture which emerged about the ideal junior science teacher was of a self-confident and relaxed individual, who assumed backward-leaning and asymmetrical postures, made asymmetrical gestures, used language fluently and syntactically with pleasant and effective voice production. The teacher exerted a good deal of dominance over the class, but this was of a benign rather than threatening kind — a calmly confident teacher, firmly in the driving seat, running an organised and busy, but not too tight, ship.

In a rather different context, another study (Endean and George, 1982) was carried out to elicit a written description of the ideal science teacher and the ideal science classroom from the point of view of a group of thirteen year olds who had been selected by their own schools in Northamptonshire, England, to attend a special summer school for 'gifted young scientists'. The youngsters in this group were very diverse in their cognitive styles, from