WORKING WITH TEACHERS: THE IMPLEMENTATION AND EVALUATION OF AN INNOVATIVE IN-SERVICE PROGRAMME.

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CHAPTER 1

THE QUALITY OF EDUCATION: IN-SERVICE EDUCATION IN A CHANGING CONTEXT.

INTRODUCTION

This thesis is concerned with helping teachers to change their classroom teaching behaviour. Schooling in Australia, as in other comparable industrialised nations, is a major national endeavour. The central resource in this endeavour is the teaching force as it is the teachers who implement the curriculum to educate the children and, ultimately, to renew the society.

The pace of change in Australian society is accelerating and this is having profound and fundamental effects. In this dynamic situation it is to education and schools that people look for the responsiveness and continuities which will equip individuals with the skills, knowledge and attitudes so they can contribute in a worthwhile manner to society. Schools are institutions established by society; if schools are to adapt to the changed society then teachers must also change so that they are able to implement the new curricula or the new practices.

In this thesis an innovative in-service programme was developed and implemented. The focus of the study was the individual teacher and his or her classroom teaching strategy, rather than a regional or system-wide innovation. The implications from the innovative in-service programme, however, are relevant to the wider system contexts and to the nature and organisation of all in-service
programmes.

CHANGES IN AUSTRALIAN SOCIETY

Australian society is in a period of unprecedented change and the causes of this change are not hard to observe; they include population changes and a concomitant increasing multicultural element, the economy, changes in science and technology, altered social institutions, changes in work and leisure, and changes in personal values. A brief consideration of these changes will provide a contextual framework from which to appreciate the multitude of factors which impinge upon the teacher.

Demographic data, while containing some uncertainty, would indicate that Australia will have a population of around 17-18 million by the year 2000 AD. This figure will vary depending not only on natural increase but also the rate of migration to Australia. The latter, being a political decision, is very changeable; the recent profile of immigration, however, shows a greater percentage of Asian migrants than from the traditional United Kingdom and European source countries. The data would also indicate that the population growth across Australia will be uneven as some areas expand rapidly as new resources, etc., are developed, and other areas decline in importance, e.g., heavy industry cities.

While there is some uncertainty about specifics it is possible to see that the various State and Territory education systems need to have a high degree of flexibility; from the number of students attending school it is possible to see that the birth rates of the 1950s and 1960s meant a surge in enrolments firstly in primary
schools and a later surge as the students then passed on to secondary schools. This cyclic pattern is about to be repeated and in practical terms, it will mean that at one time many more teachers are required at one school level than another.

Another significant factor affecting the school age population will be the number of migrants who are allowed to enter Australia. Regardless of the number to come, however, it must be recognised that Australia is already a multicultural society which is differentiated both socio-culturally and ethnically.

At the present time there are uncertainties about the international economic situation and, of course, this affects the Australian economy. In a fundamental way the economic situation directly affects the level of provision for education. However, over the last 40 years or so there has been a shift from a predominantly agricultural society to an industrial society, and more recently to a post-industrial society. This has meant changes in school curricula to recognise the importance of "service" industries such as tourism, recreation, and social services.

Science and technology are profoundly affecting Australian society through direct structural changes in industries and services and through what is included in school curricula. The implications of micro-technology for schooling, for instance, are already immense and are likely to present options not already considered by educational planners.

One consequence of the structural changes in traditional
employment areas has been alterations to the views on work and leisure. Unemployment among the unskilled young is relatively high and it is highest among those who reside outside the capital cities, are female, and of non-Anglo background.

Australian society is showing an increase in the number of marital breakdowns and the number of separated and one parent families. There are new family patterns emerging and more women are entering the work-force. The prevalence of social and personal problems such as crime, drug abuse, and so on is increasing and as traditional social institutions have declined in influence, the influence of the media in mass communication has increased.

Within the wider societal changes, which have an impact upon teaching at one level or another, it is possible to see more specific matters which relate to the teaching force. The first relates to the changes in the career patterns of teachers. The second to changes and increased expectations of the school and the teacher's role, and the third to the changes in Commonwealth and State educational priorities.

(1) Changes in teachers' career patterns. The Commonwealth Schools Commission Report (1981) showed that a decade ago the resignation rates for primary and secondary teachers were 12 per cent and 14.5 per cent, respectively. This relatively high rate, together with the growth in total teacher employment, resulted in a high teacher recruitment which in 1975 amounted to slightly more than 20 per cent of the teaching workforce. The annual resignation rates since that time have decreased dramatically and are currently
averaging 5-6 per cent for primary teachers and 6-7 per cent for secondary teachers.

In the 1960s and 1970s the number of new graduates appointed as beginning teachers in any one year constituted a sufficiently large proportion of the total teaching force to significantly bring about revitalization and change in schools. Auchmuty (1980) quoted the Commonwealth Tertiary Education Commission which in 1979 projected that new graduates would comprise only 6 per cent of the teaching force in 1985 and that by the mid-1980s, 94 per cent of teachers would already be in the school system at the beginning of each year. Clearly, to provide a more desirable match between the requirements of the society with the experience and the qualifications of the teachers, there is a widespread need to assist teachers develop their professional competence, relevant knowledge and confidence.

The change in resignation rates has come about partly because of the economic recession which reduced the alternative career options for teachers. In part, it also has come about because of a teacher over-supply at the primary school level and in some subject areas at the secondary school level. This change in the Australian teaching force has some similarities to those reported from the U.S. by Schlechty and Vance (1981). One common and important finding is that of those teachers who leave the teaching force, it is the most able and talented who move to other occupations.

Schlechty and Vance (1981) point to the importance of the politico-economic reasons for this and they suggest that governments need to allow more teachers to upgrade their qualifications and then
to reward them with an increased salary. They rightly argued that at the same time this would improve the general level of education in the teacher work-force. The problem that Australian employing authorities now find themselves faced with, however, is that they do not have the financial resources to offer open-ended salary scales to the teachers.

(ii) Changes and increased expectations of the schools' and the teacher's role. In the 1970s there were many surveys into community expectations into schools (see for example, Campbell and Robinson, 1979; Western Australian Department of Education, 1978a and 1978b) and they indicated that schools were expected to pursue a wide range of goals, which go beyond the mastery of content knowledge to include ethical and social issues and personal development.

The large scale migration to Australia has meant that there is an active promotion of understanding and appreciation of different cultural groups. In addition, the rights of all groups to equal access and opportunity to education is now generally accepted. These groups include Aboriginal students, girls, the economically disadvantaged and those who have special learning problems.

The wider impact of new technology in the community has also had an impact on schools. This is seen clearly in the area of computing where teachers are now expected to be competent in the use of computers and to prepare their students for a working relationship with them.

The significant growth of our knowledge base of education
has also been a factor. There is now a greater expectation that teachers need to move away from the didactic teaching methods which traditionally have characterised their work to a greater use of individualised or co-operative approaches which take account of their students' abilities and needs.

Another social-political factor which has had a significant impact has been the 'accountability' movement. In its widest political sense, this has come to be represented by statements such as "a public service funded by the taxpayer, should be open to public scrutiny and comment". It is also evidenced in the increased concern to evaluate the performance of teachers in both professional development, promotion, and permanancy (or tenure) decision. Whatever the particular expression of the concern there is now greater responsibility placed upon the individual teacher and the school for their actions and decisions.

Also within the schools themselves the changes in organisation, systems of governance and management will further expand the range of skills and knowledge expected of the teachers.

(iii) Changes in educational priorities. In 1984 the Commonwealth Government outlined six new educational priority areas which it began to resource. The new areas included: the Participation and Equity Programme; Computers in Education; Education of Girls; and Aboriginal Education. The curriculum and instructional changes associated with these education priority areas meant that teachers were required to renew their professional knowledge and skills.
A related concern is that of catering for particular sub-groups within the school population. The community has developed a new awareness of the needs of particular children - the physically handicapped, the ethnic minority, the geographically isolated - and it may now have the resources or the political will to give special attention to such children.

All of the above point to the changing role of the teacher. While the data have referred to Australia particularly, it is obvious that there are similar conditions and expectations in operation in the U.K. and the U.S.A. In one sense, of course, teachers have always changed as the society they live in has changed also. What is different in the recent changes, however, is that the pre-service phase of the teacher's preparation course cannot expand to accommodate to all of the new demands.

At the international level, a study was conducted by the Organisation for Economic Co-operation and Development from 1972 to 1974 entitled, "The Changing Role of the Teacher and its Implications". The survey reported that the teacher's role in the countries examined was changing as a result of the following influences: a longer period of schooling; the teacher's position of authority was altering within the general structure of authority in the society; the curricula of the schools was altering as a result of the knowledge explosion and the new social and personal objectives of the curriculum, and there were changes in the teaching-learning process, with teaching becoming more of a shared enterprise between teacher and student.
This view of "change", of course, is not new. A decade before this OECD report the British Ministry of Education (1962) had expressed a similar view:

In recent years there has been a growing recognition throughout the education service that the schools need more help if they are to adopt curriculum and teaching methods quickly enough to meet the changing needs of society.

What is new is that the educational policy makers have accepted many of the arguments and are now looking for ways to respond to the challenges.

SUMMARY

This chapter has outlined briefly the factors influencing change in Australian society and referred to three specific clusters of factors which relate to the present teaching force and its need for constant revitalisation and professional growth. It is obvious that to achieve the expanded role for the teacher which follows from the above, it is not possible to put more into the pre-service component of the teacher's preparation. In fact, in many cases, the limited practical experience of this initial phase of preparation would make it unsuitable to include some of these elements anyway. Often the professional understanding one would want to develop can come only from some extensive work in the field. It is through the recognition of teacher education as a continuous professional
development that the goal of quality education will be achieved. It is the in-service component of this continuous professional development, in particular, how one helps teachers to change their classroom behaviour, which is to be considered in this thesis.

**ORGANISATION OF THIS THESIS**

In the next chapter the organisation and funding of in-service education in Australia is presented to show how the Commonwealth and the State and Territory Governments have engaged in this important activity. In Chapter 3 some of the in-service literature is reviewed and a number of in-service activities which have been developed in Australia are given. The descriptions are used to develop a taxonomy of in-service activities and to highlight the dominance of the action-research approach to Australian in-service education. Chapter 4 deals with some of the methodological issues which arise from the action-research approach and the "coaching" model approach to in-service. Chapter 5 presented the design of the study, including the phases of the in-service programme and the details of the innovative approach which was used. In Chapter 6 results from two survey questionnaires and an interview are given. Chapters 7, 8, 9 and 10 present the results from the implementation phase of the study. Chapter 7 is the main results chapter for the study of the teaching strategy implementation. In Chapter 8 data related to the teacher's self reports of self-confidence and self-efficacy are given. Chapter 9 outlines the teacher's reports of their school principal and the wider 'education system' as supporters of change. In Chapter 10 data and issues related to the teacher's relationships with their students are given. Chapter 11 considers the recent DES Circular
6/86 and compares its' proposals for changes to in-service education with present trends in Australia. In Chapter 12, the penultimate chapter, some criteria to evaluate in-service programmes are proposed and used to compare the innovative approach used here with the 'typical' in-service programme and the action-research approach.

In Chapter 13, the final chapter, there is a summary of the main points in the thesis and some of the major issues are presented.
CHAPTER 2

TEACHER DEVELOPMENT AND IN-SERVICE EDUCATION IN AUSTRALIA

INTRODUCTION

In the first chapter the central role of the teacher in the search for a quality education was outlined. The key position the teacher occupies as the implementer of the curriculum and the manager of the classroom learning was emphasised. Some of the contextual and shaping societal influences which are leading to a change in the role of the teacher were outlined also. These changes bring with them attendant requirements for changes in the teacher's knowledge and skills. In sum, it was argued that any proposals which place new demands on the professional competence of teachers must be accompanied by appropriate professional development.

In this chapter a brief overview of the organisation and funding arrangements for in-service education at the National and State level in Australia will be presented.

The definition of in-service which will be used throughout this thesis is:

...those education and training activities engaged in by primary and secondary school teachers and principals, following their initial professional certification, and intended mainly or exclusively to improve their professional knowledge, skills and attitudes in order that
they can educate children more effectively (Bolam, 1980, p.3).

This definition has been used as it is broad enough to include Award, Non-Award and informal teacher initiated activities and it recognises that both 'education' and 'training' are goals of in-service programmes.

**TYPES OF IN-SERVICE ACTIVITY**

The in-service phase of teacher development follows the initial teacher preparation course and a period of induction into the teaching force. Figure 2.1 shows the phases of teacher preparation and development. It also shows the three major types of in-service activities that teachers in Australia have engaged in. The first of these in-service activities are the formal award courses, for example, upgrading programmes at the degree and post-graduate diploma level, and higher degrees. The second are the non-award in-service programmes; for example, conferences, school development programmes, and school-based programmes. The third are the informal in-service education activities; for example, professional reading, involvement in community activities, experience in industry, commerce and such areas.
Within this broad range of activities it has been estimated that upwards of 85-90 per cent of Victorian teachers (Auchmuty, 1980), New South Wales and Western Australian teachers (Reynolds and Clark, 1982) have experienced some in-service education in their teaching career. However, in view of the varied nature of the Award and Non-Award forms of in-service activity, it is not surprising that in-service education was described in the following way, "any attempt to appraise the situation in Australia is hampered by the complex nature of in-service education and the ill-defined characteristics it presents" (Auchmuty, 1980, p.71).

**FUNDING FOR IN-SERVICE EDUCATION IN AUSTRALIA**

In Australia it has been the Commonwealth Schools Commission which, since 1973, has played a major role in the professional development of teachers. The dramatic impact of the Commonwealth's infusion of funds can be seen when one considers the State of
Victoria. Prior to 1974 the Victorian Education Department spent around $60,000 for short courses (i.e non-award courses) and with the introduction of the Schools Commission Teacher Development Programme $2.6 million was made available to fund in-service courses in Victoria for the two year period 1974-75. Of the total outlay of $467 million which the Schools Commission allocated to the States for the period 1974-5 slightly more than 2 per cent ($10.3 million) was allocated to the Teacher Development Programme. Since that time the funds for this particular programme have decreased significantly. Coulter and Ingvarson (1985) in a review of the Commonwealth's role in this area have described the funds allocated. Table 2.1 shows the decrease in funding over a ten year period.

TABLE 2.1 Professional Development Programme (PDP)  
Funding ($'000s in December 1983 prices)  

<table>
<thead>
<tr>
<th>Year</th>
<th>PDP</th>
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<tr>
<td>1974</td>
<td>14,366</td>
<td>1,446</td>
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<td>1975</td>
<td>30,319</td>
<td>3,891</td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>31,567</td>
<td>2,804</td>
<td>3.06</td>
</tr>
<tr>
<td>1977</td>
<td>29,536</td>
<td>2,901</td>
<td>2.77</td>
</tr>
<tr>
<td>1978</td>
<td>24,911</td>
<td>2,393</td>
<td>2.32</td>
</tr>
<tr>
<td>1979</td>
<td>24,401</td>
<td>2,312</td>
<td>2.24</td>
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<tr>
<td>1980</td>
<td>18,180</td>
<td>2,285</td>
<td>1.74</td>
</tr>
<tr>
<td>1981</td>
<td>17,990</td>
<td>2,286</td>
<td>1.59</td>
</tr>
<tr>
<td>1982</td>
<td>17,989</td>
<td>2,286</td>
<td>1.50</td>
</tr>
<tr>
<td>1983</td>
<td>17,989</td>
<td>2,286</td>
<td>1.44</td>
</tr>
<tr>
<td>1984</td>
<td>10,662</td>
<td>2,286</td>
<td>0.79</td>
</tr>
<tr>
<td>1985</td>
<td>10,662</td>
<td>2,286</td>
<td>0.78</td>
</tr>
</tbody>
</table>

Taken from Coulter and Ingvarson, (1985).
The Table 2.1 illustrates clearly how major the decline in real terms has been in the Commonwealth's Teacher Development Programme over the decade 1974-85.

One consequence of the reduction in Commonwealth professional development monies has been the use of the teacher's own time to upgrade their professional expertise. That is, the employing authorities previously had used a large part of the Commonwealth money to release the classroom teachers and administrators to attend an in-service programme off the school premises. This had occurred through the provision of "Relief" or "Supply" teachers and other forms of administrative support which had been paid for with the Commonwealth money. With the reduction in the Commonwealth money the teachers and administrators had attended courses either through "donating" some of their own time in out of school hours, e.g., at weekends or after school hours, or through the teacher taking extra supervision or teaching responsibilities to free a colleague or themself at a later time.

TEACHER PARTICIPATION IN IN-SERVICE ACTIVITIES

As indicated above, in-service education programmes include award, non-award and informal activities. The breadth of these activities makes it difficult, therefore, to find a specific figure for the participation rate of teachers. However, a survey by the Australian College of Education in 1977/78 showed that about 13 per cent of the total teaching force were involved in Formal Award courses offered by the tertiary institutions. This figure would now
be considered a conservative one as the employing authorities 'have encouraged' teachers with lower qualifications to upgrade to more desirable levels. For example, while the basic award for the completion of a primary teacher's course is the Diploma of Teaching, which is a 3 year full-time equivalent course, all State employing authorities now require a 4 year qualification before the teacher can apply for a promotional position. This has meant that there are many 3 year trained teachers who are now enrolled in the Bachelor of Education degree to obtain the fourth year equivalent qualification.

The Vickery Committee (1980), which was established to report on the professional competence of teachers through the pre-service, induction and continuing education phases, reported that more than 20 per cent of Western Australian teachers were engaged in some form of tertiary study. This figure was reported to be slightly higher than in any other Australian State or Territory.

The Australian College of Education (1979) survey reported that during 1977-78, 54 per cent of the teacher respondents had attended at least one Non-Award in-service activity related to the curriculum; 37 per cent had attended a session related to teaching methods; 17 per cent had participated in courses on administration. Between 8 per cent and 4 per cent reported attendance at sessions related to community relations, multicultural education, and the teaching of handicapped children. Most of the teachers in this survey had attended only one in-service programme but a considerable number had attended more than one. Table 2.2 shows the number of teachers who reported attendance at non-award courses.
<table>
<thead>
<tr>
<th>Duration of activities</th>
<th>Percentage frequency of attendance.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 or 2 courses</td>
</tr>
<tr>
<td>1 day or less</td>
<td>27</td>
</tr>
<tr>
<td>2 to 3 days</td>
<td>31</td>
</tr>
<tr>
<td>4 to 5 days</td>
<td>12</td>
</tr>
<tr>
<td>6 to 10 days</td>
<td>4</td>
</tr>
<tr>
<td>More than 10 days</td>
<td>4</td>
</tr>
</tbody>
</table>

The survey showed that the neighbouring school or the local teacher/education centre were the most frequently used locations for the in-service activities.

Finally, the Australian College of Education (1979) survey showed that for teachers in government schools over half of the Non-Award in-service courses took place in school hours. The teachers in Independent schools (i.e., both Roman Catholic parochial schools and other religious and non-denominational schools), however, reported that they spent more of their own time attending in-service courses in out-of-school hours. The situation in the government schools, therefore, was that in 1977 approximately two-thirds of the Commonwealth Schools Commissions funds in the Teacher Development Programme ($12.5 million) went to pay for "replacement" or "supply" teachers while the classroom teachers attended a short in-service course. In Western Australia in 1980 over 80 per cent of the Teacher Development Programme funds which were available were spent on
teacher "replacement" or "supply" teachers.

In addition to the Commonwealth Government, through the Schools Commission Services and Development Programme Funds, and non-government school funds the various State and Territory Governments had also provided funds for teacher professional development. The Table below is from Coulter and Ingvarson (1984) and it shows the State and Territory funding for professional development.

**TABLE 2.3 State/Territory Funding for Professional Development (S'000s, estimated December 1983 prices)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW.</td>
<td>N/A</td>
<td>N/A</td>
<td>11,168</td>
<td>14,176</td>
</tr>
<tr>
<td>Vic.</td>
<td>40,158</td>
<td>25,316</td>
<td>19,617</td>
<td>14,444</td>
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<tr>
<td>Qld.</td>
<td>11,969</td>
<td>8,549</td>
<td>9,800</td>
<td>10,650</td>
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<tr>
<td>WA.</td>
<td>663</td>
<td>1,475</td>
<td>2,734</td>
<td>2,608</td>
</tr>
<tr>
<td>SA.</td>
<td>N/A</td>
<td>10,353</td>
<td>6,437</td>
<td>2,608</td>
</tr>
<tr>
<td>Tas.</td>
<td>1,714</td>
<td>1,754</td>
<td>1,889</td>
<td>1,980</td>
</tr>
<tr>
<td>NT.</td>
<td>N/A</td>
<td>2,695</td>
<td>2,673</td>
<td>2,727</td>
</tr>
<tr>
<td>ACT.</td>
<td>N/A</td>
<td>N/A</td>
<td>2,638</td>
<td>2,982</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>--</td>
<td>--</td>
<td>56,956</td>
<td>55,868</td>
</tr>
<tr>
<td><strong>Commonwealth</strong></td>
<td>29,536</td>
<td>18,180</td>
<td>17,989</td>
<td>10,611</td>
</tr>
</tbody>
</table>

The variations in the total funds made available by the States and Territories are quite interesting. In particular, the variations in the funds made available in Victoria and South Australia show a very significant decrease. The funds in Western Australia, on the
other hand, have remained relatively stable. In practical terms many of the State and Territory governments found themselves with reduced revenue and the area of teacher professional development was one budget item that could be cut with little electoral impact. Since 1984 the sums made available by the State and Territory governments have again declined in real terms.

**SUMMARY**

This chapter has been concerned to outline the types of in-service activity that Australian teachers can engage in and to sketch the financial contributions of the Commonwealth and State and Territory governments to teacher development. The data show that there have been major reductions in the total funds which are now available for this third phase of teacher education i.e., in-service. Further, in the case of the Commonwealth Government it now makes funds available only for its national priority areas and these categorical funds allow for no locally determined order of importance. At the Commonwealth level at least, it is the antithesis of what Bolam (1980, p.39) recommended: "This international study has revealed the paradoxical necessity for central government funding and encouragement of INSET (in-service education and training) with as little central control as possible."

In the next chapter there will be some description of the various in-service approaches used in Australia.
CHAPTER 3

IN-SERVICE EDUCATION: A REVIEW

INTRODUCTION

There is a large and growing literature in the broad area of continuing education of teachers and more specifically in-service education (see for example, Bolam, 1980; Griffin, 1983; Howey, Bents and Corrigan, 1981; Hoyle and Megarry, 1980; Sparks, 1983). From the literature it is possible to discern at least three structural levels of interest in in-service education. These are (i) the governmental level, (ii) the school level and (iii) the individual teacher level.

At the governmental level it is possible to see that there are certain changes in the Australian educational system which have been determined by legislation enacted by the Commonwealth or State Governments. These legislated changes relate to structural matters such as raising the school leaving age, creating new multi-purpose educational institutions for the whole ability range of students or the decision to integrate handicapped children into ordinary schools. They also include changes related to social concerns such as the recognition of minority groups, transition from school to work programmes and opportunities for women.

At the school level it is possible to see that some schools have embraced the idea of being a 'problem-solving' school (Eggleston, 1980). This is the approach argued for in the Australian
context by Ingvarson (1980). Other writers (see for example, Bolam, 1981) point to the wide-spread nature of this approach because it allows for deliberation by all those involved. The particular features which have lead to support for the 'problem-solving' school perspective are that the school is seen as a distinct entity with its own milieu, that most of the expertise required for school improvement resides in the teachers and that participation by teachers in the decision making process is essential to have change in the classroom.

At the individual teacher level it is possible to see research which indicated that over time the teacher's concerns move from what has been termed "survival" through a concern for teaching and the school's expectations and into a concern about the impact upon students and the quality of one's teaching (see for example, Fuller and Bown, 1975; Fullan, 1980). The "concerns" model has been further developed by Hall et al. (1976; 1978; 1979) and it will be referred to later in discussion of the curriculum implementation studies.

Another focus of study at the individual teacher level has been the professionality of teachers. This has meant, at the least, ethical and informed decision making about what is in the student's best interests and an obligation to advance the knowledge of the educational community.

The 'teacher concerns' and the 'teacher professionality' approaches mentioned above focus on different aspects of the teacher and the teaching process. These differences of focus reflect what may be termed competing paradigms. In short, the teaching concerns
approach is illustrative of the "developmental or growth" paradigm, and the teacher professionalism approach is the "inadequate or defect" paradigm.

The 'developmental or growth' approach has been described by Jackson (1971) in the following way:

...teaching is a complex and multifaceted activity about which there is more to know than can ever be known by one person...; the motive for learning more about teaching is not to repair a personal inadequacy as a teacher but to seek greater fulfillment as the practitioner of the art... there is no such thing as the complete teacher. Though some people obviously know more about pedagogy than do others, those who know most conform to no single model of perfection. In teaching, as in life, the roads to wisdom are many (pp. 26-27).

The 'inadequate or defect' approach is premised upon either some perceived inadequacy and/or inefficiency of the teaching force or some obsolescence in the teacher's skills or knowledge.

Campbell (1980) elaborated on these two paradigms when he considered in-service education in Britain. His discussion, however, was relevant to the Australian context also. Campbell referred to the two paradigms outlined above as the "Cult of Efficiency" and the "Individual Reconstruction" approaches. He argued that the approaches probably represented a continuum rather than two categories to which all in-service programmes would belong. Campbell
...where 'efficiency' is the guiding purpose: courses must be practical, oriented either to specific problems found by teachers in the classroom (such as mixed ability teaching), or to staff development, often in respect of managing schools as organisations, or in implementing "relevant" curriculum innovations.

The general characteristics of Individual Reconstructionism, on the other hand, are antagonistic to management techniques and to emphasis upon the needs of the system. Instead, the stress is upon individually defined needs as a basis for course definition... This perspective de-emphasises the teacher as teacher, emphasising instead the teacher as a person with a particular biography. It stresses the need for a general theory of adult learning...(p.101).

While the 'defective' and 'growth' paradigms in some form or other occupy most of the discussion in the literature there is a third approach; that of the 'change' paradigm. This paradigm is based on the not unreasonable assumption that the educational system not only will be reactive to keep abreast of societal changes but also, where possible, it will be proactive and anticipate changes in the wider society. This was the basis of the discussion in Chapter 1. This would mean, in practice, and as a matter of course, that the educational system periodically required re-direction in accordance with economic, cultural and technological changes.
In contrast with the 'teacher is defective' approach where"... (it) has been based on the dogmatic belief of other educators that they know, and can justify, their statements about what constitutes good teaching" (McLaughlin and Marsh, 1978, p.89) and the growth model where the teacher's political interests would best be served, the 'change' model is based on the teacher's professional knowledge and a broader understanding of the issues rather than a set of particular technical skills.

An approach to in-service which is not concerned with the 'values' debate of the 'growth' or 'defective' approaches has been developed by Howey and Joyce (1978). They suggest a functional approach where in-service can be:

(i) Job embedded. It can be embedded in the job, with the emphasis upon actual classroom performance. For example, the teacher's analysis of video-tape recordings of his/her classroom teaching.

(ii) Job related. It can be part of the job or closely related to it but it does not take place while teaching is going on. For example, teachers may be engaged in an after school workshop on new assessment procedures.

(iii) General professional. It can be based upon activities to improve general competence but it is not tailored to specific needs as closely as the above. For example, maths teachers can take workshops on the applications of computers.

(iv) Career/credential. It can be aimed at helping the
teacher obtain a new credential or to prepare for a new role. For example, a classroom teacher can undertake further study to become a school psychologist.

(v) Personal. It can facilitate personal development which may not be job related. For example, a teacher might study philosophy for personal interest and it might or might not be immediately evident in their teaching.

Howey and Joyce (1980) also asked the teachers who they saw as instructing on the in-service activities. The teachers' answers differed according to the type of in-service activity. Howey and Joyce (1980, p.207) reported:

... fellow teachers and their other related school personnel were seen as more appropriate for in-service which stressed job-embedded and job related concerns, but professors were nominated as more desirable for the remaining three categories.

Bolam (1982) reported that the action-research in-service course based at Bristol University from 1978 to 1980 supported the view that in-service work should be school-based or school focussed. He noted, "The vast majority of teachers appeared to want job-related or school related INSET" (p.17).

A TAXONOMY OF AUSTRALIAN IN-SERVICE PROGRAMMES

In Australia there has been some but not extensive research into the in-service programmes for teachers (see for example,
A review of the available in-service literature showed that the area is only weakly conceptualised (see also, Vickery, 1980). There is no agreed view on the purposes and objectives of in-service education, and the questions of who should initiate the in-service, who should co-ordinate the in-service and who should fund it are still unanswered. There has been no systematic review of the different types of in-service programmes as outlined by Howey and Joyce (1978), for example.

In the section which follows the in-service dimensions suggested by Erart (1987); namely, purpose, mode, membership, location and time, will be used to provide a taxonomy of the Australian in-service experiences. These dimensions relate to the reason for the in-service programme, the way it was organised / structured, the number, experience and background of the participants, the venue of the programme and the duration of the in-service programme.

i. **Education Study Projects.** In Western Australia there has been a Services and Development Committee of the Education Department which funded thirty people to undertake education study projects. For some grantees, this involved travelling to other States, or being granted non-teaching time to study and report on particular aspects of a local school's activity.
The Committee published a summary project report which gave details on how readers could obtain further information. It is difficult to estimate, however, how much dissemination of knowledge took place beyond the grantees themselves.

The 1979 report (Services and Development Committee, 1980) indicated that the topics covered by the grantees included music education, religious education, implementation of a primary science course, remedial education facilities and special purpose centres for art/craft in primary schools.

ii. A whole school creative week. A school in Victoria became involved in a school-based creative expressive arts programme. This involved a staff member from a local university organising the week and arranging for 24 consultants in drama, art, creative writing, graphics, sound, music, clay modelling, creative problem-solving, batik, paper making, and media were programmed to demonstrate lessons which could be adopted and extended by the teachers.

The whole school approach was used as the university staff member who organised the week thought that when an individual teacher returned from an in-service course there was little effect upon the rest of the school (Batten, 1976).
iii. **A residential study weekend.** A primary school teacher and several reading and remediation specialists together planned a programme to examine visual and auditory perceptual development in children and its relation to reading problems. The local Regional Director of Education approved a weekend plus one school day to be spent in residence in a guest house to consider the issues identified.

In preparation for the study weekend, a one-page circular giving the general topic programme and leaders' names was distributed. Six weeks before the session, intending participants attended an orientation day at which they were instructed on the gathering of case study data to be analysed later at the conference (Logan, 1987).

iv. **After school sessions.** A local programme was developed to introduce teachers to the practical aspects of photography. Four sessions were held from 5.00 pm to 7.15 pm on a school day during four consecutive weeks. A number of courses were run during the year for different groups of teachers as no more than 8 teachers were in each group. The groups placed an emphasis upon maximum practical involvement (Logan, 1987).

v **Out of school "Block" sessions.** Three staff at a tertiary institution co-operated with an Education Department Superintendent of Science in planning a 10-
day science curriculum course for primary teachers.

The tertiary staff focussed upon the schools rather than the individual teachers and they insisted that support both for physical resources and professionally was given by the school principal and local superintendents. Each school was requested to send three teachers to the course, which was spread over a two month period and began with a five-day session at the tertiary institution. There was a three-day session after two weeks and a final two-day session after four weeks. This arrangement allowed teachers to trial their science curricula in their schools and to share their experiences with their colleagues attending the in-service programme (Dynan and Lake, 1978).

vi. The school as the "Unit of Action". The Commonwealth Government's Priority Schools Programme recognised the importance of the need for organisational support, (i.e., from the principal and other staff) if teachers were to implement new curricula, or change their teaching strategies on a school-wide basis. Accordingly, the focus was on the school as the "unit of action" rather than the individual teacher.

The Schools Commission outlined its Disadvantaged Schools Programme in the following terms:

Through the Programme the Commission seeks to promote
more equal educational opportunities by positive discrimination in resource allocation and by encouraging the adoption of school programmes in response to analyses of the special needs and life experiences of students... The overall aim of the Programme has been to encourage schools to seek out a wide range of ways of tackling the problems they face (Schools Commission, 1981, p.365).

In Western Australia the term "disadvantaged" was not used and the Priority Schools Committee took the programme a step further by stating that the "programme should be seen as an action-research programme designed to promote a process which encourages people to analyse the situation in which they are placed, to identify directions of needed change and improvement, and to propose action addressed to them."

The six brief descriptions of types of in-service education presented above, represent levels of involvement ranging from individual teachers through schools and regions to the national education system; they show curriculum concerns ranging from specific skills (in the example here, photography) through various school subjects to the design of curriculum and its attendant curriculum processes, and costs ranging from very little to millions of dollars.

It should be noted from the six descriptions (1) that the role of tertiary institution staff to the area of in-service education until recently has been piecemeal, isolated from teachers in schools
and academic in orientation and (2) that the major approach has been the action-research model. Sadler and Macpherson (1983), for example, wrote: "Several models for solving problems, instituting change, and assisting staff to grow professionally exist. The one chosen for this programme goes under the name of action-research" (p.7). While other in-service programmes do not explicitly state that they are using the action-research approach many of them follow the elements in the cycle of action-research and they say something similar to "Round 2 was designed as a time for collaborative reflection on what had occurred in the various schools, in order to extract general principles, techniques, and knowledge about change processes in schools" (Logan, 1987).

In the next section of this chapter action-research, because it is so widely used in Australia, will be examined in some depth.

**ACTION-RESEARCH IN AUSTRALIA**

In a paper by Grundy and Kemmis (1981) there is a clear and concise overview of educational action-research in Australia. The authors stated that an action-research approach has been used in school-based curriculum development, school-level evaluation, in-service education and participatory decision making in schools. According to Grundy and Kemmis (1981), Australian action-research has been more concerned with strategic orientation and political awareness, and hence, is more "critical" than its British counterpart.

Grundy and Kemmis (1981) define action-research as:

...a term used to describe a family of activities in
curriculum development, professional development, school improvement programmes, and system planning and policy development. These activities have in common the identification of strategies of planned action which are implemented, and then systematically submitted to observation, reflection and change. Participants in the action being considered are integrally involved in all of these activities (p.84).

Grundy and Kemmis (1981) referred to the research of Henry (1981) as illustrating the dissatisfaction that teachers had with "expert" and "typical in-service" day models of promoting change. They argued that it was because of this antipathy that the intensive in-service activities of the action-research approach were of more appeal to the teachers. Grundy and Kemmis (1981) also stated that part of the reason for this teacher antipathy is that the traditional in-service programmes had focussed upon the ideas and skills which it is hoped the teacher will implement, without providing the teacher with the supportive assistance during the process of implementation itself.

The Grundy and Kemmis statement also made clear the impact of the action-research approach upon in-service education. They wrote, "It is in the area of in-service education that some of the most vigorous and powerful action-research is currently being done" (p.89). Grundy and Kemmis (1981) listed all of the State Education Departments as involved to a greater or lesser extent with action-research and they highlighted each State's Curriculum and In-Service
Units as the major proponents of this approach.

Grundy and Kemmis (1981) described in shorthand fashion two major aims of action-research; firstly, "to improve" and secondly, "to involve" (p.84), and listed the areas for improvement as:

(i) the improvement of a practice
(ii) the improvement (or professional development) of the understanding of a practice by its practitioners, and
(iii) the improvement of the situation in which the practice takes place.

THE FEATURES OF ACTION-RESEARCH

Grundy and Kemmis (1981) outlined the following features as important in action-research:

(a) Strategic action and social practice as the subject matter of action-research. By this they mean that the practitioner, on the basis of rational reflection rather than on the basis of custom, habit, hearsay, etc., engages in strategic acts. These strategic acts occur in a context in which interpretation is required before rules can be judged appropriate, or where appropriate rules may not exist, and decisions are required instantly. In this sense, strategic acts, unlike rule following require practical judgement. It means that the actor alone can be the final arbiter of the truth of an interpretation, not rules or principles, or theories. This does not deny rational discourse in action-research but places at the centre the notion of strategic action and the prominence of personal judgement.
This issue of theory and theory testing has been of central importance to those working within the action-research framework. Elliott (1976-7), for example, in the report on the Ford Teaching Project argued against the position where the teacher is to "test the applicability of theories to his own situation" and that "the development of these theories is the job of non-teaching researchers" (p.9). Elliott further argued that to have teachers "test" outside generated theories,"... ignores the fact that in testing a theory, as opposed to merely applying it, the teacher is necessarily involved in theory development. The critical application of a theory in a particular situation cannot be logically separated from responsibility for developing that theory" (p.9). Elliott (1976-7, p.15) instead had argued for teachers attempting to understand their own practical theories of teaching, and that this should be through "...the conscious development of new practical theories from self-monitoring."

(b) The Action-Research Spiral. Grundy and Kemmis (1981) described the action-research spiral as involving a single-loop of planning, acting, observing and reflecting. They asserted:

the improvement of practice, understanding and the situation through action-research requires a spiral of such cycles in order to bring action under the control of understanding, in order to develop and inform practical judgement, and in order to develop an effective critique of the situation"(p.85).

It is understood that in the process of implementing and
modifying the cycles of action the understanding and reflection of
the teacher (or any actor) is central.

(c) The participatory and collaborative character of action-
research. Grundy and Kemmis (1981, p.87) asserted that "...action-
research is a democratic form of research". They contrast it with
research into practice which is undertaken by researchers whose aim,
the assert, is to inform a practice "from the outside"; through
the generation of theoretical principles to be used by practitioners
as externally-validated guides to their practice. This means that
all those involved in the action research process are equal
participants and are involved at every stage of the research; it is,
in short, collaborative participation in all aspects of the
research.

This is not to deny, however, the role of the facilitator in
the group formation and group processes. Grundy and Kemmis (1981,
p.95) stated:

It seems that groups cannot easily form or develop to the
point of taking responsibility for their commitments
without the initial intervention of a facilitator. But the
question of the changing role of a facilitator— from
leader to support or resource person to group member (or
withdrawal) — needs study.

The above section has quoted extensively from Grundy and Kemmis
(1981) who were writing from their experience in Australia. There
have been many other researchers using the action-research framework
in Australia also but they have not articulated the theory of
action-research as has Kemmis. Instead they have been concerned with practical activities (see for example, Kling, 1981; Sadler, 1984; Logan, 1987). In the United Kingdom Elliott also has written extensively on the theory and use of action-research (see for example, 1976-7; 1980; 1985). Recently Elliott (1985, pp. 244-245) has written on the wider socio-political impact of action-research through the process of social change:

Stage one may, with respect to educational action-research for example, involve developing explanatory theories which focus on the constraining influences of institutional, system, and societal factors on teachers' freedom to foster educational values in classrooms. The process of action-research can bring the realisation that certain gaps between theory and practice cannot be closed until something has been done to change these contextual factors. In this case, action-research may move from reflection on pedagogical strategies undertaken to change "the system" in ways which made educative action possible.

WESTERN AUSTRALIAN TEACHER PARTICIPATION IN IN-SERVICE

Reynolds and Clark (1984) surveyed Western Australian teachers in 1982/83 to determine, inter alia, the participation rates in in-service programmes. Table 3.1 shows the teacher responses.
TABLE 3.1  Year when last attended an in-service programme
(proportion percentage of group).

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
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<td>11</td>
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<td>59</td>
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<td>11</td>
<td>7</td>
<td>8</td>
<td>12</td>
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<td>11</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Before'71</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

Key: Metro. - Metropolitan Perth.
Country - One of the Country regions of Western Australia.
Prim. - Primary (i.e. Grades 1 to 7).
Sec. - Secondary (i.e. Grades 8 to 12).
Govt. - Government School.
Cath. - Roman Catholic School, part of the Catholic parochial system.
Indep. - Independent school, not part of Government or Catholic system.

In this survey 81 per cent of the primary teachers compared with 65 per cent of the secondary teachers reported that they had attended an in-service programme in the last two years. Also, during the time of the survey (i.e., 1982/83) teachers in the Government schools were more likely to have engaged in some form of in-service activity rather than were teachers in the Catholic or the independent schools. The difference, however, is not a major one and it must be remembered that at this time there was more money available for teachers in the Government schools to get "relief" or "supply" teachers to cover for their absence.
THE NATURE OF THE LAST IN-SERVICE PROGRAMME ATTENDED

The Reynolds and Clark (1984) survey also asked the teachers to report on the nature of their last in-service activity. The data are shown in Table 3.2.

<table>
<thead>
<tr>
<th>Nature</th>
<th>Percentage of total respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher/Education Centre</td>
<td>19</td>
</tr>
<tr>
<td>Consultancy/Advisory Visit</td>
<td>16</td>
</tr>
<tr>
<td>Regionally Organised</td>
<td>16</td>
</tr>
<tr>
<td>School based</td>
<td>9</td>
</tr>
<tr>
<td>Centrally Organised</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>34</td>
</tr>
</tbody>
</table>

The questionnaire item used by Reynolds and Clark (1984) to obtain this information listed two types of in-service delivery which were summed to obtain the figure shown (i.e., 34) in the "Other" category. The two types of in-service delivery were attendance at a tertiary institution and through an external programme. Given the current status of external studies in Western Australia it was highly unlikely that many in-service activities were offered externally. It can be assumed, therefore, that the largest response to the questionnaire was to the provision of in-service activities through tertiary education institution formal award or non-award course.
THE IMPACT OF THE IN-SERVICE PROGRAMME UPON PRACTICE OR POLICY.

Teacher attendance at an in-service programme has assumed that it will have some impact upon the teacher's teaching or curriculum content or their school's policy on whatever was the subject of the programme. Reynolds and Clark (1984) asked the teachers to report on whether or not the in-service programme had an impact on teaching practice, student performance or school policy/practice. The teacher's responses are shown in Table 3.3.

<table>
<thead>
<tr>
<th>Degree of Impact</th>
<th>Impact on Teaching</th>
<th>Impact on Student</th>
<th>Impact on School</th>
</tr>
</thead>
<tbody>
<tr>
<td>No impact</td>
<td>12.6</td>
<td>22.9</td>
<td>25.5</td>
</tr>
<tr>
<td>Some impact</td>
<td>62.2</td>
<td>66.0</td>
<td>59.2</td>
</tr>
<tr>
<td>Considerable impact</td>
<td>25.2</td>
<td>11.1</td>
<td>15.3</td>
</tr>
</tbody>
</table>

Over 87 per cent of the teachers reported some impact from the in-service programme on their teaching. This assertion by the teachers is not supported, however, by the few classroom observation studies which have been done in Australia (see for example, Bourke, 1984; Power and Tisher, 1976; Tisher and Power, 1975). The teachers also reported an impact upon their students' performance and upon the wider school. In this situation it may be as Eraut (1982) has described:

teachers may not be able to state what they have learned, or even, in some cases, whether they have learned. Moreover, the knowlege may derive from any combination of
sources -- the INSET teacher, published material, co-participants, the previous and ongoing experience of the learner (p.6).

There are two other research areas which are relevant to the study of classroom innovation and implementation. The first is the research on "coaching" and the second is the more general curriculum implementation studies. These two areas will be considered in turn.

THE "COACHING" MODEL

In a series of publications Joyce and Showers (1980; 1983) and Showers (1982; 1984) have proposed a model of helping teachers expand their repertoire of teaching strategies by using a "coach", i.e., a colleague, a facilitator, or a supervisor, to work with the teacher in the classroom as they adopt a skill or a teaching strategy. In another publication Joyce, Hersh and Mckibbin (1983) expanded this procedure to bring about wider change and applied it to the question of whole school improvements.

The change "process" is the same in both situations and at its base it is a craft oriented approach. Joyce and Showers (1980, p.380) ascribe five components to what they term "training":

i. presentation of theory or description of skills or strategy;
ii. modelling or demonstration of skills or models of teaching;
iii. practice in simulated classroom settings;
iv. structured and open-ended feedback (i.e., provision of information about performance);
v. coaching for application (i.e. hands-on, in classroom assistance with the transfer of skills and strategies to the classroom).

Joyce and Showers (1980) summarised their studies and asserted that if the five components of training were followed then "...it is likely that the vast majority of teachers will be able to expand their repertoire to the point where they can utilise a wide variety of approaches to teaching and curriculum" (p.384).

The approach of Joyce and Showers is similar in some respects to the cognitive behaviourist position of Bandura (1977a; 1977b). The similarities in the position of Joyce and Showers and Bandura can be seen in the latter's Social Learning Theory. In this theory, which has moved beyond the radical behaviourism of the early researchers, Bandura argued for the importance of the following four component processes; attending, retention, motor reproduction and motivation. In the 'shaping of behaviour' Bandura (1977b), put particular emphasis upon the informative function of models. The four components of Bandura's theory and the shared importance of modelling indicate the similarity of approach. The studies conducted by these researchers and others in cognate areas (see for example, McDonald, 1973; McDonald and Allan, 1967) show that modelling procedures can have a powerful effect on behaviour and that these new behaviours can be transferred to the classroom.
A review of the curriculum implementation literature (Kennedy, Williamson, and Patterson, 1984) showed that one-shot pre-implementation strategies with a focus on the mechanics of content or skills was unsuccessful in bringing about change. However, this has been found to be the most common approach to in-service education (Fullan, 1982).

The study by Berman and McLaughlin (1976) reported that the factors affecting implementation were the project characteristics, i.e., the nature of the innovation, the scope of the change, the implementation strategies, the effects of the institutional settings and the individual commitment. In their work on the Rand Change Agent Study, a four year U.S. Office of Education study, Berman and McLaughlin (1978) found that even ambitious and quite demanding innovations were able to be adopted by teachers without causing unmanageable implementation problems. They identified the following characteristics as central to the process; concrete teacher-specific and extended training; classroom assistance from the project staff; teacher observations of the innovation in action and regular project meetings which focussed on practical problems.

A later study by Crandall and Associates (1982), the Study of Dissemination Efforts Supporting School Improvement (DESSI), looked at the teacher's role in school improvement. This project involved 146 school districts across the U.S. and reported that teachers were successfully implementing innovations with a high degree of fidelity.
Crandall et al. (1982) listed the influences they identified as important and they included: a supportive or, at least, neutral administration; training by a credible person in the use of the innovation or practice; the provision of continued support and assistance, and the opportunity to try the innovation, master it and achieve satisfying results with the students.

Crandall et al. (1982) argued that teachers are "natural emulators" and due to pressure of time, resources and other professional commitments, they do not have time to develop their own innovative programmes. The teachers, however, will adopt (or adapt) the successful practices of their peers and colleagues. Crandall et al. argued that the use of a credible enthusiastic teacher/facilitator with an exemplary innovation that is consistent with the values and abilities of the adopting teacher had an effective influence upon the implementation.

There is a great deal of research to support the idea that intensive staff training and support was essential for the implementation of an innovation. Fullan and Pomfret (1977) in a review wrote:

Implementation is a highly complex process... characterised by inevitable conflict and by anticipated and unanticipated problems... Effective implementation requires time, personal interaction and contacts, in-service training and other forms of people based support. Research has shown time and time again that there is no
substitute for the primacy of personal contact... if the
difficult process of unlearning old roles and learning new
ones is to occur.

McLaughlin (1976) also referred to the importance of the
facilitator working with the teachers in "hands-on" practical
situations. He asserted that this involvement in "concrete"
activities is best done through regular meetings to share ideas,
problems and promote support.

Huberman (1983) described the successful scenario for
implementation as one in which the teachers were able to master the
use of the innovation while receiving sustained assistance. Huberman
argued that once the cycle involving assistance-mastery-commitment
was established then it lead to stabilised use by the teacher and
was internalised and institutionalised.

Loucks and Lieberman (1983) also identified the relationship
between the teacher and those responsible for facilitating
implementation as a key variable. They described this relationship
as "trust" and their description is similar to the characteristics
outlined by Hoyle (1970).

The research of Hall and his colleagues (Hall, George and
Rutherford, 1979; Hall and Loucks, 1978; Hall and Rutherford, 1976)
is also relevant to this implementation study. Hall and his
colleagues demonstrated that change is a process and not an event,
that the individual teacher must be seen as the most important
target of interventions which are aimed at the classroom, that
change is a highly personal experience and that staff development can best be achieved for the individual by the use of a client centred diagnostic/prescriptive approach. The Concerns Based Adoption Model (CBAM) proposed by Hall et al. saw the concerns of teachers as initially concerned with "self" and when these are resolved the individual's concerns shift to focus on the task and then ultimately upon the impact that the innovation had on the students.

The findings from the Hall et al. research which have implications for in-service programmes are:

i. non-users of an innovation have their most intense concerns at the stage of "self" and the "nature of the task". These concerns are addressed by providing general information about the innovation and by describing how it will affect them personally.

ii. when working with non-users of an innovation the facilitator initially is to emphasise those aspects of the innovation which relate to the non-user rather than to the students.

iii. the process of moving from concerns about "self" to concerns about "impact upon the students" can be slow.

iv. the affective side of change must be recognised.

v. within any group of in-service participants there is likely to be a variety of concerns.

Accordingly, in the initial sessions with the in-service teachers the facilitator provided a high degree of structure in the tasks and a lot of social-emotional support.
SUMMARY

This Chapter had a broad series of aims. Firstly, it outlined the two research perspectives which have tended to frame in-service education research, namely; the 'teacher growth or development' approach and the 'teacher defective or inadequate' approach. Secondly, the typology of in-service activities proposed by Howey and Joyce (1978) was presented as it moved consideration of in-service education from the possible negative connotations of the two major approaches. Instead it is concerned to look at the context of in-service so that the professional and personal dimensions are to the fore.

Thirdly, the 'coaching' model proposed by Joyce and Showers and the relevant findings from the curriculum implementation literature were also outlined. These studies emphasised the need for support for the teacher as he or she begins to engage in change in the classroom and also for the need to provide opportunities for the teacher to acquire the skills and knowledge that they are being asked to implement. The 'outside' expert providing a one-shot implementation in-service programme was seen to be as ineffective in assisting teachers to change as a series of meetings where the teacher is never shown how to implement the new curricula or practice. A literature review failed to identify any published Australian in-service activities which explicitly utilised these research findings. The similarity of the 'coaching' model to the cognitive-behaviourist theory proposed in the Social Learning Theory of Bandura (1977) was explored.
To gain an overview of in-service activities in Australia a taxonomy was developed which used the criteria of; purpose, mode, membership, location and time to propose six categories of in-service programme. This taxonomy made it possible to consider levels of involvement ranging from individual teachers through to whole schools and regions, curricula concerns ranging from individual subject content through to the design of curriculum and its related processes and costs ranging from very little to millions of dollars. The innovative in-service programme to be implemented in this study is amenable to use in any of these categories.

The brief review of Australian in-service activities highlighted the major influence of the action-research approach. One illustrative example of this was seen in the case of Western Australia where the Education Department had rewritten a Commonwealth Government Guideline to specifically mention that an "action-research approach" should be used. The elements in the action-research cycle, as outlined by Grundy and Kemmis (1981), were presented in some detail as these elements have been central in the organisation and practice of in-service activities in Australia.
CHAPTER 4

METHODOLOGICAL ISSUES

INTRODUCTION

In Chapter 3 inter alia, a taxonomy of in-service activities was devised to illustrate the range of in-service activities in Australia. The action-research approach was dominant in the published Australian in-service activities.

This chapter considers some of the methodological issues (i) which pertain to the use of the action-research approach and (ii) which follow from a 'coaching' or technical skills development approach will be discussed. The action-research approach will be considered through the extensive case notes from an action-research project. The action-research approach will be dealt with in greater depth than the 'coaching' model.

BACKGROUND TO AN ACTION-RESEARCH PROJECT

In May 1979, a number of school teachers from Geelong met with several staff from the School of Education, Deakin University. They discussed problems with their own teaching practices and curricula and methods of monitoring their own teaching. It was agreed that they would meet together on a monthly basis to discuss their attempts to overcome their problems and their progress toward changing their classroom behaviour.
This group of teachers and tertiary staff met for about 5 months and in their final report it was noted:

The experience had been a complex one. Some had made progress, some had found it difficult to define their problems in a way that made them amenable to analysis and the development of appropriate plans of action, and some left the group feeling that it had failed to help them meet their own needs (Deakin University, 1982, p.161).

Subsequently in November 1979 a second group of teachers was formed and two teachers from the first group continued their association.

In October 1979, Stephen Kemmis addressed the Victorian In-Service Education Committee on the topic "Some implications for in-service education and a new model: The cluster-based action-research and development approach". In this paper Kemmis outlined the major structural and curricula changes which had occurred in Victoria over the last decade. Kemmis noted paradoxically that these forces for change had occurred just when there was a sudden mood shift and the order of the day was then restraint. Kemmis attributed the shift to a more conservative plan for change to the deteriorating Australian economy and the public reaction to the magnitude and frequency of the proposed changes.

In this context, Kemmis argued:

Under circumstances such as these, there seem to be two imperatives for in-service education: first, small reserves of scarce funds must be made available to help
those schools deeply committed to the ideal of school-based curriculum development and evaluation... and second, networks of intellectual and administrative support must be established which harness presently-available systemic resources in new ways so that development can continue without the addictive "fix" of extraordinary resources which artificially maintain developments (quoted in, Deakin University, 1982, p.164).

Kemmis reminded the audience that institutions do not change easily and quoted McDonald who wrote of the curriculum developers in the British National Development Programme in Computer Assisted Learning:

The belief that innovations succeed on their merits, a belief that sustained the rational optimism of the first generation of curriculum developers, has never been much in evidence at the centre of the National Programme and is becoming rarer at outstations. It is generally assumed that the citadel of established practice will seldom fall to the polite knock of a good idea. It may however yield to a long siege, a pre-emptive strike, a wooden horse or a cunning alliance. Sound strategies are chosen with a view to the observed nature of the case (quoted in Deakin University, 1982, p.164).

In the section which follows the details form an action-research programme, which was conducted by Kemmis and his colleagues at Deakin University, will be presented. The example will be used to illustrate the problems which follow from use of the action-research approach to foster change.
Description of the Action-research Project

The Proposal

A project team from Deakin University and a number of teachers in remedial reading decided to arrange a research project to consider how students with reading difficulties are best accommodated in the classroom.

The Deakin University Action-research Group proposed a procedure whereby: (i) three or four schools would participate in the project and each school would have between three and six volunteer teachers involved. The research team also stated that the project must have the support of the school principal and the relevant Head of Department.

(ii) an initial two-day workshop, would be held over a Friday and Saturday, at which they (a) discussed the problems of special language teaching and the strategies that the teachers were using to deal with it; (b) identified and described a range of potentially effective strategies to be tried by the group; (c) formulated descriptions of these strategies; (d) practiced the strategies; (e) described the conditions under which the strategies would be appropriate.

(iii) the teachers would then return to their schools to try the strategies.

(iv) it was agreed that a monthly meeting of the participating teachers and the Deakin University Action-research Group would be
held. At this meeting the group would discuss their implementation of the strategies and refine their practice and experience.

(v) it was agreed that a "debriefing" meeting of two days would be held at the end of the term. A joint statement would come from this session and it would summarise the teachers’ experience and report the success with the new strategies.

Prior to the first two day introductory meeting the Deakin University group wrote formally to each of the teachers inviting them to participate. A copy of John Elliott’s (1978) paper, "What is action-research in schools?" and a copy of a paper outlining informal methods of collecting data was also sent. A few days later the Deakin group sent to the teachers a paper on remedial reading and the teacher and one on remedial English.

The Deakin group wrote in their record:

...these materials, read in conjunction with the proposal, gave participants an idea of methods for reflection and a set of questions which could sensitise them to problems in the area of remedial reading. By the time they arrived at the workshop, everyone would be 'tuned in' to its substance, beginning to share expectations about what might happen, and have the beginnings of a common language for discussing the problems.

The Workshops

The workshop was held on 16-17 November, 1979. The Deakin University's "Observer" sent all participants a draft Observer's
Report for comment and improvement. (The notes which follow are taken from the Observer's Reports of the sessions and are quoted in Deakin University 1982, pp. 173-212.)

**Friday, November 16.**

The morning opened with an outline of the workshop's agenda from Kemmis, Deakin University, to the 24 participating teachers. He outlined the follow-up meetings, the "debriefing" workshop, the role of in-school and between-school groups, why 'remedial' language teaching had been chosen, what action-research involved and the role of the Deakin University Observer.

The teachers wrote up the strategies they had nominated and they began to consider the approaches they might use to monitor the strategies in practice.

**Saturday, November 17.**

The participants met as school groups to choose which strategies they would attempt. The groups then reported back to the whole group which specific strategies they would study. The rest of the session was given over to a report by the Deakin group on what data gathering approaches might be used, and some of the constraints on change — both personal and systemic.

There were 22 participants on Saturday morning and 18 after lunch.

The Deakin Observer wrote: "At the end of the afternoon it seemed that a few participants still had questions about selecting
specific techniques. Perhaps it would have been better to have definite techniques decided upon before leaving the workshop" (p.178).

The First Follow-Up Meeting

The Deakin group sent a reminder letter to all participants early in the school year to tell them that there was to be a meeting on February 21 at which the schools would report on the strategies they had implemented.

There were 9 teachers from four participating schools present and 6 Deakin staff. Apologies were received from 7 teachers. The teachers reported on their implementations or proposed strategies.

It was clear from the teachers' reports that they were using informal methods of monitoring and that most had not yet chosen to use the techniques described during the workshops. Kemmis stated, "We've come a long way in three months. Over the longer term, what can be done over six months? This is an agreement we have not a contract" (p.188).

The Second Follow-Up Meeting

The second meeting was held on March 20. There were 8 teachers from three participating schools present and 5 Deakin staff. Apologies were received from 8 teachers.

The Deakin Observer reported that the teachers presented verbal
reports and there was little evidence that teachers were using formal monitoring techniques.

The Third Follow-Up Meeting

The third meeting was held on May 1 and a week or so before this date the Deakin group sent a reminder letter to the participants. The reminder letter, for the first time, referred to "written reports" from members. There were 9 teachers from four participating schools present and 4 Deakin staff. Apologies were received from 4 participants (the Observer's Report does not say if they were teachers or Deakin Staff).

The Deakin Observer wrote: "The Deakin staff were becoming anxious about the degree to which the meetings were becoming a "talk shop", in which the action-research cycle was being lost" (p.191).

The Observer also wrote: Kemmis was unable to attend the meeting but he drafted a letter which was handed out at the session. The letter, in part, said;

...we might try to shorten the action-research cycle. Two ways to do this are:

1. Write up strategies as they are being implemented in schools — i.e, revise our initial strategy documents from last year's workshop to reflect current practice. This will help to close the first major loop of initial implementation. (underlined in original).

2. Begin systematic identification of particular issues arising in connection with the strategies-in-use, plan
action on these particulars, ... implement the action, then gather relevant information. (underlined in original).

... I put (these) to you in the hope that we can strengthen our whole-group enterprise by building in a little more systematic action and research which can give us a certain sense of our progress: what has already been achieved and more specific short-term goals for continuing to make progress. (Kemmis, quoted in Deakin University, 1981, pp. 191-192).

The two suggestions in Kemmis's letter were to be the focus for the fourth meeting, which was scheduled for the 23rd June.

The Fourth Follow-Up Meeting

The original meeting time could not be used as the teachers were starting a new term. The meeting took place a fortnight later on July 7. There were 7 teachers from three participating schools present, and 3 Deakin staff. Apologies were received from 7 participants (the Observer's Report does not say if they were teachers or Deakin staff).

Two schools brought written reports to the meeting. One reported on a contract learning programme and the other on co-operative teaching (i.e., team teaching). It was agreed that these reports would be sent to all participants.
The Fifth Follow-Up Meeting

The fifth meeting was held on August 7. There were 5 teachers from three schools present, and 3 Deakin staff. Apologies were received from 5 people (the Observer's Report does not say if they were teachers or Deakin staff).

At this meeting three reports by participants were presented and discussed; one on the consultative group strategy, another on silent reading and the third on co-operative teaching.

In this session while discussion was going on about one school's attempt at co-operative teaching, Kemmis was quoted as saying, "...video-tape is another way of telling people what is happening. Just a porta-pak, roll in and film activities — nothing elaborate".

The Observer's Report showed that the initial Kemmis comment was ignored by the teachers, so then Kemmis said:

Could we agree in principle to make a few brief films, e.g., one about contracts (such as making the contracts), a science teacher working with a remedial teacher, etc. (quoted in Deakin University, 1981, p.204).

The Sixth Follow-Up Meeting

The sixth meeting was held on September 25. The Deakin Observer's Report stated, "At the time of this writing, there is no Observer's Report for the meeting" (quoted in Deakin University, 58
1981, p.208). The number in attendance was not given but there was a note which said, "One of the schools has decided to withdraw since it has a new principal and there are new developments afoot" and... "The teachers involved want to be kept informed of what is happening and they will co-operate on some aspects of future work" (p.208).

**ISSUES FROM ACTION-RESEARCH**

The extensive quotations from the Deakin University Observer who participated in the action-research programme were presented to highlight and illustrate several of the issues which follow from this approach.

Firstly, there is the issue of time. Working methodically through the action-research steps of planning, acting, data gathering and observing and reflecting through several cycles takes a lot of time. Most teachers do not have this amount of time and thus either leave the activity or become frustrated. If the pace of change is slow then the new procedures/processes/skills/ideas must be attractive enough to justify the effort being devoted to them. While the teachers in the Deakin project appeared to have a high initial commitment, it appears that after a brief stay with the project, many felt it was more trouble than it was worth and opted out.

Secondly, there is the issue of how autonomous are the teachers and in practice, how democratic are the processes rather than merely rhetoric. In the Deakin project Kemmis is "prodding" the teachers
with his letter, and later his views on video-taping a lesson. Similarly, Bowen, Green and Pols (1975), three teachers on the Ford T project, wrote, "...They (the research team) kept us well supplied with material to discuss, criticise and work on". These two instances point to a possible contradiction in practice; namely, the action-research approach is guided by the reconnaissance phase and the development of the right measure(s) to fit the situation and yet the in-service activity or the school initiative often comes as a final, complete package meant to be implemented as it is described. (Sadler, 1984) has described how in some action-research projects there often appears to be no collegiate planning and no obvious explanation as to why the change or practice is needed and so on. In practice, therefore, the process is a centre-periphery model of implementation.

Thirdly, there is the issue of value for money. In the Deakin project there were about two school teachers for every Deakin staff member at the follow-up meetings. In these financial times the justification of such an expenditure needs to be questioned. Two related points are that given the teaching staff costs involved here is it reasonable to move in such a piecemeal fashion and, given such an approach, does it make change within the wider context of the school or the 'system' possible.

Fourthly, there is the issue of teacher professionalism. In the Deakin project there is no evidence of an articulated view from the teachers on what they have been engaged in.

The in-service activity agreed by the teachers and the Deakin
staff was concerned with teaching strategies for remedial readers. In this situation one would expect a substantial increase in the professional understanding and skills of the teachers to be reported. The views which were expressed by the teachers did not move beyond a peripheral consideration of the new teaching strategies for remedial students.

Fifthly, there is the issue of collegiality. While it is not evident here, there is data (see for example, Nixon, 1981; Galton and Moon, 1984) to suggest that some teachers involved in action-research projects tend to develop an 'in-group out-group' feeling and as a consequence they criticise other teachers or deride other approaches to change.

Sixthly, there is the issue of choosing the best approach for a particular task. The action-research approach often appears to be used on the basis of an 'ideological' commitment, rather than because it is the best approach available. In the Deakin study, for instance, it might have been better to focus attention on a direct instructional approach when working with teachers of remedial readers (Gage, 1978).

Finally there is the issue of reification of practical or craft knowledge. A major limitation in the action-research approach is the implicit assumption that practical experience only is the basis of learning and development. This deliberate downplaying or ignoring of theoretical knowledge is inimical to the long term vitality of the teaching profession. The question of expanding the teachers' professional experience must be placed in a wide theoretical
framework and set of processes rather than located in a specific site and practice perceived to be unique to that situation.

**ISSUES FROM THE COACHING MODEL**

The 'coaching' model approach has some issues which relate to it also.

Firstly, the published reports provide no teacher's views on what it is they were doing. Similarly, there is no comment from the teachers on their professional understanding of wider educational issues following a 'coaching' episode.

Secondly, there is the related issue of the teacher mechanically implementing a series of skills with no appreciation of important contextual or intervening factors.

Thirdly, the coaching model's view of the teacher appears to be a narrow one. Clearly, the teacher must be seen not only as engaged in certain classroom behaviours but also as an active processor of information before, during and after classroom instruction. This perspective of the teacher as 'information processor' has been shown clearly in the U.S. National Institute of Education Report, when it asserted:

*It is obvious that what teachers do is directive to no small measure for what they think. Moreover, it will be necessary for any innovation in the context, practices, and the technology of teaching to be mediated through the minds and motives of teachers. To the extent that observed*
or intended behaviour is "thoughtless", it makes no sense of the human teachers most unique attributes. In doing so, it becomes mechanical and might well be done by a machine. If, however, teaching is done and, in all likelihood, will continue to be done by human teachers, the question of the relationships between thought and action becomes crucial (National Institute of Education, 1975, p.1).

Since the publication of this Report, the research on teachers' thought processes and decisions has burgeoned. Shavelson and Stern (1981) and Clark and Peterson (1986), have provided comprehensive reviews of this research. The picture that emerges from the research shows teachers as more akin to doctors and lawyers rather than to technicians. That is, the teacher does not simply apply a set of routine skills or behaviours, but rather is engaged in complex decision making, which is reflected in classroom behaviour which varies to new circumstances.

SUMMARY

This chapter has been concerned to explicate methodological issues which come from the action-research approach and the coaching model. In connection with the former it has done this through a consideration in some depth an action-research project which was conducted in Australia. The Observer's notes from the meetings were used to highlight several important issues which follow from the action-research approach. These issues included; the large amounts of time that are required; the gap between the rhetoric of
collegiality and democratic decision making contrasted with the reality of a covert and overt leadership by the facilitator; the cost effectiveness of the approach; the possibility of the adherents developing an 'in-group out-group' frame of reference which makes it difficult for a whole school staff to work together, and the counter-productive nature of focussing exclusively on practical or craft knowledge.

The coaching model also was seen to have several issues associated with its use. These issues related to the behaviouristic framework of the approach and included: the lack of teacher discussion of wider professional concerns; and the possibility of the teacher ignoring important contextual and interactive factors to implement some pre-determined practice or procedure.

While this chapter has focussed on some of the negative issues associated with the action-research approach and the coaching model, there are, of course, important positive aspects following from each approach also. For example Elliott (1976-7) showed how the action-research approach can help teachers to develop a wider professional understanding of their classroom behaviour and the research of Joyce and Showers (1983) demonstrated how the coaching model can be used to change a teacher's classroom behaviour.

In the next chapter an in-service programme based on a synthesis of the action-research and coaching model approaches and the relevant findings from the curriculum implementation research will be proposed and used with a group of in-service teachers. In later chapters the success of this approach in helping teachers change their teaching strategies and their perceptions of wider professional issues will be examined.
CHAPTER 5.

DESIGN OF THE STUDY

INTRODUCTION

In the last two chapters the essential features of the action-research approach the 'coaching model' and some of the findings from curriculum implementation studies were outlined. In the discussion of the two major approaches, i.e., action-research and coaching it was seen that both had some important limitations. The action-research approach, for instance, was seen to have problems relating to scale, time and funding, and, presently, an 'ideological' commitment (Dunkin and Biddle, 1974) to aspects of the group's functioning.

The coaching or training model often presents the teacher as a mechanical implementer of discrete skills or teaching strategies, who is not concerned to understand or explore wider classroom or educational issues. In addition, both the action-research and the 'coaching' approaches appeared to have ignored the wider literature on curriculum implementation which has direct relevance to the translation of new skills, understandings, and behaviour into the schools.

The design of the present study comprises aspects of action-research approach, the coaching model and the curriculum implementation studies. The constraints of time, resources and the commitments of the teachers involved in the in-service programme to their ongoing school teaching situation meant that it was not
possible to utilise an experimental design (Campbell and Stanley, 1963). Practical constraints such as the time available and the number of teachers involved meant that there was no opportunity to randomise the in-service teachers involved to the treatments, i.e., the new teaching strategies, and so gain experimental control. Also, given the classroom based nature of the in-service programme, where the dynamics of the classroom situation requires that the teachers are not under an obligation to act or behave in a way that was considered appropriate at an earlier time, it is likely that the teachers will have to change their behaviour to deal with the changed classroom circumstances. In short, the classrooms are dynamic situations and the teacher must be free to alter his or her behaviour if the situation warrants it. The design can be seen as a 'patched-up' time series design (Campbell and Stanley, 1963), where the teacher's classroom teaching behaviour prior to the in-service programme is known, the behaviour after the in-service programme can be ascertained and the teachers are able to demonstrate, in their classrooms, the new teaching strategy when and as they choose.

While this in-service programme and its evaluation was not a true experimental design it is considered not a major concern, for the study does possess the important elements of scientific investigation. Firstly, it it proposing an approach to changing teacher classroom behaviour which is 'testable'. Secondly, it is empirical in that the data used to test whether or not there is a change in the teacher's behaviour is gathered by a reproducible methodology. Thirdly, the 'theory' used in changing the teacher's classroom behaviour is open to falsification.
As Rosenshine and Furst (1973, p. 76) state:

...until educators concern themselves with improving rather than proving hypotheses, and until we stop getting letters from colleagues who indicate more interest in statistics than students, we shall not learn the answers.

The Teachers in the Study

There were three groups of teachers involved at different times in the study. Firstly, an opportunity sample of 160 teachers were surveyed through two questionnaires to ascertain their views on the Aims of Education and their Classroom Organisation. Secondly, a smaller group of 26 teachers who were available and accessible for interview were taken from the wider sample. Thirdly, of the 26 teachers interviewed, 10 who could join the innovative in-service programme were asked to do so.

The teachers involved in the various activities did not differ significantly from teachers described by Reynolds and Clark (1984). Most were in the metropolitan region and there were none from the outlying regions in Western Australia.

The Phases of the In-service Programme

There were four separate but inter-related phases in the study. These are shown in Figure 4.1. The first phase involved a semi-structured interview with the teachers which sought to elicit from them information on their current teaching strategies and classroom procedures. In this phase, the teachers also completed two questionnaires (Appendices 1, 2 and 3).
The second phase involved the weekly sessions where the teachers and the facilitator worked together to develop the new classroom teaching strategies and skills in monitoring classroom processes.

The third phase involved the teachers in trying to implement the new teaching strategy in their classrooms.

The fourth phase came after the teachers had implemented the new teaching strategy. It involved the teachers teaching a lesson using the new strategy, after an interval of a minimum of three weeks or up to six weeks.

Details of the In-service Programme

Phase 1
The facilitator conducted semi-structured interviews with the teachers during the initial phase of the study. These were aimed at gaining some understanding of the teacher's school or college working situation. This information was also shared in the first group meeting. In addition the teachers were asked to describe their teaching strategies, and the "in-school" and "out-of-school" factors which they identified as barriers to change or the reasons why they were teaching as they presently were.

Phase 2
In the first group meeting situations the teachers were given a series of 'ice-breaker' activities by the facilitator. The teachers interacted as dyads, triads and did several whole-group activities.
In all later sessions the facilitator sought to strengthen the social-emotional aspects of the groups as the development of trust and support between the group members was seen as important in the later demonstration and peer teaching activities (Hoyle, 1970).

The general plan for the implementation of an action-research project (Deakin University, 1982) also was introduced briefly to the teachers in the in-service programme at the second meeting. Other aspects and relevant extracts from The Action - Research Reader (Deakin University, 1982), Methods of Investigating Classrooms, Galton, et al. (1982), "Studying learning in a collaborative classroom", (Williamson, 1984), and Models of Teaching (Joyce and Weil, 1986), were given to the teachers during this session.

In this and later sessions also, several points were highlighted for the teachers:

i. that the intention of this in-service programme, which would involve the procedures from the action-research approach and the skill development components from Joyce and Weil (1986), was to improve their own classroom practices and processes through the implementation of a new teaching strategy,

ii. that the teaching strategy which the teachers chose to implement should be achievable and not dependent upon some wider systemic change,

iii. that the proposed change should have some outcomes which could be established as either "direct" or "nurturant" effects for
the students (Joyce and Weil, 1986),

iv. that the weekly meeting would be used to deal with any queries that the teachers had regarding the implementation of their chosen teaching strategy and that the facilitator would demonstrate a wider range of models of teaching for the teachers. In addition video-tape recordings of other teachers using the teaching strategies in microteaching and classroom situations would be available for viewing either in the meeting or they could borrow them,

v. that the facilitator would be available to come out to their school to demonstrate the teaching strategy in their classroom and/or to watch them working in their classroom,

vi. that the skills the teachers would learn and apply in this activity would be valuable to their professional careers. (This was in the context where the Western Australian Education Department had been re-organised as the Western Australian Ministry of Education (Beazley, 1984).)

In each of the weekly sessions, the facilitator deliberately paid special attention to the "group" dimensions (Bion, 1961) of the in-service programme, and every opportunity was taken to strengthen the group's cohesiveness and social-emotional climate. Among the teachers the social support that they began to offer each other was quite remarkable and it is likely to have been the reason why there were no disruptive or dysfunctional coping behaviour. The importance of this "social support" in all human activities has been shown by Perlinch, Lieberman, Menaghen, and Mullam (1981).
### Fig 4.1. Phases in the in-service programme

<table>
<thead>
<tr>
<th>JULY</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
<th>OCTOBER</th>
<th>NOVEMBER</th>
<th>DECEMBER</th>
</tr>
</thead>
</table>

**Phase 1**
- interviews
- questionnaires

**Phase 2**
- group meetings
- "ice-breakers"
- development of teaching strategies
- demonstration
- practice
- feedback
- development of classroom monitoring skills

**Phase 3**
- Teachers try in own classrooms
- Report on performance to weekly meetings

**Phase 4**
- Teachers demonstrate in own classroom

---

**modified action-research cycle** 3 to 6 week interval
The teachers were asked to audio-tape record one of their typical class lessons and to bring it to the next in-service meeting for playing to the whole group. The facilitator described the Joyce and Weil (1986) approach to teaching strategies and the teachers were requested to read those chapters which they thought they might be interested in implementing, and to come to the next session prepared to discuss them.

At the next session each of the chosen teaching strategies was discussed and the facilitator demonstrated one of them to the group. The facilitator made available video-tapes of other teachers using the various teaching strategies in their classrooms. These video-tapes were available for the teachers to borrow for later viewing, or they could view them in the group.

The facilitator demonstrated each of the teaching strategies that had been selected or played a video-tape of the teaching strategy being used in a classroom. After discussion about the teaching strategy to clarify any issues and further demonstration by the facilitator the teachers were asked to peer teach the group using their chosen teaching strategy.

This phase incorporated the coaching model components.

Phase 3

The teachers were requested to implement their selected teaching strategy in their own classrooms and to audio-tape record it. The teachers were told that their tapes would be played to the whole group. Even though this situation could be anxiety inducing
all of the teachers agreed. At this stage in the group's history it was recognised that the teaching strategy should be tried in the classroom. As Bussis, et al. (1979, p.17) state:

Simply having an idea a feeling is relatively inconsequential for effective change. Translating an idea into action and expanding its consequences counts for much more and constitutes the basis for personal knowledge and learning. This shapes up the obvious importance of experience in shaping personal constraints. If significant change is to occur, it requires a quality of experience that supports personal exploration, experimentation and reflection.

To provide a structured focus on the teaching strategy for the teachers, the facilitator asked them to consider the following four questions:

1. What is the main idea around which the lesson is conceived?

ii. What learning outcomes are you aiming for?

iii. How do you implement each step in the lesson's syntax?

iv. What did you do that could be described as "Principles of Reaction"? (Joyce and Weil, 1986).

After the teachers had taught the lesson and audio-tape recorded it, they were asked firstly to replay the tape recording to
themselves; secondly to make some "evaluating" notes on their own performance with the teaching strategy and thirdly, to think of ways of improving their performance in the next cycle of action. This plan of the study is shown in Figure 4.2. and incorporated the action-research approach.

The teachers were asked to teach three lessons using their chosen teaching strategy and to make modifications to their implementation so that it more closely represented the teaching strategy described by Joyce and Weil (1986). To assist the teachers to monitor their own performance the facilitator made available checklists (see Appendix 5 for examples) which showed the components of the teaching strategy. The teachers were asked to consider each of the components and to compare it with their own performance.

The teachers' audio-tapes which were played at the group meetings were used not only to show how successful implementation "looks" in practice, but also to illustrate the problems of implementing the teaching strategies.

The use of multiple sources of feedback -- including self monitoring, provided by the facilitator, and of peers -- for the teachers was essential to the design of the study. The feedback was regularly scheduled rather than occasional.

The importance of the feedback was outlined by Joyce, Hersh and McKibbin (1983, p.141):

If constant feedback is provided with classroom practice,
a good many, but not all, will transfer their skills into the teaching situation. For many others, however, direct coaching on how to apply the new skills and models appears to be necessary.

The facilitator visited several classrooms during this phase of the study to view non-systematically the lessons in operation.

**Phase 4**
This phase occurred 3 to 6 weeks after the initial series of audiotape recorded implementation lessons. The teachers taught another lesson using their new teaching strategy and audiotape recorded it also. This audio tape was given to the facilitator. The facilitator also visited classrooms during this phase of the study.

**The Combined Action-Research and Coaching Models in Practice.**

At various times within the four phases of the study the elements of the action-research and the coaching models were evident to varying degrees. In phase 2, for example, the emphasis was upon the coaching model as the teachers learned the new teaching strategy. That is, the facilitator demonstrated the new teaching strategy to them and the teachers then practiced it with feedback on their performance. Also during this phase however, they discussed and practiced the elements of the action-research cycle.

In phase 3, the teachers monitored their classroom behaviour and modified it to more closely resemble the ideal teaching strategy through the application of the elements in the action-research
cycle. That is, they planned their lesson incorporating the new teaching strategy and they then taught it. The teachers gathered information on the strategy's implementation and they then reflected on the new teaching strategy in operation. This teacher reflection resulted in a revised plan of action which saw the cycle start over again.

In brief, during the various phases of the study aspects of the action-research cycle or the coaching model were evident. In some of the phases, however, there was a much clearer focus upon one model or the other. For example, in phase 2, when the teachers learned the new teaching strategy the focus was upon the coaching model. Whereas in phase 3, the teachers used the elements in the action-research cycle to modify their classroom use of the new teaching strategy.

SUMMARY

In this Chapter the design of the implementation study was presented. There were four separate but inter-related phases in the study. The first phase was an interview with the teachers to obtain some biographical information and information on their school or college context.

The second phase involved a number of elements. Firstly, initial group meetings where a particular emphasis was upon the fostering of a positive and supportive social-emotional climate. Secondly, the acquisition of a new teaching strategy by the teachers through the use of a 'training' model (Joyce and Weil, 1986). In these sessions the teachers were presented with the theory
underlying the teaching strategy and the facilitator demonstrated it to them. The teachers practised the teaching strategy in a micro-teaching context and were given feedback on their performance by the facilitator and other teachers in the group. Thirdly, the development of the teachers' classroom monitoring skills; and fourthly, discussion about the action-research 'cycle'.

In phase three, the teachers were requested to implement the new teaching strategy in their own classrooms and using a modified action-research approach to monitor their performance. During this phase in the weekly meetings not only were the teaching strategies further refined and practiced but the teachers' audio-tape recordings were listened to and analysed.

In phase four, which occurred after an interval of approximately four weeks the teachers were asked to audio-tape record a lesson using their recently acquired teaching strategy.

In the next two chapters the results from the study are given. In Chapter Six data from the questionnaires and interviews with the teachers are presented. In Chapter Seven, lesson transcripts of the teachers' classrooms are examined to ascertain if they were successful in implementing the new teaching strategy.
Figure 4.2

The general plan of the study

- Theory
- Demonstration
- Practice
- Feedback
- Practice

- Theory
- Demonstration
- Practice
- Feedback
- Practice

- Cycle 1
- Cycle 2

etc
INTRODUCTION

In this chapter results from interviews with twenty six teachers concerning their present teaching strategies and their perceptions of the aims of primary education and their classroom organisation are given. The ten teachers in the in-service programme whose lesson transcripts are discussed later are part of the group of twenty-six. All of the teachers constituted an "opportunity" sample, yet they did not differ significantly from the total teaching force. The vignettes were developed to illustrate the particular teaching strategies from Joyce and Weil (1986) are shown in Appendix 1. The ten vignettes were typed and given to the teachers whilst the interviews, seeking some biographical information and details of their school or college were conducted. If the teacher was unsure of what the vignette would look like in practice in the classroom, the facilitator gave an example of a curriculum area and how the strategy would work. If that did not clarify it for the teacher, they were asked to consider the next vignette.

TEACHING VIGNETTES

The teachers were asked to indicate on a five point scale from 'Never' to 'Always', how frequently they taught in the manner described in the vignette. The results are shown in Table 6.1.
### TABLE 6.1

**Teachers' responses to use of Different Teaching Strategies**

<table>
<thead>
<tr>
<th>Vignette No.</th>
<th>Teaching Strategy</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
<th>No. of Applications</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contingency Management</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>12</td>
<td>4</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Synectics</td>
<td>6</td>
<td>7</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>Group Investigation</td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>0</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>Role-Play</td>
<td>9</td>
<td>2</td>
<td>10</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Inquiry Training</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>2</td>
<td>0</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>Advance Organiser</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>Inductive Thinking</td>
<td>3</td>
<td>6</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>Non-directive</td>
<td>9</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>9</td>
<td>Concept Attainment</td>
<td>6</td>
<td>2</td>
<td>12</td>
<td>6</td>
<td>0</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>Training</td>
<td>4</td>
<td>1</td>
<td>11</td>
<td>9</td>
<td>1</td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>
As a simple content validity check a colleague of the facilitator was asked if he could identify the teaching strategies illustrated in the vignettes. He could identify them all. However, it is possible that the vignettes do not represent the models as described by Joyce and Weil (1986), and this accounts for the large number of 'Never' responses. However, even as a form of projective instrument, it is surprising to see that of the twenty six teachers interviewed nine of them asserted that they never used a Role-play strategy. Similarly, given the emphasis that primary school science has had from the curriculum developers and all Education Departments in Australia, it is surprising that ten teachers stated that they never used an Inquiry Training approach.

The most widely used teaching strategies, as reported by the teachers, are the Contingency Management strategy, the Advance Organiser strategy and the Training strategy. In Joyce and Weil's (1986) description of these strategies they do not come from the same "family" of models; that is, the Contingency Management and the Training strategies derive from the Behaviourist Psychology of B.F. Skinner, and the Advance Organiser strategy is developed from the "meaningful verbal learning theory" of David Ausubel and classified as belonging to the Information Processing family. However, the most used teacher strategies have in common the feature that they are teacher led and controlled.

The more student-centred approaches, or those where the leadership roles of the teacher are less, are used in the following order of decreasing usage (this is found by adding together the responses "Never used" with "Rarely used"): Role-Play, Group
Investigation, Synectics and the equally least used are Inquiry Training and the Non-directive strategy. (The Group investigation strategy and the Inquiry Training strategy would be the most similar in their processes to Co-operative Group Work).

The teachers' self report data, when they were considering the vignettes, is that the teacher-centred approaches are the most widely used in the classroom. This follows two decades or more of curriculum development and innovation aimed at developing such areas as the student's inquiry skills and personal development. The few Australian classroom observational studies (see for example, Power and Tisher, 1976; Tisher and Power, 1975) would support this self-report data and also show a teacher-led and teacher-directed classroom.

Similarly, Bourke (1984) found that the most common teaching/learning interactions were responses to teacher or student (17.9%) silence (10.6%), non-academic procedures (10.3%), lecture/exploration using materials (9.7%) and asking lower-order questions (9.6%). Less than one per cent of classroom time was given "to cueing, alerting students to accountability and to social interactions, while virtually no time was given to asking higher order questions or to giving examples" (p.115).

**SURVEY QUESTIONNAIRES**

A wider sample of 160 teachers completed the questionnaire shown in Appendix 2. This questionnaire sought information on the relationship between a teacher's aims and the reasons they give for
choosing a particular teaching strategy and the activities they 
report using the classroom. The majority of the respondents were 
female, aged from 25 to 34 years and had been teaching for four 
years or more, but not longer than ten years. They all had a Diploma 
of Teaching (a three year teaching qualification) but were enrolled 
in or intending to enrol in an 'upgrading' course to get a Bachelor 
of Education degree. The majority of them were from metropolitan 
Perth, but thirty were from country areas.

In the initial phase of this study an attempt was made to 
parallel some of the data gathering sections of the ORACLE II group 
work project. The questionnaire was completed by all respondents. 
The questionnaire sought information on the Aims of Primary 
Education; the patterns of classroom organisation that the teachers 
used and the activities that the teachers conducted in their 
classrooms. This data are given below.

AIMS OF PRIMARY EDUCATION

The teachers indicated that they thought the following three 
aims were the equal most important for the primary school:

1. Aim (c) The pupil should be beginning to develop a capacity for 
independent judgement.
2. Aim (d) The pupil should be happy, cheerful and well-balanced.
3. Aim (h) The pupil should enjoy school and gain satisfaction 
from his own achievements.
The fourth ranking Item of Importance was Aim (b). That is, the pupil should have acquired knowledge which he knows how to apply outside school.

**TABLE 6.2 Aims of Primary Education in Order of Importance**

Percentages are per cent of teachers who judge the aim to be of importance as indicated by numbers 5 to 0 (see key below)

<table>
<thead>
<tr>
<th>IMPORTANCE</th>
<th>5 (UTMOST)</th>
<th>4 (MAJOR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pupil should:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) be beginning to develop a capacity for independent judgement.</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>(d) be happy, cheerful and well balanced.</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>(h) enjoy school and gain satisfaction from his own achievements.</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>(b) have acquired knowledge which he knows how to apply outside school.</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>(a) have acquired basic skills in literacy oracy and numeracy;</td>
<td>43%</td>
<td>57%</td>
</tr>
<tr>
<td>(e) be beginning to acquire moral and social values</td>
<td>42%</td>
<td>14%</td>
</tr>
<tr>
<td>(g) be aware of his cultural heritage.</td>
<td>15% 29% 42%</td>
<td>14%</td>
</tr>
<tr>
<td>(f) be aware of religious and spiritual values and beliefs.</td>
<td>57%</td>
<td>43%</td>
</tr>
</tbody>
</table>
KEY: Levels of Importance

5. I think this aim is of utmost importance in primary education.
4. I think this aim is of major importance in primary education.
3. I think this aim is important in primary education.
2. I think this aim is of minor importance in primary education.
1. I think this aim is of no importance in primary education.
0. I think this should not be an aim of primary education.

It was surprising to see that Aim (a), the pupil should have acquired basic skills in literacy, oracy and numeracy, was ranked fourth after Aims (c), (d), (h) and (b), and that it was seen by the same percentage as those who saw Aim (e), the pupil should be beginning to acquire moral and social values, as of "utmost importance".

It was interesting also to note that even though the sample included several lay teachers from Western Australian Catholic parochial schools, there was not a single teacher who reported that Aim (f), the pupil should be aware of religious and spiritual values and beliefs was of "utmost importance".

The data presented here on teachers' perceptions about the major goals of primary schools comes from a very much smaller sample than the Ashton et al. (1970) study, and that of the ORACLE II group work project (Appleyard, 1982). The most obvious difference was that the Western Australian primary teachers ranked the aim of the student developing an independent judgement as of equal major importance, while the British teachers saw this as only fifth on the list of eight aims. The second significant difference was that the
Western Australian primary teachers saw the first ranked British aim, that is, that the student should have acquired the basic skills of literacy, oracy and numeracy, as equal fifth along with the aim of the student acquiring moral and social values.

The reasons for these differences may lie in the prevailing societal views of what the primary schools should focus upon. In Western Australia, until recently, the dominant view has been that the primary school is to be 'enjoyed' and the teacher emphasis has been upon the affective domain rather than the cognitive domain in which basic skills may be the major focus. As such, the teachers saw the major goals as providing a supportive environment in which the pupil is to gain satisfaction from his or her own achievements rather than in competition with others in the class, the emphasis was upon the 'whole child' but it was not to be dominated by basic skills learning and, importantly, the child should be starting to exercise some personal critical autonomy.

CLASSROOM ORGANISATION AND ACTIVITIES

When the primary teacher sets the same (or similar) work for her students to complete, she may allocate the students to groups in various ways. The different methods of organisation were reported by the sample of Western Australian teachers are given below in Table 6.3., the frequencies refer to the percentage of teachers who responded that way.
TABLE 6.3 Organisation within the Classroom

<table>
<thead>
<tr>
<th></th>
<th>Most of Time</th>
<th>Some of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Similar ability;</td>
<td>43%</td>
<td>57%</td>
</tr>
<tr>
<td>ii. Different abilities;</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>iii. Students who work well together;</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>iv. By students' free choice;</td>
<td>33%</td>
<td>50%</td>
</tr>
<tr>
<td>v. For control of behaviour</td>
<td>83%</td>
<td>17%</td>
</tr>
</tbody>
</table>

The teacher can arrange activities within the curriculum in a number of different ways. Table 6.4 shows the different activities within the classroom and the frequencies are indicated by the following percentage of teachers.

TABLE 6.4. Activities within the Classroom

<table>
<thead>
<tr>
<th></th>
<th>Most of the Time</th>
<th>Some of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. All pupils work in the same subject area at the same time;</td>
<td>43%</td>
<td>57%</td>
</tr>
<tr>
<td>ii. Groups work in different subject areas but change over at the same time during the lesson;</td>
<td>17%</td>
<td>50%</td>
</tr>
<tr>
<td>iii. Within limits pupils are free to choose the order of their work;</td>
<td>33%</td>
<td>34%</td>
</tr>
</tbody>
</table>
iv. Individuals work in different subject areas at the same time as directed by the teacher;

<table>
<thead>
<tr>
<th></th>
<th>Most of Time</th>
<th>Some of Time</th>
<th>None of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33%</td>
<td>34%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Most of Time  Some of Time  None of Time

The picture that emerges from Tables 6.3 and 6.4 is of the teachers grouping the students by ability and then having them work on the same tasks at the same time. The only variations are likely to involve the younger age children (5 or 6 years) where the teachers allow them, within limits, to choose the order of their work. Even so, the work is still specified and directed by the teacher. Part of the reason for this noticeable difference is that children of 5 or 6 years of age are in the pre-primary or junior primary school sector and there are no syllabus guidelines provided by the Western Australian Ministry of Education at this level. Also, part of the reason is that the teachers of the younger age children tend to view their educational activities as "not real work" because it is not graded or assessed, whereas once the students have gone into the primary school a pattern of grading and assessment begins.

The differences between the pre-primary level and the primary level can be seen in the typical timetables which were completed by the teachers and shown in Table 6.5.

**TABLE 6.5 Typical Timetables for Pre-primary and Primary**

<table>
<thead>
<tr>
<th>Pre-Primary</th>
<th>Primary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times</td>
<td>Times</td>
</tr>
<tr>
<td>Monday</td>
<td>Monday</td>
</tr>
<tr>
<td>8.45-9.00 Greet children, put bags away. Mat.</td>
<td>8.50-9.00 News.</td>
</tr>
</tbody>
</table>

88
9.00-9.40 Indoor activities (choice of 10)
9.40-9.45 Packing up indoors
9.45-10.00 Music and Movement
10.00-10.20 Fruit and Drink
10.20-11.10 Outdoor Activities—climbing
11.10-11.15 Packaway Outdoors
11.15-11.30 Story Time.

HOME
9.00-9.30 Recorder Practice.
9.30-10.15 Maths
10.15-10.30 Physical Fitness
10.30-10.45 Recess.
10.45-11.10 Reading.
11.30-12.00 Spelling.
12.00-12.50 Lunch.
12.50-1.25 Formal Writing.
1.25-2.00 Social Science.
2.00-2.10 Recess.
2.10-3.00 Art Craft.
3.00-3.15 Story and Pack Up.

The pre-primary flexible 'labelling' of time during the morning has given way to specific curriculum subjects at the primary level. What is more, the typical primary school teacher reported a fairly heavy focus on the basic areas such as maths, reading, spelling and handwriting practice.

The teachers were also asked to consider the use of different combinations of whole class, small group or individual teaching. Typical comments from the teachers on each of the nominated approaches were:

**Individual Learning**

It is used: - When a child needs extending.
- With children finding difficulties in keeping up with group.
- To introduce a new concept.
-With non-English speaking students.

It is not used:
- Because of time constraints.
- Because there are too many children.

**Small Group Teaching**

It is used:
- To teach concepts, games, craft or art.
- With children finding difficulties in keeping up with class.
- For revision; to give extra work; and for remedial work.
- Because my room is set up with tables for 6 children.

It is not used:
- It is easier to use whole class.
- Because it requires someone to take other children.
- Because I want the whole class participating.

**Directed Learning**

It is used:
- For mathematics, writing, learning rules.
- Most of the time, it fits into the timetable better.
- When specific skills are required.

It is not used:
- In freer lessons, e.g. painting, creative writing.
- During creative learning e.g. art, poetry, stories.

**Open-Ended Learning**

It is used:
- For indoor and outdoor activities - where children choose.
- Often, to encourage children to think for themselves.

It is not used:
- In 'basic' skills area.
- When there is work to be covered.
- When there are a lot of unmotivated children in the
In contrast to the ORACLE II researchers (Appleyard, 1982) who concluded that classroom organisation is influenced more by the structure of the school than by the stage of development of the students, the picture from Western Australia is more complicated. It would appear, for example, that in the pre-primary and the junior primary grades, there is more freedom for student choice of activity, seating pattern and time spent on the activity. As the student moves through the primary school grades the more structured the school and the curriculum becomes with the teacher increasingly selecting and organising the content, deciding how long the student will spend on it and, to a large extent determining the seating arrangements.

**STAFF PERCEPTIONS OF THE INFLUENTIAL FACTORS AFFECTING CHOICE OF TEACHING STRATEGIES AND CONTENT**

The teachers were asked to complete the Questionnaire in Appendix 3. This questionnaire sought to have the teachers reflect upon the factors which they saw affected their choice of teaching strategy and how they organised their curriculum content.

The items on the questionnaire were arranged in such a way that they sought information relating to two areas: "In-School" and "Out-of-School" influences. Also, the questions reflected different "areas" of influence, for example, the "in-school" influences included the school's aims, the principal, the resources available, the pupil's ages, needs and the pupil's abilities. The "out-of-
school" influences included in-service courses attended, parents, the media, Education Department syllabus guidelines, educational research branches and organisations, the teacher's own professional reading, the District Inspector and Adviser, curriculum and psychological theorists, subject matter specialists and the teacher education institutions.

The teachers were asked to indicate the perceived strength of influence of each of the items upon a five point scale from '1' - no influence through '3' - moderate influence to '5' strong influence. To ascertain the strength of influence these ratings then were summed, i.e. if a teacher indicated it was a 'strong influence' it received a value of 5.

The In-School influences which were reported as having most influence upon teaching strategy were, from most important to least important; the pupil's abilities, the pupil's social and personal needs, the pupil's interests, the teacher's personal preferences, the number of pupils in the class, and the resources which were available. If ancillary help i.e., junior primary aide, or specialist teacher, was available for the teacher then this also was listed as a strong influence on choice of teaching strategy.

The In-School influences on current content and organisation were, from most important to least important; the pupil's abilities, the pupil's social and personal needs, the pupil's interests, the teacher's personal preference, the furniture and size of the classroom, and the availability of resources.

In general, the nature of the influence upon a teacher's
teaching strategies tended to be the same or very similar to their current content organisation. However, there were several significant exceptions to this generalisation. For example, more teachers listed the furniture and space in the classroom as more influential upon their content and organisation than upon their teaching strategy. The teachers also indicated that the pupil's interests influenced their content organisation more than it did their teaching strategies, and the school's assessment procedures influenced their content and organisation more than it did their teaching strategies.

In the Out of School influences section of the questionnaire there were not as many 'strong influences' reported by the teachers for either the teaching strategies or the content and organisation as there were in the "In- School" factors section.

The teachers stated that their own teacher training was the most influential out-of-school factor in the choice of their teaching strategies. In terms of importance, this was followed by the Education Department Syllabus Guidelines, the in-service courses attended and teacher training institutions, theories of learning, and cognition and child development theories.

The teachers' current content organisation was reported as most influenced by the Education Department Syllabus Guidelines, their own teacher training, subject matter specialists, child development theories and theories of learning and cognition. The junior primary teachers reported that the influence of the parents upon their choice of content was higher than it was for the parental influence upon the upper primary teachers. This is likely to be because of the
'freer' Education Department Syllabus Guidelines in the junior primary years and because in these classes the parents are often involved in classroom activities, such as story reading, or environmental studies.

It is also possible to see from the teachers' responses those items which have the least influence upon their choice of teaching strategies and their curriculum content organisation. The least influence upon choice of teaching strategies are: the media (press, radio and television), the Directorate of Studies, and the Research Branch of the Education Department, Official Education Reports and Committees, Parents, and standardised tests.

The out-of-school influences which have least impact upon the content organisation are the Directorate of Studies, and the Research Branch of the Education Department, Official Education Reports and Committees, educational sociology theories, Teacher's Centres, the media (press, radio and television) and standardised tests.

The picture that emerges from the teacher's responses to this questionnaire is one where the teacher's initial preparation course has a large influence on the choice of the teaching strategy and in turn the teaching strategies are developed in conjunction with the Syllabus Guidelines, i.e., the curriculum content statements, which the State Education Department makes available to the teachers. In practice, the content organisation is most directly influenced by the Departmental Syllabus guidelines which are "understood" and made operational, in light of the knowledge and skills they received in
their initial teacher training and the schools in which they were inducted.

From the teachers' responses it is clear that several "arms" of the Education Department, e.g., the Research Branch, and Official Educational Reports and Committees have little or no influence upon the teachers' teaching strategy or content organisation. In this situation, therefore, to have curriculum or some organisational changes promulgated at the Education Department Head Office and then to assume that it will be adopted at the classroom level is not supported even on teacher self-report information.

**SUMMARY**

In this Chapter teachers' responses: to an interview and a series of vignettes concerning their current teaching strategies, to a questionnaire on the Aims of Primary Education and Classroom Organisation and Activities and, to a questionnaire on their perceptions of the factors which influence choice of teaching strategy and curriculum content are given.

The teacher's responses to the vignettes indicated that the most frequently used teaching strategies were teacher-centred and teacher-led. Over one third of the teachers reported that they never used an inquiry approach, a role-play strategy or a strategy where the students chose the task and the means of dealing with it, (i.e., a non-directive approach). Two of the three most widely reported teaching strategies - the Contingency Management and the Training Strategy - had as their basis the Behaviourist psychology of B.F.
Skinner. The other most used strategy was the Advanced Organiser, which is based on the classroom practice in which the teacher presents material verbally to the students.

In their self-reports on their use of different teaching strategies, these teachers are no different from those teachers found in the few Australian observational studies (Bourke, 1984; Power and Tisher, 1978; Tisher and Power, 1978).

The first of the survey questionnaires sought some biographical information and teacher's responses to a series of questions relating to the aims of primary education.

The teachers reported that of the eight aims listed, three were of equal utmost importance; namely, that the student should be happy, cheerful and well-balanced, enjoy school and gain satisfaction from his or her own achievements and be beginning to develop a capacity for independent judgement. The aim of acquiring the basic skills in literacy, numeracy, and oracy was ranked fifth out of the eight aims and was seen of 'utmost importance' by almost the same number of teachers who said that the student should be beginning to acquire moral and social values.

The questionnaire also sought information on the teacher's classroom organisation and the activities that occur within it. The teachers reported that they use groupings of students of similar ability for 'most' or 'some of the time', 43 per cent and 57 per cent respectively. On the other hand, while 83 per cent said that they allowed their students free choice, most or some of the time,
17 per cent said that they never allow their students free choice in who they sit with in class or in which groups they join.

When groups were established on some other basis than ability it was the teacher who formed the groups and put into it those children who he or she thought worked well together.

Over 80 per cent of the teachers reported that they sometimes use the classroom seating arrangements for the control of student behaviour.

The teachers reported that they used all four listed activities within the classroom for about 50 per cent of the time. There was a third of the teachers, however, who indicated that they never let the students choose the order of their work or had groups who moved from one area in the class to another, or who had different subject areas operating at the same time. It appeared to be a teacher determined 'lock-step' approach where sometimes the students can choose the sequence of the work they complete. It is likely that the degree of student choice decreases as the pupil moves up through the primary school. This seems to be the pattern reported by Galton (in press) when writing of the ORACLE II Group Work Project.

The second questionnaire was administered to the teachers to ascertain the factors which they saw as influencing their choice of teaching strategy and the way they organised their curriculum content. The items on the questionnaire were grouped into 'in-school' factors and 'out-of-school' factors and the teachers were asked to indicate the degree of impact of the items listed upon
their choice of teaching strategy or curriculum content.

From the in-school factors the teachers reported that it was the pupil characteristics - abilities, personal needs and social interests - combined with the curriculum content they were most familiar and comfortable with and the classroom's physical working environment which had the most impact upon the choice and organisation of the curriculum content. Similarly, the teachers reported that it was the pupil characteristics combined with their personal preference of teaching strategy and the number of students in the class that influenced their choice of teaching strategy.

While the teachers listed the student characteristics as the major in-school determinants of their teaching strategy and curriculum content, their reported practice, on the other hand, suggest that the teacher is only minimally influenced by factors other than their own preference.

In the out-of-school factors there were not as many 'strong influence' teacher responses as there were in the in-school section of the questionnaire. The most important out-of-school influence upon the teacher's choice of teaching strategy was their own teacher training course, followed in importance by the Education Department Syllabus Guidelines, the in-service courses attended, and various learning and child development theorists.

The teachers' current content organisation was most influenced by their own teacher training course and then, in decreasing order of importance, subject specialists and various child development and
learning theorists.

The junior primary teachers said that the parents influenced their choice of content quite considerably.

While the Syllabus Guidelines have a large influence upon the curriculum content other constituent elements of the Education Department - Directorate of Studies, Research Branch, Teacher's Centres - have little or no impact upon either choice of teaching strategy or current curriculum content.

The teachers who completed these questionnaires appear, from this self-report data, to be no different from teachers in other Australian studies which have looked at use of different teaching strategies and selection of curriculum content, (Bourke, 1984; Power and Tisher, 1978; Tisher and Power, 1978). In the main they also appear similar to British teachers (Appleyard, 1982).

In the next chapter the teacher's implementation of the new teaching strategies following the innovative in-service programme will be examined.
CHAPTER 7

THE IMPLEMENTATION OF THE TEACHING STRATEGIES

INTRODUCTION

In this chapter the teaching strategies which the in-service teachers implemented will be presented and discussed. In Appendix 8, there are 19 teaching strategies transcripts presented in full. In this section relevant sections of the transcripts will be used to illustrate the various "phases" in the strategies and the "principles of reaction".

TEACHING STRATEGIES

The term 'teaching strategy' has been given wide currency through the work of Bruce Joyce and Marsha Weil. The book entitled Models of Teaching, which was first published in 1972, and now has gone into its third edition (Joyce and Weil, 1986) is now set as a main text for students in education in the U.S., the U.K., Australia and in parts of Asia. Joyce and Weil have used psychological and philosophical theories to develop what they call "models of teaching". Joyce and Weil's use of the term "models of teaching" is similar to that of Nuthall and Snook (1973), in that the "models" they propose can be used for invitation, description, explanation, prediction and persuasion.
The models of teaching have been classified by Joyce and Weil (1986), into "families" or 'related' examples of models. They identify four families of models: the Information Processing Models, the Social Models, the Personal Models, and the Behavioural Models.

Joyce and Weil (1986, pp 14-18) have developed a vocabulary to describe the models of teaching and each of them is described and discussed under the same five headings:

i. Syntax.

ii. Social System.

iii. Principles of Reaction.

iv. Support System.

v. Instructional and Nurturant Effects.

i. Syntax. The syntax or phasing of the model describes the model in action. Each model has a distinct flow of sequenced activities which are called phases. The phases indicate the practical activities which the teacher must sequentially implement.

ii. Social System. The social system describes the student and teacher roles and relationships and the kind of norms which are encouraged. The leadership roles of the teacher vary greatly from model to model. In some models the teacher encourages the students to be socially and intellectually independent (low
structure), in others there is an equal sharing of activity between teacher and student (moderate structure), and in some models the teacher is the centre of the activity, the possessor of the information and the controller of the situation (high structure).

iii. Principles of Reaction. The principles of reaction provide the rules of thumb for the teacher on how to regard the learner and how to respond to what the learner does. In some models the teacher overtly tries 'to shape' the student's behaviour by rewarding certain activities and ignoring others. In other models the teacher maintains a non-evaluative, equal stance so that the learner becomes self-directing.

iv. Support System. The support system is the necessary supporting conditions to implement a model. It might include media, materials, access to other resource people or other teachers with specific skills.

v. Instructional and Nurturant Effects. Each of the models has an instructional (direct) effect and also a nurturant (implicit) effect. The instructional effects are those directly achieved by leading the learner in certain directions. The nurturant effects come from being in the environment created by the model.
THE FIDELITY OF THE IMPLEMENTATION

In the present study the teachers were told they should attempt to implement the teaching strategy as described by Joyce and Weil (1986). This decision meant that the "fidelity" of the teaching strategy could be shown through the presence of the strategies' essential components as described by Joyce and Weil, that is, the syntax, the principles of reaction, and so on. The facilitator decided if the models had been implemented on the basis of whether or not the strategy implemented accorded with the designers' "specifications" (Fullan and Pomfret, 1977).

The use of the 'fidelity' approach is to be compared with the "mutual adaptation" approach (Fullan and Pomfret, 1977). Berman and McLaughlin (1978) have described the process whereby teachers modify the innovation to fit in to their classroom situation as "mutual adaptation". From their studies, Berman and McLaughlin found that teachers usually made some adaptations in their classroom practice in response to the innovation, while at the same time, modifying the innovation to fit their practice.

In this study the teachers were asked to implement the teaching strategy as described by Joyce and Weil (1986) rather than modify it for implementation.

Not all of the lessons can be discussed here so five have been chosen to illustrate the implementation.
EXAMPLE 1. THE CONCEPT ATTAINMENT TEACHING STRATEGY

TEACHER: HT

Students: Junior primary; 5-6 years of age
23 in the class (6 children did the exercise at a time).

Teacher's Comments:
The lessons were designed around the sense of touch - a perceptual approach to learning which is important in the pre-primary and junior primary grades.

Behavioural Objective: that the children will organise objects into groups according to the objects' characteristics.

Phases of Concept Attainment Strategy with Unorganised Material

1. Description of Concept as it is used:
   - break and label concept
   - identify attributes

2. Evaluation of concept:
   - discuss adequacy of concepts
   - compare examples to other data

Phases of the Teaching Strategy                     Transcript
1. Description of Concept T We're going to have a look in our box here. We've got all sorts of things that have got different feels. When you pick them up and touch them they feel different. I'm going to see how many people can get some things out and tell me what they feel like when they touch them. We're going to describe how they
feel.

St Soft.

T Soft - good girl. Well we're going to see if we can sort out some of these things. Let's put the soft things all in one pile.

T You tell me something about what it feels like Cecilia, when you touch it.

St Hard.

T You think it's hard do you? What else can you tell me about it? Try and tell me something different about it.

St It's bumpy.

T What pile shall we make it?

St The purse file.

T Well yes - but we're talking about things that have a feel. We've got soft things there. What shall we say this thing feels like?

St Hard. The bumpy pile.

T We'll put it in the bumpy pile because its got bumpy things on it.

St I'm going to close my eyes and get one out.

T What does it feel like to touch?

St Prickly.

T Well we'll have to make a special pile for prickly things won't we?

2. Evaluation of Concept

T Let's see what happens when we put some of this on.

St Warm.

T Alright. What about this one?

St Cold.

T What can you tell me about the difference between the two of them?
St That one's lumpy.
T That one's lumpy and what's that one over there?
St Mushy.
St This still feels warm.
T Still feels warm? What can you think of that feels warm?
St Kettle.
St Milo.
St Coffee.
St The sun is very hot.
T The sun is warm - that's a good one.

Social System

There is a moderate structure but the teacher controls the action as she looks for the questions and keeps the students on task.

Principles of Reaction

The teacher is supportive of the students' ideas with children of this age, however, the latter stages of the strategy including the analysis of their thinking strategy is inappropriate.

Example from transcript:
T. Prickly. A prickly thing. Who knows what that might be used for?
St. A curler.
T. It's a curler isn't it? What do people use curlers for?
St. To put on your hair to make it curly.

Support System

A large variety of materials are needed to support this teaching strategy. This is especially the case with children of this age who "learn by doing", i.e., by experimentation with concrete objects.

EXAMPLE 2. COGNITIVE GROWTH TEACHING STRATEGY

Teacher: EH

Students: Grade Two; 6-7 years of age; 33 children (19 boys, 14 girls) in the class.

Teacher's Comments: I have chosen the strategy 'cognitive growth', that is, increasing the capacity to think. In my implementation I decided to use the area of maths. Specifically the concept of Equivalent Groups: the conservation of number.

The idea of equality in respect to number depends on our ability to isolate the number property of collections. Children need to develop awareness that the number is not affected by differences in other properties such as appearance, size or spatial arrangements.

Objectives:
1. The children recognise and construct collections of equal number values.
2. That children appreciate and experience through concrete examples that number value remains constant regardless of physical appearance.

**Phases of Cognitive Growth Strategy.**

1. Confrontation with Stage-Relevant Tasks:
   - present puzzling situation matched to learner's developmental stage.

2. Inquiry:
   - elicit student responses and justifications.
   - teacher to probe student's responses.

3. Transfer:
   - present related task and probe student's reasoning.

**Phases of Teaching Strategy Transcript**

1. Confrontation with Stage-relevant tasks

   T Have a look at all the different collections I've got there and tell me what you think about them.

   St Some of these aren't all exact. Some of them are but some of them aren't.

   T Why aren't they exactly the same?

   St Well, not all of them are. Take these for instance ... they're the same thing but they're not the same colour. As for these, this is a Coke can and these two are beer cans. These two are the same, these two - two things different are size and this one's cover. I suppose you could say these ones are the same but maybe not, because the other two don't have this list here on, and as for these two, they're alright, and these two - maybe you could say no, because of the pattern there, but...
T Alright. And so you're saying although some of them are the same colour, some of them are not the same. That's true ... but what else can you tell me about the collections there?

St Well, every set has got three in each.

T Good girl. Every set – we've got lots of sets there – we've got three bottle tops, three cubes, three straws, three round discs, three beads ... They all have the same ... what? They all have ...?

St The same amount of things.

T ... Alright then. I'm going to change them around, and I want you to do something for me. Do you think it matters that they're not all cubes, and that they're not all straws ...

St No.

T Why? ...

St Well, there's different shapes and different things...

St So it really doesn't matter. We've decided that they've all got the same number.

T I'm going to set up a collection here and I'm going to get someone to make it look the same value, like... Emma, I'm going to put three tops here and I'm going to put one thing here. Can you make these collections the same amount?

St Yes.

T How are you going to do it?

St Take away two of the lids.

T You could take away two of the lids so you're left with one each, or...?

St Or you could put them on two cubes.
2. Inquiry

T Right, so you've put them that way so Christian can see. Right, Christian, first of all can you tell us what the collection is? The one collection that Megan's given us?

St Tops and beads.

T How many

St Six.

T Right...

T How do you know these collections aren't the same?

St Because you added... that or you could count that and see that... count by two or three and see if they were alright you would know, because there's three of these and three of them and they are all different.

T Right, how many in each collection? It might be an easier way... how many in each collection? How many on that side?

St Six.

T And how many on that side?

St Six.

T Are they the same?

St Yes.

T Why?

St Because... like Kirsten said, she has three... and so if there was, you put two things on each side that means they must be the same.

T Can someone tell Heath a simpler way?

3. Transfer

St I've got all the sixes here.

T Have you? Right. What about the last group? Right, just put them back into the middle. All your piles. Alright Megan, what can you tell me about those collection of cards? We've got three piles there.
St Well, these ones all equal six.

T So they look the same? Does each card look the same.

St No.

T Are they the same then?

St Yes.

T Why?

St It doesn't matter what patterns they are, but they all have the same amount of dots.

Social System

There is a high structure when the teacher is assessing the 'level' of the child. The teacher initiates and structures the inquiry. The social-emotional atmosphere is free and open.

Principles of Reaction

The teacher must create an atmosphere which encourages student response. The teacher is to avoid leading the students to the answers and must inquire into the student's response.

Example from the transcript:

T. Alright. And so you're saying although some of them are the same colour. Some of them are not the same. Some of them are the same size and some are not. That's true, that's very true. But what else can you tell me about the collections. Have a careful look.
St. Well, every set has got three in each.

T. They all have the same amount of things. Alright then. I'm going to change them around, and I want you to do something for me. Do you think it matters that they're not all cubes and they're not all straws. Do you think that really ...

St. No.

T. Why doesn't it matter, Heath?

St. Well, there's different shapes and different things... Like, you think everything was square, like on a car, then it wouldn't go as fast as round things ...

St. So it really doesn't matter. We've decided that they've all got the same number.

T. I'm going to set up a collection here, and I'm going to get someone to make it look the same value, like... Emma I'm going to put three tops there and I'm going to put one thing there. Can you make those collections the same amount.

T. Good boy, they've all got seven dots. Emma, what about this pile, are they the same?

St. Yes.

T. Why?
St. 'Cos they've all got seven in them.

T. Good boy they've all got seven dots. Emma, what about this pile? Are they the same?

St. Yes.

T. Why?

St. Because all of the cardboard bits with dots on it have all the same amount.

T. How many have they got?

St. Five.

T. But they're not all the same pattern.

St. But that doesn't matter, because it's still the same amount.

**Support System**

The teacher needs to be well grounded in child developmental theory and create an environment that includes structured or unstructured stage-appropriate tasks.
EXAMPLE 3: THE INQUIRY STRATEGY

Teacher: BR

Students: Grade 8; 12 - 13 years of age.

32 students in the class (19 boys 13 girls).

Teacher's Comments: Trialling this teacher strategy has required courage on my part. I am new to the school (a Catholic Parochial School) and I have had problems with classroom control for some time.

The science programme in the school is highly structured by the Subject Master. Each topic has to be completed in four weeks, so with only four 55-minute periods per week this exercise is assuming some importance.

Objectives:

1. **Content.** To observe and record what happens when an orange powder is heated gently and then strongly.

2. **Behavioural.** Through the process of inquiry to speculate as to the nature of the orange powder.

3. To form hypotheses.

4. To test their hypotheses by idea experimentation.
Phases of the Inquiry Strategy
1. Encounter with a problem.
   . explain inquiry procedures.
   . present discrepant event.
2. Data gathering - verification.
   . verify the nature of the objects
     and the occurrence of the problem situation.
3. Data gathering experimentation.
   . isolate element variables.
   . hypothesise and test causal
     relationships.
4. Formulate an explanation.
   . formulate rules or explanations.
5. Analysis of the inquiry process.
   . analyse inquiry strategy and
     develop more effective ones.

Phases of Teaching Strategy Transcript
1. Encounter with the problem.
   T. Now, I'm going to heat orange powder. I want you to observe what
   happens. Now if you cannot see what happens, if you are not
   satisfied with the observation then I can let you come up in
   groups of four and do it...
   Just observe - we heat it very gently. Ok. What do you think is
   happening?
   St. Changing colour.
T. Kenneth you put a little bit of it in here so we can compare. Now, hold it up for the class to see. OK, turn around and show them.

St. It went red. Red.

T. Ok. Now let's cool it and see what happens.

St. What did you do to it?

T. I'm cooling it now. At the top, can you see a change?

St. It's going orange.

T. ...What happens when it cools?

St. It goes back to orange.

T. Alright, now what I'll do is heat it strongly... What colour has it turned?


2. Data Gathering-verification

St. When you heat it, does it dry out and turn black? All the moisture dried out...

T. Now, structure your sentence to that there are not too many things at the same time.

St. When you heat it does it take the moisture out of it? And then, when you cool it, does it...?
3. Data Gathering-
experimentation

T. Alright, now, someone says can he put a lighted splint in it. Ok, let's try.

St. It's gone out. It went out. Put a lighted taper in.

St. How would we be able to bubble it through lime water?

St. Could you please put a splint in there while the things still orange?

St. To look at that thing on the side, is that silver?

T. Now you're coming close to it.

St. Is it mercury?

T. What do you say?

St. Last year we went to this thing at Jarrahdale to see a load of bauxite. We saw pieces of bauxite and they were orange, and that's orange. Could it be aluminium?

4. Formulating an explanation

St. Would the heat of the bunsen be less than the heat that's needed for the bauxite to turn to aluminium?

T. Now we haven't established for sure that this is bauxite or aluminium, but you're working on a hypothesis that you have something
that changes into... What is aluminium?

St. Metal.

T. And what is bauxite?

St. Rock. A solid.

T. A solid. Anything else?

St. A powder.

T. A powder. Yes?

St. Is it a mineral?

T. So you want to know is this a mineral? Could be...

St. Bauxite and aluminium are two different things and if you have something made of aluminium when it cools down if it goes back to bauxite, it couldn't be aluminium.

5. Analysis of the inquiry process

T. Alright, that's good. Now we have seen how by asking questions you can arrive at something that you didn't know.

T. Now, the next thing I want to ask you is, what kind of questions do you think that you asked, enabled you to come to this conclusion, that it was mercury oxide. Now what kind of questions led you along that line.
St. Questions where something is chucked out... any question where something you know is not that...

T. Alright, yes?
St. Getting a negative answer.

Social System

There is a high degree of structure which is controlled by the teacher. However, the intellectual environment is open to all relevant ideas and the teacher is to treat ideas equally.

Principles of Reaction

The teacher is to help the students inquire but not to do the inquiry work for them.

Examples from the transcript:

T. Now today, we want to do something like this... I want you to ask the questions, but you have to be careful of the way you frame the questions...

St. When you heat it, does it dry out and turn black? All the moisture dried out, then when it...

T. Now structure your sentence so that there are not too many things at the same time.

St. When you heat it, does it take the moisture out of it? And
then, when you cool it does it...

T. Now, when you heat it do you take the moisture out of it? Perhaps you do, but can you see any drops of water vapour?

St. What is the orange powder?

T. Alright, someone wants to know what is the orange powder. I cannot say what it is. You have to ask questions to determine the nature.

-----

T. We'll see whether it goes orange or not... Now, the next thing I want to ask you is, what kind of questions do you think that you asked, enabled you to come to this conclusion, that it was mercury oxide. Now what kind of questions led you to go along that line.

St. Questions where something is chucked out... any questions where something you know is not that...

T. Alright, yes?

St. Getting a negative answer.

T. Getting a negative answer. Right. What were the most important questions that you asked, that gave you the clues?
Support System

The teacher must have access to the materials which will present the students with a puzzling or discrepant event.

EXAMPLE 4: INQUIRY STRATEGY

Teacher: KA

Students: Grade 7; 11 - 12 years of age.

32 in the class.

Teacher's Comments:

I feel rather uncomfortable with this strategy at the outset. I'm not sure my students can cope with the responsibility of gathering the data, formulating the hypotheses and trying to explain certain phenomena.

Objective: By the end of the lesson, each student will have observed a scientific demonstration and, through an inquiry discussion, establish a working hypothesis to try to explain the observed phenomenon.

Phases of Inquiry Strategy

1. Encounter with a problem.
   . explain inquiry procedures.
   . present discrepant event.

2. Data gathering - verification.
   . verify the nature of the objects
     and the occurrence of the problem situation.
3. Data gathering - experimentation.
   . isolate relevant variables.
   . hypothesise and test causal relationships.

4. Formulate an explanation.
   . formulate rules or explanations.

5. Analysis of the inquiry process.
   . analyse inquiry strategy and develop more effective ones.

<table>
<thead>
<tr>
<th>Phases of Teaching Strategy</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Encounter with a problem</td>
<td>T. We have a heavy weight hanging by a rope from another rope. Why weren't the two boys able to pull the long rope straight? Right, let's have some questions.</td>
</tr>
</tbody>
</table>
| 2. Data Gathering - verification | St. Is the rope with the weight in the middle? 
T. In the centre; yes. 
St. Would it matter if these knots weren't in it. 
T. No, that wouldn't make any difference. 
St. What would happen if you had more |
weights on?
T. If you had more weights on you'd have the same type of result, but it may be slightly different...
Same type of idea.
St. If you took some weights off?
T. If you took some weights off I'd have much the same results, though it probably would be (inaudible) differering as much. It would still dip down.

3. Data Gathering - experimentation

St. Would it make any difference if the string around the dictionaries was shorter?
T. It wouldn't make any differene at all.
St. If the string around the dictionaries...(inaudible).
T. If it was different string around the dictionaries it wouldn't make any difference.
St. Does it matter how long the rope is?
T. You'd get the same type of result but the rope might go down further.
St. Does it depend how long the rope is - if you've got a long rope it hangs down... a shorter rope.

T. Yes, you've got a shorter rope, it will hang down more. Leo?

St. Would the same happen if you had just enough to hang on each side? Would you be able to pull it straight.

St. You know where you've got the cotton tied onto the skipping rope - if you had that a bit shorter would it make any difference?

4. Formulating an explanation T. It wouldn't make any difference, no.

St. If you had more weights, it would probably go down more.

T. Yes it would. Right, does anyone have a theory about why it happens?

T. The heavier the weight, the further it will go down? Alright. We're still trying to find out why that skipping rope isn't ever going to be straight.

St. My theory is that when you put it up in the air - the length of the
rope - you have to pull it harder than if you only had a hand's length, because you'd only have to pull it a little bit and even if you pulled it hard you might not get it straight... different length it is, you have to pull it harder, and you might not have enough strength to pull it up.

T. Ok, but why is our rope always going to dip down?

St. Because it's not heavier than the dictionaries. The dictionaries have got weight, and you have to hold it up if you want to... When you pull on both sides, the stuff that goes through - the string that goes through the rope isn't sufficient to lift it up.

T. Why isn't it. We had...

St. Not enough tension on it. It's not pulled tight enough.

T. Uh,huh. Well, if we had say two very powerful men come in, what might happen then?

St. My theory is when you pull the rope there's too long... string... all that rope... shorter rope... more powerful and there's still
weight in the middle... and
that's got more weight than
what's going through to pull it
up.

T. Do you want to test your theory?

St. Miss Abbott, if you had a smaller
weight, like one dictionary, then
two people with... the rope,
would it go straight? If we had
only one dictionary and then had
two people, like two guys, two
men, putting all their force on
the rope, would it go straight?

T. It would go practically straight.
It would be straighter than if we
had four dictionaries on it.

St. Miss Abbott, just say we had that
long on each side of the - rope
on each side of the dictionaries,
I think that when you pull it
it'll be fairly straight and with
no bends in it, because
(inaudible)... the more strength
you putting into it. Because
you're not holding on the extra
weight from about that long.

T. Alright, how are we going to test
your theory? What would we need
if we wanted to test it?
... Oh, I see. You don't want to hold the end of the rope...

St. No, because that's putting on more weight.

T. Fair enough. So you want to hold it very close to the weight. Alright, you get someone to test it.

St. Joanne get closer... get... she's stronger. Miss Abbott, would the same thing happen if you had somebody way up there, and somebody down there? What would happen if you had two people on both ends? You'd still get it dipping down slightly - it might - try it.

T. Hold steady. Just about...

St. Perfect.

T. Alright, we'll say that that was straight. Why were those boys able to get it straight and we weren't able to get it with the other rope?

St. Because the rope was shorter.

T. Right let's think about what effect did the rope have on...?

St. I think that the gravity pushes the two things on the rope down...
T. OK. So the gravity's got something to do with it. What exactly has it got to do with it?
St. It pulls down to the earth - the stuff that earth's got - kind of like a magnet and it pulls it down towards the earth.
T. Mmm.
St. I say that when you have a longer bit of rope there's more slack with a longer bit of rope than there is with a short bit. And there's gravity and when the gravity pushes it down - there's more slack and it's harder to pull up and when you get closer to the weight you can pull harder than gravity.

T. Well done. How do you feel about this exercise?
St. I liked it because we did the experiment with different students on the ends of the rope...
St. And with a shorter distance between the weight and the rope ends... and heavier weights.
T. Yes. But what was the most useful thing we did?
St. We were able to talk and then try the experiment to look at our ideas on theories.
T. We will continue this next lesson.

Social System

There is a high degree of structure which is controlled by the teacher. However, the intellectual environment is open to all relevant ideas and the teacher is to treat ideas equally.

Principles of Reaction

The teacher is to help the students inquire, but not to do the inquiry work for them.

Examples from transcript:

T ...Stuart and Leo, you reckon that the most important thing of this whole experiment, is what?
St Gravity.
T. Well done. How do you feel about this exercise?
St. I liked it because we did the experiment with different students on the ends of the rope ends... and heavier weights.
St. And with a shorter distance between the weight and rope ends... and heavier weights.
T. Yes, but what was the most useful thing we did?
St. We were able to talk and then try the experiment to look at our ideas or theories.

**Support System**

The teacher must have access to the materials which will present the students with a puzzling or discrepant event.

**EXAMPLE 5: THE CONCEPT ATTAINMENT TEACHING STRATEGY**

**Teacher:** BG

**Students:** Grade One, 5-6 years of age.

- 27 children in the class.

**Teacher's Comments:** The attention span of a Grade One class is relatively short, therefore the teacher must focus the children's attention on the examples given. I will try this with a whole class but as I want to ensure student participation I should also try the strategy in a small group.

**Objectives:** Through the presentation of examples which are labelled "yes" or "no" children will compare and justify the attributes of different things we need and things we want. The concept in question is the concept of "what I need is essential to my wellbeing".
Phases of Reception-Oriented Concept Attainment Teaching Strategy

1. Presentation of data and identification of concept.
   - teacher present labelled examples.
   - students are asked to say why examples labelled as they are.
   - students generate and test own hypotheses.

2. Testing Attainment of Concept.
   - Students identify own pictures.
   - Teacher confirms previous hypotheses by agreeing or disagreeing.

3. Analysis of thinking strategies.
   - group discussion where students describe thoughts.
   - students discuss hypotheses.

Phases of Teaching Strategy | Transcript
--- | ---
1. Presentation of data and identification of concept | T. Right. Listening now and sitting nice and still. Inside this paper bag I've got some shapes. I've also got two green pieces of paper here. On top of this green paper, what have I written?
St."Yes".

T. What have I got on top of this piece?

St."No".

T. Now, you've got to guess where the shapes go. I'm going to give you a clue, so you must watch and listen carefully. I'm going to put them somewhere so you can work out... The first shape I took out was this shape, and I'm going to put it in the "yes" page. Right, would you like to choose one please Shane? Right. And that shape I'm going to put in the... "yes" part as well? That's going to go in the ...?

St."No" part.

T. Right. One shape's in the "yes" page and one shape in the "no" page. Can anyone tell me why I put all those there?

St. Because they're all the same and...

T. What do you mean "they're all the same"? What's the same about them?

St. They've all got the same shape.
T. What have they all got?
St. Points.

T. That's right. Put it in the side that you think fits it. Sssh. Right, listen. Are you listening quietly? Right, have a look at all the things that we have put in the "yes" side. Have a look at all the things we have put in the "no" side. Why did we put all those shapes in the "yes" side?
St. They've just about all got points.

T. They've just about all got points. I can see one over here that's got points. Why didn't we put that one over there?
St. Because it's not pink.

St. Because it's a triangle.

T. Are all of these shapes triangles?
St. Yes.

T. Are all the "no" shapes triangles?
St. No.
T. Right. What have triangles got that makes them go over there?
St. They've all got three points.

3. Analysis of thinking strategies.

T. Ok, boys and girls, we've finished that now. What I want to know is how you worked out the answer.
St. I didn't know at the start but you helped...
St. It was the other kids who helped me Mrs. Gregg.
T. What do you mean it was "the other kids". Natalie.
St. I heard them talking about the differences when you showed them.
T. Thank you children. Play time now.

Social System

There is a moderate structure but the teacher controls the action as she looks for the questions and keeps them on the task.

Principles of Reaction

The teacher is supportive of the student's ideas. There is a problem with children of this age, however, as the later stages of the strategy involving the analysis of their thinking strategies is
difficult to conduct.

Example from transcript:
T. Why did we put all those shapes in the "yes" side?
St. They've just about all got points.
T. They've just about all got points. I can see over here that's
got points. Why didn't we put that one over there?
St. Because it's not pink.
St. Because it's a triangle.
T. Are all those shapes triangles?
St. Yes.
T. Are all the "no" shapes triangles?
St. No.
T. Right. What have triangles got that makes them go over there?
   Natalie.
St. They've all got three points.
-----
-----
T. Ok, boys and girls, we've finished that now. What I want to know
    is how you worked out the answer.
St. I didn't know at the start but you helped...
St. It was the other kids who helped Mrs. Gregg.
T. What do you mean, "it was the other kids," Natalie?
St. I heard them talking about the differences when you showed them.
Support System

A large variety of materials are needed to support this teaching strategy. With children of this age the linking with concrete objects is important.

THE TEACHER DEVELOPED MONITORING AND DATA GATHERING METHODS

In Chapter 5, the Design of the Study, it was described how the facilitator introduced the concept of the action-research cycle and its constituent elements to the in-service teachers and how the teachers experienced subsequently the use of these in their classrooms.

In addition the teachers were asked to utilise some of the data gathering techniques described in Galton et al. (1982) to begin the process of looking more systematically at their classroom. Appendices 4(b), 6 and 7 contain examples of these.

Appendix 7 is particularly noteworthy. The teacher has combined the qualitative and quantitative methods and this has provided a very full picture of the classroom and was the basis for further cycles of action.

To guide their implementation of the teaching strategies and to make the recycling of the strategies more focussed several teachers developed their own lesson evaluation forms. Figure 7.1 shows a lesson evaluation form completed at the end of the first lesson by one of the in-service teachers who was implementing "the memory" strategy.
FIGURE 7.1 Teacher Developed Lesson Evaluation: Lesson 1

<table>
<thead>
<tr>
<th>Implemented</th>
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<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>1. Did I make the motivation interesting enough that children indicated a desire to learn the required material?</td>
</tr>
<tr>
<td>2. Did I express the purpose of the lesson clearly?</td>
</tr>
<tr>
<td>3. Did I clearly explain the relevant points about the rivers and their positions?</td>
</tr>
<tr>
<td>4. Did I accept the children's suggestions?</td>
</tr>
<tr>
<td>5. Did I 'input' too much during the lesson?</td>
</tr>
<tr>
<td>6. Did children understand the reasons behind the usage?</td>
</tr>
<tr>
<td>7. Was too much time spent on the mnemonic development?</td>
</tr>
<tr>
<td>8. Were all children actively involved?</td>
</tr>
<tr>
<td>9. Was too much new material presented in the lesson?</td>
</tr>
<tr>
<td>10. Did the mnemonic development proceed satisfactorily?</td>
</tr>
<tr>
<td>11. Were the children able to retain the chosen mnemonic?</td>
</tr>
<tr>
<td>12. Were the children able to retain the names and locations of the rivers?</td>
</tr>
<tr>
<td>13. Were the children able to relate the mnemonic to the required material?</td>
</tr>
<tr>
<td>14. Was feedback available on the retention of the and required material?</td>
</tr>
<tr>
<td>15. Do I feel the lesson was successful?</td>
</tr>
</tbody>
</table>
The teacher also wrote the following general comments:

As this class was one of the Year Seven classes, little problem was noted, and their responses were indicative of understanding and enjoyment (laughter on tape, support for each other's mnemonics). The children who appeared to show most enthusiasm were those for whom such subjects had apparently held little interest so far as retaining facts was concerned.

The lesson lost some impact by the efforts put into a too large variety of mnemonics. With a large choice some children became confused on which to choose. Some of the mnemonics were also quite difficult in context in that the word association lacked some relevance.

**SUMMARY**

In this chapter the approach to teaching procedures called "teaching strategies" (Joyce and Weil, 1986) was given and the concepts used in describing a teaching strategy were outlined. These concepts were: phase or syntax, social system, principles of reaction, support system, and instructional and nurturant effects.

The major part of the chapter was given to illustrations of the teaching strategies in operation. The teachers in the in-service programme were asked to implement the teaching strategy as it was described by Joyce and Weil (1986). This implementation approach is known as 'fidelity' (Fullan and Pomfret, 1977) and it can be contrasted with a situation in which the teacher modifies the
teaching strategy (or other innovation) to fit in with some personal preference or some circumstance in his or her situation. This is known as 'mutual adaptation' (Fullan and Pomfret, 1977; Berman and McLaughlin, 1978).

The lesson extracts in this chapter were taken from the full lesson transcripts which are shown in Appendix 8. The extracts show that all of the teachers who were in the in-service programme were able to implement their new teaching strategy as required. However, while the teachers were able to implement the teaching strategies with a high degree of fidelity, there were some school contexts in which the level of implementation varied.

The lesson transcripts show that the main research question for this thesis, that is, to develop and trial successfully an innovative in-service programme, can be said to have been achieved. The teachers were able to implement the new teaching strategy and because they were able to demonstrate the 'new' teaching strategy at a later time, it is argued that the teachers have internalised the strategy and it is now part of their teaching repertoire. The facilitator visited most of the teachers to see at least one lesson in operation.

The implementation of a new teaching strategy has a major impact on the on-going life of a classroom for both the students and the teacher. While there is the direct consequence of the teaching strategy's implementation in the classroom upon the instructional process there are also indirect effects upon the social system in
the classroom. That is, the social relationships are altered and in many cases, so are the authority or power relationships.

In the next three chapters the impact of the new teaching strategy upon other contextual, social and professional aspects of the teachers' classroom behaviour will be examined.
CHAPTER 8

THE TEACHER'S SELF-EFFICACY AND SELF-CONFIDENCE

INTRODUCTION

The literature on effective schools and teaching has identified "teacher efficacy" (Ashton et al. 1983) as an essential component of effectiveness. Not surprisingly, effective teachers in effective schools feel that they can teach and that they can make a difference in student's learning. In this chapter the in-service teachers' views on why they were successful and how they view their success will be presented.

Ashton et al. (1983) reported that most teachers in most of the schools in their project had no objective or systematic feedback on how they are teaching or how well they are dealing with the broader aspects of school life. Part of the reason for this is that teachers are isolated in their individual classrooms, and part lies in the fact that the little feedback that teachers receive tends to be summative rather than formative in nature. In this situation, it is not surprising that teachers, who see the range of factors beyond their control and yet they are adjudged on them or their consequences, experience feelings of powerlessness and frustration.

Rutherford and Huling-Austin (1984) in their work on the Concerns Based Adoption Model (CBAM) and the teacher's level of use of an innovation employ an interview to probe this area of feedback and control. One of the questions in the interview asks the teacher to think ahead to the next year and to report on how they see
themselves being involved with the innovation. From over 1000 interviews the most common response from the teachers has been, "I don't know, the (principal, supervisor, superintendent, or some other superordinate) has not told us yet", or if the teachers do say what they will be doing it is often stated as, "the (superordinate) has said we will....". In either case it is obvious that the teacher's involvement with the innovation is not determined by them but instead by a superordinate.

In Australia, Kennedy, Williamson, and Patterson (1984) reviewed the implementation of an innovative curriculum and found a similar pattern of teacher response to their involvement. A typical response asserted:

........ do you want the honest truth on the modules? I think they are a fallacy, I don't think they teach kids as well as anything we can. We weren't even consulted about it, it just happened. It happened very, very fast. We got a letter saying "you will teach according to the modular system, here's how it works, try and arrange all your notes to suit it."

THE NEW STRATEGIES USED BY THE TEACHERS

Most of the teachers implemented the teaching strategies which they had chosen in the meeting sessions. Each of these teaching strategies had been demonstrated by either some other teachers in the group or the facilitator during the course of the in-service sessions.
The teacher's reasons for choosing the particular strategies they did were often as simple as "they seemed to be best suited to the primary", or "I did my demonstration lesson on it and I felt comfortable with it". For some however, it was an opportunity to acquire a new strategy which would match with some need they had currently.

**CONCERNS EXPRESSED BY THE TEACHERS**

All of the teachers referred, in more or less overt ways, to "my own anxiety" with the implementation of the new teaching strategy. As one said:

I felt I was not relaxed enough knowing that I was starting something new. I was very aware of hoping that none of the children would 'play-up' during the lesson. These problems I worked out after a while - I was then getting used to it. The other concern I had was - was I using the teaching strategy as it was originally intended, or was I working it to suit me?

One primary teacher said that changing her teaching strategy meant that the children would need to "change" their usual ways of behaving:

in the role-play strategy my concern was for the inexperience of the children. The only way to resolve this was to have practice goes at it.
Some teachers were concerned about school activities outside their classroom and pointed to the wider school effects that a change in teaching strategy might have. One said:

for instance, if you move to a group oriented approach from a teacher-directed approach, then the children are going to be noisier. The attitude in my school is that unless a class is quiet its unproductive.

Following three lessons with the new strategy, another primary teacher said:

Most of the problems I encountered with regard to the Inquiry Training strategy arose during the first lesson. This may have been due in part to both the students' and my own unfamiliarity with the model. Although it may not be apparent on my tape, it was certainly evident (to me) throughout the lesson that the students were confused by their change of role, particularly at the beginning of the lesson.

At the secondary level a teacher referred to the specific problems facing him and how teachers may feel constrained to adopt the strategy:

My main concern in using these models was the fact that the syllabus had to be fairly closely followed, especially at this time of year. This meant my choice of subject
matter was not really a free choice. During the time I ran two of the strategies, the syllabus for Year 10 was Activities Games so I designed the strategies to fit the needs of the syllabus.

Syllabus constraints may well be one of the factors in explaining why many teachers, especially in secondary schools, are often resistant to educational change.

THE EARLY IMPLEMENTATION OF THE STRATEGY

Clearly, if the teachers perceive that there is nothing to be gained from a change in their classroom behaviour and, in fact, they might 'lose' their expert status, or reputation as a good teacher etc, then there will be no change at all. Accordingly, in this study the facilitator took care to not underestimate the added risks and the investment of reputation, etc, facing the in-service teachers. Nevertheless, there were questions continually about their professional adequacy, e.g., "Am I doing it right?"

This teacher "fear of failure" is understandable and, in some respects, similar to that students face when they are presented with more open-tasks and there is an increase in the task ambiguity. In a novel situation, the students generally try to narrow the focus of the task and to get some explicit rules on how to proceed, (Galton, in press).

The facilitator, to counter the initial anxiety of the teachers asked them to implement their chosen teaching strategy in relatively
short teaching episodes, and when it became more familiar to use it with substantial units of work rather than to implement only "bits" of the strategy and, in a sense, "ease" into it.

One of the teachers in the in-service programme was working in the Technical and Further Education sector, and after trying to implement a Group work strategy said:

"... although I have no formal training in maths teaching, I find myself increasingly thrust into this area. The reflecting on my personal experiences combined with other trade lecturers has earmarked the teaching of maths to apprentices as an area of general concern.

"... The students' response to group work over a period of weeks has moved from being enthusiastically supportive to a more general favouring it over the traditional lecture format. Some students now perceive disadvantages as the realities of effort expected, achievement necessary and the frustrations of group work set in.

I am however, still very supportive of group work and I am determined to take these initial moves further - being most pleased with the results attained in this complex topic by these students, and the levels of cooperation exhibited by them in the third lesson.

A corner has now been turned and the future task for me is to attempt to teach the students to be more cooperative so
they can teach each other.

All of the teachers reported that in their initial use of the new teaching strategies that they felt "unsettled" and that it was affecting their normal classroom behaviour and interactions with the students. The teachers' anxiety was probably higher anyway as they had been asked to implement the teaching strategy as it had been demonstrated to them and as they had practised it, and not to "adapt" it to fit in with their usual classroom practices.

Another teacher reported on the advantage of a large change in strategy:

The reactions of my children at Brookvale School were interesting when considered in light of the new learning environment I was trying to create.

These children live in a 'single parent' area and quite often the classroom is their only secure environment. Even though the children are used to me, they found the change in strategies difficult to cope with.

The reactions were quite often "this is stupid". This may of course be a reaction to the actual presentation, but I think the most loud responses were coming from children who felt threatened; for instance, the phase four in synectics where a new analogy needs to be developed, and in concept attainment where the process requires them to
develop their own theories. For some it was threatening. But dealing with it in a sudden change in my approach meant that we didn't spend lots of time in small changes.

One teacher, after seeing a videotape recording of an in-class demonstration of her new teaching strategy said:

Once I saw I could manage the strategy I began to feel more confident .... I was now able to know where I was going again.

In the Deakin University or Elliott action-research projects or the ORACLE Group Work Project, where a more gradual introduction was followed, there was little changed in the teacher's classroom behaviour. From these studies, paradoxically, it appears as though the gradual introduction resulted in a reduction of what actually had to change.

From the teacher reports given here, it appeared that the implementation of a new teaching strategy, even if somewhat anxiously and hesitantly began, meant that there was a significant change in the teacher's behaviour and this momentum meant the innovation could be maintained.

One teacher, who had decided to implement a Group Work strategy rather than a more direct instruction approach reported:

The argument that implementation is a slow, evolving process has been reinforced and taken on board. On the
other hand, if a relatively long step had not been taken initially, perhaps both the teacher and the students may not have advanced so far.

The anxieties and concerns the teachers experienced when they tried to implement the new teaching strategy appeared to be common among them. The process that the teachers described had been shown in Figure 8.1.

**FIGURE 8.1 The Teachers' Reported Implementation Course of Events.**

![Diagram showing the process of implementation](image)

From the teacher interviews and self reports it is possible to see a situation in which the teachers move from a period of 'destabilisation' as they implement the new teaching strategy into a period of 'internalised' mastery of the strategy.

The data here would suggest that if the teacher has weathered the changes required by the implementation and received positive responses from the students the teaching strategy is now internalised as part of their ongoing classroom repertoire.

As important however, is the change in self-confidence which
the teachers report at this stage. The combination of successfully acquiring a new teaching strategy and receiving positive feedback from the students is a very powerful reinforcer.

The importance of the positive feedback to the teacher not only from peers but also the students is an important finding. In the U.S., Crandall (1983), looked at 146 school districts where teachers were successfully implementing educational innovations with a high degree of fidelity. He reported that "the achievement of satisfying results with the students" was an important factor in successful implementation. Further innovation studies will need to bear this factor in mind as it has not been researched widely in the past.

**CHANGES IN THE TEACHERS' VIEWS OF THEIR CLASSROOM**

The teachers all reported positive comments on their view of themselves as a teacher. Equally, however, they reported a changed view of their classroom.

It was noticeable that as the teachers became more proficient in the use of the teaching strategy that they made such statements as, "I had more time to deal with individual students", or "I am seeing some of the kids work at a level I didn't think they could".

One teacher reported her heightened awareness of the activity within her class in the following way:
From the classroom sweep, it was obvious that I was giving the boys preferential treatment - although I wasn't initially conscious of doing this, I was responding more to the boys than to the girls. Natasha had her hand up for quite a while and I hadn't noticed. Most of my questions were directed to the boys.

For the large majority of the teachers once they had implemented the new teaching strategy and received positive feedback on it in some other aspect of the classroom life from their students their view became a much wider one. The teachers began to see the inter-relatedness of issues. For example, one said:

I am now thinking that I will have to change some other aspects of my teaching. The change in teaching strategy has meant, for instance, that I can't use the same tests or describe the student's performance as a single mark out of ten.

The teachers' perspectives were clearly broadened and they began to converse collegially about school and educational matters. One of the features of this was the way that the teachers moved away in conversations from a custodial perspective of teaching to one where they were open to ideas, and willing to try and implement them in the classroom.

The collegiality involved the facilitator, as one teacher told his students:
I am also going to audio-tape record our lessons. This will help me to see how the groups are working and to make our lessons more effective. I will also be taking the tapes to Curtin University so I can get some more advice on how to improve the lessons.

For many of the teachers there was an increase in the number of teaching strategies they acquired, and for other teachers it meant positive career changes as they applied for and were appointed as advisory teachers. For other teachers it highlighted areas of classroom life that they wished to know more about. Several of the teachers engaged in their own professional reading in the area of interpersonal interaction in the classroom. However, regardless of the particular issue or focus of this increased teacher awareness it was a very important outcome for these teachers.

In the above it has been stated that one important aspect of the teachers' self reports related to what can be described as self-worth or self-confidence. It might be argued that these perceptions of increased self-worth are as important to the teaching force as was the implementation of the new teaching strategies. Elliott (1977) reported, for example, that teachers in the Ford Teaching Project said that the value of the project was as much in the opportunity to share their ideas and experience as it did in the research outcome. Clearly in any project of this kind the increase in a teacher's skill in professional deliberations is important and needs to be fostered.
Several of the teachers reported that they now wanted time to reflect on events, or as they said, "to think about things" that occurred in their classrooms rather than to respond immediately to them.

An interesting tangential point is that several of the teachers reported that they now saw "research" in a different light. The teachers' comments in this area ranged from, "I found this really valuable" to the broader issue of how research is conducted in educational systems. One teacher asked:

Why isn't most of our Research Branch working with us in ways that help us rather than doing these large studies that have no impact? I was in a project and they turned up in my classroom to give some tests and then disappeared. I never heard from them again.

In their reflections on the in-service programme several of the teachers said that in changing their teaching strategy they had made, in some way, a more significant change in their attitudes and beliefs. One teacher said:

I had always thought that maths is best taught by telling the students the way to solve the problem, and then to have them do a series of exercises. After this in-service activity I know that some of the children learn better in other ways.

Another teacher carried this point further and suggested a
systemic-wide way of dealing with teacher misperceptions:

Unfortunately, most of my colleagues are quite content to subscribe to the view that sees their role as handing on dormant and traditionally unchanged codes of knowledge. This could be changed dramatically if the Teacher's Certificate was not a permanent form of certification, but were made invalid after say, a period of ten years. It could then be revalidated after completion of the appropriate education units either by evening study or by day-release.

REFLECTIONS UPON CURRENT PRACTICE AS THE BASIS FOR FUTURE ACTION

All of the teachers saw that in the lessons they were conducting there were areas where improvement could occur. The facilitator asked the teachers to identify these areas and to use them as the basis for subsequent planning and lesson implementation. Clearly, the skills of planning observation and reflecting would need to continue after the in-service programme finished.

One teacher wrote as his analysis of the first lesson he taught using the new strategy, aimed at improving Lesson Two:

1. Perhaps the mathematical objectives should be stated more precisely at the beginning of the lesson. I am however, not convinced that saying for example, "At the end of this lesson all students will be able to correctly answer 4 out
of 6 questions in ten minutes ..." achieves anything -

apart from turning half of the students off. Rather, the
above statement should be the objective of the teacher,
with the students being made aware that in this particular

lesson a particular topic is going to be covered - and that

they are going to raise their competence in this topic to a

satisfactory level (satisfying themselves and the teacher).

2. Need to allow students more time to settle down into their
groups.

3. Re-state idea of more student interaction/group co-
operation within groups.

4. Highlight need for each group to discuss which particular
problems they are going to discuss.

5. Need to allow more time to adequately summarise lesson.

6. Request students to attempt to reduce noise level in class
- difficult for some students to concentrate.

7. When asking questions, wait a little longer for answers -
call on more students by name.

8. Need to be aware of student attention span (about 5
minutes). Perhaps break up the long group work session.

9. Satisfied with amount of work covered and competence.
10. The three students who have difficulty with maths experience similar problems within group. Tend to work individually, become easily distracted, perhaps embarrassed to indicate their own lack of understanding.
Try to spend a little more time with them within their group.

11. The envisaged strategies Syntax was adhered to.

A junior primary teacher said:
I found that one child tended to speak very loudly over-riding the others in the group and that another child tended to answer for the child to whom the question was directed. This was an important discovery for me as I hadn't realised quite how often Doug and Nathan tended to control any discussion.

The teacher then began to manipulate deliberately classroom events to see their impact upon the children:

...... I began to use this approach to discover if any children had poor concentration spans or were easily distracted or were unable to give a confident response.

What has been described in this chapter is similar to McTaggart's (1982, p.101) conclusions when she wrote:

.... These teacher researchers know more about what is
happening in their classrooms and schools because they have begun to observe in an organised way the action they have taken, the effects it has produced, and the circumstances in which these occur.

In this study, however, the teachers were implementing a new teaching strategy which they had learned through the application of the "coaching" model.

SUMMARY

In this chapter the related issues of teacher self-confidence and self-worth have been considered through the teacher's self-report data. The teachers' feelings of self-efficacy, or the ability to be successful, has been used to tie together data on their professional skills, feelings of self-worth and self-confidence and their classroom awareness.

The teachers all reported some initial concerns when beginning the implementation of the new teaching strategy. All of the teachers agreed to implement the teaching strategy quickly and wholly and they reported after the implementation, that they saw the merit of doing this. The most commonly given reason by the teachers on the advantage of a quick implementation was that it meant the class was unsettled for less time.

The teacher's referred to the need to get student feed-back on their attempt at implementation and they described how potent this student comment was in shaping their view of the model.
For all of the teachers involved in the innovative in-service programme, there were a number of significant changes in their view of teaching and themselves. Among the teachers in the in-service group, even the least professionally engaged of the teachers reported that the activity had provided an opportunity to share some ideas and to move beyond "tricks of the trade" talk with other teachers. It seemed even at this discourse level, the development and fostering of professional dialogue and collaboration was valued by the teachers.
CHAPTER 9.

THE TEACHERS' PERCEPTION OF THE PRINCIPAL AND THE EDUCATION DEPARTMENT AS SUPPORTERS OF INNOVATION

INTRODUCTION

The view of the school principal as an instructional leader is currently widespread. It is a concept that has grown from two related research areas. The first is the school effectiveness literature (Edmonds, 1979; Phi Delta Kappan, 1980) and the second is the high school reform literature (Lightfoot, 1983; Sizer, 1984).

The research on the principal as instructional leader is common at both the secondary level and the primary school level. (See for example, Bossert, Dwyer, Rowan and Lee, 1982; Leithwood, 1982; Sergiovanni, 1984). These and other studies have shown the importance of the principal in creating school conditions that lead to student higher academic performance. The conditions which lead to improved performance include setting high academic and behavioural goals and standards, planning and consultation with staff, a desire to innovate when and where necessary, frequent monitoring of staff and student performance and involving all 'stakeholders' (parents, wider community) in the school in the life of the school.

In the application of this research, however, there is a caveat; that is to apply the American research to the Australian situation (and also the British), it must be remembered that the
role of the primary school principal in each country is significantly different. In Australian primary schools, for example, typically there is not a senior echelon of teachers that the principal has to deal with in the decision-making processes.

Also, in Australia, up until quite recently the principal has not had a voice in the selection of teaching staff for his school. This has meant that some schools consistently have had a large contingent of "new" teachers. In some schools this has combined with other factors such as: geographical location of the school, and the socio-economic status of the student population; to give a cycle of high staff turnover, and low school productivity. These conditions have led to principals spending large amounts of time on 'maintenance' activities.

In this Chapter the views of the in-service teachers on their principals as supporters for change in their school and also the support offered by the wider educational system to implement innovations are examined.

TEACHERS' PERCEPTIONS OF THE PRINCIPAL AS A SUPPORTER FOR CHANGE

In a study of the Western Australian Technical and Further Education Department, Kennedy, Williamson and Patterson (1984) reported that the college principals were not perceived by their teaching staff to be involved as instructional leaders. Rather, they were seen as concerned solely with administration. One typical teacher comment was:
We never see the principal. He's always in his office or in at Head Office. I think he meets the Heads of Department at a scheduled weekly meeting .... I don't think he understands the changes in the new course and the principles underlying it, e.g., the modular scheme and self-paced learning.

The teachers participating in this in-service activity also tended to see their principals as an administrator rather than an 'instructional leader'. However, several teachers reported that they would not have participated in the in-service programme if they thought that their principal would not agree with the general aim of what they were doing. These teacher's comments often contained an ambivalent thread. For instance, it was as if the principal was 'one-of them', i.e., an outside administrator, but "sometimes I need him to support me". The teacher's appeared not to want the principal to interfere in the classroom but to provide support when they (the teachers) wanted it.

In their survey, Reynolds and Clark (1984) reported that Western Australia principals indicated a greater preference for regionally organised in-service compared to school-based arrangements. This can be seen as a kind of 'keeping it at arms length'. While over one-quarter of teachers said they received no support from the school, the principal or the Education Department in translating in-service activities into practice in the school.

In comparison with the teachers in the Government schools one of the two teachers in a Catholic parochial school reported:
My school opened in 1978. There are 430 children and the staff are all lay teachers. The principal has been there for the last fourteen years. The deputy, who teaches Year 5, has been with the school for the past twelve years. When the principal began teaching here the community consisted of rural families, small business people and people who had opted for the quieter life. In recent years there has been a lot of development in this area and the community has grown to include a variety of people from the professional person to the unemployed. Both the principal and the deputy are very keen to involve everyone in the running of the school. They want us to be "professionals" and they have put stress upon our teaching skills and content knowledge.

We are regularly seen by either the principal or the deputy as we teach and they use the attached forms (see Appendix 6).

In this school the regular and constructive monitoring of the teacher's performance means that the teachers are not professionally isolated (Ashton et al. 1983; Lortie, 1975). Importantly, however, the principal's practice has a multiple impact upon the school community. Firstly, it lets the staff know what the priorities of the school are and how the individual staff member can help achieve them. Secondly, it shows the principal firmly in control and thirdly, it lets the teachers know what the standards are and when they are achieved.
The teachers' views about the role of the principal as the academic and behavioural goal-setter, determiner, and articulator for the school, ranged from "no influence" to "the one in charge". For some of the junior primary teachers the feeling was ambivalence and described by one as:

The principal is more interested in the higher grades than in us ...... often he jokes about us as the babysitters, but we think, or we hope, he is not serious.

A common view from all teachers was in accord with Fullan (1982, p.139) who suggested "a large percentage of principals (at least half) operate mainly as administrators and as ad hoc crisis managers". Although the percentage who saw their principal as an administrator was more than 50 per cent in the Western Australian teachers.

One teacher said that, "Our principal only has a couple of years to go before he retires. So we are able to lie pretty quiet and just see things through, if we want." On the other hand, several teachers said that their principal was seeking them out to talk about the new teaching strategies they were implementing and that they had been asked to talk about it to the other teachers. One said:

Our boss has made it clear since he arrived that the school will be different. We think he will leave in a couple of years but in the meantime change is the order of the day. He's revived the P and C (Parent and Citizens),
wants to see our programmes and test results and comes into classes unannounced.

Several of the teachers saw the proposed changes in the Western Australian educational system following the State Governments acceptance of the Beazley Report (1984) as an area where the "go-getting" principals would focus. There are several recommendations concerning professional renewal and one of the Beazley recommendations is for an Annual Review of all teachers. This review would be conducted by the principal and the principal also would be the major voice in determining if a probationary teacher should be granted permanency. These steps will mean at least in some schools, a greater degree of congruence between the values and norms of the principal and the staff.

The new functions for the principal suggested by Beazley (1984), have been supported by the work of Gersten and Carmine (1981) on the role of 'support functions', and Hall and Hord (1986) in change facilitating team functions.

On balance, from the teacher reports, it appeared that the in-service teachers who were the more successful implementers were in schools where there was a more clearly defined set of aims or goals for the school and these were sometimes discussed at staff meetings. Overall, however, there was no support for the position of 'institutional leader' that the literature suggests for the principal.
TEACHERS' PERCEPTIONS OF HEAD OFFICE IN FOSTERING CHANGE

The nature and magnitude of this project meant that Education Department Head Office involvement was not sought nor needed. The teacher's comments, therefore, relate firstly to their perceptions of the general climate for change within the Education Department, and secondly, to the support provided by the Education Department for change.

All of the teachers saw the Education Department as interested in fostering and supporting change. The teachers gave examples such as; the declared priority of computer literacy for all children, the concern to broaden the curriculum to cater for all ability levels, and the greater involvement of parents and the community in school decision-making.

The teachers' descriptions however, portrayed a system that tended to operate on a research, development and diffusion model; that is a centre to periphery model (Havelock, 1971). The teachers pointed to the fact that a school could get 'extra resources' from either the Commonwealth or State Government if the school could show that it was implementing one of the Government's education priorities, for example, computer literacy. This "extra" funding had developed what the teachers referred to as "entrepreneurial Heads".

A typical comment was:
In at Royal Street (Education Department Head Office address) they issue proclamations which are sent to the Regional Directors and the Principals. Sometimes we have
to read about them in the newspaper. We are asked to do more, for example, the computer push, but they don't provide the resources for us to do it. And with the computers it was hopeless.

For the majority of in-service teachers the Government school sector was engaged in too much change. Two teachers said that in their school some teachers didn't change at all because there were so many changes! For three teachers the melee of the legislated changes meant that if they wished, they were able to go into their classrooms and close the door and continue as before. It was reported that the teachers who were "fakers" were able to talk about the changes required by the Education Department and to sound as if they were implementing the changes. In these two quoted instances, however, the teachers said that the principal of the schools took a lower profile in monitoring the changes and the implementation than did other principals. Unlike the teachers in the Primary School Staff Relationship Project (Nias, 1987) where values in all aspects of staff interaction and the relationship of past policies were central in the shaping and maintaining of these values, the teachers in this study reported little of the continuity of values. The reason for this important difference is likely to be the relatively rapid turnover of staff in Western Australian primary schools. Typically teachers have been moved by the Education Department every three or five years. This continual teacher movement and the fact that the Principals are also moved by the Education Department means that there isn't the time together in the school to form these same solid values. This situation is likely to change in Western Australia with the new Ministry of Education's decision to allow
more say by the principal in the choice of the school staff and to
give a longer term of office in each school.

**SUMMARY**

In this chapter the in-service teachers' views on their school
principal and the Education Department as supporters of innovation
has been considered. For most of the teachers in the larger primary
schools, their principal is concerned with administration rather
than instructional leadership. The teachers reported an ambivalence
toward the principal; they wanted him or her out of their classroom
but when necessary they wanted the principal's support.

Several of the teachers reported that they had "go-getter"
 principals who, in the restructured Ministry of Education, would
embrace and use the new powers given to them. These included, a say
in the selection of staff for their school, the determination of
permanency for probationary teachers, and the conduct of an Annual
Review for each staff member.

One of the teachers from a Catholic parochial school reported
that her principal took a strong interest in the teachers'
"professionalism". This was manifested in regular classroom
observation sessions where the teachers received feedback from the
principal.

All of the teachers saw the Ministry of Education as keen on
promotion of and support for innovation. The teachers saw, however,
too much change coming from the Education 'System' at the moment.
They pointed to State and National priority areas - computer
literacy, multi-cultural education, Aboriginal education and so on - and said that they found it difficult to keep up with the demands made upon them.

While the Ministry of Education promoted change, the teachers reported that it provided little or no support to achieve it. In other studies it has been reported that thirty per cent of teachers who attend a typical in-service course reported that they received no support at all in translating the in-service course into practice (Reynolds and Clark, 1984).

The situation regarding support for in-service will worsen over the next few years. The withdrawal of the Commonwealth Government's support for funding the Professional Development Programme discussed in Chapter Two, will mean less "replacement" teacher days and less release from school for in-service work.
CHAPTER TEN

THE TEACHERS AND THE STUDENTS

INTRODUCTION

In this chapter the two related aspects of the teacher's classroom awareness and his or her relationship with the students will be examined.

Classrooms are characterised by a rapid flow of events and the teachers interpret these and take actions based upon their knowledge and beliefs. Clark and Peterson (1986) after a review of studies on teacher's beliefs concluded, "a teacher's cognitive and other behaviours are guided by and make sense in relation to a personally held system of beliefs" (p.207). Accordingly, if these beliefs are altered then it is likely to result in other changes in the classroom.

TEACHER CHANGE

The reports from all the teachers indicated that their staple approaches in the classroom were being changed. The teachers noted, for example, that they were no longer concerned only with content, but also methods. Many reported that they now saw the students as individuals and they were trying to give the students greater freedom to organise and carry on their own work. One consequence of the changed teaching strategy that many teachers commented upon, was the altered social climate. For many teachers there was now a concern for affective elements as well as the typical cognitive
goals.

One teacher reported:

I noticed that I was reacting differently to the children. I found myself asking, 'What do you think about that?' 'Can you say more about that?' 'What shall we talk about?', 'What shall we do about it?'

I now want to draw the children out without being too negative or too positive.

To facilitate learning in this area or strategy I tried to be as accepting of the children as individuals, reflecting back their comments in a non-punitive or a non-critical manner.

As the children gradually felt the freedom within the new teaching strategy, as no restrictions were present, the noise level increased dramatically, giggling, chatter, excitement in their voices.

It seemed to me that the messiness of clay and its smooth texture can release a child from many necessary restrictions of modern living. Sometimes a child needs to get grubby with impunity.

Another teacher, thinking back over a series of audio-tape recorded lessons said:
I saw improvement in my questioning where I began to elicit on the emotional level rather than just in the cognitive. For example, in my first lesson the comments and questions sounded stilted. In lesson two, it was more neutral and reflective of children's questions and emotions. In lesson three I used a variety of reflecting questions to lead or draw out possible solutions.

One older male teacher was enthusiastic about the impact of the new teaching strategy upon his students:

This model is not only applicable for this year seven class but (it) will be introduced to other classes throughout the school ...

but he recognised that it called for new behaviours from the students:

The model will need to be introduced over a longer period of time for the junior classes to internalise the process of looking for connections, associations and relating to known areas.

Another teacher, commenting on how she was "fighting my desire to jump in" and tell the children how to do the task, said:

At this stage in the childrens' use of role playing the key would seem to be to get the children who are acting
feeling secure and independent rather than going into
great depths of what alternative things could have
happened.

A junior primary teacher who was teaching a concept attainment
lesson on how the wind affects us recounted how for the first time
she had listened to four children discussing an issue! The
conversation between the children went:

C1: "Is it about fire?"
C2: "No".
C3: "Is it about Nature?"
C1: "Why Nature?".
C3: "Because of the bark and the branches".
C1: "But fumes aren't part of Nature".
C2: "It's not just your decision. It's all of us".
C3: "Come on Tim..."
C2 "Come on Brett (C4) .... you haven't said a thing."

The teacher reported surprise at the thinking on display but
also at the willingness of the group members to share ideas, and to
ensure that everyone had a say.

SOCIAL STRUCTURE CHANGES

In typical classrooms there is no doubt about the roles of the
teacher and the students and the kinds of behaviour that are
expected. The teacher is expected to teach and the students to learn
and the relationships are somehow pre-determined. With a change of
teaching strategy some of the teachers found that they also had a
changed leadership role. Whereas they were usually the centre of activity now they were a 'reflector' of student ideas or a counsellor.

In this section some examples of the teacher's reported change in authority position or the structure of a lesson will be given.

One teacher had interviewed the children to ask them if they had liked the series of lessons. One child said:

I liked the talking in a group and the way the lesson was done like a game instead of a lesson straight off.

But the child pointed out, "the thing I like the least is how you "have to wait for a long time to have a turn".

This sharing of a student's perceptions with the teacher was, for many teachers, a unique event. In fact the students seemed to open up if the teacher showed any interest at all in their reactions. The quotes below are a sample. A teacher who implemented a concept attainment lesson noted:

The way of introducing and conducting a concept attainment lesson is different from a teacher-centred one. One child told me:

The things I liked was talking together in a group because you can arg... get to talk and discuss ideas. The least things I didn't like was when at the beginning because it was all very confusing and hard.
The children after thinking about the change in the classroom, told the teacher, "I liked working it out for myself", or, "it keeps your brain working", and "you could say your opinion and hear what other people thought".

One child said:

The thing I liked about it was it took a long time so we missed out on a lot of work. The other thing I liked was you didn't tell us what it was, and we had to work it out.

One other child reported:

I liked it most in the whole class because you could share your idea. I didn't like it in groups because Tim took over.

Another child said:

The things I most liked. I liked best doing the game in the class so we could share ideas. The thing I liked least was doing... finding out the answer because it became frustrating sometimes.

The comments from the children show the teacher as being off-centre-stage. For many of the students it seemed as though this was the first time they had experienced a classroom where they shared (or controlled) some of the "power". That is, power to contribute, to share with each other and to try and sort out their own answers.

In the next quote the junior primary teacher has told the
facilitator about the children and sharing. As well and perhaps more importantly is that she had indicated that she allowed the children to explore for themselves and they "started to work together".

A primary teacher said:

This isn't necessarily a new perception, but I noticed the children are gaining more social awareness. They are losing to some extent the egocentricity which characterises this age group. I'll refer particularly to the collage activity - six or so children were working at the table and although each was doing his own work - they were all very interested in what the other children were doing and aware of other ways of doing it.

In the sand play I had various sand accessories and the hose running into the sand pit. The children were involved in building dams, etc. As I played my tape back I though it sounded very noisy, there were too many foremen and not enough workmen!

Each child wanted the water to go in a different direction at first and then they started to work together.

Another teacher who said she had always used a direct instructional approach stated:

The perceptions I gained were those which reinforced the principle that learning is active in nature. The learner himself has to do the learning. This implies some sort of
motivation on the part of the learner. The students investigating for themselves are much more likely to gain an insight into the activities... a much clearer insight than from, say, given notes or watching a film on the same topic... This greater degree of involvement, I believe, leads to better learning.

THE DEVELOPMENT OF "TRUST" BETWEEN THE TEACHER AND THE STUDENTS

It became obvious from the teachers' reports that once they began to explore the inter-action in their classroom and the students' responses, there developed a higher degree of trust between the teacher and the students. For some of the teachers it involved saying to their students such things as:

We have discussed using a group work strategy for our maths. Will we try it for a while? - I haven't done it before - and dependent on your results and your opinions we will decide to continue on using it. OK?

Whereas for other teachers it involved the students feeling confident enough to raise matters of classroom procedure. For example, one teacher interviewed her students and recorded the following:

Tanya in the interview said, 'I was only choosing the ones who had their hands up, and that I should sometimes ask questions of those who didn't have their hand up to encourage them to participate'.
Fiona (a child from the P.E.A.C. - a gifted education program) said that, 'it was quite boring and I had to wait while everyone took time to understand and get the concept... I like it when the slower ones are taken aside and given help by another teacher'.

The teacher here was sure that the children were not being 'smart-alecs' or 'bush-lawyers'. She reported that she was extremely pleased that the children would approach her in this way. In this instance it seemed that the 'psychic' rewards that the teacher was getting from this changed relationship were significant.

THE NEW TEACHING STRATEGIES AND A PROGRAMME OF WORK

Several teachers reported that there were serendipitous classroom occurrences following the change in teaching strategy that they built upon. For example, a pre-primary teacher asked her children to tell her what they felt when a spoonful of cold finger paint was placed in one hand and one spoonful of hot finger paint was placed in the other hand. The teacher reported:

The activity was greatly enjoyed by the children. They expanded well and some of the language expression and descriptive words were delightful - squirly, mushy, sloppy, slides, runny, ploppy, oozes, squeezes, squashes, slushy.

A further attribute discovered by accident rather than planned was that the fingerpaint was discovered to be thin (the hot finger paint), and some of it was thick (the cold finger...
paint). This attribute was a difficult one to describe mainly because the children didn't know a suitable word.

I decided to use this as the basis for our follow-up activities.

TEACHERS' AWARENESS OF REASONING PROCESSES IN CHILDREN

Several of the teachers reported that listening to the audiotapes of their lessons had given them new insights into how their children were "taking in the lesson". A primary teacher, reflecting on two lessons that she had taught on the topic of 'what is good for you', said:

The students assumed more initiative and one child even disputed other claims to support his reason for 'needing cigarettes'. He said, "well they're not bad for you because they haven't got any sugar in them".

He was of course, relating back to the other lesson. There were times when I asserted too much authority in dismissing children's hypotheses without allowing the other children to express some opinion, and to reach a conclusion. This may have been better for their critical thinking ability. For example I said to one boy, 'you're just being silly now', and at the end of the lesson I asserted 'We've come to the conclusion that we know the difference between what we need and what we want'.

In her view of how content is 'shaped' by our own experience,
the teacher stated that she was now broader in her outlook and she gave the following illustration:

The strategy was useful in that it nurtured an awareness of alternative reasoning within the child - there was, in many cases, not a simple 'yes' or 'no' answer. Rather there were degrees of rightness. For example,

C1: Do we really need teeth?
C2: Yes.
C1: No, you can just suck instead of chewing.
C3: No, you don't need them because you weren't born with them!
C2: But when you were born you don't eat, you suck - so you don't need teeth.

I found this part of the lesson to be very interesting - the children engaged in free discussion in order to prove their points.

The strategy encouraged young children to be more analytical in their thinking and therefore active learning was taking place, rather than passive learning.

In Lesson No. 2 by Teacher KA (Appendix 8) there is a good illustration of the teacher reflecting on the content with the students. The students have isolated variables early by asking "Are the marbles the same size?" and "Are they the same weight?" A student verified his observation of the experiment by asking, "When the black one went did the white one stop straight away?"
When the student raised the idea of marbles hitting in the right place at the right time, the teacher immediately asked him to define what he meant by "right" and then "half speed". When the discussion was getting bogged down, the teacher returned to the focus question, "Why does the second marble stop?" A student then goes on to discuss "impact", "using up speed", "power" and eventually the student redefines his hypothesis as "using sufficient energy and giving the other marble sufficient energy to go".

The teacher when interviewed, thought that she may have made at least two mistakes in the lesson, she said:

Firstly, at the beginning of the lesson I asked students who had hypotheses (I used the term theories with them) not to voice them until I asked for any. Upon reflection, I felt that possibly this restricted somewhat the inquiry nature of the lesson in that students should be able to voice their opinions at any stage.

Secondly, at the conclusion of the lesson I referred to Leo's hypothesis by saying 'that sounds like a pretty good theory' and the class took it to mean correct.

At that stage we should have tried to extend the hypothesis to other situations in order to formulate a 'true' theory.

The insights portrayed by these teachers are likely to improve
their classroom effectiveness. They have started to consider the students' creativity, motivation, and adaptability as well as the usual general intelligence.

THE TEACHING STRATEGIES AND PUPIL SKILLS AND CONTENT KNOWLEDGE

The aim of using the new teaching strategy, of course, is not only to make the teacher feel good. It is also to expand the teacher's repertoire of strategies so that he or she is more likely to enable all students to become productive and effective learners.

The teachers had different goals for their students following the use of the new strategies.

One teacher said:

Although at the outset I felt rather uncomfortable with this strategy by the end of the series of lessons I felt fairly relaxed about using it.

I particularly liked the inquiry nature of the model which places responsibility with the student to gather data, formulate hypotheses and try to explain certain phenomena.

It worked well in my class in getting students (perhaps not all) involved in discussion.

Another teacher (BR) realised that she is concerned about the
content rather than the process when she said:

I fall into the trap of directing their explanations towards 'the explanation' - being content oriented rather than trying to encourage speculation in whatever direction it should take.

Teacher (AC) saw the predictive inquiry lesson as very appropriate. He reviewed his lesson in the following way:

Generally the lesson proved to be successful. The pupils responded well to the predictive inquiry lesson and participated well throughout the discussion period. The strategy has great applicability within the science subject area. It helps to develop proper scientific thinking and analysis skills and could foster the development of the science process skills such as predicting outcomes, formulating hypotheses and making inferences.

Another primary teacher began by talking about learning processes but quickly moved to a social inter-action aspect in the classroom:

I have an increased awareness of the child's learning style and capabilities... and the children's enjoyment of different presentation strategies... I think that the child was manipulating me to give her answers. I was 'over questioning' and not allowing enough time for answers.
I need to make the pupils work harder, rather than have them wait for me to give help or answers. Anyway, I allowed the pupils longer to respond before giving help.

For one teacher the monitoring of her classroom provided information on her own and the students' patterns of behaviour. She stated:

On replaying my tapes, I realised that about one half of the class are very good participators, about one quarter of the class are occasional participators and the final one quarter, who are children at the lower end of the intellectual scale, are almost non-participators. I was semi-aware of this but this serves to highlight the problem.

Two or three children who are good participators I found I relied on quite a lot because I knew they would always give me mature suggestions.

When thinking over the impact of the new teaching strategy, one teacher said:

When I first started the new strategy it lead to changes in the students' behaviour which was more often boisterous.

The pupils enjoyed the different approach and they seemed to view it as more a fun activity or a game than a
'normal' learning task. They were more motivated.

SUMMARY

In this Chapter data relating to the relationship between the teachers and the students have been presented. It is clear that the teachers had established friendly, warm learning environments where the students were able to participate openly and freely.

The teachers reported that they were aware of changes in their own beliefs and behaviour. In particular, there were significant changes in the "power" relationships in the classrooms as the teachers moved from their use of a teacher-centred high structure strategy to a more student-centred low or moderate structure strategy.

In these changed learning environments many of the teachers reported significant changes in the social-emotional dimensions of the classroom. There were many instances of increased "trust" between student and teacher.

As the teachers began to feel more comfortable and secure in the use of the strategies, the possibilities that they offered in terms of new areas of interest and content became apparent to them.

Several teachers saw the new strategies as offering them an opportunity to re-appraise their students. In many instances the teachers were surprised by the quality of the tasks completed. Some teachers said that the new teaching strategy had given them an
opportunity to listen to their children and for the first time to grapple with ideas of how the students learn.

Overall the teachers reported improved classroom environments and were very positive about the benefits they saw flowing to their students from the use of the new teaching strategies.
CHAPTER 11

IN-SERVICE ARRANGEMENTS IN THE U.K. AND AUSTRALIA:
COMPARISON OF SOME RECENT TRENDS

INTRODUCTION

The preceding chapters have outlined the in-service arrangements in Australia and shown how teachers can expand their repertoire of teaching strategies and the consequences of this in their classrooms for the students and themselves.

In this chapter the recent changes in the in-service training scheme in the U.K. following Circular 6/86 DES (1986) will be outlined and compared with the in-service arrangements in Australia. One Local Education Authority's response to the Circular 6/86 proposal will be considered and the implications following from the proposed changes will be given in light of the changes.

In the U.K. at present there are many similarities to the Australian situation as it relates to the need for in-service work. In both countries there are the career pattern changes, the aging of the teaching forces (over half of the teachers in the U.K. are over forty years of age, [DES, 1983]), the changes in social values and the same economic difficulties which have led to real reductions in the sums of money available for education. There is also the same concern to improve the quality of teaching and to provide "better schools" (Beazley, 1984; DES, 1985). For these reasons plus the increase in the holding power of teaching as a career and, in the
U.K., a decline in the number of student enrolments, the number of new teachers required when compared with the total in the teaching force has decreased significantly. It is in this context that Circular 6/86 must be considered.

THE CHANGES PROPOSED IN DES CIRCULAR 6/86

DES Circular 6/86 Local Education Authority Training Grants Scheme; Financial Year 1987-88 was published in August 1986 and came into force on 1st April 1987. The first paragraph of the Circular gives as the purpose of the changes:

The scheme is intended to help local authorities to organise in-service training more systematically so as to meet both national and local training needs and priorities.

Enactment of the relevant Education Bill and Circular 6/86 would mean the replacement of the Local Authority "pooling" arrangements for in-service training, the specific grant scheme for in-service training and the TVEL-related (TRIST) scheme.

The general principles of the proposed scheme indicate that the new measures are aimed at:

(i) promoting the professional development of teachers,

(ii) promoting a more systematic and purposeful planning of in-service training,

(iii) encouraging a more effective management of the teacher force, and
(iv) directing in-service work into designated national priority areas.

The changes proposed in Circular 6/86 require that the local education authorities submit their proposals for in-service training to the DES for approval. It is understood that only the proposals the DES considers most likely to meet the aims set out in the section of the document entitled General Principles, will be supported.

Circular 6/86 states that 200 million pounds would be available in the financial year 1987/88 and 70 million pounds or just under one-third, is earmarked as categorical funding for the national priority areas. The Circular also says that the proposed arrangements will mean "a more even distribution of training". (Para 14).

In para 17 the statutory mechanisms to implement the proposals are outlined. It is proposed that the Secretary of State will determine the maximum amount that can be spent for grant-aid for each of the national priority areas and for the local priorities. The Secretary's decision would be based upon the LEAs current practice and future intentions for the planning and management of such training, including its arrangements for identifying the training needs of individuals (through appraisal procedures where these exist). The Secretary of State, if not fully satisfied with the proposals, may attach conditions to the offer.

The U.K. Central Government will provide 70 per cent of the grant in the declared priority areas. If the LEAs wish to spend more
in these areas they will be eligible for grant support at a maximum of 50 per cent. However, the document asserts that allocations for national priority areas may not be used to support local priorities.

All in-service work supported through this proposed scheme has to be monitored and evaluated by the LEA to assess whether there was an effective and efficient delivery of the education services (p.8).

A COMPARISON WITH AUSTRALIA

As shown in Chapter One and Two of this thesis there have been a number of common educational and societal issues and similar responses in Australia and the U.K. over the recent years. The responses although similar are not the result of close collaboration between the two national Governments. Rather both countries found themselves faced with identical issues, e.g., in the supply and demand for teachers, and they responded in similar ways.

In the U.K. the publication of Teaching Quality (DES, 1983) and Better Schools (DES, 1985), had pointed to the Government's intention to try and improve the quality of the teacher force and to provide "better schools". In Australia while there is less direct pressure from the Commonwealth Government on pre-service education, the pressure is there from the main employing authorities i.e., the various State Ministries of Education and Education Departments.

In both Australia and the U.K. the qualitative issues of teacher education are now more important than the questions of present and future teacher numbers.
At the in-service level in the U.K., as in Australia, there is a focus on national priorities rather than those established at the local level. This can clearly be seen in the U.K. in the TRIST and General Certificate of Secondary Education (GCSE) proposals. The MSC (1985) TVEi Review details how this central government influence (through making money available for 'bids') works in practice. For example, there were 14 LEAs participating in the TVEI programme in 1983, 48 in 1984 and a further twelve in 1985. Quite clearly in a situation where finances are tight, but LEAs wish to support change or innovate, then they will be more likely to accept the central Government's plans as it provides them with the only "non-tagged" money they may have.

At present in Australia financial support from the Commonwealth Government for in-service training is only given to the known designated national priorities. In the U.K. at this stage, this is less clear as approximately only one third is being ear-marked for those national priorities. However, if the U.K. Government decides to push harder to get its own priorities implemented then it will have more impact on the overall in-service education areas as the LEAs are almost totally dependent upon the financial support from the Central Government. In Australia, on the other hand, as Table 2.1, and the Table 2.3 in Chapter Two show there are still some considerable financial contributions from the States and Territories.
POSSIBLE BENEFITS FROM THE PROPOSED CHANGES

In the changes proposed in Circular 6/86, are there any positive outcomes that can be seen? There would appear to be three. The first relates to the fact that all LEAs will have to have some minimum involvement with in-service activity. At present, under the "pooling" arrangements, it is possible for some LEAs to be slower to act than some others. For example, some LEAs were spending up to five times as much as others on in-service activities.

The second positive benefit involves the LEAs for the first time, developing in-service programmes for Colleges of Further Education. The third may be a two-edged sword but it is the requirement that each school have a plan for identifying the training needs of each teacher in the college or school.

IMPLICATIONS FOR HIGHER EDUCATION IN THE U.K.

With the removal of the "pooling" arrangements in the U.K. the provision of funds for "supply" and replacement teachers has decreased significantly. Inevitably, therefore, the number of teachers enrolling in full-time tertiary award courses will drop also. In the longer term, those teachers who seek higher degrees either will have to complete it on a part-time basis or take leave without pay and tertiary institutions will need to consider developing modular courses and so on. This situation is similar to that in Australia where the number of full-time higher degree students has fallen over recent years. The teacher replacement funds available in Australia are shown in Table 2.1.
Another possible outcome is the development of non-award in-service courses by the LEAs, who will control the DES funding. In this scenario it is likely that the LEAs will continue their co-operative arrangements with the tertiary institutions. Unfortunately, in Australia there is a general estrangement between schools and the tertiary institutions and these co-operative levels are not as well developed or as strong as they are in the U.K.

**THE LIKELY CONSEQUENCES OF THE CHANGES**

The consequences of the proposed changes are in three areas. The first is at the system level, the second is at the LEA level, and the third at the local teacher level.

At the system level the most obvious consequence is that the degree of central control over in-service activities will increase. As a result of this the in-service priorities will move from the local scene to the national scene. Under this new centralisation it is likely that the teachers will be expected to implement the national in-service priorities with no or minimum input into their development. Also it is likely that institutional effectiveness research will be placed into in-service courses. In this way student teachers, supervising teachers, and staff in tertiary education would, at a minimum, have a common language. More importantly, however, it would assist senior staff to develop institutional leadership and then allow them to select and certify school principals.
At the LEA level it is possible even at this early stage to see the probable course of events. Leicestershire for example, has responded to Circular 6/86 by reporting that it already provided extra funds for teachers to work in areas that coincided with national priorities, i.e., multi-cultural education, 16-19 education, and that Leicestershire schools were involved in school-focussed INSET.

In its submission to the DES Leicestershire LEA (Leicestershire, 1986) says in para 1.1.0:

The LEA sees the (new funding) arrangements as a timely opportunity for curriculum review, institutional self-evaluation, and INSET to be brought into coherent plans, and as assistance to curriculum development at the level of individual teacher and the institution as a whole.

The LEA stated that it intended to develop an INSET profile for each institution or group of institutions and also for each individual teacher or lecturer. The INSET profiles will not only show how many and which in-service courses the teacher or lecturer has attended but also will show ".... progress in institutional and staff development" (emphasis added). While this particular LEA has stated that the in-service profile will not be used in an evaluative way, the suggestion of some profile of in-service work does lead to the possibility of a "fading certificate". That is, the teachers need to maintain some designated professional development to stay certificated or registered to teach. (This suggestion was offered by one of the teachers in the innovative in-service programme as a way
of ensuring continued professional development).

Leicestershire LEA has declared that its INSET provisions will have equal emphasis on institutional and professional (teacher) development. In the LEAs' list of Aims for Professional Development, the first states:

Teachers/Lecturers developing the ability to observe and reflect on their own work and that of their colleagues and through those processes to improve their understanding of the principles which guide their practical work with students in the classrooms (para 1.12.3).

At the third level, that of the individual teacher or lecturer, the situation bears a remarkable similarity to that in Australia. The contextual factors - that of increased calls for "better schools" and improvement in quality of teachers, a decrease in the financial resources to support the implementation of change and societal changes at an ever increasing rate - are the same in both Australia and the U.K. The responses have been the same also, i.e., the teacher is expected to shoulder an increasing share of the responsibility for implementing new changes, reviewing current practices and curriculum and evaluating all aspects of the profession.

In this present situation, an in-service alternative to the "traditional" action-research approach, which has been shown to be inefficient in the use of resources, is the approach outlined in this thesis. As shown above it can help teachers to change, review
and evaluate all aspects of their professional skills and knowledge.

As Jones, O'Sullivan and Reid (1987, 200) note:
Most of us would willingly trade some mythical "freedom"
in the tension between LEAs, Government and Providers over
INSET for some real power over course specifications,
delivery and evaluation.

Certainly if the U.K. Central Government is to move its
national priorities more into centre stage, then the expertise
required to achieve this is not to be found solely in the schools.
A course of action such as this will mean that the expertise will
need to be brought in, as it has been in the past, and through a
collaborative approach it will enable teachers to achieve the goals
they have set for themselves and for the school.

For many people the implications of the in-service profile on
each teacher which documents "progress" in in-service education will
be a grave concern. The teachers will need to be provided with the
best assistance/advice/information there is available to help them
develop the skills, knowledge and understandings which are required
in light of the Government's declared priority areas. To have some
pro-forma which is used summatively will be a mistake.

SUMMARY

This Chapter has considered briefly the in-service
arrangements which will be force from April 1st, 1987, as
outlined in DES Circular 6/86. At the national level there are
many similarities between the U.K. and the Australian Government's responses to issues and their chosen courses of action. In both countries there is now a more centralised approach to in-service education with each national Government identifying its priorities for implementation. Through a combination of resource-led actions and legislated proposals, Local Education Authorities and individual teachers in the U.K., and States and Territories and individual teachers in Australia are increasingly seen as the implementers of the central Government's proposals.

In the context of a decrease in available funds and with teachers being held more accountable for "quality", teachers should be given assistance as they implement, review and evaluate the changes asked of them. A recent study in Victorian secondary schools surveyed 1600 teachers to ascertain their job satisfaction. The lowest satisfaction rating out of the 19 items went to "the opportunities available for useful in-service education". Fewer than 50 per cent of the teachers surveyed were satisfied at all with this aspect of their job (Ainley, Reed and Miller, 1987).

This thesis has argued that an effective and more efficient way of using in-service resources is to work with the teacher in a more direct way than in a typical action-research approach. Given the pace of change in education and the wider society, if a more efficient way can be found of providing the skills for teachers which result in critical judgement and then action, rather than a narrow training in a predetermined course of action, then it should be done. Certainly, it is not the
time to opt for a narrow mechanistic approach as the teachers will be faced with situations that the trainers have not yet envisaged.

In the next chapter, the approach used to work with the teachers described in this thesis will be compared with the action-research approach, and the "typical" in-service course.
CHAPTER 12

THE EVALUATION OF IN-SERVICE COURSES

INTRODUCTION

There has been little evaluation of in-service courses in Australia (Batten, 1976), what has been done has been ad hoc and it has provided little disciplined documentation and next to none interpretation. Eraut (1987) has outlined some of the reasons for this and they include: the problem of trying to assess outcomes in the "problem-solving" situation or the "teacher growth approach", where in both approaches there is the difficulty of establishing causal links with the in-service activities. In paradigmatic terms, Eraut (1987) suggests that the "behavioural approach" is the more amenable to measurement as it relates to previously defined competencies. This was the approach taken to the implementation of the new teaching strategy in this thesis. The wider issues of student response, etc., although part of the other paradigms (following Eraut, 1987), there is data on these issues from the innovative in-service programme.

Eraut (1987) is concerned to outline the difficulties of evaluation whereas other researchers (see for example, Henderson, 1978; Donaghue, Ball, Glaister and Hand, 1981), argue that there needs to be an evaluation dimension to all in-service activities.

It is believed that regardless of the technical merits of Eraut's (1987) argument, it is essential for at least two reasons to strive to evaluate or in a disciplined way, review all in-service
activity. The first reason relates to the accountability argument. At one level there is the 'accounting' for the expenditure of resources on this activity, and on another complex level there is the general policy decision and the political rationale which accompanied it. Both of these two positions would lend support to the argument for evaluation.

The other main reason for wishing to evaluate an in-service course is that the programme may need to be modified or expanded so that it is more likely to achieve its desired aims or to meet more closely the needs of the participants.

THE CONCERNS OF IN-SERVICE EDUCATION

The approach to adopt, therefore, is not to ignore in-service evaluation but to recognise the contextual factors and the problems inherent in using a statistical procedure, and to separate the in-service course evaluation from the effect it may have upon pupils' learning. At the least, therefore, an evaluation should be conducted and it should include the following seven concerns which have been synthesised from the literature (Bolam, 1980; Elliott, 1976-77; Elliott, 1980; Eraut 1987; Joyce and Showers, 1980):

i. Did the in-service programme achieve its goals?

ii. Were the professional skills and competencies of the teachers expanded?

iii. Did the in-service programme enhance the teacher's self-confidence or self-esteem?

iv. Are the outcomes from the in-service programme still in evidence?
v. Was the in-service programme cost-effective?
vi. Did the in-service programme assist teachers to become effective and critical? and
vi. Did the teachers enjoy the in-service programme?

In the following section these items will be considered in turn.

Did the in-service programme achieve its goals?

The innovative in-service programme was set up to expand the pedagogic skills of the teachers and to allow them to review their classroom processes and practices. In the lesson transcripts and in the teacher interviews and self reports there is data to suggest this aim has been met.

Were the professional skills and competencies of the teachers expanded?

The data available shows that the teachers in the innovative in-service programme have not only expanded their repertoire of teaching skills by implementing the teaching strategy, but also they have enhanced their classroom awareness. Elliott (1980) has written of "professional knowledge" in the following way:

"..... the idea of a professional practice can be analysed into two components. First, it involves a commitment to ethical values, hence the term 'profession'. Second, it involves the possession of expert knowledge. The crucial
question is how the relationship between these two components of professional practice is conceived (p.236).

Elliot's broader view of professional knowledge moves beyond the "technical" aspects of classroom skills and competencies to self-awareness and understanding. The teachers in the innovative in-service course are shown by the data to meet this broader definition.

Did the In-Service Course Enhance the Teachers' Self-Confidence or Self-Esteem?

The teachers in the study reported personal and professional growth. The teachers had recognised that the change in teaching strategy had resulted in a period in their classroom activities when they were "chancing their arm" and putting at risk their reputation within the school for being 'good teachers' and able to control their classes. In this sense Elliott's (1976-77, p.18) contention that the ability to tolerate losses in self-esteem is essential for professional growth was clearly demonstrated here.

Of more importance however, is that the teachers now saw that through their own actions they had been successful in implementing a new teaching strategy. As one teacher said, "I can now work out my own problems and I have skills to enable me to succeed."

The comments from some of the teachers in the in-service activity indicated that while they had enjoyed mastery of the new teaching strategy, they found other skills they had acquired or enhanced as personally and professionally important.

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Are the Outcomes From the In-Service Programme Still in Evidence?

The literature and the practice of in-service work or implementation work of many kinds indicates that much of what is presented to teachers and even what they engage in, is not internalised or has a very short operating life. In the U.K. the research of Leith and Jasmine provide evidence of this (see Simon and Willcocks, 1981).

The teachers in this in-service programme were able to demonstrate mastery of the teaching strategy at one time and also at a later date. They reported also that they continued to use the teaching strategy as part of their teaching repertoire.

This in-service activity is likely to have been more successful that some others because it possessed both 'horizontal' and 'vertical' transfer (Joyce and Showers, 1983). That is, the teachers had internalised the new teaching strategy and used it in a variety of teaching situations, and they had used it as the basis to recast other aspects of their classroom practice.

Was the In-service Programme Cost Effective?

The resources - financial, material and personnel- which were available for this in-service programme were very limited, and it had to be run out of a normal tertiary education teaching budget. As such it was very much less expensive than some other much larger research projects. In terms of outcomes it also has achieved more than did many other similar in-service activities.
Did the In-Service Programme Assist Teachers to Become Reflective and Critical?

The teachers in this in-service programme generally reported a heightened awareness of what they were doing in the classroom. The comments from the teachers also indicated a growth in understanding not only of their actions in the classroom but also in their understanding of children.

The teachers were, in Elliott's (1976-77) term, "self-monitoring teachers" and from their comments they were operating at a higher level than their colleagues who had "plateaued" in performance.

Did the Teachers Enjoy the In-Service Programme?

The large majority of participating teachers showed a very high level of commitment to the in-service programme. There were no teachers who withdrew from the in-service programme and compared to the typical in-service programme in Western Australia (Reynolds and Clark, 1984), the teachers were very positive towards this innovative programme.

Table 12.1 summarises the seven areas under consideration here and compares them with a 'typical' in-service course and an 'action-research' approach. The information for the typical in-service activity and the action-research approach has been synthesised from Batten (1977); Elliott, (1976-77); Deakin University (1982); and McTaggart et al. (1986).
TABLE 12.1 A summary comparison of the innovative in-service programme, the 'typical' in-service course, and the action-research approach.

<table>
<thead>
<tr>
<th>Areas of importance following from in-service activities</th>
<th>Innovative</th>
<th>Typical</th>
<th>Action-Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Did the in-service course achieve its goals?</td>
<td>✓</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>ii. Were the professional skills and competencies of the teachers expanded?</td>
<td>✓</td>
<td>+</td>
<td>✓</td>
</tr>
<tr>
<td>iii. Did the in-service course enhance the teacher's self-confidence or self-esteem?</td>
<td>✓</td>
<td>0</td>
<td>✓</td>
</tr>
<tr>
<td>iv. Are the outcomes from the in-service course still in evidence?</td>
<td>✓</td>
<td>+</td>
<td>?</td>
</tr>
<tr>
<td>v. Was the in-service course cost-effective?</td>
<td>✓</td>
<td>x</td>
<td>0</td>
</tr>
<tr>
<td>vi. Did the in-service course assist teachers to become reflective and critical?</td>
<td>✓</td>
<td>0</td>
<td>✓</td>
</tr>
<tr>
<td>vii Did the teachers enjoy the in-service course?</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
</tr>
</tbody>
</table>

Key: ✓ - achieved.  
+ - partially achieved.  
x - not achieved.  
? - not sure if achieved or still in operation.  
0 - did not consider.

In a comparison such as this the available data suggests that the 'top-down' approach of the typical in-service course is the least effective way of attempting to attain its goals.

The action-research approach is considered to have met the important criteria of enhancing the professional skills and competencies of the teacher, and of promoting their reflection on
their classroom processes and practices. However, on the criteria of cost-effectiveness and continued usage, the data does not allow a clear favourable answer.

The innovative approach described in full above seems to meet more of the criteria than either of the other two approaches.

SUMMARY

The evaluation of in-service activities for teachers is a particularly difficult task given the variety of contexts, participants, and the problems of establishing a direct link with student outcomes (Eraut, 1987). However, these difficulties should not limit attempts at establishing the worth of in-service programmes in some way. In this current financial environment and when the calls for professional accountability are loud, in-service activities are going to be evaluated and it is the educators responsibility to provide the lead in this area.

This chapter has proposed seven areas of concern that should be considered when reviewing in-service programmes. These include: whether or not the in-service course achieved its goals?; was the in-service course cost-effective?; did the in-service course enhance the teacher's self-confidence or self-esteem?; and are the outcomes from the in-service course still in evidence? When the innovative in-service programme was compared with the 'typical' in-service course, and an action-research approach it was found to have more positive attributes than the other two. The "typical" in-service course was judged to be the least effective form of in-service activity.

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CHAPTER 13

SUMMARY AND ISSUES

INTRODUCTION

The purpose of this concluding chapter is to provide an overview of the findings as reported in the previous chapters and a listing of the major issues to emerge from the study.

The main research question in this study has been to develop, implement and evaluate an innovative in-service programme. The programme involved working with teachers to help them acquire new teaching strategies and then implement them in their classrooms. In addition to the implementation of the new teaching strategy the study also was concerned to explore the impact of the new teaching strategy upon the students and the teachers' own professional knowledge and skills.

SUMMARY

In Chapter 1 the central role of the teacher in change in schools, i.e., as mediator between curriculum innovation and classroom implementation was identified. The centrality of the teacher comes from a number of sources. For example, the changes in the society's social systems and values which result in schools being required to adopt more complex roles; the changes in teacher's career patterns mean that teachers are staying in the teaching force longer, and as the demographics of the school population change the teaching force is steadily growing older and in need of the re-
vitalisation that in-service can bring; as well there are the changes that result from governments' determination of national priorities which are to be implemented. In Australia, as in the U.K., there were changes in the value of the 'exiting' examinations which students undertook, there were new curricula to cater for the wider ability level of students staying on at school. Open-plan primary schools were built and there were efforts to integrate handicapped children into the normal classroom.

In Chapter 2 a broad overview of the organisation and funding of in-service education in Australia was given. There is some uncertainty regarding the proposals for in-service in the future but at present a teacher may complete either an 'award' or a 'non-award' in-service programme. While the award course route is the most common now government at both the State and Commonwealth level have emphasised the role of the non-award course.

At this time there are significant changes in the funding of in-service programmes. For the past decade in-service programmes have been funded mainly by the Commonwealth Government, and coordinated through a variety of National and State level agencies. In the last two years, this funding arrangement has changed dramatically with the Commonwealth now supporting only in-service programmes which are part of its declared National priorities. The result has been a decrease in the amount of financial support for in-service education and a centralisation of in-service priorities.

Whereas Chapter 2 is concerned with two in-service issues at the National level, Chapter 3 is broader in scope. The chapter is in
two parts. The first outlined in brief detail the in-service picture at the State and Local level. A number of in-service programmes are summarised to indicate the spectrum of activities that they cover. These range from several teachers meeting in their own time after school to discuss a matter to a State-wide programme, which involves several days out of school, and the expenditure of many thousands of dollars on the provision of "supply" teachers. Looking across the various in-service programmes and activities in Australia their most common approach is that of the action-research approach. Also reported in this section are data on the number of teachers who have participated in in-service programmes and their perceptions of the programmes' impact upon either classroom practice or school policy.

In the second part of this chapter the training on 'coaching' model approach to in-service education is presented together with some of the research from the curriculum implementation literature.

In Chapter 4 methodological issues relating to the action-research approach to in-service education and the 'coaching' model are given. In the case of the action-research approach it is shown that substantial concerns attend to issues such as the time needed for the in-service programme, and its cost effectiveness in terms of the number of teachers who move beyond attendance at some of the meetings to actually implementing or achieving something in their classrooms.

The 'coaching' model on the other hand, was seen to focus exclusively on the 'product' or outcome and not give any attention to the 'process' or the wider professional issues. In short, the
coaching model has tended to consist of the mechanical application of technical skills which has not expanded the teacher's broader professional competence.

The findings from the curriculum implementation literature indicated that change is a process and that one-shot technological studies are not the way to successfully implement change. Rather, what is essential is the contextual support to help teachers change and the teachers possessing the skills or knowledge that they wish to implement.

Chapter 5 describes the design of the study. In practice there were four identifiable but inter-related phases. The first phase involved the teachers in a brief interview and the completion of several questionnaires. These data gathering approaches were used to provide biographical information and information on the teacher's current teaching activities, and classroom organisation. A larger sample of teachers also completed the questionnaires to provide comparative data with the ORACLE II Group Work Project.

The second phase, though this continued for the life of the in-service programme, involved a weekly meeting of ten teachers in which they acquired a new teaching strategy which they had chosen. The facilitator used a training model in this task. Also in this phase, the teachers learned how to operationalise the elements of the action-research cycle, i.e., plan, act, observe and reflect.

The third phase of the study involved the teachers in implementing the new teaching strategy in their classroom. In this
phase the teachers were requested to implement the teaching strategy as it was ideally described and to use the elements of the action-research cycle to achieve this. That is, the teachers were asked to adopt a 'fidelity' approach to implementation rather than an 'adaptation' approach. One or more of these lessons was audio-tape recorded for the facilitator who also visited the teachers during this phase. The teachers were interviewed at this stage.

The fourth phase of the study occurred after an interval of several weeks and in it the teachers were asked to again implement the recently acquired teaching strategy. This lesson was also audio-tape recorded. The teachers were interviewed again at this time.

Throughout the study the facilitator attempted to develop the support systems and cohesiveness that are necessary when change is attempted.

In Chapter 6 the results from phase one of the empirical part of the study are given. The chapter is in three parts; the first, used a series of vignettes to ascertain the teacher's perceptions of their current teaching strategies. The second presented the data from the questionnaire relating to the Aims of Education and the teacher's classroom organisation and the activities that they use in the classroom. The third reported the data from the questionnaire on the 'in-school' and 'out-of-school' factors, which teachers see as influencing their choice of teaching strategy and content organisation.

The vignettes stimulated discussion by the teachers and
introduced the conceptual basis for considering strategies of teaching. From the teacher's self-reports (and some limited non-systematic observation), the strategies they reported using most frequently were teacher-directed and highly teacher structured.

The teacher reported that three aims of primary education were of equal importance. These were the personal/emotional development of the child, the social development of the child and the development of the child's intellectual autonomy. In their responses the Western Australian teachers were similar to both the large scale British survey of Ashton et al. (1975) and the smaller British study of the ORACLE II Group Work Project (Appleyard, 1982). The responses relating to classroom organisation and activities indicated that as the child moves through the Grades of primary school he or she is given fewer opportunities to choose the work they engage in or the order in which they attempt it. This means that by the end of primary school most decisions regarding the curriculum are made by the teacher.

In the last section of this chapter the data from the questionnaire relating to perceived influences upon the teacher's choice of teaching strategy or content organisation from 'in-school' and 'out-of-school' factors are given.

The teachers reported that the pupils' characteristicsabilities, social and personal needs - and the teacher's own preferences were the main 'in-school' influence upon choice of teaching strategy. Similarly, they reported that 'in-school' influences having most impact upon content organisation were pupil characteristics and their own preferences. The space available in
the classroom and the furniture also were seen as important factors in their choice of content.

In the section relating to 'out-of-school' influences upon choice of teaching strategy, it was the teacher's initial teacher preparation course which had the most impact, and this was followed by the Syllabus Guidelines, which are distributed by the Education Department. The content choice was most influenced by the Syllabus Guidelines and the teacher's initial teacher preparation course.

The teachers' responses indicated that several branches of the Education Department, e.g., Research Branch, have little or no influence upon the teacher's content organisation or teaching strategy.

It is important to note that while the teachers indicated that it was the pupil characteristics which had most influence upon their teaching strategy, other self-report data does not support this view. In an earlier section of the chapter, it was seen that the teachers' reported mainly using teacher directed and highly structured teaching strategies.

In Chapter 7, lesson transcripts to demonstrate the implementation of the new teaching strategies were presented. This is the major section of the thesis and it shows that the teachers acquired and implemented their chosen teaching strategy. The data show (i) that the implementation study was characterised by concrete experience and active experimentation, (ii) that reflective observation was promoted through demonstration, 'coaching' and
discussion and, (iii) that the teachers were able to cope with both affective issues and the acquisition of complex technical skills, i.e., the in-service programme was emotionally demanding and the teachers had to learn a new teaching strategy.

In the next three chapters (Chapters 8, 9 and 10), wider issues related to the implementation of the new teaching strategy are presented. In Chapter 8, the focus is the teacher's feeling of self-efficacy and self-confidence. From the teacher self-reports it was possible to see how the implementation of the new teaching strategy at first had made them and their students feel 'de-stabilised' regarding the classroom relationships and behaviour. However, once the teachers had implemented the new strategy and become more comfortable with its' characteristics and the students had responded positively the teachers experienced a greatly heightened degree of self-confidence and feelings about their professional competence. Some of the teachers saw themselves in a new light. For instance, they reported that they had stimulated intellectual curiosity, and that they could help children enjoy learning. The teachers also reported greater awareness of the classroom dynamics following the implementation of the new teaching strategy.

Chapter 9 presents the teacher's view of his or her school principal and the wider education system as supporters of change. The teachers posited a range of support for their principals, from no active support through to requests for them to give a description of the new teaching strategy to their colleagues. None of the teachers reported that their principal was against the implementation of the innovation. In the schools where there was
some "official", i.e., senior administrator, support evident then the teachers, in general, found it easier to implement successfully the new teaching strategy.

All of the teachers were in agreement that the wider Education 'system' was too keen on change at the present time. (The Western Australian Education Department had just been restructured, the Minister had released a document which signalled a new primary school curriculum with eight "core" areas and so on). The teachers were also in agreement that the Ministry of Education did not provide enough information about the proposed changes, that there was not enough time to implement the proposal and that there was not enough in-service programmes to assist them in the change process.

In Chapter 10 the teachers' perceptions of the classroom dynamics and their students following the implementation of the new teaching strategy are presented. All of the teachers reported some changed belief or deeper understanding about their classroom processes or relationships. For the majority of teachers, this was more than a case of "fine-tuning" previous knowledge or skills. Rather, it was a fundamental shift in their thinking about the students' understanding of content or the way in which the teacher and the students inter-acted. Some of the teachers reported that they now saw how, through gathering data on student's responses, to break down the 'sense of isolation' they had experienced previously.

Chapter 11 presents a comparison of some recent in-service trends in Australia and the U.K. In the U.K. the adoption of the proposals listed in DES Circular 6/86 has resulted in a greater
centralisation of in-service activities and more central control of finance than existed before. The policies and co-ordinating mechanisms which are now in place in the U.K. have a striking similarity to those in Australia. In both countries the central governments argue for a more systematic planning of in-service activities and couch it within a framework of National priorities. One important example is the very similar National initiatives in the technical and vocational areas.

The implications of the changes for tertiary education institutions are the same for both countries. For example, there will be fewer teachers attending full-time award courses and tertiary institutions will need to co-ordinate more fully their in-service programmes with local education authorities. In the longer term, it is likely that a whole array of modular courses will be developed co-operatively.

In Chapter 12, the penultimate chapter, it is argued that evaluation must be an integral part of all in-service programmes. Evaluation of in-service programmes is a complex matter to undertake but in the current financial and political context it is essential that there be some evaluation of the various programmes. The reasons for this include questions related to the expenditure of public money, i.e., "was the money well spent?", the nature of the innovation, "was it implemented?", and for the in-service organiser, "what needs to be modified to make the programme more successful next time?".

In the chapter seven dimensions ranging from the in-service programmes cost effectiveness to whether or not it attained its
goals, through to whether or not it developed reflective, critical teachers, were used to compare the innovative in-service programme with a "typical" in-service course, and an action-research approach. On the data available it is argued that the innovative programme was superior to the "typical" in-service course, and at least as effective as the action-research approach.

**ISSUES AND CONCLUSIONS: THE MODEL REVISITED**

The purpose of this section of the chapter is to examine whether or not the innovative approach developed and used in the thesis is a more effective and comprehensive way of working with teachers than either the action-research or the coaching approaches used alone. These two approaches are, perhaps, the most widely used in educational in-service situations; with action-research being the most common form of in-service in Australia and the coaching model being the most extensive in the U.S.A.

The innovative approach used in this study combined the elements of the action-research cycle, which are designed to foster teacher reflection and action, and the skill development procedures of the coaching model. Through the integration of these two seemingly competing approaches in the present study it has proved possible to extend the theory of working with teachers. In the broad philosophical terms in which it is usually presented, the coaching model is primarily concerned with 'improvement' (Joyce, Hersh and McKibbin, 1983) while the action-research approach is concerned with radical 'change' (Elliott, 1985b). In practical terms the combination of the action-research approach and the coaching model
allows the strengths of each to be maintained while avoiding their respective weaknesses.

In this section three issues which relate to considerations of this innovative approach will be discussed. The first concerns the integration and, hence, extension of the action-research and coaching model approaches. The second issue concerns the way in which this innovative school-based in-service programme has shown how there is an alternative to the action-research approach now commonly adopted as a major INSET strategy throughout Australia. The third issue relates to some of the wider policy issues concerning use of the present model beyond the 'research' context.

**Methodological Issues: Extending the Action Research Model.**

Action-research has stressed the processes of inquiry and discovery rather than of instruction as a basis for learning. This emphasis can be seen clearly in the Schools Council's Humanities Project (Stenhouse, 1975) where pupil-centred discussion was the core activity of the classroom and in the Ford Teaching Project (Elliott, 1976-7) where 'enabling independent reasoning' was the central purpose of classroom activity. Stenhouse (1975), for example, pictured each classroom as a laboratory in which the teacher would carry out curriculum research and development so that schools would gradually come to see themselves as research and development institutions; rather than research and development agencies which merely implemented curricula and teaching strategies derived from 'outside' the school.
The action-research approach has stressed also the need to ground the 'theory' in the complexities of the teaching and learning environment (Elliot, 1976-7; Elliott, 1985, p.244). Elliott (1976-7, p.15), for example, has argued that teachers should attempt to develop their own practical theories of teaching rather than seek to apply theories generated from 'outside' the classroom. The evidence, where it exists, however, suggests that most teachers are only partially successful at this theorising largely because of their choice of research topic and because of the perceived existing barriers within the school context, with the result that immediate changes to school practice cannot occur (Deakin University, 1982, p.190; Elliott, 1987). Action-research then appears to have a potent effect upon teacher thinking and upon teacher reflection, but it has little impact on classroom practice. That is, in many teacher action-research situations, there is a contribution to the theory of classrooms but not to classroom practice. The examples in the Action-research Reader (Deakin University, 1982) show that while teachers were able to better understand the actual learning process taking place (i.e., a 'theory' of classrooms) they did not show that they could move beyond their existing teaching practices or develop explanations of how such a shift could be achieved (i.e., a theory of classroom practice).

Teachers involved in action-research projects report that they have interacted more with colleagues and become more familiar with educational research (Elliot, 1976-7). Many also say that they would like to use their new skills and understandings in further research (Grundy and Kemmis, 1981). Such research might, in principle, make a shift from theorising about classrooms to
theorising about classroom practice. However, the literature review in Chapter 3 failed to find any detailed accounts of longitudinal action-research projects where the shift in theorising resulting in classroom changes of this kind could be studied. Most studies reviewed rarely got beyond the first cycle of actual data collection and a tentative hypothesising.

In many instances the action-research approach appears to assume that if the teachers changed their view of themselves then this will automatically lead to changes in practice. The changes are, therefore, an indirect outcome of the action-research programme. It is unstated but implicit that changes in the understanding of the teacher leads to changes in the classroom climate and this in turn leads to a change in practice. Action-research facilitators, however, would appear to have in their minds a clear understanding of what is the 'correct' climate to bring about the desired outcomes. For example, in the Australian action-research quoted in Chapter 3, the statements by Kemmis indicated that he had a definite process and outcome already in mind. The teachers were left, in a rather heavy handed 'guided discovery' way, to work out for themselves what the researcher already thought and wanted them to do.

The other approach discussed in this thesis, the coaching model, has been concerned primarily to change the teacher's classroom practice with the assumption that this will lead to a change in the teacher's understanding. This approach assumes that not only is there a 'technology' of teaching, but as Gage (1978, p.93) asserted "... we should not hesitate to look straight at the
problems of teaching". Gage (1978) has also argued that "... large-scale, radical departures from classroom teaching are still at least decades away" (p.14) and that in the end, "Research on teaching... merely holds out a reasonable prospect of improving on the way teaching is" (p.94) (emphasis added). In his view the objective is to improve the teaching rather than to alter dramatically the nature of the teaching by, for example, changing the classroom climate so as to effect the nature of the teacher-pupil relationship.

Gage (1978) while agreeing that teaching is an art sees it as "a useful, or practical, art rather than one dedicated to the creation of beauty and the evocation of aesthetic pleasure as ends in themselves" (p.15). The technology to which Gage refers involves the application of educational research which has identified those teacher behaviours associated with greater impact on student outcomes. As Gage (1978, p.22) described this process, it involves "... the established relationships between variables in teaching and learning". The adoption of this position would mean that habit or folk wisdom no longer informed classroom decisions but rather they would be research based.

In brief, the coaching model is teacher-centred to the extent that it focusses on the teacher's instructional practice and aims directly to alter the classroom behaviour of the teacher. There is little consideration of wider theoretical issues or in the development of greater teacher understandings about the classroom process.

The INSET model developed in this thesis differs in significant ways from the action-research approach. By incorporating the
'models' of teaching strategies of Joyce and Weil (1986), it provided teachers with a common vocabulary and thus the means to move beyond the typical 'formal-informal' categorisations of teacher classroom behaviour which characterises so much of the discussion of action-research. It also helped reduce the level of teacher frustration or indifference that follows from ambiguity about what is expected of them. This can be compared with the description, in Chapter 3, of the teachers involved with the action-research approach. Second, through the extension of the models of teaching onto the action-research paradigm it became possible to give teachers a language of pedagogy. Unlike the account in Chapter 3, where the teachers were not able to express their various concerns or experiences in pedagogical terms, the present innovative approach allowed teachers not only to satisfy their concern for the instructional process but also to move to a wider consideration of the related student and classroom climate issues.

To illustrate this shift in the teachers' perspectives, the following extracts are taken from the lesson transcripts in Appendix 8. The extracts shown are from an initial lesson in which the teacher had used the new teaching strategy and from a subsequent lesson in which the new teaching strategy had been used again. The extracts show (i) the teacher's shift in their control of the task from low risk to high risk activities (and in so doing they support the implicit theory of action-research), and that (ii) the teacher's change in the instructional process is conscious and deliberate, thus involving what has earlier been defined as theorising about classroom practice.
EXAMPLE 1

The teacher BG has a Grade 1 class (5-6 years of age) of 27 children. She is using a Concept Attainment strategy.

Lesson 1:

At the start of the lesson the teacher is in full control of the lesson and she is the main actor in the classroom.

T. Right, what can you see on the blackboards, Adam?

St. A box.

T. What do you think that sort of box is?

St. A toy box.

T. A toy box. Do you think it's a toy box, Michael?

St. No. It's a treasure box.

T. It's a treasure box. Right. Now I've got some words here, and I'm going to put these words on the blackboard...

In the middle of the lesson, the teacher is still in full control of the activities.

T. Right, you've got the word 'date'. Where's it going to go? Yes. Here's a picture of a rake, cake, late, make, date, Kate are things we don't want. Hat, sat, mat. Can anyone tell me what we've done? Luke.

St. The sand box has got a ... hat, sat and mat in it and they've got an 'a' in them and the...

T. No that's not the answer, Kevin? You've forgotten. Paul?
Towards the end the lesson is still teacher-centred.

St. Cake.

T. Now you know the answer, come and get a 'yes' word for me please Adam. One of these three words that are left go in the treasure box because it's a 'yes' word. What word do you think it's going to be? What does that word say?

St. Gate.

T. Right. Why does it say 'gate' instead of 'gat'?

Lesson 4:

The same teacher has now taught three lessons using the concept attainment strategy. She has listened to the audio-tapes of the previous lessons and thought about how she will change her teaching in this lesson. She is beginning to shift her role in the classroom and is no longer always the main actor.

T. So, hands up...

St. If you didn't have a car you could walk, but it would take a longer time, and you'd get into trouble by your boss.

T. Oh, I see, alright. What about toothpaste. Now let Shane have a little talk, because Shane hasn't had a go yet.

Later in the lesson the teacher begins to involve the children in some of the 'control' decisions.

St. You get things mashed up then.

T. And do you think it's good for you just to eat mashed up things all the time?

St. No.
T. Right, let's have a vote. People who thing teeth should go in the 'no' column, we don't really need teeth.

At the end of the lesson the teacher is open to students' comments on the lesson and its outcomes.

T. Right, we learnt the things that we want and the things we need, we learnt by thinking and guessing. Wade, do you think that's a good way of learning, by thinking and guessing?

St. Yes.

St. No.

T. Who said 'no'? Lee, why don't you think it's a good way? Why don't you think it's a good way of playing a game like this and learning things?

St. It's too boring.

T. It's boring. You didn't like this game, Lee. Right, why didn't you like it, why do you think it was boring?

In the whole lesson sequence therefore, it can be seen that the teacher has modified significantly her classroom behaviour.

EXAMPLE 2

In a similar manner the second example shows the teacher modifying her classroom teaching strategies. The teacher KA has a Grade 7 class (11-12 years of age) of 32 students. She is using an Inquiry Training Strategy.

Lesson 1:

The teacher has just conducted an experiment for the students. She is in control of the lesson.
St. Did the sand have rocks or sticks in it?
T. No.

St. What colour sand was it?
T. It's not a "yes" or "no" question and you know very well... If you think you know why it did that you can propose your theory to me. Jason?

Later in the lesson the teacher is still the main actor in the classroom and in control.

St. When you had the can in the water, when you ... and held it up you still had about that much of the top out of the water.
T. First time. The second time it was right down. Are you asking me a question or are you telling me something?
St. I'm saying something.
T. Nicole?

At the end of the lesson the teacher still has control of the lesson.

T. Well, you saw what it read beforehand, didn't you? So yes, it does make a difference when you put it in. We saw that. Peter?

St. When you put the can in the water, the pressure pushes it up and makes the level...
T. What is this pressure that pushing it up? You keep telling me it's pressure, but what pressure?

Lesson 3:

The teacher has taught two inquiry lessons and audiotaped each of them. She has listened to the audiotapes to get ideas on how to modify the following lesson.
Early in the lesson she has established a moderate degree of control.

St. Is the rope with the weight in the middle?
T. In the centre, yes. Peter?
St. Has anybody ever done anything with it?
T. Done what?
St. Like making... straight.
T. No, they haven't. Michael?

Later in the lesson she has begun to share the control with the students.

T. Alright, how are we going to test your theory? What would we need if we wanted to test it?
St. (Inaudible).
T. Oh, I see. You don't want to hold the end of the rope...
St. No, because that's putting on more weight.
T. Fair enough. So you want to hold it very close to the weight. Alright, you get someone to test it.
St. Joanne, get closer...

Get..., she's stronger.

Miss would the same thing happen if you had somebody way up there, and somebody down there?

At the end of the lesson the teacher not only shares control but involves the students in the analysis of how it went.

T. If you were in water? I don't know. So Stuart and Leo, you reckon that the most important thing of this whole experiment is what?

St. Gravity.
T. Well done. How do you feel about this exercise?

St. I liked it because we did the experiment with different students on the ends of the rope...

St. And with a shorter distance between the weight and the rope ends... and heavier weights.

T. Yes, but what was the most useful thing we did?

St. We were able to talk and then try the experiment to look at our ideas or theories.

The two examples above are taken from the transcripts in Appendix 8. The lesson extracts show that there is a significant difference between the initial use of the teaching strategy and the later implementation. This change in the use of the teaching strategy is deliberate and is the result of teacher reflection upon the cycles of implementation. In discussion with the teachers about this reflection upon their classroom action, a typical teacher statement was:

The reactions of my children at Brookvale School were interesting when considered in light of the new learning environment I was trying to create.

These children live in a 'single-parent' area and quite often the classroom is their only secure environment. Even though the children are used to me, they found the change in strategies difficult to deal with.

The reactions were quite often 'this is stupid'. This may of course be a reaction to the actual presentation, but I think the most loud responses were coming from children who felt threatened; for instance, the phase four in
synectics where a new analogy needs to be developed, and in concept attainment where the process requires them to develop their own theories.

In this extract when the teacher spoke of the children feeling 'threatened' by the need for them to be actively engaged in the lesson she demonstrated an understanding of the student's learning processes and the classroom climate.

The teachers, in short, have not only demonstrated a mastery of the new teaching strategy but also they have demonstrated through their reflection upon the classroom processes their willingness to increase the level of risk that they take from 'low' to 'high'. They have shown that they understand the processes of learning and they have applied them (Elliott, 1976-7). Thus they can be seen to have moved from a coaching model focus to an action-research approach.

**School-focussed In-service**

Bolam (1982) has argued for school-focussed in-service programmes and has stated that they can resolve the conflict between course-based and school-based approaches. For Bolam there is a tension between the needs of teachers as professionals and as employees. Course-based programmes are aimed largely at improving the professional skills of the individual, through externally provided, off-the-job courses. For example, university run courses in child development or assessment techniques.

On the other hand, school-based in-service, for the most part,
has concerned itself with such areas as curriculum review or
curriculum innovation. Bolam has argued that school-focussed in-
service - through its focus on a school's identified needs - and by
the participation of individuals with expertise from outside the
school can assist in the negotiation of a resolution to these
competing approaches.

In the volume edited by Bolam (1982) entitled School-focussed
In-service Training there is a section headed "Realities of
Practice". In this section Bolam has drawn together 14 case studies
of school-focussed in-service programmes. These case studies show
clearly the nature of the problems currently inherent in school-
focussed in-service work. In broad terms, half of the cases
presented deal with the general policy issues of staff development
or issues related to school management. The remaining 7 cases cover
such diverse areas as helping probationary teachers, the
establishment of procedures for student teachers, how schools use
outside agencies and consultants and how teachers can monitor their
own classroom behaviours. The 14 school-focussed accounts are
striking in that the teachers do not see that issues at the heart of
their concerns are related to pedagogy. Rather, the concerns are
expressed in broader terms such as requests for management
strategies or a sharper clarification of roles, etc. As noted also
by one of the authors, "A third feature was that outsiders were only
rarely invited to take part in the discussions to determine INSET
needs, yet where such involvement did occur it was seen as helpful
and beneficial to those who know about it" (p.203). A second point
to note from the case studies is that the teachers do not appear to
have the language to express their pedagogical needs other than a
very general manner. For example, "(there).... was a marked tendency in all types of schools to nominate INSET requirements in very broad terms - for example, 'Maths'" (p.202).

However, it has been demonstrated that in this innovative programme the teachers are able to use a language of pedagogy to critically reflect upon their classroom behaviours. As they acquired and then implemented a new teaching strategy they also showed that the programme outlined in the thesis is a valuable way of having teachers address both individual and school-focussed needs. In this respect it would appear to offer a more useful strategy for innovation in the classroom.

The Implications for In-service Policy

This thesis has argued that changes in schooling - its governance, curricula, teaching strategies and goals - are inevitable and, therefore, that teachers are in need of continuous assistance if they are to change also.

The preceeding chapters in the thesis have shown that the innovative model, in a small scale 'research' context, was successful in helping teachers to acquire new teaching strategies and to broaden their professional understanding. This model, as described in Chapter 5, differed significantly from existing action-research and course - or school-focussed approaches to in-service. The policy question which remains is how the innovative model can be operationalised on a larger scale?
The size of the teaching force and the conditions imposed by the geography of Western Australia obviously mean that it is inappropriate for educational researchers to play the facilitator role in each school. Recent organisational changes to the Ministry of Education have also meant that Advisers have now become more generally concerned with curriculum and the fostering of school-community links. These considerations lead to the conclusion that only teachers are in the position to take the lead in these activities. More positively, it is most appropriate for teachers to occupy the role of facilitator since it is congruent with their professional responsibility to emphasise the centrality of pedagogical issues.

The education system in Western Australia has been altered radically in the last four or so years and it is likely that the changes have not yet finished. To summarise these changes briefly, first, in 1985 the Education Department was abolished and replaced by the Ministry of Education. Second, in 1986 the State Government released their blue-print for schools in a document entitled Better Schools. This document detailed, inter alia, how the control of school finances and school governance were to be devolved. Third, also in 1986, the Minister of Education announced that the recommendations of the Beazley Committee of Inquiry, which was established to report on changes needed in school curricula and staffing to take them into the twenty first century, would be adopted.

Two recommendations of the Beazley (1984) Report have
particular relevance to the argument that teachers should assume responsibility for co-ordinating the INSET approach suggested. The first is that teachers will be 'reviewed' annually by the Principal who will be concerned with their teaching performance and their general contributions to the school. The second recommendation is that promotional (i.e., senior) positions in schools will no longer be tied to seniority but rather to merit and demonstrated "excellence".

The Ministry of Education in Western Australia is in an unique position, therefore, with minimum cost and disruption, to align the 'reward' structures through the promotional system and to enhance a policy which facilitates the development of 'master' teachers through the application of this INSET model developed in the present study. These 'master' teachers, who in the first instance might be Deputy Principals, would be trained in the research bases of effective teaching and effective schools and also in the skills necessary for working with adult learners. They would be in the schools to assist their colleagues in those aspects of their professional development relating to pedagogical issues.

For the teachers who live in metropolitan Perth the innovative programme could be run as a weekly evening meeting for two school terms and the teachers could implement the required practical activities in their own schools. For the teachers who live in the country regions, the tertiary institutions could provide a 4 week "block" in-service programme during the summer vacation. The country teachers could then use the first school term to undertake the required practical activities.
There are 4 tertiary institutions in Perth. If 20 teachers were involved in the innovative programme in each of the institutions every six months and the institutions also ran a 4 week "block" summer in-service session for country teachers, then each year 240 teachers would have experienced the innovative programme. Also in the first cohort of participants would be the 120 Advisory Teachers, who would be allocated 30 to each tertiary institution. Using this scheme in two years every school in Western Australia would have at least one 'master' teacher and the whole Advisory teacher service also would be experienced in the approach.

In parallel with this initiative the principals and other senior staff would undertake specialised training in the skills necessary to support and facilitate teacher development.

The introduction of any initiative gives rise to some concerns. There are four associated with this proposal. First, given the size of Western Australia it is possible that some of the rural primary schools and District High Schools might not fully understand the purpose and functions of the 'master' teacher scheme. The Ministry of Education would need to address this problem through meetings at Regional and District Offices and include it as part of the discussions in their annual visits to each school. Second, would the role of the 'master' teacher cut across that of the Principal? In light of the Ministerial decisions regarding the expanded role of the Principal (see, for example, Better Schools) and given that schools currently have Deputy Principals, with responsibilities for such areas as academic programmes, students, student teachers and so
on, who do not infringe the principal's position, this can be assumed not to be a major problem. On the other hand, the 'master' teacher would also be a valuable member to assist the Principal as he conducts his Annual Reviews. Third, each school would use part of its School Grant to provide the secretarial support for transcribing audio-recordings, photocopying of notes, etc., for the teachers involved.

Finally, it is possible to estimate the costs involved. One teacher in each school who is in a promotional position costs the Ministry of Education very little as there is already a need for promotional positions and the salary difference between the top of a scale and a promotional position is generally only in the region of $2,500. In a total education budget of $800 million this sum is relatively small. With respect to the costing of the in-service courses at the tertiary institutions it would involve 8 staff at most. That is, each institution would designate a staff member who would run the in-service programmes twice during the academic year. The same staff member could run the intensive summer session or an institutional colleague could. In this way full replacement teaching and ancillary costs would be less than $200,000 per annum.

This sum is less than one tenth of the money provided for professional development in Western Australia (see Chapter 2). On the other hand, it represents a huge saving on the typical in-service programme where it has been necessary to 'replace' the teacher who attended the course during school hours. Clearly, the sum required to finance the innovative programme is not of major concern when seen against the Budget for the Ministry of Education.
on the Professional Development Programmes.

It can be shown, therefore, that the implementation of this innovative scheme on a 'system' wide basis would not be a problem in either the policy or the financial areas. In fact, in light of the recent changes to the whole Western Australian Education System the proposal does not require a major policy initiative; rather, it is a change in philosophy which is needed.
BIBLIOGRAPHY


Appleyard, R. (1982). Results from the Teachers' Questionnaire. ORACLE Group Work in the Primary School Project, School of Education, University of Leicester.


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APPENDIX 1

LESSON VIGNETTES
VIGNETTE NO. 1.

In my teaching I try and keep the two related elements of instruction and classroom management separate. In instruction I typically present the students with some information and then task them an ordered series of questions about it. When they respond to my question I try and give immediate confirmation of whether or not their answer was correct. Because of the logistics of the classroom, I usually do this by using programmed instruction materials, kits or the computer. Sometimes I will spend my time with one student and work in similar fashion; that is, present some information, ask the student a question and then tell the student if they are right or wrong.

In my classroom management approach, I tell the students what behaviour I want in the classroom. The majority of students will conform to this but for those who cause discipline problems I try to improve their behaviour by rewarding those aspects that are desirable. I also continue to reinforce the good behaviour of the other students.

VIGNETTE NO. 2.

In my teaching I try to develop the creativity of my students by having them explore unfamiliar or unusual aspects of familiar things, or in trying to think of new things or ideas. I try to do this by having the students develop analogies and metaphors. This allows them to see a comparison and a relationship between one thing or idea and another thing or idea. For example, I might ask the
class what they think it feels like to be a motorbike, or how a school is like a shoe? This teaching approach will not only foster the students' creativity but also allow them to participate as members of a class group.

**VIGNETTE NO. 3**

I want my students to be involved in the solution of meaningful problems and at the same time have them experience the process of social negotiation which is found in a democratic community. I begin by presenting the class with a situation which contains some puzzling problems or question(s). Then either as a whole class or in smaller groups, the students have to identify the problem and formulate a strategy to solve the problems or answer the question(s). I try to have the students really grapple with the information pertinent to the puzzling situation. Finally, I ask the students to think about how they worked together and how their solution deals with the original problem.

**VIGNETTE NO. 4.**

I have my students identify a problem in say, interpersonal relations or intergroup relations or an individual's dilemma, and then ask them to think about the roles of the people or groups involved. Then I ask either for volunteers or I choose participants to act in the role of the characters that have been identified. The participants then enact their roles. Finally, as a class, we review the role-play and relate it to "real" experience. I use this strategy to explore general principles of behaviour with the students.
VI GNETTE NO. 5.

I want my students to be independent and creative theory builders. In class I present puzzling situations that the students can enquire into. For example, I might show them a metallic strip held over a lit bunsen burner and they see that it bends. I would then have the students ask me questions about what they saw. The data they gather from me is used by the students to develop a theory to explain what they saw. As a class we analyse how we went about formulating our questions and gathering the data. I do not however tell the students that a particular strategy was good or bad.

VI GNETTE NO. 6.

I begin my lessons by presenting some concept, principal, law or generalisation that encompasses or subsumes the material I will teach in that session. I then explicitly relate the new material into a framework so that the students have an overall sense of where it leads and how it is tied together. I try to do this so it has meaning for each student. I think that each curriculum subject has an ordered organisation of content and I try to teach my students this organisation.

VI GNETTE NO. 7.

In my class I present my students with some information or puzzling event and I ask them to list aspects of the situation presented. I have them group or categorise the listed items by identifying common properties and labelling each category. The
students then collect data about the groups or categories that they have identified. I question the students to encourage them to make inferences and generalisations. I always test their generalisations by asking them further questions.

**VIGNETTE NO. 8.**

In my classroom I don't try to impose any particular work task on the students at any specific time. I begin by asking my students what they wish to do for that session and then, depending on their choices, we either work individually or in groups. I see my task as a facilitator, that is, someone who guides the students' growth and development, in an atmosphere of openness and acceptance. In practice this means that everything is student centred and student directed. My responsibility is to assist each student to become self directed and fulfilled.

**VIGNETTE NO. 9.**

If I wish to teach a particular concept I tell the students about it and in doing so I contrast it with other related concepts. Where possible I present the information in the form of pictures or diagrams. For example, if I wanted to teach a particular concept I would show them pictures to illustrate the concept and tell them that this is an example. I would also show them pictures of unrelated or somewhat similar concepts and tell the students that these were not examples of the concepts. I would continue to show the pictures until each student had their own idea about the concept I had in mind. As a class we would discuss the processes we went through and the concept they had identified.
VIGNETTE NO. 10.

I plan very carefully for my classroom activities and I think of what I want the students to do at the end of each session. Knowing where I want them to end up I explain the necessary theory or present the rationale of the performance to them. I then demonstrate the correct performance for the students. The students then practise the performance of the task with me giving them feedback on how they are performing. This is often in simulated conditions. Finally, I have the students practice the task in the "real" situation.
APPENDIX 2

QUESTIONNAIRE

TEACHERS' OPINIONS AND PRACTICES
### BACKGROUND INFORMATION

<table>
<thead>
<tr>
<th>1. Sex.</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please tick)</td>
<td></td>
</tr>
<tr>
<td>a) Male</td>
<td>□</td>
</tr>
<tr>
<td>b) Female</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Age group.</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Under 25</td>
<td>□</td>
</tr>
<tr>
<td>b) 25 - 34</td>
<td>□</td>
</tr>
<tr>
<td>c) 35 - 44</td>
<td>□</td>
</tr>
<tr>
<td>d) 45 - 54</td>
<td>□</td>
</tr>
<tr>
<td>e) 55 and over</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Teaching experience.</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Number of years</td>
<td>□</td>
</tr>
<tr>
<td>b) Number of years at present school</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Educational training.</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please tick as many as necessary)</td>
<td></td>
</tr>
<tr>
<td>a) Diploma of Teaching (2 year)</td>
<td>□</td>
</tr>
<tr>
<td>b) Diploma of Teaching (3 year)</td>
<td>□</td>
</tr>
<tr>
<td>c) Diploma of Education</td>
<td>□</td>
</tr>
<tr>
<td>d) Graduate</td>
<td>□</td>
</tr>
<tr>
<td>e) Higher degree</td>
<td>□</td>
</tr>
<tr>
<td>f) Advanced diploma</td>
<td>□</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5. In-service training.</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please indicate number of courses of each type attended in last three years.</td>
<td></td>
</tr>
<tr>
<td>a) Degree or diploma course</td>
<td>□</td>
</tr>
<tr>
<td>b) Educ. Dept. of W.A. Course (Head Office)</td>
<td>□</td>
</tr>
<tr>
<td>c) Educ. Dept. of W.A course (Regional Office)</td>
<td>□</td>
</tr>
<tr>
<td>d) Other, please specify........</td>
<td>□</td>
</tr>
</tbody>
</table>

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6. Present position.
   a) Headteacher
   b) Deputy Head
   c) Head of Department
   d) Post of responsibility
   e) Class teacher

7. Age range of class. ..........years to ..........years

8. Number in registration group. Boys....... Girls....... 

9. Pupils sometimes stay with the same teacher for more than one year. Does your present class leave you
   a) at the end of one year having spent just this year with you? a) 
   b) at the end of two years, with all the children moving on? b) 
   c) at the end of two years, with approximately half the pupils moving on each year? c) 
   d) other, please specify.........................

10. How many pupils in your class receive extra tuition in English? .......... 

11. Is your class
   a) of mixed ability? a) 
   b) of mixed ability with some children regularly withdrawn for extra help? b) 
   c) at the same level within a banding or streaming system? c) 
   If (c), which level? .......... 
   d) Other, please specify.........................

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1. When a group of pupils is set to work on the same (or similar) tasks by the teacher the pupils may be allocated to the group in various different ways. Please indicate by ticking the appropriate box how often you use the following methods of allocation to a group for the majority of the pupils.

<table>
<thead>
<tr>
<th>Method</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) similar ability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) different abilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) pupils who work well together</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) by pupils' free choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) for control of behaviour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) other, please specify..............</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Activities within the curriculum can be organised in a number of different ways. Please indicate how often you use each of the following arrangements

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) All the pupils work in the same subject area at the same time.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Groups work in different subject areas but change over at the same time during the lesson.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Within limits pupils are free to choose the order of their work.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Individuals work in different subject areas at the same time as directed by the teacher.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Other, please specify...............</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ten years ago, a national survey was carried out to find the aims and objectives which teachers thought education should have. The questions below are based closely on that survey, to see if any changes have occurred since then. To shorten the questionnaire, several ideas proposed by the teachers at that time have been combined into single statements.

The aims and objectives listed below define the knowledge, the skills and the qualities which many teachers think that in general children in the middle range of ability should have at the end of their education. Taking each statement as a whole, please consider these aims and objectives in relation to children in your school deciding what you would hope for them by the time they leave your school.

Please indicate your opinion of the importance of these aims and objectives of primary education for children in your school by using the scale 5, 4, 3, 2, 1, 0 as set out below and putting a circle round the number you choose as representing the importance of each statement.

5 I think this aim is of the utmost importance in education
4 I think this aim of major importance in education
3 I think this aim is important in education
2 I think this aim of minor importance in education
1 I think this aim of no importance in education
0 I think that this should not be an aim of education

Points to remember when rating these statements: to have in mind children in your own school, who are in the middle range of ability and who are about to transfer from your school.

a) The pupil should have acquired basic skills in literacy, oracy and numeracy. 5 4 3 2 1 0
b) The pupil should have acquired knowledge which he knows how to apply outside school. 5 4 3 2 1 0
c) The pupil should be beginning to develop a capacity for independent judgement. 5 4 3 2 1 0
d) The pupil should be happy, cheerful and well-balanced. 5 4 3 2 1 0
e) The pupil should be beginning to acquire moral and social values. 5 4 3 2 1 0
f) The pupil should be aware of religious and spiritual values and beliefs. 5 4 3 2 1 0
g) The pupil should be aware of his cultural heritage. 5 4 3 2 1 0
h) The pupil should enjoy school and gain satisfaction from his own achievements.

We would like to know which classroom practices are used most frequently.
For this purpose, would you please write down the most recent day on which you did your usual amount of classroom teaching..........................

Would you please tick the appropriate column by each of the practices listed below to indicate whether or not you used it in the classroom on the day stated above. If you are not sure that a particular item applies, please tick the column labelled 'NA' (not applicable). All of the practices are quite separate; you may have used any combination of them during the day in question. Each of the listed practices therefore needs one tick.

<table>
<thead>
<tr>
<th>Choice of activities or themes for pupils' work.</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the day stated above, did you, on any occasion:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 set different work for different groups of pupils?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 set different work for individual pupils?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 set the same piece of work for all the pupils in the class?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 specify a general area and allow individual pupils to work on an item which they chose from within it?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 specify a general area and allow groups of pupils to choose from it an item of interest to the group?</td>
<td></td>
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</tr>
</tbody>
</table>

Discussion.
(pupils encouraged to talk to each other directly)
Did there occur:

<table>
<thead>
<tr>
<th>Did there occur:</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 class discussion on a theme which you chose?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 discussion in groups on a theme which you chose?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 class discussion on a theme chosen by pupils?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 discussion in groups on a theme chosen by pupils?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Method for pupils to follow in working. At any time during the day were pupils working to a method:

<table>
<thead>
<tr>
<th>Method for pupils to follow in working.</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 which was closely specified by you, either verbally or by worksheets or books?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 which pupils chose themselves, but within general guidelines?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 which groups of pupils chose together?</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Finished work (not necessarily written: e.g. learning a poem). Were pupils engaged in tasks for which:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
</table>

1. finished work was or will be required from individual pupils?
2. groups of pupils co-operated to produce a jointly finished piece?
3. no finished work was or will be required?

Evaluation of pupils' work (marking; also review and choice for display)

On the day stated above, did you

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
</table>

1. set a test in any subject for the whole class?
2. test individual pupils in any subjects?
3. allow pupils some say in the evaluation of their own work?
4. allow pupils some say in the evaluation of each other's work?
5. evaluate work independently of the pupils?

The day in question might not have been typical with respect to some of the activities listed above. If this is the case, would you please tell us what the most important differences were?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
</table>

1. .................................................................
2. .................................................................
3. .................................................................
4. .................................................................
5. .................................................................

These questions have concentrated on a few particular aspects of classroom practice. There may be aspects of your own practice in the classroom which have been ignored and which you feel are of particular interest or importance. If so, would you please tell us briefly what they are?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
</table>

1. .................................................................
2. .................................................................
3. .................................................................

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A recent survey has suggested that, broadly speaking, different teachers use different combinations of whole-class, small-group or individual teaching. Similarly, different styles of learning are encouraged by teachers. There are teachers who prefer to direct the pupils' work closely, while others follow an open-ended approach in which the pupils are given considerable freedom in planning and carrying out their own activities. Whatever your own practice, we would like to know your opinions of all of these approaches. For each approach listed below, we would like you to tell us four things:

- when you might consider using that approach (the main circumstances, e.g., class size, types of pupil, subject area, general aims of lesson)
- why you might use the method (what is its main advantage)
- when you would certainly not use the method (the main circumstances)
- why you would not use the method then (what is its main disadvantage)

<table>
<thead>
<tr>
<th>Teaching Approach</th>
<th>When use</th>
<th>Why use</th>
<th>When not</th>
<th>Why not</th>
<th>When use</th>
<th>Why use</th>
<th>When not</th>
<th>Why not</th>
<th>When use</th>
<th>Why use</th>
<th>When not</th>
<th>Why not</th>
<th>When use</th>
<th>Why use</th>
<th>When not</th>
<th>Why not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Teaching</td>
<td></td>
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<tr>
<td>Small Group Teaching</td>
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<tr>
<td>Class Teaching</td>
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<tr>
<td>Directed Learning</td>
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</tr>
</tbody>
</table>
Open-Ended Learning

When use .................................................................

Why use .................................................................

When not .................................................................

Why not .................................................................

TIMETABLE FOR LAST WEEK

If it is possible for you to tell us the timetable of activities which your class followed last week, please fill in the details on the form below.

If you are not able to fill in the timetable, could you please tell us why not?

....................................................................................................................

<table>
<thead>
<tr>
<th>TIMES</th>
<th>MONDAY</th>
<th>TUESDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If you filled in the timetable, could you please indicate whether

a) the activities were not directed in advance by a written timetable?  

b) the activities followed a plan that was written down in advance?  

c) If the timetable was written down in advance, was it decided by

   (i) you yourself?  
   (ii) school policy?

<table>
<thead>
<tr>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3

QUESTIONNAIRE

INFLUENCES ON CONTENT ORGANISATION AND TEACHING STRATEGIES
INFLUENCES ON CONTENT ORGANISATION AND TEACHING STRATEGIES.

Please complete the following:

You are requested to indicate the strength of the listed influences on your content organisation and teaching strategies. The strength of the influence should be shown on the appropriate scales by circling the number on the given line which you choose as representing the strength of each influence.

e.g.

<table>
<thead>
<tr>
<th>Influence</th>
<th>No Influence</th>
<th>Moderate Influence</th>
<th>Strong Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

The influences are arranged in two groups, In-School and Out-of-School, and include persons, groups, ideas, institutions and circumstances. You are asked to rate them in the two areas of "current teaching strategies" and "current content organisation".

"CURRENT TEACHING STRATEGIES" means the current practices you use in relation to general and specific teaching situations.

"CURRENT CONTENT ORGANISATION" means your current practice in organising your content presentation, e.g., in separate subjects.

Thank you,

John Williamson.
A. IN-SCHOOL INFLUENCES

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STRENGTH OF INFLUENCE ON YOUR CURRENT TEACHING STRATEGIES.

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STRENGTH OF INFLUENCE ON YOUR CURRENT CONTENT ORGANISATION.

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<td>18. Ancillary help (write N/A if not applicable).</td>
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Of the above In-School Influences, please rank IN ORDER OF IMPORTANCE the five strongest by giving their numbers:

i. ________  
ii. ________  
iii. ________  
iv. ________
### OUT-OF-SCHOOL INFLUENCES

**STRENGTH OF INFLUENCE ON YOUR CURRENT TEACHING STRATEGIES.**

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1. 19. In-Service courses.

2. 20. Parents.


4. 22. Press, Radio, T.V.


7. 25. Theories of learning, cognition.


9. 27. Colleagues in other schools/pre-schools.

10. 28. Professional magazines, books, journals.

**STRENGTH OF INFLUENCE ON YOUR CURRENT CONTENT ORGANISATION.**

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1. 19. In-Service courses.

2. 20. Parents.


4. 22. Press, Radio, T.V.


7. 25. Theories of learning, cognition.


9. 27. Colleagues in other schools/pre-schools.

10. 28. Professional magazines, books, journals.
Of the above Out-of-School influences, please rank IN ORDER OF IMPORTANCE the five strongest by giving their numbers:

i. _____

ii. _____

iii. _____

iv. _____

v. _____

Of the strongest In-School and Out-of-School influences, please rank IN ORDER OF IMPORTANCE, the five strongest influences OVERALL:

i. _____

ii. _____

iii. _____

iv. _____

v. _____
APPENDIX 4

LESSON PLAN AND TRANSCRIPT FOR PREDICTIVE INQUIRY MODEL

SITE OF LEAST IMPLEMENTATION
LESSON PLAN

PREDICTIVE INQUIRY MODEL

General Aim

Teacher: AC

To have the pupils inquire into the elements associated with an electrical circuit.

Behavioural Objectives

At the end of the lesson the pupils will be able to:

(1) state the elements required to make an electrical circuit function;
(2) recognise the difference between an open- and closed-circuit.

Support System

(1) Two pieces of electrical circuit.

(a) (b)

(2) Chart to record responses.

Procedure

(1) Set up the two pieces of apparatus. Firstly, an electrical circuit consisting of a 1.5v battery, 2 wires leading from the positive and negative terminal to a globe. Secondly, the same apparatus, except for the inclusion of a switch.

(2) Explain to the class that we'll be looking at electrical circuits in order to discover what we will need to make one successfully work.

(3) Proceed through the steps of the predictive inquiry model as follows:

(a) Show the situation, and describe it for which an outcome is unknown.
(b) Pose the question? What will happen if the loose wire is connected to the terminal?

(c) Record the pupil's hypotheses on the blackboard. Have the pupils draw an inference for each hypotheses about the theory it implies.

(d) Proceed with the pupil's experiment, so that pupils can observe what happens.

(e) Have the pupils evaluate the various hypotheses in the light of the observed outcome.

(f) Have pupils draw conclusions based on the most supported hypotheses and draw inferences for building theory.

(g) Have the pupils suggest alternative procedures or additional evidence from every-day experiences that could be used to further test the conclusion.
Lesson Transcript: Teacher AC

**
T: Take a look at the two sets of apparatus and describe what you see. As we describe the sets we'll write down the information.

St: Well there's a big battery.
St: A light bulb.
St: It's a 1\ volt battery with a wire leading from it and it's blue and red.
T: No.... we don't require that information.
St: One wire goes to the bulb and there's another bit of wire goes somewhere else.
St: Yes, and there's a light bulb.
St: It's from the...... what do you call the one with plus sign? that's not negative.
T: Positive. OK there's one wire connected to the positive and there's a wire free.
St: From the bulb it comes.
T: Let's have a look at the second set of apparatus and describe it.
St: There's a battery, it has wire at the negative.
St: There's wire from the battery connecting the light bulb.
St: There's another wire which is connected to a black panel. An instrument with black and yellow knobs.
T: What is the name of the panel? What is it?
Class: When you pick it up it makes a tapping noise.

T: Give me a name instead of "a black panel".
Class: (No response).

T: Just leave it for now. OK, so the first piece of apparatus has a wire leading from the battery to a bulb and these are connected from the other side of the bulb running free. The second set of apparatus we decided was a battery with a wire connected from the battery to the light and the other wire running to the black panel. The other wire leads from the panel and is free. Now I want us to create hypotheses which are statements that you think will happen.

T: What do you think will happen if she takes the loose wire and connects it to the battery?
Class: It will light up.

T: I want you to re-state this in sentence form.

St: When the wire is connected the globe will light up.

T: OK....

T: Why do you think that will occur Samantha? Can you think of anything else that will happen?

St: When the wire is connected to the negative terminal there may be a little spark.

T: Why do you think it will spark?

St: It may do nothing. The battery may be flat.

T: That's a good point. Although we know it isn't.....

T: So we have three hypotheses which we think may take place. One when the wire is connected to the negative terminal the globe will light up. Two, it may cause sparks at the point of contact with the negative terminal and three it may simply do nothing at all, and as Justin suggested, the battery could be flat or drained as Angela described. Now for what reasons do you think it will light up?

St: Because the wire from the positive to the light and back to the negative should make electricity.

T: Jane, why do you think it will light up?

St: Because the electric will just go down through the wire.

T: Any other reason?

St: It's just flowing electricity.

St: It's like a telegraph wire one line joined to the house while the other is joined to the power.

T: Why do you think sparks may occur.

St: Because it's electricity.

St: When you pull a plug out it sometimes sparks up.

St: When you touch something with electricity you get a shock or spark.

T: What reason can you give me for the hypotheses that nothing will happen?

St: Maybe its not connected properly.

T: OK, possibly it's not connected properly.

St: The battery may be flat.
T: Let's try the experiment. Angela go ahead.

Class: Oh!

St: Did work but no spark.

T: That's right. Which of your hypotheses are right? We could reject a couple.

Class: The first one. Second and third didn't.

T: When the wire was connected the light went on...

St: Maybe there wasn't enough voltage to create sparks.

St: Not enough electricity.

T: Justin used the term electricity... we used a cell. If I use mains electricity it would be too powerful and dangerous. Electricity would have 240 volts. Why wouldn't I let her touch the wire in this case?

St: She may get a shock.

T: So there may not have been enough voltage to spark. Why didn't nothing happen?

St: Because there's enough power.

St: It's connected up properly.

T: Good it's connected up properly. So there's enough power to drive the globe. Right, let's have a look at the second piece of apparatus. You have already described the apparatus, now let's try and formulate some hypotheses about what will occur when we connect the free wire.

St: When the wire is connected to the negative terminal, the light will light up.

St: And when you press this black knob the light would come on.

St: When you connect the wire the light won't come on, but when you press the black knob I think the light will come on.

T: So you think that this will make the light work.

St: Another thing which could happen is when you connect the wire to the terminal the light will come on but when you press the black knob the globe will go off.

T: Connection will cause the light to go on.

St: The black light will make the bulb go on and off.

St: It will be like a morse code.

A: Oh, Yeah!
T: What else may happen?

St: Nothing may happen.

T: You may have nothing take place. What makes you think nothing will happen?

St: Same reasons as the first.

St: It could be badly connected, flat battery.

T: Let's have a look at the hypotheses so far. Number one, when you connect the wire to the negative terminal, the globe will light up. Secondly, connection will not cause the globe to work. Thirdly, connection will cause the light to come on and when you press the black switch down the light will go off. Fourthly, you said that nothing will happen. Any other possibilities?

St: I think it could be the wire could have been crossed.

Class: Not the right wires.

St: With the first one the starting wire was always connected to the positive terminal, and now this one has the starting wire on the negative and nothing will happen.

T: So you are saying that connection to batteries is reversed and incorrect. So you think that the wire should first of all be connected to the positive terminal then you connect the negative terminal later.

St: Just before we go on you have left something out of number two. You didn't put down that when the globe didn't work but when you pressed the black knob it would work.

St: It's connected to number three.

T: Connection will not cause the globe to work. Well let's arrange another hypothesis.

St: The connection will not cause the globe to work unless the black knob is down.

St: Just another one. Because the wires are reversed a spark may be caused.

T: Now we have six main hypotheses. Now what we want to do is just like the first experiment. Jane will connect the wire to the positive terminal and we'll see what takes place. OK, the globe didn't light up....

T: At this stage why has the globe still not come on?

St: Because these two wires are not connected yet. To be connected the black knob will have to be down.

St: The electricity is being cut off here (switch) and once that is pressed down the electricity will be able to come
through.

T: What about the terminal? Are they connected properly?

Class: Yes.

T: How do you know?

St: Because the wires are wrapped around it and are touching.

T: Samantha can you see any other reasons why it may not be working?

St: The globe is blown.

T: How can we test now to solve our problem further?

St: Let's take the wires off and try them on the first battery.

St: Just press the button on.

Class: Yes.

T: What happened when Samantha pressed the black button on?

Class: The globe went on.

T: Now let's look at the hypotheses and see whether we can solve the problem. Firstly when the wire is connected to the negative terminal the globe will light up. Did that take place?

Class: No.

T: Why not?

St: Because when you touched it, it didn't go on.

T: Yes, but why?

St: Because the power was cut off here and in the first experiment there was no place to cut off the power.

T: Have a look at number two. Connection will not cause the globe to work. Did that take place?

St: Yes.

T: Right that did take place.

St: That's not completely the answer.

T: No it wasn't completely right although it did take place. Let's now look at three. Connection will cause the light to come on, then when you press the black button, the light will go off.

Class: No that didn't happen. It is the opposite.

T: Right it was already off. Number four, nothing will happen.
St: Nothing did happen.
St: It's still only half right.

T: It is similar to number three. It's partially correct but not the complete answer. Let's try number five. Because the wire is reversed as Andrew stated he was worried about whether this affected it, a spark would result. Is that hypothesis relevant now?

Class: No.

T: No that didn't occur. Number six, connection will not take place unless the switch is down.

Class: Yeah. That's the one.

T: Out of all of these which is the most correct?

Class: Number six.

T: That is what did take place.
St: How do you tell the negative from the positive?

T: On the top of the battery there is a plus and negative sign. If you look at your dad's car battery you'll see the same.

St: That's why a good radio battery has a plus and negative sign.

T: Using what we have done, and thinking of situations around the home, like the car, what do you think is important to make an electrical circuit work?

St: Two wires connecting to a battery and some form of electricity.

T: Alright you need some form of power. Whether it be full electricity through the house or like we have here a cell. What else do you think is important for a circuit to work...?

T: Samantha think of what we have here. What else do you need?
St: It's like turning your TV on you have to put it into the plug. You have to have the right connection.

T: Right. You must have proper connections. That's another suggestion, if these wires had been slightly off the terminals, push down the switch Samantha, now if I don't have that touching or properly connected what will happen?

Class: It won't work.

T: Is there anything else? Think of the second one. In number one we had proper connections, we had a power source.
St: Both of these wires were connected to the battery without a switch.

T: Yes. How will this affect it Jane?

St: It's just like a switch in the house. It has to be switched on to work.

T: What must the circuit be?

St: It has to be stopped.

T: Think of a flowing stream. If I placed a dam in the middle what would happen?

Class: The water would stop.

T: What would happen if I took the dam out?

Class: It would start flowing again.

T: OK, what if I had a stream that I was using for power, a circular stream. And as the water moved around it turned a windmill and that windmill was essential for power to work the lights for my home. Now if someone went to the stream and put that dam in the middle, what would happen to the power?

Class: The windmill wouldn't turn because the water had stopped.

T: What has this caused?

Class: A cut in the electricity.

T: Right, so what do we need to have to make a circuit work?

St: Connection.

T: Yes, connection. But we already had this.

St: A switch.

T: Yes, we had a switch.

St: It needed to be continual.

T: What did?

St: The current or power flow.

T: The power must be continual it must be flowing. If there is a break in the circuit what will take place?

St: It will stop.

T: Right. No matter how good your power source or connection is, if there is a break in the circuit it would not work...

T: Now when it's flowing, if you think of a circle, it's never ending, it keeps on going and going, it is closed. The
circle has no opening, no end, no start. It is a closed circuit. The first one is closed, because what is happening?

St: It is joined. It keeps on going.

T: What is the second one? What is the opposite to closed?

Class: Open.

T: So initially it is open but what happens when I put the switch down... I make it?

Class: Closed.

T: So that the power is flowing through, when I lift that, the power stops there (switch). So let's have a look at what we need. We need a proper connection, we need a proper power source, in this case we need a globe, but we've already allowed for this. And the circuit and the current must be.....

Class: Flowing.

T: Alright the current has to be flowing. Good. Well done.
APPENDIX 4(b)

LESSON ANALYSIS INTERVIEW: SITE OF LEAST IMPLEMENTATION
The purpose of the lesson was clearly stated. However, it was not recorded and consequently did not appear on the transcript. The pupils were told that they would be working with a couple of electrical circuits in order to determine the elements required to make the circuits work. The pupils were very interested initially as was indicated by the fact that they started to connect the wires up straight away before any formulation of hypotheses. The situation was definitely open to a number of predictions about the outcome of the experiment as was apparent by the number of hypotheses formulated by the pupils.

Once the initial introduction was completed, i.e., description of the apparatus, questions were posed by the teacher. For example: "What do you think will happen if she takes the loose wire and connects it to the battery?" (predictive). "Why do you think that will happen Samantha (re-directing question)?" "What reasons can you give me for the hypothesis that nothing will happen"? Such questions formed the basis for the formulation of the pupil's hypotheses.

The pupil's hypotheses were elicited and written down. In the first experiment they were recorded on a sheet of paper, while in the second experiment they were recorded up at the board. The questions such as those already mentioned help the pupils to create hypotheses such as "When the wire is connected to the negative terminal there may be a spark". "When you connect the wire the light won't come on, but when you press the blank knob I think the light will go on". Questions followed such hypotheses in order to provide inferences about why they think something would happen. For example, Samantha hypothesised that "nothing may happen". This was followed
up by a question from the teacher. "What makes you think that nothing will happen?" Another example can be found where Angela hypothesised that "When the wire is connected the globe will light up". Once again this was followed up by a question to elicit a further inference:

"Why do you think that will happen? Can you think of anything else that may happen?"

All the hypotheses were written down so that the pupils could see the alternative solution they had proposed. Having then written where the pupils could see them helped when summarising what we had done. They could also reject or accept the hypotheses more easily once the experiment had been carried out.

The situation was allowed to continue until the pupils could see what had taken place. The results of both experiments were verified so as to eliminate any doubts about the outcome. For example, in experiment one, "Let's try the experiment. Angela go ahead". Oh! It did work, but it did not spark. That's right". The pupils were always asked to state what had taken place. In the second experiment the following took place:

T: "What happened when Samantha pressed the button on?"

St: "The globe went on".

Once the pupils had determined what took place, they were then asked to examine which of the formulated hypotheses were correct.
The pupils were encouraged to evaluate their hypotheses in the light of what they had observed. For example:

"Now let's look at the hypotheses and, see whether we can solve the problem. Firstly, when the wire is connected to the negative terminal, the globe will light up. Did that take place?

Another example can be found in,

"That's right. Which of your hypotheses are right? We could reject a couple".

In order to solve this the pupils needed to eliminate hypotheses created in the light of what took place. An example of this can be seen in:

"Have a look at number two. Connections will not cause the globe to work. Did that take place? Yes, Right that did take place".

Once the pupils had reached this stage, they were able to narrow down possible solutions.

The pupils did draw conclusions based on the most acceptable hypotheses. For example:

"Using what we have done, and thinking of situations around the home, like the car, what do you think is important to make an electrical circuit work?"

St: "Two wires connecting to a battery or some form of electricity".
The pupils were given the opportunity to provide alternative procedures for testing the theory. An example of this can be found in:

T: "What about the terminal? Are they connected properly?"

St: "Yes".

T: "How do you know?"

St: "Because the wires are wrapped around it and are touching".

T: "Samantha can you see any other reasons why it may not be working?"

St: "The globe is blown".

T: "How can we test the problem further?"

St: "Let's take the wires off and try them on the first battery".

They were also provided with every-day experiences to reinforce the theory:

"What if I had a stream that I was using for power, a circular stream and as the water moved around it turned a windmill and that windmill was essential for power to work the lights for my home? Now if someone went to the stream and put a dam in the middle, what would happen?"
Such real life situations helped the pupils to conceptualise the theories related to how an electric circuit works. These situations proved to be an essential part of the lesson.

Generally the lesson proved to be successful. The pupils responded well to the predictive inquiry lesson and participated well throughout the discussion period. The model has great applicability within the science subject matter. It helps to develop proper thinking and analysis skills and could foster the development of the science process skills such as, predicting outcomes, formulating hypotheses and making inferences. The content and the lesson format was appropriate to both the grade level and subject aims.
SAMPLE TEACHING STRATEGY ANALYSIS GUIDES USED IN IN-SERVICE PROGRAMME

(ADAPTED FROM JOYCE AND WEIL, 1978)
TRAINING MODEL

TEACHING ANALYSIS GUIDE

In your post-lesson analysis you can use the following guide which focuses on aspects of teaching that are important to the syntax of the model, the teacher's role and specific teaching skills.

Respond to each of the statements below by circling the number which most closely corresponds to your observations:

1. Thoroughly.
2. Partially.

PHASE ONE: CLARIFICATION.

1. Was the purpose of the lesson/activity clearly stated in terms of expected student behaviour?  
   
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2. Student understanding of the activity was clarified by the teacher.  
   
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PHASE TWO: THEORETICAL EXPLANATION.

1. Reasons for the activity/task were clearly explained in terms of student needs.  
   
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2. The purpose of the activity/task was clearly linked to previous student learning/experience.  
   
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3. Students were questioned to ensure understanding of the activity/task.  
   
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PHASE THREE: DEMONSTRATION.

1. Did the teacher clearly demonstrate the activity/task?  
   
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2. Was the activity/task broken down into small components with each demonstrated clearly?  
   
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3. Was a clear description and explanation of the activity/task given by the teacher?  
   
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4. Were the important aspects of the activity/task performance stressed by the teacher?  
   
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5. Did the teacher question the class at each stage of the activity/task demonstration to ensure that it was understood?  
   
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6. Was the teacher's demonstration of the activity/task as precise as it could be?  
   
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</table>
PHASE FOUR: PRACTICE.

1. Did the student have ample opportunity to practice the activity/task? 1 2 3 4

2. Was the practice broken down into small steps for students to master? 1 2 3 4

3. Were the steps sequenced for the students to integrate into the complete activity/task? 1 2 3 4

4. Did the teacher provide feedback to the class as a whole on their level of performance? 1 2 3 4

5. Did the teacher provide feedback to individuals on their level of performance? 1 2 3 4

6. The form of feedback provided by the teacher was:
   Diagnostic ____________________________________________________
   Corrective _____________________________________________________
   Oral __________________________________________________________
   Visual _________________________________________________________
   Sequential ______________________________________________________
   Positive ________________________________________________________
   Encouraging ____________________________________________________
   Personalised _____________________________________________________
   Discouraging __________________________________________________
   Negative _______________________________________________________
   Mechanical _____________________________________________________

7. Did the teacher provide enough time and feedback for the students to attain mastery of the skill? 1 2 3 4

PHASE FIVE: APPLICATION.

1. Did the teacher re-state the purposes of the activity/task?  

2. Did the teacher clarify with the students problems encountered by them individually or as a class? 1 2 3 4

3. Are the students able to analyse their own activity/task performance and make adjustments as needed? 1 2 3 4
4. Were applications of the activity/task made clear to the students by the teacher?  
   T.  P. M.  NN.  
   1  2  3  4  

ANALYSIS OF TEACHING SKILLS: GENERAL. 

1. Comments on verbal teaching behaviour e.g., pace, pitch, tone, volume, audibility, enthusiasm, formal, casual. 

2. Vocabulary e.g., appropriate to topic/task, experience and ability level of class. 

3. Responsiveness to students e.g., encouraged to participate in lesson/activity by questions, praising, reinforcement of contributions, or were the students actively discouraged from participating in the lesson? 

RE-TEACH. 

Indicate below the changes you would make in re-teaching this lesson: 

(a) To lesson plan in terms of the model. 

(b) To lesson presentation. 

(c) Personal changes in terms of teaching skills, verbal behaviour, responsiveness to students.
ADVANCE ORGANISER MODEL

TEACHING ANALYSIS GUIDE

In your post-lesson analysis you can use the following guide which focuses on aspects of teaching that are important to the syntax of the model, the teacher's role and specific teaching skills.

Respond to each of the statements below by circling the number which most closely corresponds to your observations:

1. Thoroughly.
2. Partially.
4. Not needed.

PHASE ONE: PRESENTATION OF THE ORGANISER.

1. Did the teacher clarify the aims of the presentation?  
   T.  P.  M.  NN.
   1  2  3  4

2. Was an Advance Organiser presented?  
   Was it expository or comparative? (E. or C?)  
   1  2  3  4

3. Did the organiser presentation identify, clarify or explain the essential characteristics of the concept or proposition serving as the organiser?  
   1  2  3  4

4. Did the presentation of the organiser include examples of it?  
   1  2  3  4

5. Was the language or terms of the organiser repeated or otherwise emphasised?  
   1  2  3  4

6. Did the teacher prompt awareness of relevant knowledge or experience in the learner's background?  
   1  2  3  4

PHASE TWO: PRESENTATION OF THE LEARNING TASK OR MATERIAL.

7. Did the teacher develop the material (content) in logical order from general to specific?  
   1  2  3  4

8. Did the teacher make the material (content) explicit to students through outlines, explanations and specific examples?  
   1  2  3  4

9. Did the teacher use procedures to enhance the organisation of the presentation, e.g., explaining links, diagrams, use of media, etc., to aid meaningful assimilation of the material?  
   1  2  3  4
10. Did the teacher clearly and precisely define new terms and concepts introduced in the material?  1  2  3  4

PHASE THREE: STRENGTHENING COGNITIVE STRUCTURE.

11. Did the teacher make use of integrative reconciliation (periodical summarising, repeating precise definitions, relating new material to previously learned material, making linkages, etc.)?  1  2  3  4

12. Did the teacher ask questions to promote active reception learning during presentation?  1  2  3  4

13. Did the teacher periodically summarise, question and attempt to clarify student's misunderstandings or confusions?  1  2  3  4

14. Did the teacher demonstrate a critical approach to the information (recognising assumptions, inferences, testing propositions contained in the new material)?  1  2  3  4
TEACHING ANALYSIS GUIDE

In your post-lesson analysis you can use the following guide which focuses on aspects of teaching that are important to the syntax of the model, the teacher's role and specific teaching skills.

Respond to each of the statements below by circling the number which most closely corresponds to your observations:

1. Thoroughly.
2. Partially.

PHASE ONE: INTRODUCTION.

1. Did the teacher present a problem area to be investigated?  
   T. P. M. NN.  
   1 2 3 4

2. Were the inquiry procedures explained to the students?  
   T. P. M. NN.  
   1 2 3 4

3. Was the problem to be investigated clear to the students?  
   T. P. M. NN.  
   1 2 3 4

PHASE TWO: PREDICTIVE QUESTION/DISCREPANT EVENT.

4. Was the inquiry directed towards verification of data, conditions, properties, objects, etc?  
   T. P. M. NN.  
   1 2 3 4

5. Did the teacher ensure through questioning that the problem to be solved was clearly conceptualised by the students?  
   T. P. M. NN.  
   1 2 3 4

6. Did the teacher ensure that all objects, data, etc., necessary for students to use for evidence in solving the problem were available?  
   T. P. M. NN.  
   1 2 3 4

PHASE THREE: DEVELOPING AN EXPLANATION.

7. Did the teacher encourage testing of relationships and/or isolation of relevant variables?  
   T. P. M. NN.  
   1 2 3 4

8. Did the students respond to looking for cause-effect relationships in solving the problem?  
   T. P. M. NN.  
   1 2 3 4

9. Did the teacher use language appropriate to inquiry/problem solving such as hypothesis testing, theorising, etc?  
   T. P. M. NN.  
   1 2 3 4
10. Did the teacher encourage the students to formulate a theoretical explanation of the problem?  

PHASE FOUR: EVALUATION OF HYPOTHESES.

11. Did the teacher press for evidence to be used to support student theories?  

12. Were the students encouraged to develop generalisations from their explanations?  

13. Were the students encouraged to analyse the processes from which they derived their explanations?  

14. Was there a discussion of the elements of inquiry/problem solving such as data gathering, testing and hypothesising?  

PHASE FIVE: REFLECTING ON THE PROCESS.

15. Were all inquiries, theories, explanations accepted in a non-judgemental manner?  

16. Were interactions and sharing of concepts, data, theories, and explanations among students encouraged?  

17. Were the teacher's questions phrased at a cognitive level to encourage students to analyse and evaluate data, explanations, etc.?  

18. Was the teacher an information source or inquiry stimulator?  

PHASE SIX: EXTENSION/APPLICATION.

19. Were students encouraged to test the conclusion with alternate procedures or evidence from every day life?  

20. Was the explanation extended to formulate a theory or law?
APPENDIX 6

SAMPLE LESSON ANALYSIS SCHEDULES DEVELOPED IN SCHOOL
### Whole Class Activity Schedule

**STUDENT ACTIVITIES**

<table>
<thead>
<tr>
<th>Time of Sweep</th>
<th>Watching</th>
<th>Reading</th>
<th>Manipulating</th>
<th>Planning</th>
<th>Other</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Listening</td>
<td>Writing</td>
<td>Equipment</td>
<td>Discussing</td>
<td>On-Task</td>
<td>Task</td>
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<td>1</td>
<td>B</td>
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<tr>
<td>Time of Interaction</td>
<td>Type of Question</td>
<td>Feedback to Student</td>
<td>Work Behaviour</td>
<td>Type of Question</td>
<td>Teacher Volunteer</td>
<td>Seeks Evaluation</td>
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<td>+Praise</td>
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<tr>
<td>2</td>
<td>G</td>
<td>+Affirms</td>
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<td>G</td>
<td>+Answer/</td>
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<td>O No response</td>
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APPENDIX 7

MONITORING AND EVALUATION OF LESSONS: AN EXAMPLE OF LESSON ANALYSIS
LESSON I.

LESSON PLAN.

TEACHING GUIDE.

OBSERVATION SHEET (GALTON).

OBSERVATION SHEET (WILLIAMSON).

QUESTIONS TO GUIDE ANALYSIS OF LESSON FROM TAPE RECORDINGS.

ANALYSIS OF LESSON I, AIMED AT IMPROVING LESSON II.
**STUDENT OBJECTIVES:**
1. On completion of lesson students will be able to correctly answer 4 out of 6 questions in an individual test.
2. Students will begin to acquire the social skills necessary to operate satisfactorily in a group situation.

<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC/OBJECTIVE</th>
<th>TEACHER ACTIVITY</th>
<th>STUDENT ACTIVITY</th>
<th>TEACHING AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mins</td>
<td>1A INTRODUCTION</td>
<td><strong>Sign</strong> time book. Recap-before holidays maths in small turn on tape deck groups.</td>
<td><strong>Listen</strong> Ask questions</td>
<td><strong>Tape deck</strong> <strong>Tape Extension cord</strong></td>
</tr>
<tr>
<td>10 mins</td>
<td>1B Group Organisation <em>How and why of group work.</em></td>
<td>Teachers talk <em>Ask questions Answer questions Suggestions for group formations on board</em></td>
<td><em>Listen Ask questions Answer questions Organise themselves into groups</em></td>
<td><strong>Chalk</strong></td>
</tr>
<tr>
<td>15 mins</td>
<td>1C INTRODUCE TOPIC <em>How groups will operate, Introduce topic.</em></td>
<td>Explain - discuss how groups will operate Write structure of lesson on board Work through examples of topic</td>
<td><em>Listen Discuss in groups Ask questions</em></td>
<td><strong>Chalk</strong></td>
</tr>
<tr>
<td>2 mins</td>
<td>2 HAND-OUT PROBLEM SHEETS TO GROUPS <strong>Distribute handouts Answer questions</strong></td>
<td>Clarify situation</td>
<td><strong>Problem sheets (Group)</strong></td>
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<tr>
<td>40 mins</td>
<td>3 GROUP WORK <em>Students work in groups on 10 problems.</em></td>
<td>Positively interact with groups and individual students Turn tape over Make notes on how groups/class progressing</td>
<td>Work in groups Select problems and work through ten Assist each other</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>TOPIC/OBJECTIVE</td>
<td>TEACHER ACTIVITY</td>
<td>STUDENT ACTIVITY</td>
<td>TEACHING AIDS</td>
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<tr>
<td>20 mins</td>
<td>4 REVISION PROBLEMS</td>
<td>Distribute revision problems</td>
<td>Independent work on revision - test problems</td>
<td>Revision sheets (Individuals)</td>
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<td>Interact with individuals and class as a whole</td>
<td>Student-Teacher interaction</td>
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<tr>
<td>13 mins</td>
<td>5 REVISION OF LESSON</td>
<td>Discuss topic with individuals/groups and class as a whole</td>
<td>Discuss</td>
<td>Chalk</td>
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<td></td>
<td>Student thoughts on group work.</td>
<td>Ask/Answer questions</td>
<td>Homework exercises</td>
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<td>Home work.</td>
<td>Give opinions</td>
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<td></td>
<td>How students perceived group work</td>
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<td>Sign off time book.</td>
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TEACHING GUIDE

PRE-APPS - GROUP WORK - FORMULA-SUBSTITUTION - LESSON I
(NOTE: This is a summary of the tape-recording).

Good morning - sign timebook.

1A. INTRODUCTION

- Before holidays discussed doing maths in small groups
- Run maths sessions in a group format for 3-4 lessons, dependent on results and your opinions we will decide whether to continue on in that vein.
- Most studies show that small groups of 3 to 6 people of mixed abilities are most effective.
- Suggest we try that formation first - see how it works
- Any questions?

1B. GROUP ORGANISATION

- I've analysed your part marks and come up with the following suggestions:
- As everyone appears comfortable with the whole class knowing each other's results - ok - I suggest three groups of 4 x 4 or 5 students - say Red, White and Blue Groups.
- Each group has one student of above average marks, 1 student with below average marks, and 2 or 3 students of average marks.
- Is that agreeable?

so

- Red Group: David
  Blue Group: Steven
  White Group: Wayne.

- Now Geoff, Todd and Mark Cockshot choose whichever of those groups you wish to join.
- Now remainder join any group you like, remembering we want 4 x 4 or 5 members in each group.
- Any questions? Right, good.
The aim of the group is to help its members through the exercises.

The responsibility is now on you and your group.

If you are not sure of anything, ask your group mates. Only when you cannot figure it out as a group ask me.

Initially I will supply information, examples and problems from 3 or 4 tests to give you an idea of typical problems. From these each group will select which problems they wish to attempt.

Again in first lessons I will try to give the lessons some structure and goal so we don't go around and around in circles. However eventually the aim is for each group to select the goal and make sure each individual reaches it. After all it is you who has to pass the final exam.

I am also going to tape lessons - enable me to check lessons, to see how groups are working, to make lessons more effective. Tapes will also be taken to Curtin University so I can get more advice on how to improve lessons.

Happy with that? Any questions?

As for structure - have to see how lessons progress as I have never attempted a maths lesson before using the group work format.

Envisage about 10 minutes for each of you to read through the 3 examples of solutions for today's lesson,

then 30 minutes working through any 10 problems in your groups,

then 20 minutes doing 4 or 5 problems yourselves to see what you have learned,

the final 15 minutes reviewing the lesson - finding out what you thought about group work.

Once you get going I will write this structure on the board so you can follow it.

Any questions?

General Topic - problems involving formula - will take 3 to 4 lessons.

Today we will evaluate the subject of a formula given all the variables but one.

Ask for example of formula - write on board

In your case what is subject? What is variable?

What are formula? What do we use them for?
Rule - proved to be correct by experimentation - once you know which formula to use where an enormous amount of time can be saved.

Everyone clear about what a formula is and does?

What about you, X, can you explain what a formula is? Good.

Generally a formula is expressed by signs, symbols and letters - this makes the formula more concise and easy to read.

So, taking your example, instead of having to write all of this:

.............. we can write this:...........

Now what we are going to do today is solve formulas that have only one unknown.

So, in your example we are looking for?

This unknown is often called the Subject of the Formula

So, we could say "Find the subject of the formula, given A = 5, B = 19 and C = 13.

Is that clear? Any questions?

2. HAND OUT PROBLEM SHEETS TO GROUPS

- Clear up any queries.
- Get groups started.

3. GROUP WORK

- First read through examples and solutions to problems.
- Within each group select 10 problems for your group to attempt.
- Help each other's answers.
- Don't just copy. Try and explain to the other person how to do the problem.
- Any questions?
- If your group can't solve a problem, or can't help one of its members then ask me.
- Positively interact with the groups.
- Make notes on how groups/individuals are progressing.
- Check if students can do the problems.
4. **REVISION PROBLEMS**

- Hand out problems for students to do individually.
- Ask if anyone needs assistance.
- Interact with students individually, checking if students have problems.

5. **REVISION OF LESSON**

- More examples on board if necessary.
- What did students think of lesson?
- Do any students require homework?
<table>
<thead>
<tr>
<th>STUDENTS</th>
<th>TEachERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved and Co-operating</td>
<td>Non-involved and Distracted</td>
</tr>
<tr>
<td>Interacting with Group</td>
<td>Interacting with Individual</td>
</tr>
<tr>
<td>Planning Discussion</td>
<td>Monitoring Classroom</td>
</tr>
<tr>
<td>Partially Co-operating</td>
<td>Homekeeping</td>
</tr>
<tr>
<td>Waiting for Teacher</td>
<td>Housekeeping</td>
</tr>
<tr>
<td>More interested in Teacher activity</td>
<td>Housekeeping</td>
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<td>6uT5e30d0</td>
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General Comments: Students sometimes sit staring (may just seem long to me). One organized student worked quite hard for about 30 minutes—perhaps next lesson-break long group session with 5 mins. teacher led discussion. Little disappointed with some students' language—when lecturer working with other group individuals! Students best to ignore—goes away without being an issue—perhaps due to novelty of being typed. Almost impossible to keep accurate data sheet and keep up continuous interaction with class.

GROUPS

Red
- Wayne
- Julie
- George
- Mike
- White

Blue
- Sue
- Mark
- Lee
- Yellow

Green
- Mark
- Daniel
- Todd
- Gold

Black
Grade: Metal Tab, Pre-Activity: Transposition of Formulae

Date: 28.8.87 Time: 8:00-9:45 Length of Observation: 45 min.

List of Observations:

1. Observation started at commencement of Groupwork.
2. Takes about 3-4 mins. for group to get started.
3. Next 5 mins. groups working on task.
4. Going better than expected.
5. Students start to become distracted.
6. George wants to move away from topic.
7. John very slow getting started/doing anything.
8. Tends to work by himself.
9. Students work well on task for about 10 mins.
10. Cooperating quite well—some quicker.
11. Students now helping others with problems.
12. However—working mostly on their own.
13. Last of groupwork—student students finished.
14. 5 probs. fastest easily finished. 10
15. Individual problems—again takes.
16. Students 3-4 minutes to get going.
17. Typing mistake in handout causes some confusion.
18. Teacher tended to drift back into talking pattern.
19. For last 5 mins. interacting with students individually.
20. Lesson took longer than expected—only 5 mistakes for discussion/review.
# Questions to Guide Analysis of Lesson From Tape Recordings

## Lesson 1: Transposition of Formula

<table>
<thead>
<tr>
<th>Questions</th>
<th>Specific Comments</th>
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| Were objectives specific and made clear to students? | Perhaps objectives should have been stated more specifically at beginning of lesson. They were rather spread out through the lesson.
| Was explanation of how groups were to work clear and well detailed? | Yes, processes clearly described.
| Did students form into groups? | Yes, however, something was necessary to rectify the standard thinking it gave too much time to students.
| Were the students clear on how they were to operate within the group? | Thought that I had covered this adequately - last student's interest.
| Was appropriate data presented to students? | Yes.
| Were the work sheets and blackboard work clear and pitched at the student's level? | Blackboard work could be weaker.
| Did the students discuss which problem they were going to do? | Some groups less than equal. Needed to seize this more often.
| Did students co-operate and work effectively as a group? | Did not cooperate with each other. Worked more in pairs. Needed more individual attention. Explanation clearer. (Was)
| Were students able to satisfactorily complete the revision problems? | All students completed at least 6 of the 6 problems. This segment following.
| Did lecturer interact positively with groups/individuals/whole class? | With individuals, groups and class as a whole.
| Was lesson summarised and reviewed? | Did not allow enough time to cover this objective. |
GENERAL NOTES - focus on improving next lesson.

1. Introduction: Satisfactory - too much talking.
   in background - need to gain longer after asking
   questions.

2. Why and how of group work: OK.

3. Explain/discuss how groups will operate:
   More time needed for students to settle down,
   some students more interested in getting their notes
   on tape - allow students more time to answer questions.
   Students still talking if task too much. Ask students
   were my name, so refused to question if whole class.


5. Group Work: Students take some time to get organized.
   Need to clarify instruction 3 or 4 times - how carefully
   do they listen, three groups - work very well for 5-
   mins, became a little noisy for a minute, so then
   made quietly for 5 or 6 minutes again. Pattern repeats
   itself four or five times. Some students more easily
   chattered than others.

6. Individual Revision: Some time in
   settling down again, perhaps need to separate
   groups to work individually - now need to talking
   marking in a group? Dulling individual work student.
   attention gap appears to be about 5-6 mins. Then go
   back: This cycle repeats itself 5 or 6 times. Probably
   less because too noisy - however interested to see
   where group work would lead class. After leaving
   + steals' revision? class settles down by itself more
   student talk needs to be topic oriented.

7. Lesson Review: Not enough time for adequate
   revision - mixing task - students more interested in
   packing up and going for morning. Then adequate review
   of group work reduces a mediocre amount of notes.
   Surprising to note that students felt that they
   shared a lot more work in their groups than individually.
   Perhaps even though appear at task for about 2 mins, merely
   2 mins. (2.15 - 3% of time) when students are sitting quietly
   spent daydreaming. So much of this time, in fact,
ANALYSIS OF LESSON I, AIMED AT IMPROVING LESSON II

1. Perhaps the mathematical objectives should be stated more precisely at the beginning of the lesson. I am, however, not convinced that by saying, for example, "At the end of this lesson all students will be able to correctly answer 4 out of 6 questions correctly in 10 minutes...." achieves anything - apart from turning half of the students off. Rather the above statement should be the objective of the teacher, with the students being made aware that in this particular lesson a particular topic is going to be covered and that they are going to raise their competence in this topic to a satisfactory level (satisfying themselves and the teacher).

2. Need to allow students more time to settle down into their groups.

3. Re-state idea of more student interaction/co-operation within groups.

4. Highlight need for each group to discuss which particular problems they are going to discuss.

5. Need to allow more time to adequately summarise lesson.

6. Request students to attempt to reduce noise level in class - difficult for some students to concentrate.

7. When asking questions, wait a little longer for answers - call on more students by name.
8. Need to be aware of student attention span (about 5 minutes).
   Perhaps break up the long group work session.

9. Satisfied with amount of work covered and competence gained.

10. The three students who have difficulty with maths experience similar problems within group. Tend to work individually, become easily distracted, perhaps embarrassed to highlight their own lack of understanding. Try and spend a little more time with them within their group.

11. The envisaged syntax was adequately adhered to.
LESSON ONE - INQUIRY METHOD.

TEACHER: BF

T.* Right boys and girls. Here's our "feely bag". We're using Francine's bag and inside there are some objects. Now you have to guess - we're going to play the "Yes/No" game again. The "Yes/No" game is when we're only allowed to answer "Yes" or "No". But this time Mrs. French's going to answer "Yes" or "No" because I'm the only person who knows what's in the bag. You have to think of your questions very carefully, because if you ask the right questions, you'll get to know what it is quickly, won't you. Right, the first question is going to come from Natasha. Now you have to work out how many things there are inside here. We'll just take out this because we don't want that, and this. Right. You have to work out how many things there are, and ask us. Ready? Now you can have a feel in. Put your hands in and have a feel. Don't look though. Right, when you're ready, ask us a question. That's not a questions, is it?

St.** Is there three?

T. Is there three what? Yes, there are three things. Have another feel.

St. Is there some sticky tape?

T. Yes. Don't forget you can ask us what the things are made out of. Or what shape they are, whether they're square ....

St. One of your coloured pens?

T. Yes.

St. Is it a jar?

T. Yes, good girl. You've got three things. Look, boys and girls. There was a coloured pen, there was a roll of sticky tape and there was a jar. Thank you Natasha, sit down. Now, if you had asked questions - if you weren't quite sure you could ask, "Is the shape round or is the shape thin, or is the shape fat, or is something made of glass, is something made of plastic?" Questions like that. Right. Hide your eyes and we'll put some more things in our "feely bag". Rebecca, up you come. Have a feel in the "feely bag" and ask us some questions.

St. Is there a staple?

T. Yes.

St. Is there something sharp in it?

* T: Teacher
** St: Student
T. Yes. That's a good question, isn't it? Ask another question about what sort of things are in there. Have you asked a question about how many things there are? So far you've guessed one thing. You've got to ask us a question. Are there...

St. Are there two things in there?

T. No.

St. Is there a stamp in there?

T. What sort.... Put your arm in and have a feel, Rebecca. Right, what was your question? Have you guessed all the things now? Let's have a look if Rebecca was right. Rebecca said that there was a stamp and it had a lid. Was she right?

St. Yes.

T. She didn't tell us what shape it was though, did she? She could have asked more questions. She said, "Was there something sharp in there?" And we did say "Yes", didn't we? And she asked if there was a stapler in there, and we said "Yes". Good girl. This time we're only going to let Jonathan hide his face, and we're all going to know what's going to go in it. Right Jonathan, hide your face. Jonathan, have a feel in the "feely bag". You have to ask us questions Jonathan, and Jonathan has to ask us questions, we're only allowed to say "Yes" or "No".

St. Is it some paper?

T. Yes. But paper can be lots of things, Jonathan. Can you ask us a question about what sort of thing it is?

St. Is it a letter?

T. Yes. But you have to think harder about the letter. Can you ask us another question about the letter? Is it just a letter? You have to ask us a question. Right Jonathan, you've got it mostly right. There's two other things in there - can you feel those two? Ask some questions about it.

St. An elastic band around it? Two match boxes?

T. Yes, very good. Can you feel another thing in there? Can you feel something else, Jonathan? Do you have a question, Jonathan?

St. Is it some safety pins?

T. Yes, but can you ask us some other questions about them.

St. Is it in a row?

T. Yes. Right, let's have a look and see whether Jonathan
really thought about what he was asking. Is that right? Some safety pins in a row? Good boy. And a letter. You could have said, "A letter in an envelope", but you didn't ask us the right questions to work that out. And you got that one - matches with elastic bands around it. This says Brett's Honour Cards, but would Jonathan have been able to tell what it said by just asking us? No, he couldn't could he, because we were only allowed to answer "Yes" or "No". Now we're going to play another guessing game. This guessing game here is more fun. Listen carefully. I'm going to give everyone a piece of white paper. On that piece of white paper you're going to fold it a special way and you're going to draw something special on it. Just one special thing. And then we're going to see if we can play the "Yes/No" game with our friends, and our "Yes/No" answers will help them to work out what's on the special piece of paper. Right? Shut your eyes and have a thing about what you're going to draw.

I'm going to guess someone's magic picture, and that person's only allowed to answer "Yes" or "No" to me. And I would like to - yes, Bethwyn - I'm going to guess your picture. Are you ready? Is it something that goes inside a house?

St. No.
T. Is it something that goes outside a house?
St. Yes.
T. Is it alive or dead?
St. Alive.
T. Does it walk?
St. No.
T. Does it talk?
St. No.
T. Can I see one if I look out the window?
St. Yes.
T. Is it black?
St. No.
T. Is it brown?
St. Half of it.
T. Half of it's brown. Is the top part green?
St. Yes.
T. I know. Does it start with a "T"?
St. Yes.

T. Is it a tree?
St. Yes. But what kind of tree?

T. Is it a big tree?
St. Yes.

T. Is it an apple tree?
St. Yes.

T. Right. Would you show us your magic picture? Oh, I am right. Good. Right, I'm going to choose someone else to do it now. Go... Wendy, Big voice. Ask Natalie some questions. Let's have a guess. Come on.

St. It is a tree?
St. No.

T. Everyone else put their magic pictures down and stop rustling them. Everyone can ask Natalie questions and we'll try and work out what it is. Maree, what's your question?

St. It is a house?
St. No.

St. It is a bell?
St. No.

T. Adam, ask Francine a question.

St. Is it a lion?
St. No.

St. Is it an egg?
St. No.

T. Right, who else has a question? Brett.

St. Is it inside the house?
St. No.

T. Natalie.

St. Is it a ball?
St. Yes.
T. Oh, show us. That was a good guess, wasn't it? How did you know it was going to be a ball?

St. Because I could see the back of it, like that.

T. Oh, I see. You'll have to keep it covered up. Right, this time we'll ask Richard what his picture is. Keep yours flat so no-one can see. Who's got a question to ask Richard? Brett.

St. Is it a ball?
St. No.

T. Right, who else has a question? Kevin.

St. Is it alive?
St. No.

T. Melissa.

St. Is it a hose?
St. No.

T. Bethwyn.

St. Is it a tree?
St. No.

T. Sharon.

St. Is it a letter?
St. Yes.

T. Ask some more questions. We now know it's a letter. What's another sort of question we can ask about it? O.K. Sharon, ready? Let's ask Sharon questions about her magic picture. Who has a question? Jonathan, do you have a question?

St. Is it a crocodile?
St. No.

T. Leeanne. Think about the questions you ask, don't just guess. What about asking whether it's an inside or outside thing, alive or dead, a growing thing or a thing you can put in the cupboard. Off you go Melissa.

St. Is it alive?
St. No.

St. Has it got a roof?
St. Yes.
T. Right, we now know it's got a roof. Who else can ask a question? Tricia. Peter.

St. Is it a chimney?

St. No.

St. Is it a shed?

St. Yes.

T. Right. We're going to guess what colour shed it is, now we know it's a shed we can ask some more questions. What it's made of? Lee.

St. Is it yellow?

St. Yes.

St. Is it steel?

St. Yes.

T. Well done. We'll try this again later on.
LESSON THREE - INQUIRY

TEACHER: BF

T.* I want you to listen very very carefully. I've got two containers here, full of something that you know. Right. You keep your thoughts to yourself from now on and just watch closely. Two that are level. Now we know that if we have some scales and we put two things on that are exactly the same, what will happen to the scales? If I put these two medicine cups on, which are exactly the same, they're made out of the same things, and we stick them on like that - what happens to the balance? Who can tell me? Francine?

St.* They're both heavy, they....

St. But one's heavy.

T. No. Have a close look. What's happened to it. What do you call it when the scales go level like that. Melissa?

St. One goes....

St. Donna's got money in her mouth.

T. Take it out please. Goodness gracious. Tricia, what do we call it when the balance is going like that?

St. Level.

T. It's level and we call it, what Brett? They are.....? Balancing, because they're exactly the same thing, aren't they? Right, if I put two things on there and they're exactly the same, they balance. But if I put two things on that are different, what happens then? They don't balance, do they? I've got two things here which are the same. They're both medicine cups and they've both got the same in them. I want you to ask me questions about what happens and Mrs. Freeman's only allowed to answer "Yes" or "No". Are you ready to watch? Ssshhh. Don't forget your manners by putting up your hand. They both look exactly the same. ask me some questions about what happened and I'm only allowed to say "Yes" or "No". Tricia?

St. They're not level.

T. Yes. They're not level. Francine?

St. One's got dry sand and one's got wet sand.

T. Yes.

St. The dry sand is not as heavy and the wet sand is heavy.

T. Yes.

T* : Teacher
St**: Student
St. I know why the dry sand is lighter. Because wet sand's got water in it and it makes it heavy, and the dry sand hasn't.

T. Have you got a question to ask me? Ask me a question so that I can say "Yes" or "No" to it. You just told me what you thought. Can you ask me a question about it to say whether you're right or wrong? Natalie? Is the......?

St. Is the wet one heavier than the light one?

T. Yes it is. Right. Now we've worked that out, who would like to make up an experiment to find out whether you're really true? What could we do, Richard?

St. You put your hand in to see if it's wet.

T. Right. You have to ask me a question. Sharon? Alright Richard what's your question?

St. Could you put your hand in and feel how wet it is?

T. Yes. Right, come up and do that please Wendy.

St. Which one?

T. Well, you have to decide that one. Richard will tell you which one.

St. Is it wet?

St. It's wet.

T. Now, what should we do next? Maree? What else can we do? Natalie?

St. Pick a person to feel the dry sand now.

T. Yes. You can decide who can do that Natalie. Right. What have you worked out?

St. That one's dry.

T. Right. Thank you. So, now we know, because you've tried it for yourself. Point to the wet side. Point to the heavy side. Now, point to the dry side. Right, hands down. Leeanne, point to the heavier side. Right. Now, if we take these off, if we can test that we're right, what happens if we put.... What can we put on this side to test whether it's just not a trick? Perhaps if we put dry sand on this side, it might also be heavier. What shall we do? Ask me a question... Richard?

St. I know why the other sand was heavy. Because that sand is.... the other sand was higher than the dry sand.

T. No. What could we do? Sharon?
St. Why can't we fill one cup with dry sand...... and see what it makes it like.

T. So you want this half full with dry sand. Is that right? Alright, half full. We put it on, and the other one's full to the brim. What's going to happen? Ask me. Rebecca?

St. The one's that already on.....

T. Shall we try? Watch.

St. Yes.

T. That still doesn't prove that wet sand is heavier than dry sand. What could we do to this, Francine? Put some more sand in, alright. Put some more sand in so that they are now going to be...? Exactly the same.

St. Before, the one that was wet had more moisture than the dry sand.

T. That's right. What's happening there? You can ask me a question? Kevin?

St. They're level.

T. Is that a question?

St. No.

T. Alright, you just tell me what you can see then, please.

(Inaudible)

T. Right. They're both the same so they weigh the same. What should we do to find out whether water is the one thing that makes it get heavier? What should we do? Hands up.

St. Put some water in.

T. Right, we should put some water in. Right Richard. Would you like to go and get some water please, as fast as you can. And we'll see whether your experiment's going to work. Are you ready Richard, or shall we give someone else the job? Fill it up with water from the tap. Who has got a question to ask me what they think will happen? Brett?

St. It's nearly going to balance.

T. Nearly going to balance. Good boy. Jonathan, what did you say?

St. The wet one's going to make it heavier.

T. Ready? Let's find out. We'll add water to this and see what happens. What has happened? Who can tell me? When we put water in, what happened Kevin? What's happening?
What's the water making it do Wade?

St. Making some moisture come into it and that moisture makes it go heavy.

T. Good boy. So we were right, weren't we? What we said before was right. Well done. So heavy sand does weigh more than dry sand because of the water. Right.
LESSON ONE - CONCEPT ATTAINMENT

TEACHER: HT

T.* We're going to have a look in our box here. We've got all sorts of things that have got different feel. When you pick them up and touch them they feel different. I'm going to see how many people can get some things out and tell me what they feel like when they touch them. Ann-marie, come and take something out of our box. You don't need to close your eyes. We're going to describe how they feel. Going to talk about it. Can you tell me something about what you've got in your hand? You tell me what you think it is? Big feel.

St.*:* Soft.

T. Soft - good girl. Well, we're going to see if we can sort out some of these things. Let's put the soft things all in one pile. We'll have a pile here, Ann-marie, and you can put your soft.... Who knows what this is?

St. Cotton.

T. It's not just cotton.

St. Cotton wool.

T. Cotton wool - that's why it's in big fluffs. What do you use cotton wool for?

St. For when you've got a cut.

T. If you've got a cut you might fix it up by putting cotton wool on it. What else does someone use cotton wool for?

St. To make things.

T. Yes, we make things here out of cotton wool don't we? Cecilia, you can come and get something out of the box. We'll do your shoe up after.

St. What are you going to do with that?

T. That's our tape recorder.

St. What are you going to do with the tape recorder?

T. It tapes what people say.

St. I've got one of those tapes.

T. Choose whatever you like. Alright, now. You tell me something about what it feels like, Cecilia, when you touch it.
St. Hard.

T. You think it's hard do you? What else can you tell me about it? Try and tell me something different about it.

St. It's bumpy.

T. You think it's bumpy? You have a feel and tell me what you think about it.

T. She thinks it's hard and you think it's bumpy. Why do you think it's bumpy?

St. There's bumps.

St. And I think it's soft.

St. There's little balls.

T. Well that's funny. She thinks it's soft, and you think it's hard, and you think it's bumpy. I wonder which one it's going to be? It can be all those things can't it, really? Because it's got some hard things that are on it - it's got hard things on it, and when you move it - what happens to it when you move it?

St. It wiggles.

T. It wiggles doesn't it? So, if it wiggles it's usually fairly soft, but those little things are hard, and those little things are bumpy when you run your fingers over them. What pile shall we put that in, then?

St. There.

T. What pile shall we make it?

St. The purse file.

T. Well yes - but we're talking about things that have a feel. We've got soft things there. What shall we say this thing feels like?

St. Hard. The bumpy pile.

T. We'll put it in the bumpy pile because it's got bumpy things on it. Right Nicholas, you choose something out of the box.

St. I'm going to close my eyes and get one out.

T. What does that feel like to touch?

St. Prickly.

T. Prickly. A prickly thing. Who knows what that might be used for?

St. A curler.
T. It's a curler isn't it? What do people use curlers for?

St. To put on your hair to make it curly.

T. Yes, if people like to make their hair curly they put lots of them in their hair don't they? And you said it was prickly. Well we'll have to make a special pile for prickly things, won't we?

St. A prickly pile.

T. Right, so what have we got now? What sort of pile is this one?

St. A bumpy pile.

St. The prickly pile and a soft pile.

T. Well we're going to have to find some more things to go in those piles, aren't we? Can you get something out of the box, Doug?

St. A necklace..........(inaudible).

T. Well, we'll feel that first shall we? What's that feel like?

St. It's round, like a "C".

T. Yes, it looks like a "C" shape. What about when you touch it?

St. It's hard.

T. It's a hard thing. Alright, we'll have to have a hard pile for it.

St. And it can stick to things.

T. It can pick things up. Why can it pick things up? What's it made out of?

St. Metal.

T. Metal. What things do we know that pick things up? What's it called?

St. Magnet.

T. A magnet - that's right. Because it picks things up that are made of metal. It's a magnet... magnetic.

St. I know, let's call this the metal pile.

T. Alright, we'll have a metal pile then.

St. How about making those colours?

T. Well, if we have a metal pile, that's not really what it feels like, is it? That's just describing what ...?
We want to describe what it feels like. What did you say those things felt like?

St. Hard and round and like a "C".

T. OK. So we'll have to put the hard pile here. OK, so we've got a hard pile and we've got a bumpy pile, a prickly pile and a... ?

St. Soft pile.

T. Soft pile. Alright, Shannon it's your turn to have a look. Can you move out of his way Nicholas, he can't reach when you're in the way. Oh, what have we got here? What does that feel like?

St. Bounces.

T. It bounces - it moves doesn't it, when you pull it, it moves in and out.

St. I know what it does - it goes up, it goes down steps.

T. Yes, it can go down steps. Has anybody seen anybody use one of those things before?

St. Yes.

T. What are they called?

St. Slinkies.

T. Slinkies? There's another word for those - they're called springs. In a bed you have a spring, like that. When you sit on your bed....

St. It bumps.

T. Yes, it moves back into place. It springs back. If you let it go - you watch. You hold your end and I'll let it go. See how it springs back out again? It's a spring. What does it feel like when you touch it?

St. Hard.

T. It's a hard thing. Where's our hard pile? Alright, let's put it in our hard pile.

St. My bed's got springs in it.

T. Your bed's got springs. Who's got a sofa at home that they sit on? A lounge suite? They've got springs in them haven't they?

St. Yes, we have got a lounge. Me and Eric has got a lounge.

T. Have you? Right, who hasn't had a turn? Nathan, you can get something out now please. And we'll find what else we've got. We've got one, two, three, four piles now. What have you got there? What does it feel like when you
touch it?

St. Furry.

T. Furry. That's one way to describe it. What else does fur feel like?

St. Hard.

T. You think so? You have a feel of it.

St. Why have we got those things up there?

T. Oh, we'll talk about that later. Run your fingers along it and tell me what it feels like. We're talking about this one here. Nobody's listening very well. You put your hands on there. What does that feel like?

St. Soft.

T. It's a soft thing. Where's our soft pile?

St. There.

T. Alright, so we've got a cotton wool, and what's this?

St. Carpet.

T. Carpet. So we've got cotton wool and carpet in our soft pile, haven't we? And we've got what in our hard pile? Spring...

St. Magnet and a tin and a prickly pile - there's a curler.

T. Yes, and what have we got in our bumpy file?

St. A purse.

T. A little purse with beads on it.

St. And I got a purse.

T. Right, Ann-Marie. You can choose something out of the box this time, and let's see what else we can find.

St. And why aren't we going to put the tape on?

T. It's on. We'll listen to it afterwards. See what she finds.

St. I've got puppets at home. I'll bring one.

T. Right, now let's have a look at what Anne-Marie's got. What does that feel like?

St. Hard.

T. Something hard. Do you know what she has in her hand?

St. Mirror.
T. Is it a mirror? Can you see yourself in it? Not really, can you? Has anybody seen one of these on the floor in your bathroom?

St. No, we've only got squares in our bathrooms.

T. You've got squares in your bathroom. But they're made of the same sort of material, aren't they? They're called tiles.

St. Oh, we've got tiles in our bathroom.

T. Sometimes you might have tiles in the kitchen, around your sink. Has anybody got tiles in their kitchen?

St. Yes.

T. OK. Now, what pile does that go in?

St. Hard.

T. Hard pile. Right. Cecilia, you have a look in the box and see what you can find this time. We've got lots of things in our hard pile, haven't we? Right. You tell me what that feels like to touch?

St. Carpet.

T. Yes, but what does it feel like to touch? We know what it is.

St. It's paper.

T. Yes, it's made of paper. What does it feel like when we touch it though?

St. Soft - bumpy -

St. Bumpy and it's hard.

T. Well, she says it's soft and you say it's hard. You have a feel and see if you agree with her.

St. I think it's hard.

T. What else could we say about it? What about it's shape?

St. Bumpy.

T. Yes, if you have a look you can see.... You run your finger along there and see what happens. It goes up and down doesn't it?

St. Bumpy.

T. Where's our bumpy pile? Can you find the bumpy pile, Cecilia?

St. There.
T. We'll have a couple more turns then we'll go and do something else. Who can tell her what pile that is?

St. Soft pile.

T. What was this pile here?

St. Metal pile.

T. What did we say about the way they felt? Hard aren't they? What did we say about this one here? What did they feel like to touch?

St. Round and like a "C" and hard.

T. What does it feel like to touch though?

St. Like a "C".

T. What does it feel like? You hold that and tell me what it feels like.

St. Metal.

T. But it doesn't feel like metal. What does it feel like to touch. You described what it looks like. We want to know what it feels like.

St. Hard.

T. It's something hard, so they're all the hard things. Nicholas, you have a turn and look in the box. What does that one feel like?

St. Soft.

T. Very soft isn't it. Wonder what it is?

St. Sticky.

T. It's sticky as well is it? Oh, it is too. Do you want to have a feel Shannon?

St. On the side it's sticky.

T. It's sticky on one side. Is it sticky on the other side too?

St. Yes, it's sticky everywhere. There too.

T. What is it?

St. Foam. Sticky foam.

T. What can you use foam for?

St. Ring up.
T. No, not "phone". Foam... with a 'm' sound. It's what you're holding. Have a think about it. What do you use foam for?

St. It's soft.

T. Let's put it in our soft pile.

St. I can see three cans in there.

T. Let's put all those soft things on top of that one. Pop it down Emily. There we are, we've got how many things in our soft pile?

St. Three.

T. Let's count them.

St. One, Two, Three.

T. Three right. How many things in our hard pile?

St. One, Two, Three, Four.

T. Four things. How many things in our bumpy pile?

St. One.

T. One. Alright. We'll have one more go. Doug, you can have a look in the box, and choose something different.

St. Then we listen for our voices.

T. You listen to your voices. Oh, what have you got there? What does that feel like to touch?

St. It's big......... and hard. Round at the end, in here and long.

T. He's describing it very well, isn't he? What about, when you put it on your cheek, what does it feel like?

St. That's cold.

T. Cold? Perhaps we need a cold pile.

St. Can I have a turn? It's cold.

T. What pile shall we make that? Nicholas, you're being silly. Is that a separate pile? What pile shall we put it in? Shall we make a pile for it, or.......

St. The spoon pile.

T. What about what it feels like? You said it was cold and we said it was hard...

St. No, the cold pile.

T. What did you say?
St. Steel.
St. Spoon.
T. Yes, we know it's a spoon, but we're talking about how it feels.
St. Steel.
T. That's what it's made out of. That's not how it feels though.
St. Plastic.
St. No.
T. You feel it, tell me what it feels like. How does it feel? What does it feel like?
St. I don't know.
St. Hard?
T. Well, remember when we put it on your cheek? What did we say it was?
St. Cold.
T. Cold, wasn't it? So, let's put it in a cold pile. Everyone seems to agree that it's cold, don't they?
St. And steel.
T. Right, why did we decide to put all these things here, in this pile?
St. Because they're soft and this one's got......
St. Hard.
St. Bumpy pile, the cold pile, the prickley pile and the steel.....
St. Hard pile.
St. Metal.
T. What sort of things did we put in the hard pile?
St. A spring, a magnet, a tin and a tile.
T. Why did we put those in that pile though? Apart from being hard - we know they're all hard, but.....
St. Different.
T. They're all different aren't they, those ones? Who can tell me what they've got in common? What have they got in common, about those ones. What's the same about all
those things?

St. Steel.

T. Well yes, they're steel too.

St. They're all metal.

T. Well, ... what about this, this tile, it's not metal is it?

St. No.

St. They're all hard.

T. They're all hard, that's right, so that's something that they've got in common, isn't it? They're all hard. Right, I'll find something and describe it. Noisy isn't it? I can hear it making a noise.

St. A carton.

T. It feels - you have a feel and see what you can tell me about how it feels.

St. Bumpy.

T. You think it's bumpy?

St. I think it's bumpy.

T. You think it's bumpy too? What do you think about it, Peta?

St. Plastic.

T. You think it's plastic. We know it's plastic by looking at it. What does it feel like?

St. Soft.

T. You think it's soft, do you? So somebody thinks it's soft and a lot of people think it's bumpy. So which pile should we put it on?

St. Bumpy pile.

T. You think it goes on the bumpy pile? Give Nathan a feel, Cecilia. That's not Nathan, that's Doug.

St. That's bumpy.

T. Alright, so we've got something that's made of plastic on our bumpy pile. So, although all these things are made of different things, they've all got the same feel, haven't they? That one's made out of... what?

St. Bumpy.

T. What's it made out of?
St. Paper.

T. Paper. What's this one made out of?

St. Plastic.

T. Plastic. What's this one made out of?

St. And this one's made out of foam, I mean material.

T. Material. They're all made out of different things, but what's common about them. What's the same about them all?

St. They're all bumpy.

T. They're all bumpy. Yes, that's right. So all those things are bumpy - all those things are soft - all those things are...?

St. Hard.

T. That's?

St. Hard.

St. Cold.

St. Soft.

T. Cold. That's our cold pile, isn't it? What was this one?

St. Prickly. It does feel prickly.

T. What do you think they might feel like?

St. Horseshoe. It's real hard.

T. It's very hard isn't it?

St. Oh, you should put that on your door.

T. Why should I put it on my door?

St. 'Cos, if you put it this way it's for good luck, and you put it that way it's for bad luck.

T. Oh, we don't want any bad luck do we?

St. And so you can knock it.

T. Horses wear shoes don't they? They wear shoes. That stops them getting sore feet when they're galloping and running round in the paddocks.

St. Does it hurt?
T. No, it doesn't hurt them. They have little nails that go in those holes there and they bang them into their hooves.

St. So it must 'urt.

T. No, it doesn't hurt them because they've got bone on the bottom of their hooves, so they can't feel it. Not like you or me. If somebody tried to bang a shoe in our foot we'd feel it, wouldn't we?

St. Yes, we'd say 'ouch'.

T. Because we've got soft skin, but they haven't got soft skin. Which pile does this go in?

St. Hard.

T. Hard pile. We've got lots of hard things. Hard and soft, bumpy and cold. What does this feel like if we run our fingers over it?

St. Cold.

T. Apart from cold, what else does it feel like?

St. Hot.

T. No, it can't be hot and cold at the same time.

St. A little........um........skinny?

St. Hot?

St. Warm?

St. Big and thin?

St. Hard?

St. But why isn't the voice on there?

T. Listen Nicholas please. We're talking about what's in Doug's hand.

St. A spoon.

T. Yes. How does it feel, apart from being cold, what's another word that could describe it? If you run your fingers along, can you feel any bumps in it?

St. No.

T. No. So what's another word for it?

St. But if you go this way you can feel that bump there.
T. Oh, that's just where it joins on though. It's smooth. That's a word to describe something that hasn't got any bumps, that you can run your fingers along and you won't feel any bumps in the way. It's smooth.

St. It's got bumps inside.
LESSON TWO - CONCEPT ATTAINMENT

TEACHER: HT

T.* In our feely bag there are lots of things that have a
different feel about them. We're going to get one person
at a time to come up and take one out and feel it, and
tell me what it feels like. We're just going to put our
hand inside, pick it up and tell everyone else what it
feels like, without actually.......(inaudible) Let me
see, Doug,.... you come and have first go. Put your hand
in there, pick something out and tell everyone what you
think it is.

St.**Well, you can tell what it is.

T. What does it feel like?

St. Well, it's a little bumpy. It's just like a tank, just
like a lacy band that goes outside something, and ..... 
they're over there.

T. Well, that's a lot of things you've told us. It's
bumpy.... with things around it...... (inaudible) like
a tank, is that right? ........ like an army tank,
and we have......

St. Well, I'll show you one....

T. Yes, you show us the one you held in your hand. Doug.
Not over there love. The one you held in your hand.
There you are. Who knows what that is?

St. A toy.

T. ........ an army tank. A caterpillar. It runs without
wheels. We can put that in our...... pile. We have other
piles now. Right, so we're going to make a line here.
And all the other things that go in this pile
are.........?

St. (inaudible).

T. That's right, so we put our caterpillar...... OK that's
our caterpillar track. Carl you can have a go now. Feel
something and describe it to us.

St. It feels hard, like a triangle made out of wood.

T. Triangle made out of wood. Well let's see if he's right.
He is too. Good boy,that was very good. He thought about
all the different things it felt hard, it was like wood
and he used his fingers to work out what the shape was.
So that's going to go in what sort of pile?

St. Square.

T*: Teacher
St**: Student
St. Hard.

St. Triangle pile.

T. What do you say......?

St. Hard.

T. Hard, so we're going to make a 'hard' pile, aren't we? The wooden triangle.........(inaudible) OK, there we are. Put that with our pile down here. Now. You can have a turn, Nathan. Put your hand in. Tell us a little bit about what it feels like.

St. Half of a round thing.

T. Half of a round thing.

St. It squashes.

T. It squashes? I wonder what it might be?

St. I think it's one of them round....... 

St. I think it's play dough.

T. If it's something that squashes, what could we say about it?

St. Clay.

T. Could be.

St. It's white.

T. But you can't see that it's white.....

St. I know it's white because I saw it when the bag was open.

T. Oh did you? Well, you tell us a little bit about it. It squashes, it's round....... 

St. It's half round... it's an eggshell.

T. When you squash something, what does it tell you about it? Can you squash the floor?

St. Yes.

St. No.

T. Why can't you squash the floor?

St. It's too hard.

T. It's too hard. So if you can squash that, what does that mean? If the floor is too hard to squash, what does that say about the egg-shell?

St. It's soft.
T. Yes, an egg-shell is soft. If the floor's hard and you can't push it down......

St. See I knew it. I saw it through the hole.

T. Oh trust you. OK, so that's an egg-shell. Squashy isn't it? I don't think we could really call it (inaudible) even though it's squashed... What shall be put that in? What pile shall we make the egg-shell go in?

St. The hard pile.

T. You think so?

St. The soft pile.

St. The hard pile.

T. ............ you think it goes in the hard pile? Well what about you put the broken egg shell in the soft pile and a full egg in the hard pile? Because if the egg was boiled till it was hard you wouldn't be able to break the shell. Oh, here we are. We'll put an egg in there..... (Lots of class noise). Right, there you go Nathan. Your turn to...... Right, now you put your hand in. Put it in, pick something up and tell us what it feels like. Tell us something about it. Pick it up... feel it. Tell us what it feels like.

St. It's hard.

T. You think it's hard. Can you tell us something else about it?

St. Like a fish.

T. Like fish? Just hold the one thing in your hand...... (inaudible). Can you tell a little bit about what it might be? Big or small, or........

St. A circle.

T. It's a circle? Let's see what she's got. Now, she didn't describe it very well, did she? It's not really a circle. It's got a lot of things on it. When you run your fingers along, what does it feel like?

St. Bumpy.

T. Bumpy. And prickly at the top. She said it was hard. Which one shall be put it in. Which pile.

St. The prickly pile.

T. The prickly pile?

St. The hard pile.

St. The bumpy pile.
T. Well we'll put it in a prickly pile and in a bumpy pile and in a hardpile. We'll put one in each pile. What is it by the way?

St. Um...........it's on the telly.

T. (inaudible).

St. The bumpy pile and the hard pile.

T. OK, one more. OK, Shannon, you can come out. Pick something out and tell us what it feels like.

(inaudible) You tell me something about it. You tell me what.... Why is it bumpy?

(Noise - Noise - Noise - Noise)

T. Let's see what happens when we put some of this on.

St. Warm.

T. Alright, what about this one?

St. Cold.

T. What can you tell me about the difference between the two of them?

St. That one's lumpy.

T. That one's lumpy, and what's that one over there?

St. Mushy.

T. Mushy. Lumpy and mushy.

(Noise)

St. This still feels warm.

T. Still feels warm? What can you think of that feels...... what are some other things that feel warm?

St. Kettle.

T. Kettle, yes. The kettle's very warm. It's hot.

St. Milo.

T. Milo, yes.

St. Coffee.

T. Coffee.

St. Tea.

T. Tea.
St. The sun is very hot.

T. The sun is hot - that's a good one. If you look straight at it it will hurt your eyes, yes. What are you going there Ben?

St. I made a pattern.

T. You've made a pattern. How did you make your pattern?

St. I just did that.

T. (inaudible) your hand. And what happened to the tape when you did that?

St. It makes a banging sound.

T. Yes, and what happens to the tape?

St. It goes all lumpy.

(Noise - Noise - Noise).

St. Look at them ear rings.

T. Yes, they're lovely. (Noise - noise). What's the difference? One's sticky? What's the other one?

St. It's warm.

T. It's warm and it's...? What's happened to it? Does that one move the same way as that one?

St. No.

T. How does that one move?

St. It just falls off your hand.

T. It falls off your hand. Does that one fall off your hand? No. so that's the thin one but the thick one

(Noise)

St. How did you make that?

T. I just made it......

St. Look at all the paint I've got.

T. How did you get it.

St. Just.........

T. You use the edges of your hands don't you, to scoop it all up.

St. Like a bull-dozer.
T. Like a bull-dozer. Bull dozers scoop up sand, don't they? Scoop it, loop it,...... they're all words that sound the same.

St. And stupid!

T. Oh, that's not a very nice word. What do you think might be in the kettle?

St. Hot water.

T. Hot water. Let's put it in here. Can you see something happening? What's happening? What's all this here?

St. Steam.

T. Steam. Yes. Steam comes out of a hot kettle. That's all the water evaporating. Now I'm going to mix all this up. Put two hands out in front of you and we're going to see what happens when we put two different sorts of paper on it. Michelle, have you got one hand ready? Right, put that on there and we'll put this one on there. Can you tell me which one - what this one feel like?

St. Hot.

T. Hot. One feels hot and one feels cold. Can you tell me something about that one? Something else about it?

St. ......... falls off.

T. That one falls off. Why do you think that one's falling off?

St. Because it's all melty.

T. It's all melty? It's all runny isn't it, that one? Let's see if David can see that. There you are David. We'll put some on you. Some there and some there. What's the difference between those two?

St. That one's cold and that one's hot.

T. That one's cold and that one's hot. And what happened to that one?

St. It fell off.

T. It fell off? What happened to this one?

St. It stayed on.

T. I wonder why it stays on? Can you think of a reason why it might be staying on you?

St. 'Cos it's cold.

T. Do you think that's why? 'Cos it's cold? That one fell off you - that one's still there. Why do you think it's still there? What happened to is?
St. It's melting.

T. Well, it's moving very slowly. This one is thin and this one is thick, stuck together What's happening to your sticky tape now, Michelle? Michelle, what's happening to your sticky tape now?

St. It's going all lumpy.

T. It's going all lumpy. Rocky, quiet there please. What's happening to your sticky tape, Jamie?

St. It's floppy.

T. Floppy? What are you doing to it now?

St. Wiping it off.

St. Look, I made a hand.

T. You made a hand print did you?

St. This is like paint.

T. Like paint? What happens when you do that, Michelle?

St. It goes on your hand.

T. Yes, it goes in between your fingers, doesn't it.

T. What does it feel like?

St. Cold.

T. What about this one?

St. Hot.

T. What can you tell me about that one?

St. That one's wobbly and that one's not.

T. One's wobbly and one's not. Yes, I wonder why this one's wobbly?

St. 'Cos it's got water in it.

T. It's got lots of water and that one's only got a little bit, hasn't it? Goodness me, what are you doing, Michelle?

St. (inaudible).

T. How are you doing that? What's happening...........

(Noise - Noise - Noise).

And some in this hand. What does that one feel like?
St. Cold.

T. Cold. What does that one feel like?

St. Hot.

T. Hot. What's happening to that one?

St. It's running out of my hand.

T. It's running out of your hand. What about that one?

St. It isn't.

T. It isn't. I wonder why then?

St. Sticky.

T. That one's all sticky and this one is......?

St. Runny.

T. Runny. One's runny, one's thin and one's thick. What happens when you squeeze them both? One hand feels cold and one hand feels hot. Is that true? Alright, let's put some on there. What about that one? What does that one feel like?

St. Cold.

T. What else does it feel like? Can you tell me something else about how it feels? What happens when you squeeze it?

St. It falls.

T. It falls. Can you see how slowly it slips out of your hand? See it slowly dripping. What about if you put this one one. What about that one, how does that feel?

St. It's hot.

T. That's hot and what does it do?

St. It drips.

T. It drips. Is it going to drip the same way as that one?

St. No.

T. What's different about it?

St. That one........

T. That one - you said that one drips slowly. What about this one here? What does that one do?

St. It drips fast.
T. It drips fast, doesn't it? There we are. Excuse me Lynette please. What happens when you put your hands in the finger paint? What do you do with it?

St. You can dip your fingers in.

T. Yes, and what happens?

St. You can make circles.

T. You can make things - you can make circles. What part of you is making the circles?

St. You go round.

T. What's making the circles though. What's this?

St. (inaudible).

T. (inaudible) making the circles isn't it.

St. I want to have a turn afterwards.

T. Yes, you will in a minute after........

St. I'm going to have a turn after......

St. This is a pencil sharpener.

T. Is it? Goodness me. What's happening to the paint now, Linda?

St. It's nice and cold.

T. Nice and cold, is it?

T. What's that?

St. It's gooey.

T. It's all gooey? Yours has got glue in it do you think? What do those things feel like when you touch them?

St. Hard.

T. Hard things in it. What about the rest of it? Does it feel hard, does it all feel hard? What does the other part of it feel like?

St. Soft.

T. Soft. Finger paint's soft when you move it around isn't it? Do you want some more?

St. Hot.

T. Hm, hm.

St. Colder.
T. Colder, yes. Hot and cold. Oh, that's nice and thick isn't it? All bunched up in there.

(Noise — Noise).

T. So first we've got those two. Put those things up here.

St. We've got tomatoes... and milk.

T. Milk. Who knows that this is?

St. Yoghurt.

T. Yoghurt. What do you think this might be?

St. Salad.

T. Well, yes, it's like that. It's got a special name though. You put it in your salad, it makes it taste nice. Has anyone heard of mayonnaise? No?

St. I had it in my hamburger.

T. You had it in your hamburger did you? Well, that's called mayonnaise. It's a white colour isn't it? And it's like a cream.

St. And it's made out of butter.

T. Yes, it's got butter in it, and it's got eggs, vegetable oil, sugar, all sorts of things. Right. What's this one here?

St. Peanut paste.

T. Peanut paste.

St. Or peanut butter.

T. Or peanut butter, yes. Some people call it peanut paste and some people call it peanut butter...... And that's cream.

St. Tomato soup.

T. Tomato soup. This is called tomato puree. It's not really a soup. You can use to make - or to add to your soup.

St. You could put vegetables in it.

T. You could, too.

St. You could chop them up and put them in... and meat as well.

T. Yes. You can use this in a casserole if you want to. Some mums make casseroles and they put meat in, and vegetables and they put tomato puree in it as well to give it a bit of flavour.
St. My mum does.

T. Does she?

St. I like that, that's lovely.

T. Very tasty. It's made out of tomatoes, isn't it?

St. Delicious.

St. So is tomato sauce.

St. I have that on cheese on toast.

T. Ugh, you have that on cheese on toast, do you?

St. I have that on bread.

St. And macaroni.

T. Oh yes, I've heard of it being on macaroni. What else can you have tomato sauce on?

St. Steak.

T. Steak and sausages, yes, that would be nice.

St. Chips.

T. You have them on chips do you?

St. Hamburgers.

St. I have them on fish and chips sometimes.

St. I have pepper and salt on fish and chips.

T. Who knows what's in this container? Sophie and Ben?

St. Vinegar.

T. No. What can you see in there?

St. Oil.

T. Yes, there's a bit of oil.

St. Vegetables.

T. It's got a little bit of vegetable all chopped up inside.

St. A little bit of carrot.

T. A little tiny bit of carrot.

St. Chilli.
T. Some chillies yes, and capsicum, little capsicum chopped up. And you use this in you salads too. This is called salad dressing. Right, OK, So we've got salad dressing and we've got oil, cream, orange juice, tomato sauce, and what's this one?

St. Yoghurt - flavoured?

T. Yoghurt, passionfruit yoghurt. What was this one called? Do you remember the name?

St. Hamburger dressing.

T. Well not really. The name starts with a 'MMM'. Say it - mayonnaise.

St. Peanut paste.

T. Peanut paste.

St. Tomato.....

T. It wasn't soup remember.

St. Tomato sauce.

T. Well ..... Kelly, it's called puree, tomato puree. Right. Now I'm going to put some of this tomato sauce......there we are. In the container. I'm going to ask you to tell me what happens to the tomato sauce when I put it in a container. What's it do?

St. It stops in. Sometimes my dad puts a knife and turns it around and turns it up and down a bit.

T. What if I shake it, it might help.

St. That'll make it runny.

T. That'll make it runny do you think? Now let's see. What's happening to it?

St. It's runny.

T. Yes, it's running more. It's pouring into the container, isn't it? Can you tell me something about the way it's going into the container?

St. It's running.

T. It's running into the container, yes.

St. It's thick.

T. Good girl, it's thick. Can you see how it comes into the...... All very thick, and it comes out - not terribly fast really, does it? It comes out quite slowly. In big blobs. We should have some sausages shouldn't we, then we could use our tomato sauce.
St. Dip your finger.
T. I beg your pardon?
St. Dip your finger.
T. Dip my finger.
St. Do you know what to do with tomato sauce if it doesn't come out? I bang it on the ground.
T. Beg your pardon Barbara?
St. (inaudible).
T. Oh does it? I don't know, I've never found that out. OK, so we've said that the tomato sauce was thick when it was poured into the container. What happens when we pour.....
St. That'll be easy to pour.
T. You think that'll be easy to pour? Why do you think that'll be easy to pour?
St. 'Cos it's just drinking stuff.
T. Well, you could drink tomato sauce if you wanted to, I suppose.
St. Yum yum. We could drink that.
T. Right down Christopher. You'll be able to see if we hold it up high.
St. It makes a noise.
T. Comes out quickly doesn't it, and it makes a noise. Did the tomato sauce make a noise?
St. No.
T. It didn't really make much of a noise.
St. I heard it.
St. Miss Thomas, let's drink it.
T. So, the tomato juice comes out of.....
St. Oranges.
T. Tomatoes don't come out of oranges. Tomato sauce comes out of tomatoes. Orange juice comes out of oranges and orange juice comes out quickly, and tomato sauce comes out ....? 
St. Slowly.
T. Slowly. Tomato sauce is thick and orange juice is....?

St. Thin.

T. Thin, that's right, it comes out as a thin liquid. All these things are called liquids, because they move when you tip them. They move. When you pour them out they move.

St. Miss Thomas, why don't we drink it?

T. Oh, we'll have it a bit later on. OK, that's our orange juice. Right, now let's try the next one. Which one shall we try?

St. Milk.

T. Try the milk?

St. No, cream. Cream.

T. Alright. Yes, I know, I've seen it Catherine. You've already shown me twice. OK. They've got really clever ways of putting lids on cream and orange juice haven't they? Have you seen these types of lids before?

St. Yes.

St. No.

T. You pull a bit of plastic off and then you can lift them off easily.

St. Sometimes they are like the milk cartons. I love cream.

T. I like cream too.

St. So do I.

T. How do we eat the cream?

St. Put it on cakes.

St. On puddings.

T. Put it on puddings, cakes. What does mummy do to it though, before she puts it onto a cake?

St. Mix it.

T. Yes, she mixes it up.

St. Puts colouring.

T. Yes, she might put colouring in it. Why does she mix it up? What happens to it?

St. It goes coloured.

T. Well, does it go hard.
St. No.

T. No, really. What happens to it?

St. It goes all thick.

St. It goes all bubbly.

St. Sometimes it...... when it goes bubbly.

T. What happens when you beat it up though.

St. Goes all creamy, more.

T. It gets creamier, yes, Jodie?

St. It goes thinner and runny.

T. When you mix it up, does it go runny? I don't think really that's what happens. Ben and Jason you're not listening very well there. You watch what happens to the cream. It's quite thin isn't it? it runs.

St. Quickly.

T. Quickly, yes. Well come in here and we'll see what happens to it. It comes out a thin liquid doesn't it, that way. It's thin when I put it in there, then I whip it up. What do you think might happen to it then?

St. It goes bubbly.

T. Does it go bubbly? Well, let's see.

St. We'll soon find out.

T. Soon find out, won't we.

St. My Mum's got a beater with a blue handle and blue thing to hold on to.

T. The beaters are going round. Look out, all those things.... Would you like to hold it for me Michelle?

St. My mum does it and I hold it for her.

St. It's going through there.

T. Yes, it's going throug the beater, isn't it.

St. Sometimes mum gives me the beaters to lick.

T. Does she? Right, who can tell me what's starting to happen to our cream?

St. Getting bubbly.

St. Getting bumpy.
T. It's getting harder for me to make the beaters go round.

St. Harder and harder.

St. It is getting a little bit tough to turn it around?

T. Yes, it's getting tough to turn it around. Why is it getting tough to turn it around? What's happening to it?

St. Getting harder.

T. No it's not hard. Look, it's still soft.

St. Getting thick.

T. Thick, that's the word. Good boy! It's getting thicker. It was nice and thin when it was in this container, and now its......? Thick. So thick things don't move as much as thin things do, because I have a lot of trouble making these beaters go round, because the mixture's too thick. Do you know what happens to cream when you go on mixing it? and mixing it and mixing? It gets thicker and thicker and thicker and it turns into.... ?

St. Milk.

T. No, not when it gets thicker. Milk's......?

St. Cream.

T. It's already cream. What do you have on your bread?

St. Butter.

T. Butter. Did you know that cream will become butter if you keep on mixing it?

St. If you had a beater and it was electric, it wouldn't be hard to turn.

T. No, well an electric beater would be much easier, wouldn't it?

St. It just beats it and beats it and never stops.

T. It beats and beats and never stops. Well it stops when you turn the power off. There it is, see how thick it is now?

St. Can I lick it? Can I lick it?

T. We'll have some later. Right. What about...... What's this one?

St. Salad dressing.

T. Salad dressing. good boy. Let's try......

(noise - noise - noise).
T. Right, let's watch and see what happens to the salad dressing.

St. Yuk, it's thin.

T. It's thin, good girl. It's thin. Why is it thin. What's happening to it?

St. It's splashing.

T. It's splashing. It's splashing me! All those little things inside it are landing heavily. Can you hear the sound it makes?

St. Like horses make. Like rain.

T. Yes, they make a clip-clopping sound. It had a smell, didn't it, that one? So sometimes, sometimes you can find out about things by smelling them, and by... what else? You can find out about things by smelling them, and you can find out about things by what?

St. Tasting them, yes.

T. Tasting them. Yes, that's right. How else can you find out about things?

St. Smelling them.

T. Let's all help to pack up now and we'll do some more after play.
T.*  .... to have a look at all the different collections I've got there and tell me what you think about them. Just tell me what you think about all those different collections there on the table. What do you think about them? Have a look at them all, and tell me what you think. Jason, what do you think?

St.** Some of the these aren't all exact. Some of them are but some of them aren't.

T. Why aren't they exactly the same?

St. Well, not all of them are. Take these for instance... they're the same thing but they're not the same colour. As for these, this is a Coke can and these two are beer cans. These two are the same, these two - two things different are size and this one's cover. I suppose you could say these ones are the same but maybe not, because the other two don't have this bit here on, and as for these two, they're alright, and these two - maybe you could say no, because of the pattern there, but......

T. Alright. And so you're saying although some of them are the same colour, some of them are not the same. Some of them are the same size and some are not. That's true, that's very true. But what else can you tell me about the collections there. Have a careful look.

St. Well, every set has got three in each.

T. Good girl. Every set - we've got lots of sets there - we've got three bottle tops, three cubes, three straws, three round discs, three beads, three big tops, three rods. They all have the same..... what Christian? They all have....?

St. The same amount of things.

T. They all have the same amount of things. Alright then. I'm going to change them around, and I want you to do something for me. Do you think it matters that they're all not cubes, and they're all not straws. Do you think that really....

St. No.

T. Why doesn't it matter, Heath?

St. Well, there's different shapes and different things..... Like, you think everything was square, like on a car, then it wouldn't go as fast as round things......

St. So it doesn't really matter. We've decided that they've all got the same number.

St. It wouldn't really matter because...... (Inaudible) ..... bang, bang, bang!

T*:  Teacher  St**: Student
T.* I'm going to set up a collection here, and I'm going to get someone to make it look the same value, like... Emma, I'm going to put three tops there and I'm going to put one thing there. Can you make those collections the same amount?

St.**Yes.

T. How are you going to do it?

St. Take away two of the lids.

T. You could take two of the lids, so you're left with one each, or...?

St. Or you could put them on two cubes.

T. Right. And on the two cubes? Are the collections the same now, Megan?

St. Yes, but (inaudible) take one of them away.

T. Right, you could put two on that side and two on that side, so we could do lots of things. Alright, Megan can you make up a collection so that Christian can finish it off and make it the same?

(Inaudible).

T. Right, so you've put them that way so Christian can see. Right, Christian, first of all can you tell us what the collection is? The one collection that Megan's given us?

St. Tops and beads.

T. How many?

St. Six.

T. Right. Is he right there?

St. Yes.

T. How do you know these collections aren't the same?

St. Because you added...... that, or you could count that and see that...... count by two or three and if they were alright you would know, because there's three of these and three of them and they're all different.

T. Right, how many in each collection? It might be an easier way... how many in each collection? How many on that side?

St. Six.

T. And how many on that side?

St. Six.

T. Are they the same?
St. Yes.

T. Why?

St. Because ....... like Kirsten said, she has three..... and so if there was, you put two things on each side that means they must be the same.

T. Can someone tell Heath a simpler way? Megan?

St. Because there's the same amount on each side.

T. Good girl, there's six on that side and there's six on that side, so they've got to be the ...?

St. Same.

T. Kirsten, can you make up a collection? You can choose someone - you make up your own and get someone to make it the same.

St. We've got ... there's one on one side and there's more on the other so you put three, two and one more and that gives the same amount.

T. That's the same amount - are you sure? How many on each side?

St. Nine.

T. Nine, so by saying that it's the same amount, what are we saying Jason? What's another way of saying that they're the same amount?

St. The numbers of what's on each side and what's on the other are the same.

T. The same, so ... the same amount, the same. What's another word we could use for saying 'the same'? We use it all the time with our sums. We could say - they are.....?

St. Equals.

T. Equals. Good boy, Christian. Right. I'm going to put all those away and I'm going to put some (inaudible) cards down. Can you just put all those bits and pieces into that box there. I'm going to put down on the desk a whole pile of cards. I'm going to ask someone to put them into the same sections, so that all the cards have the same value - they're equal. I'm going to put them all down, all over the place. You can help each other out. Thanks, Kirsten. They're all black dots, but they're not all the same. I want you to put them into piles of being the same. You can start. Have a look and see what you think. Make sure you're all not sort of doubling up. Put all the fives piles together.

St. I've got all the sixes here.
T. Have you? Right. What about the last group? Right, just put them into the middle. All your piles. Alright Megan, what can you tell me about those collection of cards? We've got three piles there.

St. Well these ones all equal six.

T. Do they look the same? Does each card look the same?

St. No.

T. Are they the same then?

St. Yes.

T. Why?

St. It doesn't matter what pattern they are, but they all have the same amount of dots.

T. Good girl, that's exactly right. What about that pile, Heath?

St. Well, they are odd, but it doesn't matter, 'cos, it looks something like the same, but it isn't.

T. Right, does that matter?

St. No, it just means that they're all in the right pile and they're all the same.

T. Why are they all the same?

St. 'Cos you can........

T. Why is that pile all the same? Who can help him out? Kirsten?

St. Because if that pile's all the same, well it has to be the same amount of things in one pile.

T. Good girl. How many dots are in that pile?

St. Seven.

T. So all those cards have?

St. Seven.

T. So are they the same?

St. Yes.

T. Why?

St. 'Cos they've all got seven in them.

T. Good boy, they've all got seven dots. Emma, what about this pile? Are they the same?
St. Yes.

T. Why?

St. Because all of the cardboard bits with dots on it have all the same amount.

T. How many have they got?

St. Five.

T. But they're not all the same pattern.

St. But that doesn't matter, because it's still the same amount.

T. Good girl. I'll just put all those piles of dots back in the middle. I'm going to give you a sheet now and it's got all rows of dots on it. Each row has got different amounts. Some are the same, some are not. I want you to cut them out and the rows are the same amount, I want you to glue onto the butcher paper. Glue the ones that are the same onto the butcher paper. Christian can you give each person one of those sheets? Right. Perhaps when you're gluing on, it might be easier to glue downwards like that, because that way you'll fit them all on. If they go down. It's up to you, but it might be easier that way.

St. Some only have little spaces, some have big spaces. They could look as though they all go up to there but they still could have bigger spaces.

T. Good girl. Some of them with the bigger spaces might look like they've got room, but they might not. That's a good point, Megan.

St. You should always count the dots before you stick them on.

T. Why?

St. Because just as Megan has said - you might get tricked because of the bigger space.

T. And so what would you count for, Jason? What are you counting the dots for?

St. You know how Megan said you might get tricked because of that? Well, you don't want to get tricked by that and you can avoid that if you count the dots.

T. Good boy. We'll take the scraps away and you can have more room.
This is Lesson No. 2. What I want you to do this morning is... inside each of your hoops, I want you to make up four collections that are the same. Off you go - four collections that are the same.

St.** How many in each?

T. That's up to you. But I want you to have four different collections inside your hoop.

St. Do they have to be even?

T. I'll say it again Jason. I want you to have four collections that are the same. Organise them in your hoops so that they're all spaced out.

St. One group, two groups, three groups and four groups - now I've got my fourth group.

T. Alright, we'll just wait for Emma.

St. Did you mean the same sort, or...?

T. What do you mean by the same sort?

St. Like if you had one straw and one of these?

T. No, as long as each collection has the same amount. Right, that looks pretty good. You have a look around at everyone else's hoop. I'm going to go around this circle and I want you to tell me what your collections are. Explain to everyone. Kirsten, do you want to start?

St. Well, I've got four draws and four bottle tops and four squares and four circles.

T. Are all Kirsty's the same?

St. Yes.

T. Penny? Good girl. Heath?

St. I've got one circle, one bottle top and one block and one kind of ........ broad bean.

T. Alright, are Heath's collections the same?

St. Yes.

St. I have four straws, four squares and four paper circles and four beads.

T. Are Megan's the same?
St. Yes.

T. Good girl, Megan. Emma?
St. I've got four straws, I've got four bottle tops, four paper circles, and four broad beans.

T. Are Emma's the same?
St. Yes.

T. Yes, good girl. Christian?
St. Four straws, I've got four bottle tops, another four straws, and four paper circles.

T. Are Christian's the same?
St. Yes.

T. Good boy Christian. Jason?
St. In my first group I've got two beans, in my second I've got two blocks, a cotton reel and a bead, for my third I've got four cotton reels and for my last I've got two cool drink bottle tops and two little paper circles.

T. Can I just ask you a question Jason? Are they all in one collection or are you splitting up those collections?
St. They're all split up.

T. So how many collections have you got?
St. Four.

T. The way you explained it, it sounded like you've got more. You said you only had two beans and yet you've got four in a group. Do you understand what I mean?
St. I though I said I had four.

T. You might have - I might have picked you up wrong. I though Jason said two.
St. Yes he did.

T. I'm not worried - how many beans have you got?
St. Four.

T. Right, so in each collection Jason, how many have you got?
St. Four.
T. Is Jason correct?

St. Yes.

T. Right. What I want you to do is - which is going to be fairly easy - I want all the people who have the same amount in their collections to go and stand together. All the people who have a look round the hoops - all the people who've got the same amount in their collections, to go and stand together. You can stand in the middle! Alright. Everyone had the same except for......?

St. Heath.

T. Heath. Heath only had one in each group. Well done. Right, out you go. I want you to put all your collections in the middle. In the middle of your group, because you won't be going to use them again. Now this is what I want you to do. Because you're be going to use one of the hoops - very quickly and very quietly, and don't take too long, go and partner off with someone. Go and sit beside someone... Great. That was nice and quick. What I'd like you to do with your partner is give them a collection and ask them to make up a collection which is the same amount. Take turns at doing it.

St. (Noise - noise).

T. That's enough that's all we're going to need - all them's one group, remember.

St. We're doing pretty good.

St. Let's see if you're right. One, two, three, four, five, six, seven, eight, nine, ten, eleven and one, two, three, four, five six, seven eight, nine, ten, eleven and twelve.

St. No - four, five, six, seven, eight, nine, ten, eleven.

T. Are they the same?

St. Yes.

T. Right, now Emma you have a turn and give Jason one.

St. OK, Emma. You can use some more if you want, because.... (inaudible). Here's a 'hardy', one, two, three, six nine, .....hang on, two, four, six, eight, ten, twelve, fourteen and one more is fifteen. What do you have? One, two, three, four, five, six, seven, eight, nine, ten..... fifteen there. Now we have fourteen there and six there. thirteen there and one, two, three, four, five, six, seven, eight, nine. Nine there. Hang on. Twelve there and ten there. Eleven there and eleven there.

T. Are they the same?

St. One, two, three, four, five, six, seven, eight, nine, ten, eleven. I did it!
T. Are they the same Jason?

St. I think so.

T. Why? How do you know they're both the same?

St. We counted and there's eleven here and eleven there.

T. Good boy. How are you going, Christian and Heath? Have you both had a turn each?

St. Yes.

T. Right, when you've both had a turn each you can go back and sit with your hoop.

St. I had four straws, ....... I had six, I had four..... (noise - noise).

T. That was good. This time, what I want you to do is instead of using your bottle tops and straws and things, I want you to get your piece of paper and crayons - your piece of paper and use all sorts of different coloured crayons, and on your page I want you to draw me four collections that are the same amount. Draw me four different collections and each collection is the same because it has the same amount.

St. Can we have any circles or anything?

T. It's up to you. Don't forget to put your name on the top of the sheet.

St. I think before I do anything I'll divide it into four different sections.

T. Good idea. You don't have to - it's a good idea though. When you've done your first lot, come and show me.

St. This is my first....

T. Alright. Three (inaudible), three squares, three triangles, three straight lines. Well done. Draw me another group of four that are the same.

St. I've got one ..... What do you have to do? One group of four.

T. No. You're drawing four different collections, and they're all the same because they have the same amount in them. Right, most people should just about be finished that. Look, you've got five in each. Good boy. Got your name on it, Heath?

(inaudible).

T. Right, it's only one collection though. You've got to do the other three collections.

St. I've got to do number one - I've got to do number one.......

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T. One, two, three. Got your name on it? Right. One more
minute and then we can stop. One, two, three, four. One,
two, three, four. Right. I'll hang on to your piece of
paper - you go back and put your board down. When you've
done all of it you can come and give me your piece of
paper. And you can put your bits and pieces back into the
box.

St. I'll just do the rest of mine.

T. That's alright, take your time.

St. There we go.

T. Let's have a look. One, two, three. One, two, three.
One, two, three. One, two, three. Good boy. All the same.
LESSON 3 - COGNITIVE MODEL

TEACHER: EH

T.* Lesson No. 3.
I'd like you to have a look at the piece of paper in the middle of the circle. I've drawn some collections there but I haven't finished them off. I'm going to choose different people to come and finish them off because I want them to be the same value. Megan, would you go and do the first one? I've got three crosses equals one circle. Do you think that's right?

St.* No.

T. No. Can you make it right for me? Make it the same? Good girl. What have you done, Megan? Tell everyone else.

St. You add two circles.

T. And how many in each collection now.

St. Three.

T. Three. Are they the same?

St. Yes.

T. Why?

St. Because they're the same amount.

T. Good girl. For my next collection I've got two squares equals nothing. Is that right Jason?

St. No.

T. Can you make it right for me? Make it the same amount?

St. Could you use any kind of shape you want?

T. Yes please.

St. I think I'll put..... Two sticks. There's one box and two boxes.

T. Why did you want two sticks Jason?

St. It makes it even. The same as that.

T. Good boy. Right. Thank you. Well, the next one's a little bit different. We haven't done this type before. I've just drawn six is the same as three strokes. Is that right Kirsten?

St. No.

St. I put - where the six was - I didn't do anything to that, but I did something to the three strokes. I put three more to make it the same as six.

T. Good girl. Thank you. Heath, with the next one, I've got 'three apples is the same as one cross.' Is that right?

St. No.

T. Why isn't it right?

St. Because they both haven't got the same number.

T. Good boy. Can you make them the same amount for me? Can you tell everyone what you did?

St. I added two crosses and that makes it the same because it's both got three in each.

T. Good boy. Christian. In the next one I've got 'three strokes is the same as nothing.' is that right?

St. No.

T. Can you fix it up for me? Make it the same amount? Can you tell everyone what you just drew on the piece of paper?

St. I did three more straws to make it the same amount, so there's three in each group.

T. Right. And a last one for me, Emma. I've got one, two ... 'five triangles is the same as one cross'. Now is that correct?

St. No.

T. Can you make it the same for me? You're having problems aren't you Jason?

St. The tummy ache's gone.

T. Has it? Right. Emma, you tell everyone what you did.

St. I've put four crosses onto it to make it equal.

T. How many have you got now?

St. Five.

T. Right. And how many triangles?

St. Five.

T. Are they the same?

St. Yes.
T. Why?

St. They're the same on each side.

T. Right. I'm going to turn it over, because I drew those pictures. I'm going to ask Keith to come out draw a collection, and then choose someone to make it the same amount as your collection. Right, you can draw any collection that you want and you choose anyone you want to finish it off. Right. You can choose anyone.

St. Jason.

T. Right Jason. Can you tell us what Keith has drawn?

St. He's drawn four crosses equal nothing, which I think is ridiculous.

T., Right, can you fix it up for me?

St. Of course I can.

T. We are getting a smarty, aren't we.

St. A cross goes the other way, and another cross goes the other way. And another cross goes the other way, and another cross goes the other way, and another cross going the other way which makes it even.

T. Right. Kirsten, would you like to come out and draw a collection? And we'll get someone to finish it off. Right, you can choose someone. Oh, good one.

St. She's done nine circles equals one cross.

T. Alright then, What have you drawn?

St. I added eight more crosses to make it even on both sides.

T. Good boy. Last one. Megan, have a go. Good girl. You can choose someone, Megan.

St. Emma.

T. What did she draw Emma?

St. She done six stars equals two stars.

T. Is that right?

St. No.

T. Right, can you fix it up for us? Is it the same now?

St. Yes.

T. Why?

St. Because I put four stars on it.
T. To make it...? To make it what?

St. The same, equal, the same amount on each side.

T. Good girl. Thank you. Christian, you can have your board to lean on. Right. I'm going to give you a piece of paper. You put your name on the top. Because you're using crayons, you'd better be careful they don't get too big. And I've drawn some collections but the collections are not the same. I want you to make the collections the same amount. Get a big sheet and you can start. Put your name at the top.

St. You can hear on the tape when the door slammed.

T. It won't matter. Because yesterday when I taped the other lesson and played it back I could hear Mrs. Smith talking in the background. But that doesn't really matter. Right. ..... Christian..... When you go back in will you put them on the mats, and in that box...... Can you put those things back into the containers for me? Thanks. Emma? ........ and everyone can collect....... Thanks Megan. You people, you can put your crayons away and when you've finished you can go straight out to play. Thank you.

(packing up noises).

St. Pretend that one isn't there and......

T. Well, you haven't done the last one. How about just colouring that in so I know that's not included. Right? And just the last circle there.
LESSON FOUR - COGNITIVE MODEL

TEACHER: EH

Right. I'm going to put, one, two, three, four straws, one block. What does four straws and one block make? Jason?

St.**Five.

T. Can you come and show me another collection that's the same as mine?

T. Right, can you tell us your collection?

St. Two, and one, is three, and two is five.

T. Good boy. Is it the same as mine? Same value? Right Kirsten. Something different. That's the same as mine. Can you tell everyone what it is?

St. Well, I put three blocks and two red circles....

T. Which makes...?

St. Which makes five.

T. Is that the same as Jason's and mine?

St. The same value but it's not the same pattern.

T. Good girl, very good. Heath, will you just do a last one for us? Can you explain yours out loud?

St. Well, I've got four groups and in three groups I've got one, and in the other one I've got two, and altogether it makes five.

T. Well done. Right Megan, can you put them back into the middle? Right? Right, this time we're going to have number stories. And I've written some number stories on a card, and I want you to make your own collection the same as my collection. I've got two and two and two. Christian, can you make your collection the same amount as my card? Good boy. Well done, can you tell everyone what you've done?

St. I've done two blocks, two... two... straight up and down, makes six.

T. And what does my card make it?

St. Six.

T. Well done. Can you put them back in? I've got another one here. It's written a bit differently. I've got a star -
I've got nine stars and five stars on my card. Heath, makes your's the same as mine, the same amount. Good boy, can you read them out?

St. Well, I've got nine straws and five blocks, and altogether that makes fourteen.

T. Good boy. Put them back in? Last one. My card says three and two and one, Emma. Can you make a collection that will be the same amount as my card?

St. Yes, I'm going to put three straws, two red circles and one shoe.

T. And what does that make?

St. Six.

T. And what does my card say?

St. Six.

T. Good girl. Put them back in? Right. This time, what I want you to do is, each person is going to make up their own number story. Then we're all going to move round and try and do another number story with the same amount. Right? You shift the blocks and the straws. Here are the numbers for your collection. Let's clear this up otherwise we're not going to have enough left........... When you've done it stand up. Right, move round to another person's number. Alright, look at their number story. I want you to do your own number story that is the same amount as that... Got to leave these there...

What was at the front? What was the first number story?

St. There was six, and there was six. I mean there was six paper circles and three straws and another three paper circles.

T. And what did that mean?

St. Nine.

T. Right. Nine. And what have you done?

St. I put two tops, two straws, two beans, and two paper circles and one top.

T. And that makes?

St. Nine.

T. Good girl. You put all yours away. Kirsten, can you read out the first one that was there.

St. Well, Nathan put three cotton reels and three large beans and six blocks, and altogether makes twelve.

T. Good girl, what have you done?
St. Well, I put five bottle tops and five red circles and two straws, and altogether makes twelve.

T. Super. You explained it so well. Thank you. Heath, what about yours? What was one of the numbers there?

St. Well, they had five blocks and five cotton reels and one straw, and I put two bottle tops, three beans and another three beans.

T. Are they the same?

St. Yes.

T. How?

St. Because they're both the same number.

T. Good boy. Christian, what are yours?

St. Well, there's four straws, two boxes, one bottle top.

T. What have you done?

St. I've done three red circles and four bottle tops.

T. Are they the same?

St. Yes.

T. Right.

St. They're the same amount.

T. And that is?

St. Seven.

T. Super. Emma?

St. Christian put six straws and he put seven red circles.

T. And what did you do?

St. I put eight circles and five beans.

T. And they made?

St. Thirteen.

T. Super. Jason, last one.

St. Nathan had two blocks and four circles, making six. My first group was a cotton reel and a block..... to two, makes it four, I put a block and a paper circle. Then for my third group, a bottle top to make it five, and last, to make it the same amount, a block.

T. That makes?
St.  Six.

T.  Right.  Everything back in its place.  That was very well done.  Now I've got one last thing for you to do.  You can go back in and finish off the fish.  Put your name at the top.  It's different this time - a little bit different from the other sheets we've done - a little bit harder, which will be good.  You have to make both sides the same.  Make them equal.  You may start as soon as you get it.

Thanks Heath and thanks Megan for doing the tape with me.  Thanks Jason, thanks for doing the tape with me.

St.  That's alright.

St.  I'll take away one on this side.

T.  What's ten take away one?

St.  Nine.

St.  Thank you for letting me do the tape.

T.  That's alright.  Seeing that one's nine, twelve take away how many is the same as nine?  Twelve - count backwards from twelve with me.  Twelve......

St.  Eleven, Ten, nine.

T.  How many jumps back?

St.  Four.

T.  No.  Eleven, ten, nine.  How many jumps?

St.  Three.

T.  Good girl.  Thanks Helen, thanks for doing the tape.  Like to put the boards back for me?  Great.
Lessons One - Inquiry Strategy

Teacher: BR

T.* ......... around you, lots of fascinating and puzzling things occur. And because man is intelligent, and because he can think and wonder, he's not interested in just observing - he wants to know why these things happen, and he wants to explain them, so that they can make sense to him. For example, for a long time man used to wonder what kept the planets in their orbit. Why didn't they collide with one another? They used to wonder why certain rocks would give out rays. They wondered why milk maids never got smallpox while the rest of the population used to die from smallpox epidemics. They wondered what is it that spoilt wine and changed it to vinegar. Why people died of diseases and others didn't. Now some men weren't satisfied with the way things were. They asked questions and they guessed, and they tested out. You can see the pattern - observation, the formation of a hypothesis and the testing out of the hypothesis. And in this way many important discoveries were made. Many of the things that happened - all the wonderful things that happen can be explained today because certain men bothered to ask questions and test the results.

Now today, we want to do something like this. I want you to ask the questions, but you have to be careful of the way you frame the questions. I can only answer "yes" or "no". So that means you will have to do the thinking and the wondering. Now I'm going to heat orange powder. I want you to observe what happens. Now if you cannot see what happens, if you are not satisfied with the observation, then I can let you come up in groups of four and do it. You can also jot down your thoughts on a piece of paper.

There's a bit of orange powder that I'm going to heat. Now first of all we heat it very gently. Can you see the orange powder? Feel free to speak your thoughts. Just observe - we heat it very gently. OK. What do you think's happening?

St.* Changing colour.

T. Kenneth, you put a little bit of it in here so we can compare. Now, hold it up for the class to see. OK, turn around and show them.

St. It went red. Red.

T. OK. Now let's cool it and see what happens.

St. What did you do to it?

T. I'm cooling it now. At the top, can you see a change?

St. It's going orange.

T. The test tube takes some time to cool. So what happens when it cools? Tony?
St. It goes back to the normal colour.

T. What's the normal colour.

St. Orange.

T. OK. Right, we'll heat it again gently. Alright, now what's happened again? I've heated it again. What's happened? Luke, can you see from there?

St. It's gone like the colour it was the first time. I can't see the colour properly from here.

T. You can't see the colour properly from where you are. Alright. If I put the white paper behind it, what colour has it turned? Can you see from there?

St. Dark....

St. Black.

St. Dark Green. You can't really distinguish the colour. It's not black.

T. It's not black. What colour is it?

St. Green.

St. Dark pink.

T. Alright, now what I'll do is I'll heat it strongly. Alright, look carefully. If I put a white piece of paper behind it, perhaps....... OK, now, look closely. What colour has it turned?


T. Alright, what colour's it turned now?

St. Black. Is that black or blue? You can't see from here.

T. In a while I'll let you come up with some of your friends and you can see for yourself. Alright, watch carefully.

(inaudible).

Alright, look carefully now at the test tube. Yes Kim?

St. There's sort of an orange colour close to the top... then it's red then black.

T. There's black there. That's because - the orange there would be because I didn't heat it. Is that all you can observe?

St. There's moisture......

T. Can you speak up louder?

St. There's moisture on the top half....
T. Can you illustrate on the board what you can see? Come on.

St. Mrs. Ross.

T. Yes?

St. ..............one is bigger than the other.

T. If you ask me a question, I must only answer "yes" or "no". I can't tell you what it is, but you have to think of a question to ask.

St. A chemical change, isn't it?

T. Why do you say that?

St. It's integrating.

T. Alright, you say it's moisture over there. Do you see something over there, and over here? What has happened on cooling? What do you say?

St. There was a bit of orange round the glass, now it's all going down the bottom.

T. Alright. Yes?

St. When you heat it does it dry out and turn black? All the moisture dried out, then when it........

T. Now, structure your sentence so that there are not too many things at the same time. Alright, listen please.

St. When you heat it, does it take the moisture out of it? And then, when you cool it does it.....?

T. Now, when you heat it do you take the moisture out of it? Perhaps you do, but can you see any drops of water vapour?

St. No.

T. If it was liquid, wouldn't it flow back? Now there's obviously something there.

St. Put a ........ in it.

T. Why do you want to put a ........ in it?

St. To see if there's gas in it.

(inaudible).

St. What is the orange powder?

T. Alright, someone wants to know what is the orange powder. I cannot say what it is. You have to ask questions to determine the nature. Alright, now, someone says can he put a lighted splint in it. OK, let's try. You're not supposed to look at the book. Alright.
St. It's gone out. It went out. Put a lighted taper in.
   (inaudible).
T. Have you seen what happens......?
St. How would we be able to bubble it through lime water?
T. You think you should bubble it through....Now, this answers your question.
T. What happens? You see the moisture dripping out? Alright, now let's see.
St. This time you can't get it lighted.
St. There's oxygen there, but just now it was....
St. Carbon dioxide makes it go out.
St. Yes, but how can we put it out again.... Watch. Watch. Put it in....
St. It went out....
St. Yes I know. But when the ..... powder was still orange.....
   (inaudible).
St. Can we do it when it's orange?
T. Alright, I can't sit around now. Have a look.
   (inaudible).
St. Could you please put a splint in there while the thing's still orange?
T. Right, give me that.... OK, then.
   (inaudible).
T. Alright come on. Now, somebody's asked me if there's at any stage nitrogen in the tube, and I say, "No, there's no nitrogen in the tube at any stage." Alright, any other questions? Yes?
St. Carbon dioxide?
T. No. No carbon dioxide. Yes?
St. Is it an unknown gas, that we don't know about?
T. No, you do know the gas, but unfortunately we weren't successful in testing for it. Yes?
St. Would it be hydrogen?
T. No. There would have been a 'pop'. Yes?
St. Oxygen?


St. ........................one goes out when you put it in....
T. I don't know - that's not...... You'll just have to keep trying them. Alright?

St. Is it possible that it's a mixture of gases?

T. Not really. It's not a mixture of gases at all. You must try and get to the bottom of it. Can you see one reason why when you put a splint in it it tends to go out. Have you got an answer for that? Alright Marcus?

St. Because the oxygen's used up?

T. Yes.

St. It went out before you went anywhere near the bottle.


St. (inaudible).

T. It could be. It could be so because it makes its own carbon dioxide it just might go out.

St. Could you.... and then take it out and put the splint in?

T. Did I.

St. Could you?

T. Could I? No, I think you'd do it while it's heating. Alright, any more? Aren't you interested to find out what the red substance is that we're heating?

St. Yes.

T. Well, what do you think it is.

St. Oxygen.

T. No. Now is this oxygen? What is the nature of this?

St. It turns red and black.

T. Have you looked carefully at the top of the test tube? Look carefully - something on the test tube. Can't you see? Put up your hands. What do you say - it looks like.....? Come on.

St. Spray paint.

T. Now he says it looks like spray paint. OK? Yes?
St. Precipitation.

T. Now she says precipitation. I say no, not precipitation. Yes?

St. Moisture?

T. No, not moisture. Alright, Joe?

St. Pink powder.

T. He reckons it's pink powder. Heath, what do you think?

St. Dust.

T. Dust? No, it's not dust.

St. Paint.

T. She thinks it's paint.

St. Talcum powder.

T. Talcum powder? No, it's not talcum powder. Look carefully again. Alright, Michael?

St. To look at that thing on the side, is that silver?

T. Now you're coming close to it.

St. Is it mercury?

T. What do you say?

St. Last year we went to this thing at Jarradale to see a load of bauxite. We saw pieces of bauxite and they were orange, and that's orange. Could it be aluminium?

T. Alright, we're getting some good questions. It is aluminium because he had seen bauxite which was red, and he saw the end product - aluminium and he thinks now that bauxite powder and the silvery stuff is aluminium. Well you're coming close to it now, you're getting the idea. Now work close to that again. You're getting the idea. Now please listen. Yes?

St. When it's frozen will it...... together, or does it stay in powder form.

T. Well it's always the powder form at room temperature. Any more questions? Do you think that's bauxite which turns to aluminium on heating? Alright? That's a good guess. Anything else? Yes?

St. Would the heat of the bunsen be less than the heat that's needed for the bauxite to turn to aluminium?

T. Now we haven't established for sure that this is bauxite or aluminium, but you're working on a hypothesis that you have
something that changes into... What is aluminium?

St. Metal.

T. And what is bauxite?

St. Rock. A solid.

T. A solid. Anything else?

St. A powder.

T. A powder. Yes?

St. Is it a mineral?

T. So you want to know is this a mineral? Could be. Alright, you must learn to listen. Now, she's got something to say. Will you please listen?

St. Bauxite and aluminium are two different things and if you have something made of aluminium when it cools down if it goes back to bauxite, it couldn't be aluminium.

T. Good idea. Because the change can be reversed she thinks it's not aluminium. Alright, what else could it be then? Here you have a change from a powder to....?

St. Where do you get mercury from?

T. Aaah, you're getting close to that. Frame your questions so I can say "yes" or "no".

St. Do you get mercury from a powder?

T. Good question. Yes, you can get mercury from a powder. You think the silver stuff is mercury? Alright.

St. Yes.

T. Good. It is mercury. Alright, the silver stuff is mercury. What do you think the powder is?

St. Mercury.

Mercury and bauxite.


St. If it produces oxygen, would it be an... oxide?

T. Alright, he said, "If it produces oxygen will it be an oxide" and I said yes. Very good. Mercury oxide.

St. I knew that.

T. You knew that? Who said he knew that?

St. Geoffrey.
T. Alright that's good. You knew that at the beginning of the experiment. Alright. Now listen. Please pay attention. Now we have seen how by asking questions you can arrive at something that you didn't know. Did you have any idea Miguel that this was mercury oxide?

St. I knew it was a peroxide or an oxide or something like that.

T. But you didn't know it was mercury oxide. But by observation and asking questions you can guess.

St. What happens when you add water to it?

T. Oh, don't worry about that. What happens when we add water to it?

St. (inaudible).

St. It turns into an orange liquid.

T. We'll see whether it goes orange or not.... Now, the next thing I want to ask you is, what kind of questions do you think that you asked, enabled you to come to this conclusion, that it was mercury oxide. Now what kind of questions led you to go along that line. Yes?

St. Questions where something is chucked out.... any question where something you know is not that.....

T. Alright, yes?

St. Getting a negative answer.

T. Getting an negative answer. Right. What were the most important questions that you asked, that gave you the clues? Please, pay attention. Can you listen to Tim? What were you trying to say? Speak loudly please.

St. How can that change to mercury?

T. If the powder can change to mercury. You thought that was the question?

St. If a powder.

T. If a powder, right. Adam, what did you want to ask? Nothing, Alright now. Jason, did you want to find out what happens if you add water?

St. (inaudible).

St. Precipitation.

T. Now you can........ precipitation if you've got two clear liquids and then you mix them together. You've started with a powder so you can't say rightly this is a precipitate. What else could you say then, about this powder. Yes John?

St. (inaudible).
St. It magnetises......

T. Today, we're going to heat these dark crystals. I'll pass these plastic bottles around so that you can see them. You can open it but I don't want you to take any in your hands, or I'll be accused of poisoning the class! Now, pass it around..... Alright, I've got a question here. Are dark crystals the name of them, or have they got another name?

St. A scientific name. I think they have.

T. You form the questions again, and I have to say "yes" or "no".

St. Is dark crystal the correct name?

T. No, it's not a proper name. Alright, now let me remind you of how it will work. Listen. Are you listening? Now, I'm going to heat the dark crystals and you observe what happens, and from your observations I want you to form some hypotheses or explanations as to what dark crystals are. Now please don't forget the way to ask questions. Your questions must be framed in such a way that I can only answer "yes" or "no".
LESSON TWO - INQUIRY STRATEGY (CARTESIAN DIVER)

TEACHER: BR

T.* Another inquiry lesson today, boys and girls. Now, the other day I put this on the lab table and some of you came along and pressed on it, and it squeaked.

St.**(inaudible).

T. Now, watch as it comes up.

St. It increases in pace. It increases speed.

T. Watch again. Watch the test tube very carefully - the secret lies in that.

St. The air gets in and pushes it up... No, it's the pressure in there, takes it right up to the surface. Why does the water go down? Yeah, the water goes down. And now it's going up.

T. Let's see what you have to say. Tony Ellis? You can explain that. Now you can ask me a question, you can put your ideas in the form of a question. Come on, Tony.

St. Would the test tube move up and down if it didn't have the water in it?

T. Would the test tube move up and down if it didn't have the water in it?

No it wouldn't. It wouldn't stay upright. Yes? Speak loudly please.

St. The air pressure that the what's-a-name...... Going up and down....

T. How do you explain that? Air pressure makes it go up and down. You'll have to explain it a bit better than that. Yes?

St. See how the water - it's not filled up to the top....

T. Alright, it's not filled up to the top. You've made that observation. So what's there?

St. Air.

T. Carry on.

St. Does it mean that when you push down on the top of it, it pressures the air in it and brings it down?

T. Let's see.

St. When you push it down...

T*: Teacher
St**: Student
T. When I push what down?

St. When you push the rubber down, you press the air....

T. OK, so what happens?

St. That compresses the water and the water can't be compressed very much..... It's screaming - for air! It pushes the air out.

T. Alright. Please listen. Please speak up louder.

St. ...getting compressed....

T. Where, getting compressed?

St. ........ at the top, between the water and the top......

T. Alright, this is the rubber. OK, carry on. Please listen.

St. The air gets compressed, it compresses the water - it can't be compressed very much but it has to compress something so it compresses the air inside the test tube.....

T. What do you mean by "to compress"?

St. To put something in, like air can be compressed to put....

T. Stand up.

St. ..... a larger amount into something that's not as big. It has to push it down.

T. Push it down, in other words. You're using the words compress or push. Alright, so you push on the air and then you push on the...?

St. Test tube.

T. Push on the water. Alright. From there, where do we go to? Yes?

St. (inaudible).

T. Alright, the water rises in the test tube. Is that so? So what happens then?

St. If the water does rise, where does all the air inside go?

T. Alright. He said, "if the water does rise, where does the air go?" The air....?

St. Compressed.

T. The air is compressed. OK? OK, alright now. Yes?

St. (inaudible).

T. Yes, but what's making this go down then?
St. The more water there is....

T. The more water where?

St. In the test tube.

T. Alright, so what happens?

St. It sinks, and then when you let go the water...(inaudible).

T. That's right. Can you follow that now? OK, that's what happens. Alright, watch the water level. When I press..... see? Just watch the test tube. Alright, let's hear it from you again, what happens?

St. When you press that black thing down, the water rises in the test tube. And when you let go it goes down again.

T. Alright. As the water rises in the test tube, what happens?

St. It gets heavier, compressed.

T. Alright Jo. Explain?

St. When it goes down it gets lighter...... (inaudible).

T. Alright, who's going to wrap it all up neatly now, to explain how the Cartesian Diver works? Alright, start from when I exert pressure on the rubber. Please pay attention. Yes?

St. When you squeeze the rubber, water in the test tube rises.

T. Why does the water in the test tube rise?

St. When you press down on the rubber, the air between the water in the cylinder and the rubber, gets compressed and it pushes the.... And more water goes in the test tube and air in the test tube gets compressed......

T. Now when more water rises in the test tube what's the effect?

St. (Inaudible) will sink.

T. Why?

St. Because there's more water and the water pulls down the air, right? And when the water goes out, it comes back up.

T. Alright, Yes?

St. (inaudible).

The water can't be compressed so when you press it down it's got to have somewhere to go so it goes in up the test tube, and when you let go, the water....

T. Alright. If the water's coming up the test tube, what is the result then?
St. The air becomes compressed..... (inaudible).

T. Now, someone wants to know - what do you think? She wants to know if we had a different covering, would it still work.

St. Yes........ no.......  

T. Alright, explain.

St. ...... substance the water might not sink........ a piece of paper, it would just soak through the paper.

T. Alright, Paul?

St. If it was material, and it had holes in it, the air could escape through it.

T. That's right. So it's got to be pretty airtight. And you can see already some air is escaping from the sound it's making, Right? Yes Conrad?

St. When you push it down, how does the water come out....?  

T. Alright, when I push, watch the water level. Alright, when I let go, I'm exerting no more pressure.

St. There's a vacuum in there?

T. No, there's no vacuum. Alright, yes?

St. (inaudible).

T. OK we have to finish now, the bell has gone, we’ll carry on with this later.
LESSON FIVE - INQUIRY STRATEGY  (PASSING A CURRENT THROUGH A BLUE SOLUTION)

TEACHER: BR

T.* ...... circuit, and you've observed what's happened. Now, any questions? Yes John? I can only answer "yes" or "no", remember? Yes?

St.** Is it true that.... (inaudible).

T. Yes.

St. Is there a gas?

T. Is there a gas? Did you observe a gas? In the liquid. No, there was no gas dissolved in it. Yes?

St. Is it..... chloride?

T. No, it's not a chlorine compound. Yes?

St. Are the black substances in the beakers the same material?

T. Yes. They are. Yes?

St. Was the water - the liquid substance - was that coloured water?

T. No, it's not coloured water. Yes?

St. Are the black things in the liquid... cells in the battery?

T. Yes they're from cells in the battery. Yes?

St. Are those rods carbon?

T. Yes they're carbon rods. OK? Yes?

St. That's copper sulphate solution.

T. Yes. The solution is copper sulphate. OK? Yes?

St. You know how one of those rods changed colour? Is that because of the blue substance in the liquid?

T. Yes. It was because of that, yes.

St. Is the gas produced, carbon?

T. Now, is carbon a gas? What's carbon?

St. Rods...

T. No, the gas wasn't carbon dioxide. Another guess? Yes?

St. Is it air?

T*: Teacher.
St**: Student.
T. No it wasn't air. Yes?

St. Was it oxygen?

T. Yes, the gas was oxygen. Right. Any more questions? Come on, more questions.

St. Is the liquid common?

T. Yes, we've already established what the liquid is - very common. Yes?

St. Was the black substance on the bottom of the beaker from the..... changing colour?

T. Yes, they're just impurities. Any more questions? Alright. No, ask the questions first about the apparatus. Yes Steven?

St. Is the changing of the colour of the rod to red a chemical change?

T. Alright, what do you think? Do you think it's a chemical change?

St. Yes.

T. If there was oxygen produced and a change in colour? Alright then, we've established there was. Alright, what else? Come on Tony. What questions did you want to ask? No questions? Anyone else? Yes?

St. (inaudible).... bubbles, is that........ the battery or the liquid?

T. Was it because of the battery of the liquid? I can only answer "yes" or "no".

St. Was it from the battery?

T. Well, what do we say has happened.

St. Chemical change.

T. Yes. Now, when you put it in without pressing the switch, what then? Did a chemical change occur?

St. No.

St. Yes experiment like electrons...... water.

T. Yes. Alright?

St. You know the negative end? Does it coat the other terminal with copper?

T. Alright, good. That's right. So what was the negative terminal coated with?

St. Copper.
T. You had oxygen and you had copper. Alright, any more questions about the apparatus? Yes?

St. You know the oxygen comes from the water because you dissolved copper sulphate in the water? There wasn't much of the sulphate........

T. There was much of the sulphate. You expected the sulphate to come up?

St. No, but where did it go? Does it just dissolve in the water, or......?

T. What do you think? If it isn't liberated what happens? What do you think happened to it? Yes? Ask loudly?

St. When the one that didn't change pinky to the red colour...... (inaudible) ... did that have anything to do with the water?

T. Not with the water but with the....?

St. Oxygen.

T. Oxygen. What do you call that, if it flakes off? What do you call that? What happens? What is the substance doing to it?

St. (inaudible) .... corroding it, eating it up.

St. Could the black thing, not the one that was turning orange, but the other one, oh no, the one that was turning orange - could that ever, could the orange stuff ever flake off?

T. Did you try and flake off the orange stuff?

St. No.


St. After a long time, does the lead rod's end also change colour?

T. The lead rod. Did we use lead rods?

St. Carbon rods - carbon rods.

T. Where was the copper? On what rod was the copper? X or Y?

St. Y.

T. So you want to know whether the X rod would be coated with copper? The answer is "no". Alright, now who would like to explain what happens? Come on, more hands up. Alright, Victor?
St. When you push the button down electricity goes through the wires... through the negative rods and all the bubbles were coming off it.

T. Alright. Anyone else like to explain what happens? Philip?

St. When the bubbles were stuck to the rod and some of them were rising and the little black things on top of the water....

T. Yes, we'll explain the whole thing. What is the whole thing? What have you done? What have you demonstrated? Yes?

St. When you supply the current, like the..... of water.

T. Yes, what is the word he's used?

St. Electrolysis.

T. Electrolysis - haven't you done this before? Electrolysis of another substance and you got two gasses. What was that?

St. Electrolysis of water.

T. And what did you get with the electrolysis of water?

St. Oxygen.

T. Alright, now what are we doing here? What is this called? The electrolysis of....?

St. Copper sulphate.

T. And what were the products of the reaction?

St. Copper - and sulphate - and oxygen.

T. Yes, so what is this? What is providing the energy for the chemical change?

St. Electricity.

T. Electricity. So all of you, what have you just demonstrated?

St. Electrolysis of copper sulphate.

T. And what other product?

St. Oxygen......

T. Alright, now where was the oxygen liberated? Now, don't say X or Y. I want positive or negative. Yes?

St. From the negative rod and it..... up.

T. Did it? Was oxygen liberated from the negative? Jason?

St. It was liberated from the positive.
T. Alright, and what was the other produce ... reaction?

St. (Inaudible).

T. Alright now, listen to what we have to do. Take this page off home - listen. I want you to complete this student evaluation sheet - don't move please - and bring it back to me tomorrow. And if you like you can also write up your explanation.
Right, we've just seen an experiment. We had a heavy weight on the end of a metal spring and it weighed 1500 grams. We then put the weight into a bucket of water and then our metal spring only measured 500 grams. What we're going to do now is try to work out why the reading on that scale went down. Now the way we're going to work that out - or the way you're going to work that out is this. You're going to ask me questions about the bucket, the water, you can ask me about his, the spring, you can ask me any type of question that you like in order for you to get the information to work out a reason why that reading went down. There's one thing about your questions - they've got to be able to be answered by a "yes" or "no". All I'm going to answer is yes or no; or I might answer 'maybe'. OK? You can't ask me what's in the container - that'll be answered by a yes or no. One person's going to ask a question at a time. Now, you can ask more than one question if you wish - if you wish to ask say four questions, that's fine, and tell me when you've finished asking. Now when you think you've got enough information, just hold onto it till everyone else has got an idea. Leon?

What if you know it?

Well then, just wait. Tracey?

Is the water hot?

No, cold. Michael?

Was the thing filled right up? ........ (inaudible).

Filled to the top.

Was the sand wet or dry?

It was dry. That's not a yes or no question.

(two or three questions inaudible).

You know how you did it in cold water? Would it float in hot water as well?

Yes it would.

Was it hard to lift up when you put the thing in the water with the metal spring?

How do you mean? Ask the question again. When I put it in..

Was it heavy or light?

Ask it to me now as a yes or no question.
St. Was it heavy?
T. No.
St. If you put your arm in..... carry all the weight?
T. Yes.
St. Was it light?
T. You asked me that last time.
St. Is the can heavy by itself?
T. No. Very light without sand.
St. Did the sand have rocks or sticks in it?
T. No.
St. What colour sand was it?
T. It's not a "yes" or "no" question and you know very well... If you think you know why it did that you can propose your theory to me. Jason?
St. My theory is that the cold water takes the pressure off the can of sand.
T. Cold water takes the pressure off the can? What pressure is on the can?
St. The sand inside.
T. The sand insides got pressure. In which direction?
St. Down.
T. Hmmm. And how does the water take the pressure off it?
St. It takes all the air out of it. I reckon that when you put it in it took three times the weight from the tin, from what it was....
T. How do you mean, three times?
St. When you dipped it in, it takes three thirds the weight off the can.
T. Three thirds? What takes all the weight?
St. The water.
T. How does it do that?
St. Because water's lighter than sand. The sand floats then sinks to the bottom.
T. Alright, what's your theory, Leo?
St. In the water there's no gravity.

T. No gravity in the water? But what does that mean?

St. When you're out in space you float and when you're in water you float. It doesn't pull you down. It's got enough pressure to push it up and when the earth gets cold, the colder it gets the harder it gets to float.

T. Right, don't forget when I put it in without the string on it, it sank right to the bottom.

St. I mean, the colder it gets, like right down the bottom of the ocean, you start to float up to about half way because of how cold it is down at the bottom.

T. If it put hot water in here would it make any difference?

St. If you had salt water it would.

T. If I put salt water in, what difference would that make?

St. The salt takes some of the stuff out of the water and it gets it to go up.

T. Alright, fair enough. Jason?

St. ........ (inaudible)....

T. The string was holding it up?

St. You were holding it up anyway so....

T. Hmm. I had to have it suspended in the water in order to get a reading.

St. When you had the can in the water, when you..... and held it up you still had about that much of the top out of the water.

T. First time. The second time it was right down. Are you asking me a question or are you telling me something?

St. I'm saying something.

T. Nicole?

St. The water makes it lighter when... - the water makes it lighter.

T. How does the water make it lighter? Michael?

St. When the air....... they're heavier than when in the water. When they get in the water it's lighter.

T. Fair enough.

St. When you get the tin in there the water makes it lighter because there's no gravity in there.
T. Leo?

St. The stuff in the water clings together like oil and the stuff in the air doesn't cling together as much, and when you put something like what you put in then, it kind of holds it up because it's like, thicker than air.

T. Right. Now, question?

St. If that was salt water, salt water would make it float better than fresh water because the salt water's got salt in it, and if you went to the salt lakes...... you'd float ........ in fresh water.

T. Yes, that was a point that Leo brought up. Right, Gaynor?

St. Would the atmosphere make any difference? Because when you go under water it changes.

T. Well, you saw what it read beforehand, didn't you? So yes, it does make a difference when you put it in. We saw that. Peter?

St. When you put the can in the water, the pressure pushes it up and it makes the level.....

T. What is this pressure that's pushing it up? You keep telling me it's pressure, but what pressure?

St. Because water's thicker than air? If you dropped it in the air it would go down a lot faster than if you dropped it in a pool of water, because that's thicker and it's got more strength than the air.

St. The water pressure makes it a lot lighter.

T. Mmm. Fair enough. But what does that mean?

St. It makes the reading go lighter......

T. What's that? When you put it in water?

St. Yes.

T. Uh huh. Alright.

St. (inaudible) ...... Empire State building......(inaudible)

St. If you went down by the ocean it's pressure down there would crush it, and I reckon when... it get's weaker and weaker as it comes to the top, and that same pressure keeps it afloat by...... it squashes the top and the bottom and then both the sides. I reckon it's like pushing some soap - it comes up out of your hands.

T. When you come towards the surface?

St. Yes.
T. Yes, but look. We didn't have a great amount of water on
the top of ours. We just had a little bit. I mean what
you're talking about is probably right, but......

St. (inaudible).
Now, we just saw an experiment where Peter used two marbles, and he flicked a black one which hit a white marble. The white one took off in the same direction and the black one slowed down and stopped. Now we're going to try and find out why that happened. We're going to try and find out why the black marble slowed down and stopped - why that didn't keep moving. Hands down. Now this time, you're going to try and ask me questions - the same thing. You've got to ask me questions that have a "yes" or "no" answer. You're allowed to keep asking me questions about why you think it happened, and gather some information, and when you think you've got enough information or you can't think of any more questions, you can pass, and let the next person speak. Now if you've got a theory about why it happened, just hold onto it, listen to see what other questions people are asking, Darren and Michael, and then I'll ask if anyone's got a theory. But you can ask me whatever you like about the marbles. Leo?

Were they both the same weight?

Yes. Stuart?

Did the black one move a bit when - once it hit the white one?

It moved a little bit, yes. And then it slowed down and stopped. Stephen?

Were they both the same size?

Yes. Nicole?

Miss Abbott would it have been the way Peter threw it?

No. He could have thrown it any way... any type of flicking way and that's what would have happened. Stephen?

When the white ball went, did the black ball stop straight away?

Not straight away. It slowed down very quickly and then it stopped. Peter?

Would it happen if.....

Yes. Tim?

Is it impossible? To make the ball stop completely?

No, it's not impossible. It's possible for people to make it stop suddenly. Stuart?

It isn't possible to make it stop because..... (inaudible).
T. That's not a question. Tracey?

St. Is is anything to do with the..... (inaudible).

T. Yes. Tim?

St. Are they both made of the same stuff?

T. Yes.

St. If you use smoother ground, would it still be the same?

T. Yes.

St. What about if it was on glass. You know how glass is real smooth? Would it - it would still slide wouldn't it, when it hit the thing?

T. No. You'd get pretty much the same result.

St. But not the same? It wouldn't be the same?

T. I'd say yes, it would be the same. Stephen?

St. If you bowled it a bit faster and from a further distance would the experiment be the same?

T. Yes.

St. It depends on how long it is.....

T. Do you want to ask me a question about the length?

St. Yes.

T. Alright, ask me a question.

St. How far would it be away?

T. I can't answer that with a "yes" or "no". Nicole?

St. Miss Abbott, would it matter if you were real close or further away?

T. No, it wouldn't make any difference, the distance. Fiona?

St. If the marbles were made of steel, would it do what it done when it did it?

T. Yes, it would do exactly the same thing. Leo?

St. Does it have anything to do with the impact?

T. Yes, it does have something to do with the impact. Stephen?

St. If you used a larger ball, would the experiment be the same still?

T. Yes. Stuart?
St. Would it be still the same if you shot a bigger marble at the little marble and hit it? Would it still be the same?

T. Yes, it would be pretty much the same. Might not be exactly, but the same idea would work. Tracy?

St. Does it matter how it hits it? ... (inaudible)... or straight?

T. Yes, it does matter how it hits it. Michael, have you got a question?

St. Has it got anything to do with vibration?

T. Yes, a bit. It has got a bit to do with vibration.

St. Would it matter if the marbles were different sizes?

T. Do you mean if they were both the same size but bigger?

St. No.

T. One was bigger and the other was smaller. It wouldn't make all that much difference. There might be a little bit. Stephen?

St. If you had a soft ball and a hard ball would the experiment be the same?

T. No, it would probably be different. Leo?

St. Would it have anything to do with the weight and the smoothness?

T. It has a little bit to do with the weight, yes. It doesn't really have all that much effect on the smoothness, as long as they're round. Stuart?

St. Would it have anything to do with the speed.... when we hit it, it kept going.....

T. It has something to do with the speed, yes.

St. Miss Abbott, would it matter if you hit a tennis ball with a softball.

T. It might make a little bit of difference, but the principle would be the same.

St. If the distance was far and we had a slow motion of hitting it, would the white ball go further, or wouldn't it?

T. You're not asking me yes or no. You're asking me for information, you're not asking me a yes or no question.

St. Would it be better if it was further and a slower.....?

T. No, it wouldn't be better if it was further and slower.
St. If you got the marble, and you got it close up and then you hit it slowly, would it stop exactly after it hit the ball?

T. No, it wouldn't, Leo?

St. When are we going to able to say what we think?

T. Have you got a theory now?

St. Yes.

T. You can propose your theory.

St. My theory is that if you hit it in the middle, or in the right place, at the right speed, the big one, or the black one, would stop completely and the other one would have gone, would have started going.

T. Well that sounds a fair enough theory, but how do we work out what's the "right place", and what's the "right speed"?

St. The middle, and about half speed.

T. What's "half speed"?

St. Flick it, not as fast as you can, but just enough to get it to go that far, and hit it in the middle - just a little bit above the middle - the middle of the other ball, and the one that you hit will go, and the one that you flicked will stop.

T. Alright, I accept your theory. Now I'm going to ask you, "Why is that second marble going to stop? Why doesn't that second marble keep moving?"

St. Because the impact will get weaker and then it'll start slowing down. Because it hasn't got - when it got pushed it was given a certain amount of speed and it starts to use that up.

T. How does it use that speed up?

St. By how far it went and how rough the carpet or something is. Like if you did it on sand and you flicked it, it wouldn't go as far as if you flicked it on glass you'd go a lot further than if you flicked it on carpet.

T. So you reckon it's all to do with speed?

St. Yes, it's all to do with what it's done on.

T. Oh, and the surface as well? So if I flick the marble, and I flicked it very slowly in the middle - in the centre of the second marble, would that make the second marble stop?

St. It won't give it enough power to be able to separate them like - you'd probably just move a fraction, and the other one would probably just push on it.
T. OK. Now you've brought up a word now - you've used the term 'power'. Now, before, you were talking about speed. So what do you want to talk about now? Is it something to do with speed?

St. And power. If you hit it and, say, the speed hits it and the power that it gives the other marble - that's what makes it go.

T. What about the first marble that we flicked?

St. That'll stop, if it's flicked fast enough and hits it at the right time, that'll have used up sufficient energy to stop and give the other one that amount of energy to go.

T. Right, that sounds a pretty good theory. Is there any way that we can test it? Well actually, firstly - does it still have something to do with the surface?

St. Because if you did it on sand it would slow down, but if you did it on grass or thick carpet you won't get the same effect. The marble would have to be flicked harder and the other one won't get at the necessary speed to make it deflect.

T. Alright. Let's just pause for a moment. All eyes this way. Well I think Leo, that sounds like a pretty good theory. Did you use information that you got from the questions that you asked or the questions that the people asked in order to formulate that theory?

St. Yes.

T. What does 'yes' mean? You got information from what?

St. I got information from the weight and speed, I got information from the different sizes, I got information from softer and harder, I got information from the sizes and the speed they were pushed.

T. OK, fair enough.
TEACHER: KA

T.* Right, let's have some questions. You've got to ask me questions that have to be answered either 'yes' or 'no'. Nicole?

St.** If you .......... still be the same?

T. Yes, it will still be the same. Darren?

St. If....... would it still be the same?

T. Yes.

St. (inaudible).

T. No, it would be slightly different. Geoffrey?

St. If it had been two ........... would it still be the same?

T. It would be much the same. Maybe slightly different but the same idea. Stuart?

St. Is the rope with the weight in the middle?

T. In the centre, yes. Peter?

St. Has anybody ever done anything with it?

T. Done what?

St. Like making.... straight.

T. No, they haven't. Michael?

St. Would it matter if those knots weren't in it?

T. No, that wouldn't make any difference.

St. Is it possible to make it flat?

T. Yes. Leo?

St. Is it be exactly in the middle, or would it be a bit out of the middle?

T. It's exactly in the middle.

St. Would it matter if you had more weights on?

T. If you had more weights on you'd have the same type of result, but it might be slightly different...Same type of idea.

St. If you took some weights off?

T*: Teacher.

St**: Student.
T. If I took some weights off I'd have much the same results, though it probably would be (inaudible) differing as much. It would still dip down.

St. Would it make any difference if the string around the dictionaries was shorter?

T. It wouldn't make any difference at all.

St. If the string around the dictionaries..... (inaudible).

T. If it was different string around the dictionaries it wouldn't make any difference.

St. Does it matter how long the rope is?

T. You'd get the same type of result but the rope might go down further.

St. Does it depend how long the rope is - if you've got a long rope it hangs down .....  a shorter rope.

T. Yes, you've got a shorter rope, it will hang down more. Leo?

St. Would the same happen if you had just enough to hang on each side? Would you be able to pull it straight?

T. No, you still wouldn't be able to pull it straight ..... tiny bit.

St. Would you be able to pull it straighter than it was now?

T. No. Joan?

St. How can it not be straight.

T. That's what you're trying to find out. Tim?

St. You know where you've got the cotton tied onto the skipping rope - if you had that a bit shorter would it make any difference?

T. It wouldn't make any difference, no.

St. If you had more weights it would probably go down more.

T. Yes, it would. Right, does anyone have any theory about why it happens?

St. ..... (inaudible).

T. The heavier the weight, the further it will go down? Alright. We're still trying to find out why that skipping rope isn't ever going to be straight. Leo?

St. My theory is that when you put it up in the air - the length of the rope - you have to pull it harder than if you only had a hand's length, because you'd only have to pull it a little bit and even if you pulled it hard you might
not get it straight...... different length it is, you have to pull it harder, and you might not have enough strength to pull it up.

T. OK, but why is our rope always going to dip down?

St. Because it's not heavier than the dictionaries. The dictionaries have got weight, and you have to hold it up if you want to ...... When you pull on both sides, the stuff that goes through - the string that goes through the rope isn't sufficient to lift it up.

T. Why isn't it? We had.....

St. Not enough tension on it. It's not pulled tight enough.

T. Uh, huh. Well if we had say, two very, very powerful men come in, what might happen then?

St. They might be able to pull it straight.

T. So we wouldn't be able to test that unless we had two very powerful men?

St. My theory is when you pull the rope there's too long..... string...... all that rope.... shorter rope..... more powerful and there's still weight in the middle.... and that's got more weight than what's going through to pull it up.

T. Do you want to test your theory?

St. Miss Abbott, I think you might have to - when you pull it at this side you pull that thing straight, but can't get that straight.... ....up there it gets strong then it gets weaker and weaker as it gets to the middle.

T. What get's weaker - you mean the rope?

St. The tension on the rope gets weaker as it goes through.

T. Through the rope. What makes you think that?

St. Because it's getting pulled down.

T. Right, we're testing Stuart's theory that if you had a smaller rope and the same weight, do you get a different result. Our result was much the same. It still dipped down in the centre. But we still want to find out why didn't the rope ever go straight. Even if we had two very strong people. Leo?

St. Would the same thing happen if you had a tractor and a tractor and you tied both of them to the two bar and they ran apart? Would the same happen there?

T. To anyone looking, it would probably look very straight, but actually there'd be a tiny.......
St. Even if they pulled it so it broke - hard enough for it to break?

T. If they pulled it so tight so that it was just about to break it would be practically straight. Anyone looking at it would think that's straight.

St. It depends on how high you've got your.....

T. Well let's get back to the rope firstly, and keep a..... Jackie?

St. On all of the dictionaries (inaudible) is the white string the same on each side of the pile.

T. Yes, they're exactly the same and we've got exactly the same amount of weight on both ropes, except we had a long rope and a shorter rope. Col?

St. Miss Abbott, if you had a smaller weight, like one dictionary, then two people with .... the rope, would it go straight? If we had only one dictionary and then had two people, like two guys, two men, putting all their force on the rope, would it go straight?

T. It would go practically straight. It would be straighter than if we had four dictionaries on it. Fiona?

St. Miss Abbott, just say we had that long on each side of the rope on each side of the dictionaries, I think that when you pull it it'll be fairly straight and with no bends in it, because (inaudible) the more strength you're putting into it. Because you're not holding on the extra weight from about that long.

T. Alright, how are we going to test your theory? What would we need if we wanted to test it?

St. (inaudible).

T. Oh, I see. You don't want to hold the end of the rope.....

St. No, because that's putting on more weight.

T. Fair enough. So you want to hold it very close to the weight. Alright, you get someone to test it.

St. Joanne, get closer........ Get ......., she's stronger. Miss Abbott, would the same thing happen if you had somebody way up there, and somebody down there? What would happen if you had two people on both ends? You'd still get it dipping down slightly - it might - try it.

T. Hold steady. Just about......

St. Perfect.

T. Alright we'll say that that was straight. Why were those boys able to get it straight and we weren't able to get it
with the other rope? Michael?

St. Because the rope was shorter?

T. Right, let's think about what effect did the rope have on.....? Heather?

St. When it's a small rope they've got more control of the....

T. More control. In what way have they got more control?

St. Well, it's easier to pull it up. Like, if it's a long rope you've got really only control in the end.

T. Alright, so if you're controlling the ends, what happens then to the middle? How far does your control extend down the rope?

St. It extends as far as the rope.

T. Uh, huh. Leo?

St. I think that the gravity pushes the two things of the rope down and if you had it straight up the gravity's not pushing it down so..... get it straight.

T. When you've got a long rope....... 

St. Yes, or a short rope, and it's attached to the roof and you pull it down tight and attach it to the ground and you dangle off it, from the roof....

T. What are you dangling off?

St. If you pull it straight up there and you pull it straight down here as hard as you can, I reckon you could get it straight... (inaudible).

T. Stop. You want the rope going up and down? That's a .... I know what you mean but that's a different type of idea. All we're talking about is having the rope straight, not using any other thing. Now you mentioned gravity, and you said. "Gravity is..." What?

St. Stronger.

T. Stronger than what?

St. Humans. Stronger than your hands. When you get gravity, dictionaries and the rope, it's too heavy for a person to do it.

T. Even if we had two of the most powerful people in the world.

St. Yes, but there's more gravity than there is people in the world.

T. What exactly is gravity?
St. It pushes the rope down to the ground. It's stuff that's around anywhere.

T. Right Leo. Give us one word for what gravity is.

St. Kind of like a magnet in the ground, it magnetises everything else.

T. Right, pulling things to the ground. Can you think of one word for it?

St. Pressure?

T. What type of pressure? What's a better word for it?

St. Atmosphere.

T. No atmosphere's what's around it - the air. You're on the right track.

St. If you had more people on the end of the rope would it make any difference?

T. Well, if you had more people on the end of the rope, that's like making it a stronger person on the end of the rope. And you saw what would happen when we had stronger people - the rope when straighter.

St. I reckon it must have something to do with the gravity, because I reckon in space, if you got up to the moon and did it you'd get it perfectly straight just by pulling like that. It'd be really easy to get it straight. So I reckon gravity must have something to do with it, otherwise you'd be able to do it down here as well.

T. OK. So the gravity's got something to do with it. What exactly has it got to do with it?

St. It pulls it down to the earth - the stuff that earth's got - kind of like a magnet and it pulls it down towards the earth.

T. Mmm, hmmm. Stuart?

St. I say that when you have a longer bit of rope there's more slack with a longer bit of rope than there is in a short bit. And there's gravity and when the gravity pushes it down there's more slack and it's harder to pull up and when you get closer to the weight you can pull harder than gravity.

T. Alright, so both of you two are on about gravity. And you say if you go into space it is less gravity ...... Pardon?

St. Where there isn't any gravity......

T. Say if you're on the moon, where there's less gravity. What would happen then?
St. Then you'd go straight. You'd go straight easier than it would be down here. So you'd probably find that you're going perfectly straight up there.....

T. OK. Say you were on a planet that had greater power of gravity than what we've got, what might happen then?

St. You wouldn't be able to lift it up. It would hang down more. Say you had a short bit of rope.... up straight, it would bend down more. It would take more strength to lift up the rope and the dictionary than it is now. When you lift it up in space, it's easier to lift up a rock, or a person, than to lift them up here where it's a lot harder.... a place where it's got lots and lots of gravity and you probably won't be able to lift them up.

T. OK, that's fair enough.

St. You won't be able to lift the rope up if there's a lot of gravity.

St. Would it do the same if you're in water?

T. If you were in water? I don't know. So, Stuart and Leo, you reckon that the most important thing of this whole experiment, is what?

St. Gravity.

T. Well done. How do you feel about this exercise?

St. I liked it because we did the experiment with different students on the ends of the rope...

St. And with a shorter distance between the weight and the rope ends... and heavier weights.

T. Yes, but what was the most useful thing we did?

St. We were able to talk and then try the experiment to look at our ideas or theories.

T. We will continue this next lesson.
LESSON FOUR - INQUIRY METHOD

TEACHER: KA

T.* Right, any questions that you want to ask me about that experiment? Sharon?

St.** Are the blocks both the same sort of wood?

T. They're different wood. Leo?

St. Are they hitting the ground at exactly the same time?

T. Exactly the same time. Tracey?

St. .... gravity?

T. Yes. Jacky?

St. .... (inaudible).

T. Yes it would.

St. If you dropped them into water would it be the same?

T. Yes, they'd hit water at the same time. Tim?

St. Would it make any difference if you done it higher?

T. No, it wouldn't make any difference - they'd still hit the ground at the same time. Darren?

St. Does it matter how big they are?

T. No.

St. Miss Abbott, would it matter if the big one was heavier than the smaller one?

T. No, that wouldn't matter either. You'd still get the same result.

St. Does it matter if there's a big wind?

T. No, that doesn't have any effect. Leo?

St. Is it impossible to have them both at the same height and yet to actually hit at different times?

T. Yes, it is impossible.

St. Would it matter if you had them both the same size and the same weight?

T. No, that wouldn't matter because they'd still hit the ground at the same time.

T*: Teacher.

St**: Student.
St. Would it matter if they were both the same size?

T. No, that wouldn't matter either. Jacky?

St. If the small one was bigger and they both weighed the same, and you dropped it, what would happen?

T. Exactly the same thing. Tim?

St. Would it happen if you have it out like that?

T. It would be the same.

St. So they both exactly hit the ground at the same time?

T. Yes, they did.

St. Would it matter if they were put down low? If you put them down...

T. Put them down low? No, that wouldn't make any difference.

St. What about if you took them up very very high?

T. If you took them up very, very high, that wouldn't make any difference either. I've answered a lot of questions with no, but I'd like to answer something with yes. Anyone have any theories?

What's your theory?

St. Gravity may make them.....

T. You haven't explained it very well.

St. My theory is, if the blocks are the same size and different weights, they'd still drop down the same.

T. But, our theory means we're trying to explain why that happens. Darren?

St. I would think that if (inaudible) was the same weight ..... (inaudible).

T. Yes, they would. Leo?

St. My theory is that one of them must be hitting the ground a little bit before the other one?

T. No, Leo. We've already explained - they are hitting the ground at the same time. Exactly the same instant.

St. What about if they have different shapes, would it be still the same?

T. Exactly the same, yes.

St. Is it anything to do with the weights? Like, if you drop two feathers, they'd both hit the ground at the same time?
T. Nothing to do with weight.

St. What about the thickness and that? You've got the thin one and the thick one, and.... (inaudible).... more weight in the middle of it.

T. So what's your question?

St. So...... anything to do with how thin they are, how thick they are?

T. Right. No, nothing to do with how fat or how thin they are.

St. Has it got anything to do with the varnish on the other piece of wood?

T. No.

St. Miss Abbott, my theory is - you know how.... (inaudible).... when you're holding it.... the edge goes down there more....

T. But Fiona, it didn't .... down. Because they were dropped from the same height and they both hit the ground at the same time. Nothing was slowed down or speeded up.

St. Has it got anything to do with the atmosphere?

T. NO.

St. My theory is - when you got to the end it doesn't matter how..... they are?

T. Mmmmm. I've already answered that. That was someone's question so it can't be...... We know that it's nothing to do with the weight.

St. Is it the gravity? The gravity makes them.....

T. Keep going. Have another think about it, I think you're on the right track.

St. Would it matter if it wasn't wood, if it was a piece of slab?

T. No, that wouldn't matter. The same thing would happen.

St. Does it matter if it's.....(inaudible).

T. No, that wouldn't matter.

St. ........ (inaudible).

T. OK, but in this experiment, it doesn't matter.... Tim?

St. If it was just with two small pieces of wood, would it matter?

T. Two small pieces of wood? No, it wouldn't matter.
St. My theory is that because of the gravity, the heavier weight... (inaudible).

T. Right. Tracey's got a theory. She says because of gravity the heavy one doesn't seem as heavy in the air. What does anyone think about that? Stuart, if you want to make a comment, or ask a question, put your hand up.

St. OK then. If the gravity's got something to do with it - and that fat block is lighter, I reckon that'll push it down because - push it down harder than the heaviest one......

T. In other words, gravity will PULL it down.

St. Yeah, PUSH it down, whatever.....

T. But, we had that light piece of wood - we had a heavy one.

St. Yeah, I said ... (inaudible) ... the heavy one than the light one.

T. But that didn't change our experiment, did it?

St. If you dropped them from a higher distance I don't reckon they would hit the same, no.

T. Someone ask me that question. Patrick.

St. .......... (inaudible) ... two different things?

T. For example?

St. Pieces of steel?

T. Do you mean would we get different results? We'd get the same. Peter?

St. If you dropped a brick from a big building and you dropped that big block, would the brick hit first?

T. No.

St. They'd both hit at the same time?

T. They'd both hit at the same time.

St. What about a feather and a brick?

T. Well, if you had a feather and a brick, realistically they would hit the ground at the same time, but you know that when feathers drop they go down like that. So they're affected by something else. Peter?

St. So it doesn't matter if you have the heaviest thing you can find and the lightest thing?

T. It doesn't make any difference. Jacki?

St. Does it make any difference if you drop them from different heights?
T. Oh, yes. But we're examining what happens when you drop them from the same height. Donna?

St. Miss Abbott, you know those two blocks - if one was a triangle and that other piece was a circle...

T. Do you mean a sphere?

St. Yes, and if you still held them up at the same height, would they both still hit the ground...?

T. Yes, they would. Leo?

St. If you had some way of measuring the strength the atmosphere has to pull the little bit - like if you read on a computer that the little one took more than the lighter one, would that solve it?

T. What do you mean by pressure?

St. You know how the gravity pulls things down - if you had some way of measuring how much gravity it takes to pull the little one down, would it need more to pull the big one down?

T. No. Gravity's exactly the same for both of them. Stuart?

St. Which way ....... the light block and the heavy one ..... from a higher height?

T. Well, if we could try it we would, but we can't, in the school.

St. Why don't you get a pen and a ruler, or something?

T. I've already answered that - we'd get exactly the same result. Darren?

St. Would it matter if you had a thing like a piece of wood and it was hollow?

T. A piece of wood - how big?

St. About the size of the blocks you had then, but - both the same size - but they were hollowed out.

T. Would that make any difference? No it wouldn't. Patrick?

St. What about if you throw them up. Would they come down the same?

T. If we throw them up, and we throw them up to the same...

St. If you throw them as hard as you can, would they come down both the same?

T. If I threw them up to the same height, yes, then they would come down, hit at the same time. But sometimes it's impossible to throw them up at the same height. Leo?
St. What if one was hollowed out? Would that make any difference?

T. And the other one wasn't?

St. Yes.

T. Wouldn't make any difference.

St. If you get that square block and get one of those blocks there, would it still be the same?

T. Yes, it would.

St. If that piece was hollow, and that piece of brown wood that was varnished, and that wasn't hollow, would that make any difference when you dropped them?

T. No, that wouldn't make any difference.

St. Miss Abbott, are all these experiments something to do with gravity?

T. You mean, is the one that we did today?

St. Yes.

T. Yes.

St. Would the air put weight on?

T. No.

St. If there was a weight tied to one and not the other, would it make any difference?

T. No. Leo?

St. What if you had a nail through... you cut one in half, say the small one, in half and nailed one to the other, that far apart - if you nailed them like that, would it make any difference?

T. No. Stuart?

St. They told me to ask you..... atmosphere.....

T. Is that a question? No it hasn't. Peter?

St. Say if you put one on top of the other and you dropped them, would it still just stay together? Or would they separate?

T. They'd separate. Unless they were glued. John?

St. Miss Abbott, say if you were standing on a building and you throw one down, would it make any difference?

T. Settle down. You're standing on top of a building....
St. Yes, and you threw one down and you dropped the other.

T. You threw one down and you dropped the other... Yes, if you threw one down and you dropped the other, yes, that would make a difference. Right, Jacki?

St. You know how we did it on the bitumen, would it make any difference if we did it in the house?

T. In a room? No, it wouldn't make any difference. Karen?

St. Would it do the same if you got two people on the roof and then jumped?

T. Two people - and they're on a roof, and they both jump off? You're talking about people.

St. What about if it's a baby and an adult?

T. Stop. We've still got you talking? You're talking about people jumping off, which is slightly different to having objects the same size and falling.

St. If you didn't have... high.

T. You're still talking about different things.

St. Would it matter if two people jumped off in the same parachute, would it still happen the same?

T. You're talking about something.... you're talking about jumping now. I'm not going to answer that question. Peter?

St. Would it be the same with anything you used?

T. Anything that you used - yes, it would be the same.

St. Say you had two buildings ..... (inaudible).

T. Settle down. You're going to ask questions that are sensible.

St. Would it matter if it's under water?

T. You're talking about something that's completely different to what our experiment was. There's a difference between dropping something in air and dropping something in water.

St. Yes, but would it make any difference though?

T. Of course it would make a difference.

St. What about two sheets of paper?

T. Two sheets of paper. Well, ideally they would hit the ground at the same time.

St. What about cardboard and a sheet of paper?
T. Well ideally once again. They would also hit the ground at the same time.

St. Miss Abbott, what is "ideally they would hit the ground". What does that mean?

T. Well, it means that if they were exactly the same size... See, when you're talking about paper, which is something different to wooden blocks, paper doesn't really have a lot of weight, and it's flat. 

St. What if the paper's exactly the same size and made into a cube?

T. What, so if you had two pieces of paper made into.....

St. Yes, if you made one into a cube- you got a bit of slab in a cube, a perfect cube, and had a piece of paper made into a cube, or when they make it they just compound it into a little square....

T. Then you should get the same result.

St. What about instead of dropping, what about if you threw them...

T. Well then it would be different because you're throwing things.

St. Why wouldn't it be different if one was a lot heavier than the other?

T. That's what we're trying to find out. It doesn't make any difference what the....

St. So the paper would just go down the same as that? Wouldn't the paper start wobbling and that would go just like that?

T. You're only talking about paper that's completely full? A cube that's completely full of paper?

St. Yes, a cube that's completely full of paper and a cube of concrete. Why wouldn't the concrete hit the ground first? It would, wouldn't it?

T. No, it doesn't. They both hit at the same time. We'll have to continue with this later.
LESSON ONE - CONCEPT ATTAINMENT

TEACHER: BG

T.* Right, what can you see on the blackboard, Adam?

St.**A box.

T. What do you think that sort of box is?

St. A toy box.

T. A toy box. Do you think it's a toy box, Michael?

St. No. It's a treasure box.

T. It's a treasure box. Right. Now I've got some words here, and I'm going to put these words on the blackboard and we're going to play a game. We're going to play a game of deciding which words fit in which chart. Do they fit in the treasure box or do they fit in the sand? Now, if I pretend and we all pretend that we are pirates - peg-leg pirates - the things that we want to keep, where would we put them? Kevin?

St. In the treasure box.

T. Right. We'd put them in the treasure box. Things that we didn't want to keep, where would we put those. Brett?

St. In the sand.

T. In the sand. We'd throw them away onto the beach sand, wouldn't we? So the words that I don't want, I'd throw away into the sand. Words that I do want, I'll put in the treasure box. Now your job is to try and guess why I choose some words. All the words that I put in the treasure box are going to be the same, and you have to work out what is similar about them. ... I'm going to put this picture in the treasure box. What's that a picture of, please Shane?

St. A rake.

T. A rake. And I'm also going to put this word in there. And I'm going to put this word in the sand, because the sand is where the words go ... The treasure box holds the words that I do want. We have to work out what's the same about the words we put in there. Who would like to guess which word should go in the treasure box? Come and get a word please, Shannon, and put it in the right place. And Mrs. Gregg will say yes or no. Right Shannon go and sit down now, thank you. Just think about it while you're on the mat and I'll give you another go in a minute, Shannon, when you've thought of it. Right? This one - where would you like to put this word Tricia? In the sand? Yes, that does go in the sand. Right. Kevin, come and guess where you're going to put it. Ask me and I'll say yes or no. That one? What are you going to ask me? Give me a question?

T*: Teacher. St**: Student.
St. (inaudible).

St. Treasure box.

T. Yes, it does go in the treasure box. Right, who else thinks
they know why there is.......OK, Jen, you come and ask me a
question about a word. Right, what's your question, Jen?
Which word would you like to put in the treasure box or the
sand? That one, right. Would you ask me where it goes?

St. The sand.

T. Yes, it does go in the sand. This word, where do you think
this word's going to go?

St. In the sand.

T. No.

St. Treasure box.

T. Right, it does go in the treasure box.

St. There's an 'a' in each one of the words.

T. Good girl, there's an 'a' in each one of them. Brett, can
you see anything.

St. There's all 'a's in the middle.

T. Right. Have all of them got 'a's in the middle?

St. No.

T. Can anyone tell me so far why we put all those over there
with the picture of a rake.

St. They've all got 'x' in them.

T. They have got 'x' in them. Have these got 'x' in them?

St. No. They've got 'a' in them. They've all got 't' in them ,
and 'a'.

T. They have all got 't' in them. Yes. They have all got 'a'
and 't'. Perhaps you could read the words for me, Natasha?

St. Hat, sat and mat.

T. "Hat, sat and mat", everyone. Good girl. They do rhyme.
Let's have a look at these ones. Who can read these ones
for me, Brett.

St. Kate, late, hate.

T. Right, Kate, late, hate. Listen carefully. We've got a
picture of the rake and we've got Kate, hate and late in
there. Why did Mrs. Gregg say that that word could go in
there? Can anyone tell me that? Yes, Jonathan?
St. All of the words like lake, Kate, late and treasure have got an 'e' at the end as well.

T. They have got an 'e' at the end, but that's not the answer.
T. Let's have another guess. You still haven't even got close to the answer yet. Now Shannon, you can have another go, now that you've thought about it.

St. Date.

T. Right, you've got the word 'date'. Where's it going to go? Yes. Here's a picture of a rake, cake, late, make, date, Kate are things that we don't want. Hat, sat, mat. Can anyone tell me what we've done? Luke?

St. The sand box has got a .... hat, sat and mat in it and they've got an 'a' in them and the .........

T. No, that's not the answer, Kevin? You've forgotten. Paul?

St. (inaudible).

T. Yes they've got a 't' at the end of them and these words in the treasure box have got an 'e' at the end of them. Very clever, but that's not the answer. Brendon?

St. All the words in there have got a 'a' in and all the words in there have not an 'a' in.

T. Why didn't we put them all together then? Listen to the words that I've said 'no' to. Listen to the 'no' words. Late.

St. Yes.

T. Lake.

St. Yes.

T. Hate.

St. Yes.

T. Date.

St. Yes.

T. Who can tell me now. Dean?

St. (inaudible).

T. Yes, that's right. Luke?

St. They've got the same colour, and they haven't got the same colour.

T. No. John?

St. They've got yes, they've got no and they've got yes.
T. No. Richard?

St. The 'yes' ones sound the same and the other ones don't sound the same.

T. Yes, nearly right. Who else can tell me? Jonathan?

St. That side and that side....... All of them have got 'a' and 't' in them......

T. No. Sounds that are in the middle of the word. Listening? Hat, sat, mat. Hate, late, lake, date. Sharon?

St. They've all got 'a' in them.

T. Yes. Nearly right.

St. They've all got an 'a' in the middle.

T. No, that's not the answer. Shannon?

St. They've all got a 't' in the middle.

T. No. Shane?

S. (inaudible).

T. No. You can have a turn later. We've still got more words to test.

St. They've all got an 'a' in them, every single one of them.

T. That's right, but that's not the answer. We want to know why we said 'yes' to these ones and why we said 'no' to those words. I've given you a clue. It's something to do with the sound of the - this letter.

St. They've all got 'a' in them.

T. Read this word, everyone.

St. (inaudible).

T. No. Leanne.

St. Make and mat rhyme, and some of them rhyme and some don't.

T. No. Jonathan?

St. Every single one on that side has got 'a' and all the other ones on there have got 'ae'.

T. Yes! Jonathan's got it. Jonathan, would you like to stand up here and show everyone? Why did I say 'no' to these words? Because they've got an......?

St. 'a' in them.
T. Listen to the 'a' sound, everyone. Hat, sat, mat. Can you hear the 'a' sound? Right? And what about the 'yes' words, Jonathan?

St. Cake, make.

T. On that side, the words...... the 'a' says 'a', but over here it says 'ae'. I wonder if you could look at these words and try and tell me what makes that word......

St. The beginning word makes it........

T. No.

St. The 'e' at the end.

T. Right. The 'e' at the end makes 'a' say 'ae' instead. If I didn't have the 'e' there it would say c-a-k, cak. But because I have got the 'e' on it, it says 'cake'. It changes this letter into a long sound. C-a-k-e. Everyone say that word.

St. Cake.

T. Now you know the answer, come and get a 'yes' word for me please Adam. One of these three words that are left go in the treasure box because it's a 'yes' word. What word do you think it's going to be? What does that word say?

St. Gate.

T. Right. Why does it say 'gate' instead of 'gat'?

St. Because it's got an 'e' at the end.

T. Good girl. 'e' changes the 'a' into?

St. "ae".

T. Clever girl. Where are you going to put it? In the treasure box or throw it away into the sand? Well done. Is she right everyone?

St. Yes.

T. Hands up if you think this word should go in the sand. Bake.

St. No.

T. No. Where should it, Ray?

St. Treasure box.

T. Why should it go in the treasure box?

St. Because it's got 'e' at the end.

T. Right. So what word does it say?
St. Bake.

T. Right. I should go in the treasure box because it's got an 'a' sound in it. They've all got 'a' sounds in them. What does this word say please, Lee?
TEACHER: BG

T.* Right. Listening now and sitting nice and still. Inside this paper bag I have got some shapes. I've also got two green pieces of paper here. On top of this green paper, what have I written?

St.**"Yes".

T. What have I got on top of this piece?

St. "No".

T. Now, you've got to guess where the shapes go. I'm going to give you a clue, so you must watch and listen carefully. I'm going to put them somewhere so you can work out....... And if you're sitting nicely you might even get a turn to dig into my lucky dip bag. The first shape I took out was this shape. And I'm going to put it in the "yes" page. Right, would you like to choose one please Shane? Right. And that shape I'm going to put in the ....? "Yes" part as well? The lucky last one. Right, that's going to go in the....?

St. "No" part.

T. Right. One shape's in the "yes" page and one shape in the "no" page. Can anyone tell me why I put all those there? Kevin?

St. Because they're all the same and..........

T. What do you mean, 'they're all the same'? What's the same about them?

St They've all got the same shape.

T. What have they all got.

St. Points.

T. They've all got points. Has this got a point?

St. No.

T. Alright. Pick one out of the bag please, and you ask me where it's going to go, and I'm only going to say 'yes' or 'no'. And we'll see whether you were right. Dean, come and pick one out of the bag.

T. Where do you think that goes?

St. On this part.

T*: Teacher.
St**: Student.
T. No. Right, you put it where I told you to. Ask me where should it go. That's right. Stop doing that. Sharon, come and choose one. Where does it go, Sharon?

St. Here.

T. That's right. Leanne, come and choose one.

St. Here. It's the same as that one.

T. That's right. Which side does that shape go in? The 'yes' side or the 'no' side?

St. Yes.

T. That's right. Put it in the side that you think fits it. Sshh. Right, listen. Are you listening quietly? Right. Have a look at all the things that we've put in the 'yes' side. Have a look at all the things that we've put in the 'no' side. Why did we put all those shapes in the 'yes' side? Who can guess? Pardon Tricia?

St. They've just about all got points.

T. They've just about got all points. I can see one over here that's got points. Why didn't we put that one over there?

St. Because it's not pink.


St. Because it's a triangle.

T. Are all of these shapes triangles?

St. Yes.

T. Are all the 'no' shapes triangles?

St. No.

T. Right. What have triangles got that makes them go over there? Natalie.

St. They've all got three points.

T. Good girl. Let's count them. One, two, three. One, two, three. One, two, three. One, two, three. One, two, three. So the 'yes side' has got what? Three points. Right. All the shapes in the 'no' side have got?

St. No points and some points.

T. Good girl. Here's one that's got no points, so it goes on the 'no' side. What else have triangles got? Dean.

St. Three sides.
T. Good boy, three sides. Would you check these please Shannon, and count the sides. Natalie? I can't hear, Natalie.

St. Three points, and they've all got three............

T. Good girl. Can triangles be small?

St. Yes.

T. Can triangles be big?

St. Yes. They all can be big and little.

T. Right. It doesn't matter what size they are, does it? Why is that over on the 'no' side?

St. It's not like a triangle and it hasn't got three points.

T. How many points has it got, Luke?

St. Four.

T. Count them.

St. One, two, three, four.

T. Therefore it can't be a.......?

St. Triangle.

T. Right. Let's check this one. Michael, watch closely. Where shall I put this one, on the 'no' side or the 'yes' side?

St. No........ yes........

T. Who said 'yes' side? Wade, does that look the same as all the others?

St. No.

T. How many points can you see in that shape?

St. One. It's like a zero.

T. It is like a zero shape. It's got no points so it goes on the....? 'No' side.

T. OK, boys and girls, we've finished that now. What I want to know is how you worked out the answer.

St. I didn't know at the start, but you helped...

St. It was the other kids who helped me Mrs. Gregg.

T. What do you mean it was "the other kids", Natalie?

St. I heard them talking about the differences when you showed them.
T. Thank you children. Play-time now.
Lesson Three - Concept Attainment

Teacher: BG

T.* Right. Listen very carefully. We're going to play a game and I've got lots of pictures in an ice-cream container. Pictures of things that I'm going to stick up here. And at the end you have to decide whether this label goes on which piece of paper. Can you tell me what this word says? Yes?

St.**'No'.

T. Good girl. What does it say, everyone?

St. 'No'.

T. And who can tell me what that one says? Yes?

St. Yes. No.

T. Oh good, you know those words really well, you clever people. Right, we see at the end when we've got lots of pictures on these sheets you're going to have to decide whether you would put 'no' there or would you put 'no' there? You can't tell yes, can you, because there's nothing on the paper.

St. I can.

T. You're only guessing though, because you don't really know whether 'yes' would go on this side or that side. You have to think about what I stick up, and I might even get you to stick up some pictures, and you can decide what side they'll go on. The first thing I'm going to stick up is going to be this. What are they, Tricia?

St. Yummm - biscuits. There's my favourite ones there.

T. Biscuits. I'm going to put biscuits there. And I'm going to put....

St. Yummm.

T. Chocolate biscuits.

St. Chocolate fingers.

T. Good, I'm going to put chocolate sticks there. I hope you're thinking whether this is going to be a 'yes' side or a 'no' side. And I'm going to put ......... I'm going to put this (inaudible) over the side. And I'm going to put one more picture on this side. And you've got to try and guess why I'm putting ......... (inaudible)... Justin? Fish. Alright, let's see. Sssh. Perhaps some of you could tell me where we'll put 'no'. Would we put it on the side with the biscuits on or would we put it on the side with the egg and the fish on.

T*: Teacher  St**: Student.
St. The egg and the fish.

T. The egg and the fish. Why would we put......?

St. Because they aren't the same..... You put the 'no' on the biscuits because the biscuits are sweet.

T. Do you all agree with that?

St. No.

T. Well, why would you put 'no' there?

St. Because the biscuits are sweet.

T. Well, I'll tell you what. We'll do some more examples. This time I'll shake up my container and let you do a lucky dip and let you pick out a picture, and you'll ask me which side it should go on, and I'll tell you 'yes' or 'no'. Right? You're sitting up nicely. You can choose one and tell everyone what you've chosen. Stand up and come up the front. Goodness me, I like Hayley up there, she's sitting up beautifully. What have you got? Cake. Which side would you put it on, David? Point to the side. Yes, that's right. We'll glue it on and you can stick it on whenever you like.

St. I know this game.

T. Do you, have you played this game before?

St. Yes.

T. Alright. I'm going to let someone else who's sitting up nicely have a go. And then we'll ask you again which side the 'yes' and 'no's' go on. Would you like to choose one? Oooohh, come up and tell us what you've got. What's that? A pear. Point to the side that you think it should go on. Ask someone to tell you where to put it. Hayley, where would you put it? Point to the side, you don't have to come all the way up. Which side? Yes, that's right. Put it in - we need a bit of glue on the back don't we, to make it stick. Now, who can tell me which side would have the 'no' on now? Elizabeth.

St. That side.

T. That side. The side that's got cakes and biscuits. Why would you put 'no' there Elizabeth?

St. Don't know.

T. Don't know? Yes?

St. Why don't you put it on this one?

T. On the side with the fish and the pear and the eggs? Why?

St. Because the eggs are different and these aren't.
T. But chocolate sticks are different from cakes aren't they? Do you think his reason's a good reason?

St. No.

T. Now, someone else. You can argue with these people if you like. Right up the back there.

St. You can eat them for dinner and........ dessert....... and for playtime....... 

T. I see, well where would I put 'no'? The side with what on?

St. The biscuit side.

T. The biscuit side. Do you think that's a good enough reason?

St. No.

T. Why did you say 'no'?

St. 'Cos I like the biscuits and cakes best.

T. So what would you put on that side?

St. 'Yes'.

T. OK. What's your name?

St. Kirsty.

T. Kirsty would put the 'yes' here because she likes it the best, and she would put 'no' here because she doesn't like those things. Is that a fair enough reason?

St. Yes...

St. No...

T. Hands up those who think it is. Alright. The people who think it is - Tricia, tell me why you would put it this way.

St. Because I like those the best.

T. Oh, because you like those the best. Who's got a different reason? Right up the back.

St. Because those are much better for you.

T. They're better for you. Hands up if you agree with that. Right, hands down. Are those good for you?

St. No.

T. Why aren't they good for you. Who can tell me?

St. They're bad for your teeth.
T. They're bad for your teeth, that's right. Biscuits and cakes and chocolate biscuits are bad for your teeth. Fish and eggs and pears aren't bad for your teeth. Do you know why?

St. 'Cos those things have sugar in, and all that.

T. So the things on the 'no' side have sugar in them. Do you all agree with that?

St. Yes.

T. Justin, do you agree with it? Jamie, we were talking about sugar. How do we know that biscuits, cakes and chocolate biscuits have got sugar in them?

St. They're made with some.

T. How do you know? What do they taste like?

St. They taste like they've got sugar in them.

T. How do you know? What do things taste like when they've got sugar in them? Do you know? Richard, do you know? What do they taste like? Perhaps you know? What do things with sugar in taste like?

St. Chocolate.

T. Not always. I mean, I've had a biscuit like that and it doesn't taste like chocolate, but it's still got sugar in it.

St. They taste like a horrible flavour.

T. Do they? You don't like those things. Something beginning with 'sw'. They taste........

St. Sweet.

T. Sweet! Of course. They taste sweet, those things, don't they, because they've got sugar in them. But over here - does a pear taste sweet?

St. Yes.......No.

T. Hands up if you said "yes". Yes, Elizabeth, I think they do too. Hands down. A pear does taste sweet, but no-one put the sugar inside the pear, the pear's got it's own sugar inside it that makes it sweet. But, you have to put sugar inside the biscuits to make them sweet, when you're cooking them. You've got to put sugar inside these things to make them sweet too. Can you put sugar inside a fish?

St. No.

T. You can, if you do it, but then we'd have to put it on the 'no' side, wouldn't we? These things have got their own sugar. These things have got sugar put in them by someone.
else. We call the pear sugar - natural sugar. Can you say that?

St. Natural sugar.

T. Now, just to see that Mrs. Gregg's saying the right thing, I wonder if we could pick some more out, and you can decide whether to put them in the 'yes' or 'no' side. Someone I haven't had yet. Justin, up you come. Quick sticks. You choose something out of here. Hold it up and tell everyone what it is. What is it? It's a .......? You have them for lunch. Tell him what it is, everyone.

St. Sandwich.

T. Alright Justin. Would you put the sandwich in the 'yes' or the 'no' side?

St. 'Yes' side.

T. You'd put it in the 'yes' side. Do you all agree with that?

St. Yes.

T. Yes. But why do we put it in the 'yes' side? Thanks Justin. You can sit down.

St. 'Cos it's good for you.

T. Because it's good for you, but because it's got no......?

St. Sugar.

T. Sugar in it. Right. Oooohh, come and put this delicious looking thing in the right place. What is it?

St. Ice cream.

T. No, it's not ice cream. It's a scone with cr....? 

St. Cream.

T. Right, what side are you going to put it on, the 'yes' side or the 'no' side? Let him concentrate Elizabeth. He can't think. Pick a side. Does it go on the 'yes' side or the 'no' side?

St. 'No' side.

T. 'No' side. Hands up if you agree with this boy? This goes on the 'no' side. Right, hands down. Hands up if you disagree with him? Why do you disagree?

St. (inaudible).

T. Isn't jam sweet?

St. Yes.

T. Is jam good for you?
St. No.
T. You decide yourselves. I'm not going to tell you. Where do you think this really should go - on the 'yes' side where it's good for you, or the 'no' side. Hayley?

St. 'No' side.
R. On the 'no' side. I think most people have decided on that.

St. 'Cos cream's got sugar in it.
T. That's right, and someone puts the sugar in, don't they?

St. The factory does.
T. The factory does, good girl. Right, someone else who's sitting up nicely. You may come up. Warren's got something - tell everyone what Warren's got. Will you tell everyone please?

St. Cake.
T. Oh, I can tell you like these things. It's not really cake. What does it look like? What does it look more like? Hayley?

St. It looks like fruit cake.
T. Yes, because it's got fruit in it, hasn't it?

St. That's my favourite cake.
T. A fruit cake, with what on top?

St. It looks like a birthday cake.
T. It does look like a birthday cake, yes.

St. It's got on it all bad things.
T. Why do you say bad things?

St. All sweet things, lollies.
T. Are all sweet things bad?

St. No.

T. I thought we'd decided - boys at the back - sit down... I thought we'd decided that things that were sweet, like pears, were good for you. We put it in the 'yes' side. Someone put it in the 'yes' side. And that's sweet.

St. They aren't lollies, because you can tell - they look like cherries.

T. Cherries. Have cherries got lots of sugar in them?
St. No...

St. Yes...

T. These type of cherries have, so they're not very good for you are they? So where would you put them, Warren? In the ..........No side. Good boy. You can sit down. Thank you. Richard, have a turn. Richard, do you know what that is? Right, put it back in and choose one that you know. Richard's going to put a strawberry up. Now have a look closely at this strawberry. Who's tasted a strawberry? What does a strawberry taste like?

St. Sweet.

T. A strawberry tastes sweet. Does somebody put sugar inside the strawberry?

St. Yes...

St. No...

T. Who does? Yes?

St. The people who make it.

T. No, because strawberries grow in your garden. Would you like to tell me about strawberries? Who's got strawberries growing at home? Right, when you pick a strawberry, Peta-Lee, when you pick a strawberry, what does it taste like when you eat it straight away?

St. Sweet.

T. Sweet. So no-one's had time to put sugar in it. It's got its own sugar inside, hasn't it? But, what has this strawberry got over it, Justin?

St. Chocolate.

T. Is chocolate good for you? Richard? You decide. As the boys and girls.

St. No. On the 'no' side.

T. You'd put this strawberry on the 'no' side would you? What happens if it didn't have the chocolate over it, if it was just ordinary strawberry where would you put it?

St. Put it on 'yes'.

T. Why would you put it on the 'yes' side?

St. It wouldn't be sweet.

T. Well it still would be sweet wouldn't it?

St. ...(inaudible).
T. Did you? So they're not overly sweet. We would put it there. Perhaps you could say it's got its own sugar, it's got natural sugar, hasn't it? But because it's got chocolate we're going to put it in the 'no' side. Right, you can glue it on, Richard. Right, Kelly, tell everyone what you've got to stick on. And I hope the boy up the back's listening. What have you got, Kelly? Show everyone and tell them.

St. ...(inaudible).

T. Your dad's growing peas? Well you'll know all about peas then. Peas, potato and chops. Where would you put all those delicious things? I don't think they heard you, Kelly. Kelly's going to tell you. Perhaps you could whisper to her where she should put it.

St. (inaudible).

T. OK, Kelly, you glue it on where you think it should go. Is she right everyone?

St. No...

St. Yes...

T. Who said 'no'? Michael, would you like to tell us why you said 'no'?

St. 'Cos they're sweet.

T. Oh, that could be a reason.

St. And chops aren't very good for you.

T. Why not?

St. 'Cos they get stuck in your teeth and you have to clean them.

T. I wonder why that is. What's different about my teeth and your teeth? Look at my teeth. What's different?

St. Your teeth are big and our teeth are small.

T. Your teeth are still growing, aren't they? Right, now we've got lots of pictures up here. On the 'no' side we've got biscuits, cakes, chocolate biscuits, birthday cake, scones and chocolate-covered strawberries. On the 'yes' side we've got eggs, fish, a sandwich, vegetables and a pear. Right, if you were to shut your eyes, quickly - shut your eyes, I want you to dream about something you'd put in the 'yes' side, and something you'd put in the 'no' side. When I say "Open eyes". I want you to be ready to tell me when I point to you. Dream of something that should go in the 'yes' side and of something that should go in the 'no' side. Right. Open eyes. As soon as I point to you, tell me the 'yes' thing first and then the 'no' thing. Justin - 'yes'.
St. Sandwich.

T. Good boy. 'No'. What's to go on the 'no' side, Justin?

St. Cake.

T. Good. Mark, would you like to tell me what could go on the 'yes' side?

St. Pear.

T. Pear - What should go on the 'no' side? Something that you've thought of all by yourself, that's different from these.

St. Scones.

T. Scones - right. Would you like to tell me something that you have at home that would go in the 'yes' side?

St. Vegetables.

T. Vegetables? Yes, and what would you have at home that goes in the 'no' side?

St. Cake.

T. Right. Kirsty, what would you have at home that goes in the 'yes' side?

St. Fish.

T. And what would you have at home that goes in the 'no' side?

St. Biscuits.

T. Biscuits. Right. Just because we've got all these things in the 'no' side, does that mean that we never ever eat biscuits, or strawberries, or chocolate biscuits?

St. No.

T. What does it mean? Yes?

St. It means that if you eat them and don't clean your teeth, your teeth go rotten and they fall out.

T. Right. Because I know that I love Cadbury's chocolate biscuits but I know that if I ever eat them I've got to brush my teeth straight away, and I know I wouldn't have very many of them. But if I was to have eggs, I know they're good for me. I wouldn't have to brush my teeth straight away, would I?

St. My uncle said if.......(inaudible).

T. Has he? Yes?

St. I'm getting a new tooth now.
T. Good boy. You'll have to be careful what you eat. I'm going to play back our voices now on the tape, and you're going to listen to them and you can tell me what you think about them. Sit very quietly.

T. Right, who likes playing that 'yes'-'no' game? Good. Hands down. Do you think that it's a good way of learning which foods we can eat and which foods we can't eat?

St. Yes.

T. Who would like to tell me whether they liked or didn't like doing this game? What would you like to tell me? Yes?

St. I liked playing it because we had to guess.

T. You had to guess, and you like guessing, do you?

St. (inaudible).

T. And you played another guessing game, did you?

T. Well perhaps Hugh can come and teach us that game next time. Warren, behind you, did you like doing this game? Why?

St. It was fun.

T. It was fun - what did you think?

St. It was good.

T. Why was it good? Is it a good way of learning, by guessing things?

St. Yes.

T. Do you think it's a good way of learning if your friends tell you whether you're right or wrong, or do you prefer the teacher to tell you if you're right or wrong?

St. The teacher tells you, because the teacher knows all about food.

T. Does she? Don't you think Elizabeth knows anything about food? Well, don't you think it would be good to hear her, and what she thinks about it? David, do you like learning by guessing? Beg your pardon? You do. Who didn't like playing this guessing game? Who thinks it's not a good way to learn things? Nobody? Justin, don't you like playing guessing games? No answer - you've lost your tongue. How else can we learn about words? If we had to make up a different way of learning about food, how could we work it out? How else could we learn of learning about food, how could we work it out? How else could we learn about what's good food and what's bad food? What's another way of doing it?

St. By trying it.
T. By trying out the food? That's a good idea. We could do that next time perhaps. What's another way, Kelly-Anne? Peta-Lee, sorry.

St. Ask your Mum.

T. Ask your Mum, Would your Mum know what is good food and what is bad food?

St. Yes.

St. No.

T. Who said "yes"? Hands up. Good, hands down. Who said "no"? Why wouldn't your Mum know?

St. 'Cos she doesn't know everything.

T. Doesn't she? Who knows more than your Mum?

St. My grandfather.

T. He knows, so you'd ask him would you? Right. Who likes just talking about things instead of going and drawing them? Who would have preferred to have gone and drawn them instead of just talking about them? Only three people. That's not very many. Who likes just talking about it instead? One, two, three, four, five, six, seven, people. Good. Hands down. Right, listen again please. We've got a 'no' column and a 'yes' column and I'm going to stick in some pictures of all different things into special columns and you've got to try very hard and try and work out what my idea is, without me telling you. I've put them there for a special reason. You've got to work out the reason. And this time when we're playing this game, you're allowed to talk between yourselves and try and work out my idea. See if you can work out Mrs. Gregg's idea. See if you can trick me. Right? I'm not going to tell you until you've thought about the idea, and the picture I'm going to put up is a picture of a house. And I'm going to put the house in the 'yes' column. The second picture I'm going to get out of my bag is going to be a picture of a family, and I'm going to put that in the 'yes' side. The third one is going to be a picture of what?

St. Cigarettes. My dad smokes. It's a dirty habit.

T. Cigarettes. It is a dirty habit. The next one I'm going to put in the 'no' ..... No, I'm going to put it in the 'yes' column. What is it a picture of? Peter? What do you call that? Do you know what it's called?

St. A toilet.

T. No.

St. A lighthouse.
Right. I'm going to put a fire in the 'yes' side. I'm going
to put a Dad, we'll pretend this is our Dad, in the 'yes'
side. I'm going to put a doll in the 'no' side. I hope
you're trying to think of why I'm putting these here. I'll
put one more up and then I'll ask you, because I can see
some people have thought about it already. I'm going to put
some cheese — cheese goes in the 'yes' column. So, so far
I've got a house, a family, a Dad, a fire, a lighthouse and
cheese in the 'yes' column, and I've got a doll and
cigarettes in the 'no' side. Has anyone thought about it
yet? Alright, Francine, what have you thought about?

St. The cheese should be in the 'no'.

T. Why?

St. Because the cheese shouldn't be in the 'yes'.

T. Do you know why? Mrs. Gregg's decided it would go in the
'yes' side. Do you know why I did that? Shannon?

St. Those ones....(inaudible).

T. What was that Lee?

St. You need a lighthouse to light the water, light boats.


St. Cigarettes are good for you. They haven't got any sugar in.

(noise - noise - noise).

T. Who agrees with Luke? Who thinks you should have
cigarettes? Do you need cigarettes?

St. No. It's a dirty habit.

T. Nobody thinks you need cigarettes. Yes Natalie?

St. If you have smokes they give you yellow teeth.

St. No they don't, not always.

St. My dad smokes and I tell him off.

T. Kevin. Listen to Keven.

St. The things that go on the 'yes' side, you live in. And
things go on the 'no' side that you don't live in.

T. Who agrees with that? Who doesn't agree with that? Who
can see something that you can't live in? What can you see,
Leeanne?

St. You can't live in the cheese or the fire.

T. No, that's right. You can't live in the cheese or the fire,
Kevin. So your answer isn't correct, is it? You'll have to
think of another one now. Yes, Natalie?

St. All the things that are in the 'yes' side are things you need to have sometimes, and all the things on the 'no' side aren't very good.

T. Alright. Let's test what Natalie said. Let's find out whether she's correct. I'm going to put some things in. Ready? I think that this could go in the 'yes' side . Do you need this car seat, like Natalie said? 'Cos Natalie said we're going to put it over there - we need it. If you're a baby, do you need a car seat in a car?

St. Yes.

T. Why do you, Francine?

St. My Mum needs one for after.

T. For after what?

St. My Mum's having a baby.

T. Is she? So she's going to need to buy one. Why does she need one of those for her baby?

St. Then the baby won't fall.

T. That's right. If the car stops. I think this should go in the.... You tell me instead. Where should this map of Australian people go?

St. In the 'yes' column.

T. Now why should this go in the 'yes' Jonathan? Do we need people? Why do we need people?

St. So that they can look after you.

T. Right. If we didn't have people, there'd by so many jobs we'd have to do for ourselves, wouldn't there?

St. No. We could just go out and play and do whatever we wanted to do.

T. Without anyone else? You wouldn't be able to play.

St. You wouldn't have enough money to buy food.

St. Yes you would. You'd save up some of your pocket money and keep it in....

T. Who's going to make the money, Luke?

St. Get it out of the bank?

T. Who's going to make the bank? Who's going to be in charge of the bank?

St. Me.
T. Do you need people Luke?

St. No, no in Australia you don't. In Albany you do.

T. Albany is in Australia.

St. No, it's not.

T. Yes it is. Someone point to Albany please, on the map. Brett. Go and show Luke where Albany is. No - right down the bottom of Western Australia Luke. I'm going to glue in a fridge. Does that say what Natalie said? Does that obey what she said? She said we only put in things that we need. Do we need a fridge?

St. Yes.

T. Luke, what are you going to say to that?

St. You don't need a fridge all the time.

T. No, but you do need it on hot days, don't you. It's not just something that you want. Pardon?

St. You just don't sit in a freezer.

T. No. But what happens if it was a hot day and we had all our food in our house and it was so hot, what would happen to the food?

St. It would melt.

T. So do you think we need a fridge?

St. No.

T. What would we do to keep them cool?

St. Put them on the fire.

T. A fire doesn't keep it cool. You're being silly now, aren't you?

St. The wind.

T. And if it's a very hot day with no wind, what would you do to keep the food cool? Dean?

St. Put it under the fan.

T. That's a good idea, but could you put butter underneath the fan? What would land on it, and make it full of disease?

St. Ants.

T. And what else goes buzz, buzz, buzz? Dean?

St. Flies.
T. Flies. Fridges keep flies out too don't they? Alright, I'm going to put this glass of Fanta in the 'no' side.

St. That's not got any sugar in?

T. Fanta? What was that, Tricia? Do you think Fanta should go in the 'no' side or the 'yes' side?

St. Yes...

St. No...

T. Hands up if you think it should go in the 'no' side. Hands up if you think it should go in the 'yes' side. Right. Natalia says things that go in the 'yes' side are things that we really need. Do we need Fanta? Or do we just want Fanta?

St. We need Fanta. If we had no water to drink we'd need Fanta.

T. Good boy, you said the magic word. We need water but this isn't water, remember. This is Fanta orange drink. That's right. So do we only just want it 'cos we like it, or do we have to have it?

St. Have to have it to drink.

T. But if we didn't have it, what could we drink instead?

St. Water.

T. Right. Can you see the difference, boys and girls? Listen. The things on the 'no' side are the things we just want 'cos we like them. It doesn't matter if we don't have them. It doesn't matter if we don't have a packet of cigarettes - we're not going to die. It doesn't matter if we haven't got a dolly because a dolly doesn't make us well or doesn't make us sick. It doesn't matter if we haven't got a drink of Fanta, because we can have a drink of something else. but when you get over to the 'yes' side - if we don't have a house, what would happen to you, Jonathan?

St. You'd catch a cold.

T. Yes, with nothing to shelter you.

St. You could go camping.

T. You could go camping, couldn't you? Do you need a family, boys and girls?

St. Yes...

St. No...

T. Luke say's 'no'. What happens if you didn't have a family, Luke?

St. You wouldn't get lost. You'd stay with your friends.
T. Right. Well, we've got friends down here, with the people. Do you need a light-house?

St. Yes...

St. No...

T. What happens if we didn't have a light-house, Dean?

St. The boats would bang into the rocks.

T. Right. In winter, when it gets very cold, do you need something to keep you warm?

St. Yes.

T. When you're a baby and you can't walk and you can't crawl, do you need a car seat to keep you.....

St. Yes.
LESSON FOUR - CONCEPT ATTAINMENT

TEACHER: BG

T.* The next part of this game is where you decide where to put it, and I will say 'yes' or 'no'. Come and tell me where we put money. Lee. Put some glue on it and you tell us where you'd put it.

St.** In the 'yes'.

T. Does everyone agree?

St. Yes.......no.

T. Alright, put it in the 'yes' side, Lee. Most people agree. Right. Come and tell me where we're going to put this fresh rain water. Jonathan, where are we going to put this fresh rain water?

S. On the 'yes' side.

T. Why?

St. Because we need water to drink.

T. Right. And this is where we put....

St. And there's fish in there and we need fish to eat.

T. OK. Put it in. We all agree with that? What about a car? Right, Kevin. Do we need a car? Does everyone agree that we do need a car? If you don't have a car you'd have problems. Is that right? Listen to Wade, please. Off you go Wade.

St. If you didn't have a car you could walk.

T. That's right, so perhaps Wade, do you think it's just something that we only want? Is there anyone in this class who doesn't have a car in their family at all?

St. Richard doesn't.

You do so.

T. So, hands up.....

St. If you didn't have a car you could walk, but it would take a longer time, and you'd get into trouble by your boss.

T. Oh, I see, alright. What about tooth paste. Now let Shane have a little talk, because Shane hasn't had a go yet. Where would you put tooth paste? Would you put it in something that we definitely need, or something that we just want. I can't hear Shane.

St. Yes.

T*: Teacher.
St**: Student.
T. In the 'yes' part. Alright. What about pineapples? John? Do we need pineapple or only just want it because we like it?

St. We need it.

T. If we didn't have pineapple would something happen to us? What would happen to us? Paul.

St. Die.

T. If we didn't ever eat pineapple we would die would we? Francine?

St. No, it's only a fruit.

T. Yes, it's only fruit. We could have something else instead couldn't we? So, this is just something we want 'cos we like, so where do you think we'll put it, Lee-anne? In the 'no' side - right. This is a picture of what? Peter?

St. Teeth.

T. Teeth. Do we need to have teeth in our mouth?

St. Yes........no.

T. Luke?

St. No, 'cos when you're a baby you didn't have teeth.

T. And what happened then?

St. And you could still eat.

St. You don't eat when you're born.

St. Yes you do.

St. No you don't.

(noise - noise - noise).

T. Alright, you decide. You tell Mrs. Gregg what to do. I don't know what to do.

St. Yes........No.

T. How are we going to tell whether we should put it into the 'yes' or 'no' side, Shannon? What should we do? How are we going to decide, John?

St. If you have no teeth, you can suck on it.

St. Yes, you can just swallow and then have a drink.

St. No, you would choke.

T. Yes Tricia?
St. You can just have a drink.

T. Boys and girls, we're not talking about when we were babies. We're talking about now. Now. Do we need teeth?

St. Yes.

St. No.

St. You get things mashed up then.

T. And do you think it's good for you just to eat mashed up things all the time?

St. No.

T. Right, let's have a vote. People who think teeth should go in the 'no' column, we don't really need teeth. Oh, only one person? Hands down. Hands up if you think it should go in the 'yes' side? One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen people. Where shall it go, everyone?

St. 'Yes'.

T. Right. Now we've played that game we've worked out some of the things that we do need and some of the things that we don't need. The things that we don't need are things that we simply want 'cos we like them. Who can think of something that they can think all by themselves that we just want? Something that we don't have to have, but we just want.

St. We have to have clothes.

T. Good boy, Kevin. But I'm asking you what's something that we just want 'cos we like it. Kevin?

St. Toys.

T. Right, toys. Toys would go in what side?

St. 'Yes'.

T. 'No' side, because you don't have to have toys. Right Leanne. You said the magic word. You said you wanted them, and Natalie told us that this side is 'want' and that side is 'need'. Right? So it can go in this side. Think of something else that will go in this side. Alright, then perhaps someone else would say it. Jonathan.

St. Racing track. You don't need a racing track.

T. That's true. Does everyone agree with that? You don't need a racing track.

St. Yes you do.
T. Why?
St. For when you race.
St. You don't have to race.
St. Yes you do.

T. Would something happen to you if you didn't race, Luke?
St. Yes, you'd be bored stiff.

T. But - what were you going to say, Leeanne?
St. You could do other sports, you don't have to do that. Running races........

T. Yes, Dean?
St. You don't need tracks.....

T. No, that's just something you want, so what side would that go on?
St. Yes.
St. No.

T. OK, boys and girls, before we go on to our painting, let's have a talk about what we just did then. We did a 'yes/no' guessing game and we learnt - what did we learn from that? Francine?

St. Things that are good and things that are bad.

T. Right, we learnt the things that we want and the things we need, we learnt by thinking and guessing. Wade, do you think that's a good way of learning, by thinking and guessing?
St. Yes.
St. No.

T. Who said no? Lee, why don't you think it's a good way? Why don't you think it's a good way of playing a game like this, and learning things?
St. It's too boring.

T. It's boring. You didn't like this game, Lee? Right, why didn't you like it, why do you think it was boring?
St. (inaudible).

T. Yes, but you like doing things, do you? Kevin?
St. You need to learn..... you don't need to learn the 'no' - you don't know things when you grow up.
T. But you learnt just then, didn't you? Who helped you to learn?

St. You.

T. I didn't tell you the answers though, did I? Who told you the answers Francine?

St. The kids.

T. The kids. Do you think that's a good idea Francine, that sometimes you can learn off other kids?

St. Yes.

T. Yes, I think it's good too. Jonathan?

St. On the Australian place there, you'd need an island to live on.

T. You certainly would, because Australia is an island, after all. Brett?

St. They're on the desk.

T. They are on the desk. I'm letting them, 'cos they're telling me whether they liked playing this game. Wade -- big voice.

St. You don't need sandwiches for lunch, you don't even need a big salad, you don't need a drink or do anything.

St. You do, you need food.

(noise - noise - noise.)

T. OK, boys and girls. We've decided that we've come to a conclusion that we know what we need now, and we know what we just want. And we know how to tell the difference. Who helped us work that out just then? Lee-anne?

St. The kids.

T. Right, so that means that this time you've played the game, Mrs. Gregg didn't have to tell you what was right or wrong - you decided yourself. Do you think that's a good idea, deciding yourself Natalie?

St. You don't call children kids, 'cos baby goats are kids.

T. That's right. Very true.

St. They're cubs. No, they're not.

T. Alright. OK, sitting up very nicely please.
Working with teachers: the implementation and evaluation of an innovative in-service programme.

JOHN WILLIAMSON

ABSTRACT

This thesis is concerned with the development and evaluation of a new approach to helping teachers change their classroom practice. The model adopted combined elements from the action-research model and the 'coaching' model, and findings from the curriculum implementation studies.

Governments are concerned increasingly to introduce new centralised curricula in response to social changes or economic pressures. In the community there are calls for widespread reform of schooling at all levels. Also, with changes in their career patterns it is imperative that teachers, who are likely to be teaching for thirty or forty years, have available a sustained programme of professional development. Regardless of the origins of the calls for change, to be successful the introduction of a new school practice must be accompanied by a corollary programme of teacher education. Typically, however, in-service education has lacked direction, been inappropriate and been poorly executed.

While the focus of the thesis is upon the fidelity of implementation of the new teaching strategy, it also reports on the teachers' understandings of the classroom dynamics, their feelings of self-confidence and perceptions of his or her Principal as a supporter of classroom innovation.

In the present economic and political climate judgements must be made about the worth of particular in-service programmes. Several important dimensions of an in-service programme were used to compare the innovative model with an action-research model and a 'typical' in-service model. On the criteria considered the innovative model fared better than the other two models.

Recent changes to in-service education in the U.K., announced in DES Circular 6/86, have meant a high degree of similarity in the espoused purposes and procedures of the British and Australian Governments. The in-service programme outlined here is well-suited to the new in-service policies and financial arrangements in both countries.