

FOURTH FORMERS LEARNING TO LEARN:

AN EXPERIMENT IN ENHANCING CLASSROOM LEARNING STRATEGIES

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ABSTRACT

Recent official support for learning to learn as a goal of education is discussed, and the research evidence for enhancing students' learning metacognition as the means to that end reviewed. Metacognition is defined. The research indicates that effective self-directed learning depends in large part upon the learner's perceptions of her/himself as a learner, of what learning is, and upon control of the learning processes in any given situation through the use of strategies. Metacognition delivers the strategies. Also supported is the view that such metacognition and strategic learning can be taught.

In an intervention study, four classes of average fourth form students of comparable ability at two city co-educational high schools were taught the same subject topic within the same time frame. While an experimental group of two classes (one from each school) was taught both the topic and how to control and direct their learning within it, the control group made up of the other two classes was taught the topic content and skills without such facilitation. Pre- and post-treatment comparisons showed that while both groups made gains in knowledge and skills of the topic, the experimental group significantly out-performed their control counterparts. Also, upon a measure of metacognitive learning skill, the experimental group had made considerable gains, whereas the control group remained static.

The conclusion was reached that the facilitation of learning skill received by the experimental group produced their greater success upon the topic test. The implications of the study for schools, teachers as individuals, and the education system are discussed, and some recommendations made.

CHAPTER 1: INTRODUCTION

The Curriculum Review (1987) affirms that 'Learning how to learn is an essential outcome of school programmes' (p.10), and states that as a matter of priority 'Students will be empowered to take increasing responsibility for their own learning...' (p.11). The first principle of the subsequent draft National Curriculum Statement (1988) is that:

Learning is a continuous and lifelong process. The curriculum should build on what has already been learned and experienced. It should also develop the knowledge and skills students need to move confidently through school, and from school to the world of work and further education...

The curriculum should enable students to take increasing responsibility for their learning. With their teachers they should be involved in setting goals, planning their activities, organising their studies to gain skills and understanding, and evaluating their progress.' (p.7)

The sentiments expressed in these documents are not new, though the degree of emphasis may be. This researcher suggests that an effective way to so 'empower' and 'enable' students at secondary school is to integrate work on learning skill with work on subject skills and content, and to draw attention to it in its own right.

A continuing challenge to all teachers is that of how to meet the individual needs of their students when there are 20-30 of them in a typical classroom. Methods of attempting to do so range from grouping students with similar needs together and teaching those groups, to withdrawal from class for special tuition or providing in-class support for those with special needs. In a sense all students have special needs as learners: grouping still means that these may not be fully met, and the withdrawal and in-class support approaches are normally used for the most demanding cases. Every student differs from every other in her/his prior knowledge, capabilities, learning style and perceptions.

If a student knows enough about learning and her/himself as learner, then s/he can make the most of any learning situation and make sure that her/his own needs get met. While other solutions may contribute towards meeting the needs of the individual, it is proposed that none has greater potential for improving each student's school learning and performance than equipping her/him to be a more autonomous, self-directing learner.

As has been suggested, enabling students to become effective self-directing learners has long been part of schooling's agenda, albeit frequently its hidden agenda.

'Hidden' not because someone has been using the curriculum manipulatively, but rather the opposite: because inadvertently learning to learn has seldom been directly addressed. In secondary education at least, learning to learn has largely been seen as the incidental by-product of learning in the separate subjects that make up the curriculum. The various study skills schemes that many schools operate are an acknowledgement that what the individual does to learn is important, but few stress the processes and strategies central to where the student spends most of his/her on task time: in the classroom (see Munro, 1988). Likewise, most teachers see themselves as subject specialists with syllabuses crammed with content to teach, and therefore little time or energy to spend upon developing learning skill per se nor upon the transfer of that skill to other subjects.

The researcher contends that learning skill should be developed within the normal school tasks in all subjects, rather than in some adjunct fashion. Moreover, it takes no more time to do it that way. Also, skills found effective in real tasks are more likely to transfer to other real tasks than ones learned in contrived but artificial situations.

With the intention, then, of seeing whether students can develop their learning skill and their subject performance at the same time, the researcher takes his own subject, English, with some fourth formers of average ability, and using some of them as a control teaches the others a topic while giving overt attention to developing their learning skill as he does so. The control group's learning skill gets no such overt attention. The students are tested separately before and after for learning skill on the one hand and topic skill and knowledge on the other, and the results of the two groups of students are compared.

CHAPTER 2: REVIEW OF RESEARCH

There has been a shift in research on learning in the last dozen years or so from investigating teaching and its interaction with the individualities of learners to investigating how teaching can help students to be more effective at learning itself (McKeachie, 1987).

Active Learners

Research support for active learning has a long history which goes back to the second decade of this century (see Gates, 1917). The activity of the learner is fundamental in improving her/his learning. Shuell (1988) points out that '...learning is an active, constructive, cumulative, goal-oriented process'. If learners are not mentally active no cognitive learning occurs. The extent to which they are mentally active will affect the quality of the learning, but even more, the sorts of mental activity they engage in, and the ways in which they orchestrate these sorts of activities and check them, will determine to a large extent whether their goals are achieved.

Thinking About Learning

The role of metacognition in improving learning has engaged the attention of many learning psychologists. John Flavell's work on metacognition in the 1970's has been seminal and his definition is probably authoritative. He sums it up as

knowledge concerning one's own cognitive processes and products or anything related to them...Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of the processes...usually in the service of some concrete goal or objective.

(quoted in Resnick, 1976, p.282)

Good learners have been shown to be metacognitively adept, and poor ones metacognitively deficient in how they tackle learning tasks in most subjects (see Shuell, 1988; Wang and Peverley, 1986). The potential of metacognition for enhancing the strategic learning of the individual has been recognised.

Student Perceptions

However, student perceptions have been shown to have a strong influence upon how they learn (Marton and Saljo, 1976; Biggs, 1985 and 1988); what they will allow themselves to see as possible for them to do as learners (De Charms, 1972; Schunk, 1985); and the likelihood of being successful as a learner (Bandura et al, 1965). If students have inadequate perceptions of the nature and process of learning (Baird and White, 1982), what intelligence itself is (Dweck, 1986), or of themselves as learners (Rogers, 1977), then they will see their

options as limited and their skill will suffer. For these reasons the learners' perceptions received some attention in the teaching phase of the research. Such perceptions can be influenced by successful performance, modelling and verbal persuasion (Bandura, 1986).

Autonomous Learners

One who has learned how to learn is an autonomous learner. There has now developed a substantial literature upon the nature of such autonomous learning in its various guises as: 'self-regulated learning' (e.g. in McCombs, 1986; Zimmerman, 1986), 'self-instruction' (e.g. in Wang and Peverley, 1986), 'self-control of learning' (e.g. Baird and White, 1982), 'self-directed learning' (e.g. in Biggs, 1988) and 'autonomous learning' per se (e.g. in Grolnick and Ryan, 1987).

The distilled wisdom of the literature would seem to suggest that model autonomous learners are individuals who:

1. have purposes for their learning;
2. have some understanding of what learning is;
3. have a positive view of themselves in control of that learning;
4. are active in the process;
5. bring their relevant knowledge both of content and of ways of learning it to bear on the task;
6. plan ahead;
7. can select from amongst their own and other available resources and use these resources;
8. can vary their learning styles according to task;
9. can develop their own strategies to achieve their goals;
10. monitor their progress;
11. adjust their strategies where necessary;
12. assess their achievement of their goals; and
13. generalise the strategies they develop.

The empirical research which would seem to support these indicators needs expansion. Little of this has occurred in New Zealand.

Learning Strategies

So-called 'executive control' (Brown, 1985) of learning by the learner is exercised through her/his learning strategies. These are complete plans put together to achieve specific learning goals (Derry, 1988/89), and they orchestrate the processes vital to learning (Kirby, 1984; Biggs, 1984).

In recent years there has been much work on strategic learning. The controlling role of metacognition in putting strategies together and directing them has been established (see Corno, 1986; Weinstein, 1988; Levin, 1988, and Rowe, 1989), and there is a general confidence in the practicality of classroom application (Baird, 1986; Gow, 1988). Broadly speaking such strategies can be grouped under six categories:

asking questions, planning, monitoring, checking, revising (in the sense of 'adjusting') and self-testing (Nisbet and Shucksmith, 1986, p.28).

The explicit teaching of strategies is supported by all researchers and goes hand-in-hand with the detailed modelling of them by teachers (Gilbert, 1986). The strategies themselves, how to control them, and their transfer to other tasks should be modelled (Nisbet and Shucksmith, 1986; Weinstein, 1987; Ogle, 1988/89, and Gow, 1988). Generic strategies such as those mentioned in the categories above need to become automatic (Nisbet and Shucksmith, 1984), so that students self-generate from them strategies for more specific tasks.

In the practice of teaching strategies, various researchers stress developing understanding of the processes of learning (Nisbet and Shucksmith, 1986; Weinstein, 1987); the learning task - analysis of it, feedback on such analysis, and transfer from the task; teaching learning strategies while teaching one's own content area using ordinary tasks (Weinstein, 1987); metacognitive dialogue, teacher-student and student-student- (Pramling, 1988); and all stress the need for plentiful practice and feedback upon it.

While there is a large volume of research upon the strategic learning of tertiary students, there is less work upon metacognition and learning with secondary students, and much of that is tied to learning from text (e.g. see Brown et al, 1981). Also few in number are the researches in ordinary classrooms with adolescents.

Teacher Style

Finally, the teacher's style is important in attempting to enhance students' learning. It needs to be supportive of self-direction (Grolnick and Ryan, 1987), and be facilitative rather than directive. It would seem that schools in many countries fail to provide the teaching and general social contexts that support independent learning and its development (White, 1984; Glynn, 1987).

Conclusion

The foregoing research findings moulded the teaching in this project. Encouraging the students to be more active in their learning and to take more responsibility for it was central. They were helped to do so by classroom practices designed to model effective strategies and provide them with success in the use of the strategies. Much talk and reflection upon goals and the best ways of accomplishing them occurred along with analysis of tasks. Students were helped to think through and use what they knew about learning, and were becoming aware of about it, to develop their own strategies and become more autonomous. Within the constraints of the available time they practised the approaches and techniques and received feedback on their success and help with transfer. How,

precisely, this was done, the propositions that were being tested in so doing, and the shape of the research form the next sections of this report.

CHAPTER 3: HYPOTHESES

The following hypotheses were put forward.

1. That a short course of lessons on the topic of Argument and Reasoning which incorporated metacognitive principles would produce greater gains in knowledge and skill within the topic in Form 4 students than would be shown by a control group of comparable ability and background.
2. That concurrently with those gains, the experimental group would also make greater gains than the control group in their learning skill, as measured by a Learning Skill Questionnaire than the control group.

CHAPTER 4: METHOD

A. Sample

The subjects were 4 classes of Form 4 students (14 and 15-year-olds) at 2 city co-educational state high schools. The total number of those entering the research study was 112. Of these, 81 are reported upon. The various reasons for this drop in number are discussed below in the section on procedure.

Each school had one class in the experimental group and one class in the control group. The classes from a particular school were not compared with one another, except as part of the total group to which they belonged.

All 4 classes were drawn from the middle ability bands of their respective schools. Both schools banded their students on entry to secondary school the previous year by using the New Zealand standardised Test of Scholastic Abilities or TOSCA. The TOSCA performances of the groups were the only objective measure available upon which to establish their equivalence. The test yields a raw score which can then be read as a percentile ranking in terms of age, and a stanine score. The stanine score was used as the point of comparison because performance by age is irrelevant to the object of the investigation. Only the level of performance is of interest. The mean stanine scores and standard deviations for the classes, schools and groups are reported in Table 1 (page 13). On the basis of these scores for the 81 students the experimental and control groups were deemed to be of equivalent ability as total groups, and slightly above the national average for New Zealand.

TABLE 1

TOSCA STANINE SCORES OF EXPERIMENTAL AND CONTROL GROUPS

Group	No.	Mean	SD.
School 1			
Experimental	24	6.33	.90
Control	18	6.94	1.03
School 2			
Experimental	18	5.61	1.01
Control	21	5.10	1.29
Combined			
Experimental	42	6.02	1.01
Control	39	5.95	1.51

B. Instruments

Two sets of instruments were developed specifically for use in the research. Both were produced in an 'A' and a 'B' form to enable them to be used as pre-test and post-test in each case. One is a test of knowledge and skill in the topic being taught: Argument and Reasoning, hence its name: Reasoning Pre/Post Test (RPT) A and B (see Appendix 2). The other is a combination of test, questionnaire and inventory intended to reflect understanding of and skill of learning: the Learning Skill Questionnaire (LSQ) A and B (see Appendix 3).

1. Reasoning Pre/Post Test

As already mentioned, this test is made up of content and skill items. In terms of its coverage of argument and reasoning it falls into two parts.

The first part is worth 15 marks and covers the following.

- a. Definitions
Students are asked to define 5 terms to do with reasoning, e.g. a sweeping statement.
- b. Examples
They are asked to give examples of 5 devices, e.g. circular argument.
- c. Identification
To see whether they can apply the sort of knowledge sampled by 'a' and 'b', students are then asked to identify 5 statements as examples of different devices, e.g. The French are very fashion-conscious.

The second part, likewise, is worth 15 marks, but is more subjective to mark. It goes further into the application of knowledge about the topic, or skill in using that knowledge. To avoid possible recall, this part covers the same skills but has different content in the A and B forms. The following are dealt with.

- d. Evaluation
A contention is stated and 3 counter-arguments presented for evaluation.
e.g. 'A' Form:
Contention: That smoking should be banned in all restaurants.
Counter-argument: e.g. People shouldn't smoke anyway.
They should give up completely.

'B' Form:

Contention: That professional sportswomen should be paid the same as men playing the same sport.

Counter-argument: e.g. Sportspeople shouldn't be paid anything at all. They should play sport for the love of it.

e. Extended Argument I

A case comprising a number of points is built up and presented for evaluation.

e.g. 'A' Form: Against equality of the sexes.

'B' Form: Against amateurism in sport.

f. Extended Argument II

The students are asked to present a brief case on an issue, either for or against.

e.g. 'A' Form: On raising the driving age to 16.

'B' Form: On raising the school leaving age to 16.

2. Learning Skill Questionnaire

While the development of the Reasoning Test was relatively straightforward, the development of the Learning Skill Questionnaire was quite another matter. None of the various tests or inventories that related to the area of school learning seemed likely to reflect the attitudes, approaches and full range of metacognitive behaviours which I regard as indicative of skill in learning. Most such instruments fell short for one of two reasons. Either they had too narrow a conception of school learning or they were too superficial.

In most cases in such instruments school learning is typified as relying upon adequate study skills with the consequent narrowing of focus that the word 'study' implies and the fragmentation of the learning process suggested by 'skills'. I have dealt with this matter in more detail elsewhere (Johnson, 1987) and shall not expand on it here. Other tests sometimes narrow what is needed for school learning to skill in a small number of generic domains seen as central to such learning, e.g. the verbal and mathematical domains. One of the aims of the LSQ is to reflect more adequately understanding of the learning process with tasks typical of classroom work in most subjects. This latter emphasis upon ecological validity seems largely missing from other measures.

Tests, questionnaires or inventories that suggest responses to students through multi-choice items had two drawbacks:

1. through their suggestions, students were in fact prompted to make one of a number of responses where on their own they might not have been able to make any, and
2. the limited length of response often seemed not to do justice to the complexity of the learning involved.

It would not be fair to criticise existing measures upon such grounds where their purposes were significantly different, but the realities of classroom learning seemed to require something closer to it in character in a measure designed to assess skill in it. There seemed to be no alternative to constructing a new instrument.

The content of the LSQ is the result of this emphasis upon the real classroom. It seemed reasonable to suggest that in most subjects, if not in all, students were required at times to memorize or learn some material by rote; that frequently they have to read and learn, and to express what they know in writing; and research continues to show that their skill in listening is still perhaps drawn on too much. Again, teachers across the curriculum at all levels set project work of one kind or another which draws upon planning, investigative, organisational and reporting skills that are important to self-directed learning. By including all of these: **memory, reading, writing, listening and project work** it seemed likely that while any one of them might on its own inadequately reflect what is typical of classroom learning tasks, together they were unlikely to be far astray from the experience of students exposed to the prevailing curriculum of general education for students in Form 4. If, again, the tasks chosen to represent these areas of endeavour were common ones then the classroom is even more likely to be fairly sampled.

Thus the LSQ falls into the five sections mentioned, with one addition - a final section upon **learning itself**, in which students are asked what they understand of the process they engage in and their part in it.

The research basis for the LSQ has already been indicated (see Chapter 2), but the major demands upon a teacher's skill in developing such an instrument came in translating what the research shows into the questionnaire items and the schedule for marking them. The questionnaire items were the result of reflection upon what seemed to be typical tasks in the areas of reading, etc., based on earlier work on learning across the curriculum, even though they were set in the context of a unit of English teaching. The questions upon the students' approaches to these tasks and handling of them in fact or theory were the result of bringing the findings of research to bear upon what students seemed typically to do in such tasks, in order to elicit from them their understanding of what they were doing in order to learn and why. All of this was facilitated and underpinned by drawing up a list of indicators of skill in learning which the questions in the LSQ would attempt to reveal. (See Appendix 1.)

The LSQ items themselves are of 4 main types:

1. Those that require the students to actually undertake a task, with questions on their activity before, during or after, or all of these.

Such an item is the 'Remembering' one in both A and B forms. e.g. in the A form students are asked to learn a list of spelling words relevant to the topic (see Appendix 3 for actual item), and are then asked questions that reveal the coherence of their strategy, their monitoring of it, and their understanding of what they have done.

2. The second category of items is the hypothetical learning situation in which students are asked to engage with an imaginary but specific task, with questions similarly designed to get them to 'unpack' their learning.

The 'Listening' items in both questionnaires are of this nature. e.g. in the 'B' form students are asked to imagine that the teacher is explaining to them how to go about a complicated task they are about to undertake, namely, working out on paper the moves on stage of actors in a play they are studying (see Appendix 3 for wording). They are then questioned to reveal how purposeful their learning is, whether they can transfer the skills involved to similar tasks in other settings, and whether they understand assessment and can apply it to their own work.

3. Thirdly, some items are hypothetical to a degree, with actual performance of part of the learning task involved. The 'Writing' tasks in the questionnaires are like this.

e.g. in the 'B' form students are asked to imagine that they had to write a 200 word piece on what they liked and disliked about being a teenager. (See Appendix 3.) Then they are asked questions to reveal how well they orchestrate their known techniques to plan the work, whether they understand why they do it that way and whether they understand the teacher's purposes in setting such tasks.

4. The fourth type of item differed from the rest, not in closeness to reality, but in breadth. The 4 'Learning' section items ask the students to show whether there is a coherence in their view of and approach to learning. The section is the same in both forms (see Appendix 3). The questions reveal how much the students understand about themselves as learners, about learning tasks and about the concept of 'learning'.

3. Trialling

The A and B forms of the LSQ were trialled on two classes of fourth formers at a large co-educational city high school. This trialling served as a check upon a number of factors. It was important to find out to what extent, unprompted, such students could respond to questions about their learning. Likewise, whether the LSQ items revealed the intended understandings, approaches and strategies needed some guarantee. Both the items themselves and the marking schedules for them were shaped to some extent by the findings in the trial.

Such a trial enabled the practical details of administration to be checked, also. As a result, the time-allocations for items were adjusted and at specific points I, as the test administrator, was prepared to answer non-substantive questions.

C. Procedure

1. Time

- a. The total time involved in the teaching and testing was 5 weeks in the middle of the third term of the New Zealand school year.
- b. Over that time each class used 13 one-hour periods of lesson time, of which 6 were used for testing and 7 for teaching/learning. Both schools used one-hour periods as the basic unit of teaching time.
- c. Of the 6 periods for testing, 3 were used for pre- and 3 for post-testing. In each case, 1 hour was required for the RPT and 2 for the LSQ.
- d. The 7 hours for learning were allocated so that the classes involved did not have more than two per week. This meant that the timings of periods within the school day could be kept comparable.

2. Pretesting

- a. A week or so before the start of the programme classes were told in very general terms about it, and immediately before pretesting were told about the topic: Argument and Reasoning, and the general purpose of the research: to compare teaching methods. They were not told what these methods were, nor what sort of group they were supposed to be.

- b. Given that this situation was obviously unusual, the testing/teaching context was otherwise kept as normal as possible. The teacher/researcher was introduced by the normal English teacher of the class, all work was in the timetabled classrooms, and the topic to be taught was identified as one which was ordinarily part of a course in English in Forms 4 and 5. Any marks gathered would contribute towards end-of-year assessments. For the next 5 weeks their English programme would be split between English periods as part of the research, and English periods with their normal teacher.
- c. The first 3 periods of the programme were occupied with pretests: RPT in one period followed by the LSQ in two sessions. The purposes of the pretests were made clear and the fact of post-testing also. Records were kept of explanations, etc., with the tests administered to the first class, and these were used to control the conditions for the other 3 classes. Students were allowed questions upon procedure.
- d. The RPT was allowed to take natural time, and the LSQ was administered according to the time set down for each question (see Appendix 3).
- e. The research design included using the equivalent forms of both RPT in a changeover pattern between pre- and post-tests to cancel any possibility of a specific test in a particular position in the pattern affecting the results

Test Crossover Pattern

Class	Pre-test	Post-test
E1	RPT 'A' + LSQ 'B'	RPT 'B' + LSQ 'A'
E2	RPT 'B' + LSQ 'A'	RPT 'A' + LSQ 'B'
C1	RPT 'B' + LSQ 'A'	RPT 'A' + LSQ 'B'
C2	RPT 'A' + LSQ 'B'	RPT 'B' + LSQ 'A'

3. The Lessons

a. Towards Standardization of Teaching

i. Focussing the Differences in Treatment.

Before preparing the lessons I tried to crystallize the differences between the two styles of teaching to be used, as a guide to implementing them. The one style would still be characterised as 'good, solid teaching' with the teacher doing much of the work and the students kept up to the mark: the control classes were to be taught this way. The style by which the experimental classes would be taught was more facilitative - the onus for learning being shared between teacher and students, with the aim of allowing them to take over as much as they could (see Appendix 4 for detail).

ii. Lesson Planning.

(a) Topic Work

Lesson plans were prepared for experimental and control classes 'in tandem' so that the differences in the treatments, accorded the two groups could be easily focussed.

e.g. For both groups the teaching phase of the research started with the viewing of a video tape taken from a popular T.V. programme 'People's Court'. In it litigants with a minor dispute present their own cases before a judge who makes an immediate decision. Here are the guide notes from the planned lesson:

Experimental	Control
<p>Video: <u>People's Court</u></p> <p>1. Relate work on video to <u>dual purpose of unit</u>: (a) <u>to improve learning skill</u>, (b) to improve skill in handling argument and reasoning.</p> <p>2. Specific instruction: <u> jot down</u> the strong points in the arguments of both sides in Case 1, e.g. 'When.....'</p> <p>3. Run Case 1.</p>	<p>Video: <u>People's Court</u></p> <p>1. Relate to <u>single purpose only</u>: to improve skill in handling argument and reasoning</p> <p>2. Instruction: in Case 1 <u>try to detect</u> where the people are arguing well and where not.</p> <p>3. Run Case 1.</p>

<p>4. Class discussion of findings with key words/phrases noted on blackboard. Generalise to what makes strong and weak (spoken) argument.</p>	<p>4. As for experimental group.</p>
<p>5. After question and answer to establish the reasons for doing so, <u>students formulate their own notes</u> using blackboard points as focus. Questions about how to do this and problems in it taken and clarified.</p>	<p>5. <u>Teacher dictates notes</u> using blackboard points as focus.</p>
<p>6. Instruction: '<u>Jot down</u> anything you would want to add as we watch Case 2.'</p>	<p>6. Instruction: '<u>See if there</u> is anything you would want to add,' etc.</p>
<p>7. Run Case 2.</p>	<p>7. Run Case 2.</p>
<p>8. Blackboard - focused clarifications or additions.</p>	<p>8. As for experimental group.</p>
<p>9. <u>Students add</u> to their own notes.</p>	<p>9. <u>Teacher dictates</u> additions.</p>

The differences that show up in the planning of the video work for each group are generally typical of how the envisaged differences in treatment turned out in practice. The dual purpose of the classwork was continually emphasised with the experimental classes; at strategic points they were encouraged to be as active as possible in their learning; and, typically, whatever notes were needed they formulated for themselves, sometimes with teacher modelling, sometimes without.

At this early stage with these classes, the only significant point made about learning as such was that making your own notes made sure you understood, and if you did not you could ask questions of the teacher or someone else.

(b) Learning Logs

After the first of the 7 lessons the keeping of a 'Learning Log' was introduced to the experimental group. Simply, it meant that at points where there was something worth crystallizing from the learning strategies/tactics used and/or our metalearning discussions, an entry with the title 'Learning I, II, etc.' went into the students' record of the work and, again, they made their own notes. What was to go in

the Learning Log was planned as part of the lessons in general terms. eg. Both experimental and control groups had feedback on their performance on the RPT in that they received their marked papers back, I discussed the answers and types of errors, and they were encouraged to ask questions. The experimental group was then helped to engage in personal goal-setting and the reasons for this were discussed. Their Learning Log entries were planned to contain something like this:

Learning II

My Goals:

1. I need to know - analogy
sweeping statement
jumping to conclusions
etc.
2. I need to concentrate on, and clarify,
- what makes an argument easy to follow, sorting
relevant from irrelevant, etc.

Later Learning Log entries referred back to this one and students monitored their progress as they noted for themselves how far they had moved towards reaching each goal, reset some goals and perhaps added others.

iii. Lesson Recording.

Teaching 4 classes the same material in close time proximity has the possibility of losing track and doing significantly different things with classes meant to have the same treatment. For this reason I kept a running record of what happened lesson by lesson and checked it where I was about to repeat a session. This also kept me conscious of any deviations from my planning.

iv. Control Treatment Monitor

The regular teacher of the first control class was present throughout his class's lessons. We discussed the teaching his class received at various points. This enabled me to monitor the fairness of the control treatment and to standardize it with the second control class.

b. Lesson Content:

i. The Topic

For both treatments the 7 period hours on Argument and Reasoning were tied reasonably tightly to the post-test content (see Appendix 2). They contained the following:

- Primer/pipe-opener on oral argument (People's Court).
- Pre-test feedback.
- Analysis of a set of arguments in support of the contention that 'Teenagers Today Have Too Much Freedom'.
- 10 Major Fallacies, e.g. red herring, false analogy, etc.
- Evaluating Arguments against the right of a wife and mother to go out and work.
- Evaluating an Extended Argument: Science and Morality.
- Writing an Extended Argument: Making Cycle Helmets Compulsory.

The four classes covered these aspects of the topic. Time was created for the experimental classes to work on metalearning by allowing for control classes to have more practice at analysis of argument, identification of fallacies, evaluation and production of argument, and more time on discussion.

ii. The Work on Learning with Experimental Classes Only

(a) Student Responsibility for Learning

Students were encouraged to take greater responsibility for their learning through, firstly, giving them information about learning, and reinforcing it as the lesson series progressed. This was not done in isolated snippets, but as it was relevant to the learning tasks engaged in. For example, before seeing the opening video, students were told, 'Research shows that the more active you are in your learning, the better it is likely to be,' and this theme was returned to at various points from then on. Again, before tackling the first 4 fallacies inductively we had a discussion initiated by my statement that, 'It is important to give what you want to learn enough working over by the mind to do what needs to be done: to understand, to memorize, etc.'

As part of this classroom talk about learning, a straightforward vocabulary of learning began to build up. For instance, it became possible to refer to 'mental processing' for 'working over by the mind', and to mention a 'learning strategy', 'learning goals', 'monitoring progress' etc. This was never taken out of context and normally paraphrased to help those students still coming to terms with the concepts.

Another way of promoting more acceptance by students of responsibility for their learning was the use of the rather obvious device of catch-phrases or slogans. The two settled on were 'Good learners are made, not born' and 'I can learn how to learn'. The significance of these was drawn out early in the teaching sequence, and they were referred to a number of times from then on. The latter phrase appeared more memorable and useful.

(b) A Strategic Approach

Students were encouraged to ask themselves questions such as the following when faced with some new learning task.

What am I trying to do? (What is the goal of this task? What will I be expected to do as a result of this?)

What do I know already?

How will I know that I have got there? (...if I can do it? etc.)

What are the ways I can tackle this? (How can I get the job done?)

What are the advantages and disadvantages of these ways? Which way will I choose? (Which strategy is best?)

Is this method doing the job? (How far is this strategy getting me? Do I need to change something?)

How well have I done this job? (What are the gaps I need to plug?)

Is there anything further I need to do?

Is there anything else this might work for?

The questions were varied in wording and all reasonable paraphrases were acceptable provided that they helped the student to:

- Get in touch with his/her prior knowledge.
- Clarify the task.
- Set goals.
- Construct and employ strategies.
- Monitor how the strategy was working.
- Take corrective measures where necessary.
- Assess how well the goal had been achieved.
- Review what had been done.
- Work for transfer.

It was made clear that there was no one 'correct' way of going about any task, but that the way chosen needed to fit the goals, the content and the students' style. Some suggestions were made as to methods that might prove useful, and why they might be so.

eg. Working co-operatively with another student:
'because you had to try to put your own understanding to the test by putting it into words; because you had to communicate your own understanding to someone else; because you gained from someone else's understanding,' etc.

(c) Facilitative Teaching Methods

The teaching methods used with the experimental group were intended to facilitate self-directed learning, given that 7 one-hour periods is not a sufficiently long exposure to have a major effect upon the student/teacher balance of responsibility for classroom learning.

One example of this was **modelling** by the teacher of the needed strategies or tactics with **meta-cognitive commentary** upon what was being done for what reasons. For example, when it came to writing extended arguments on 'Making cycle helmets compulsory', I worked through both the structuring of my arguments, and the writing of my case on the blackboard talking aloud to myself about my arguments and how I could put them. In this way processes which are often covert were exposed.

Similarly, the responsibility for the learning was **moved in easy stages** from teacher to students. For example, in working on the 10 arguments in 'Teenagers Today' I modelled the answers to items 1, 4 and 6 and the notes to go with them; pairs worked on 2 and 7, instructing one another and asking questions of me where necessary; students then did 3, 5, 8, 9, and 10 individually, took their findings into groups for checking, and if the groups had any further questions I answered them. By this third stage I was the resource and the learners made use of me as such.

Finally, the students in the experimental groups were encouraged to work **inductively** as much as possible. The work on the fallacies serves as a good example. On the first of these I modelled what was needed: finding the common element in the examples provided, stating what it is, and finally trying to put an appropriate term to it on the sheet. Then, in groups, the students did the same for the next 3, we discussed them and they did numbers 5-10 on their own.

(d) Learning Log

The Learning Log was the main device by which students clarified for themselves their understanding of what they were doing in their learning and made a record of their understanding. Over the 7 periods 5 log entries were made at appropriate points covering the following:

Learning I: Slogans and Questions (to ask yourself)
Learning II: My Goals (in this topic)
Learning III: Progress on My Goals
Learning IV: What helps my Learning
Learning V: A Strategy for Learning

Students were given guidance as to the sorts of things they might write and time to write, but their logs were for their own learning purposes and were not examined by the teacher.

4. Post Testing

- a. The alternate forms of the RPT and LSQ were used with the 4 classes immediately upon completion of the 7 teaching/periods, within the pattern of periods used throughout.
- b. Post-test results were not produced for any student who had missed a single period. This reduced original numbers in the sample. The numbers in the experimental group fell from 59 to 42 and in the control group from 53 to 39. Reasons for absence included sickness, sport, music lessons and being the school administration's 'runner'.
- c. Two special cases were also deleted. These were Samoan students in the control class at one school whose difficulties with English would have biased the results.
- d. The missing cases have no effect upon the research as all reported data, including that on matching, excludes them.
- e. Whereas I had marked all pre-tests, both RPT and LSQ, all post-tests were marked by a research assistant using the marking schedule and sample check - marked 'blind' by me.

CHAPTER 5: RESULTS

A. Pretesting

- i. Table 2 shows the results of the RPT as pretest.

TABLE 2
Pretest: Topic Knowledge

RPT	GROUP	
	Experimental	Control
Number	42	39
Mean	3.29	3.44
Standard Deviation	1.95	2.17

The performance of the two groups upon the pretest for knowledge of the topic shows no significant difference between them.

- ii. Table 3 shows the results of the LSQ as pretest.

TABLE 3
Pretest: Learning Skill

LSQ	GROUP	
	Experimental	Control
Number	42	39
Mean	24.36	24.28
Standard Deviation	5.99	8.99

The performance of the two groups upon the pretest for skill in learning likewise shows no significant difference between them.

B. Post-testing

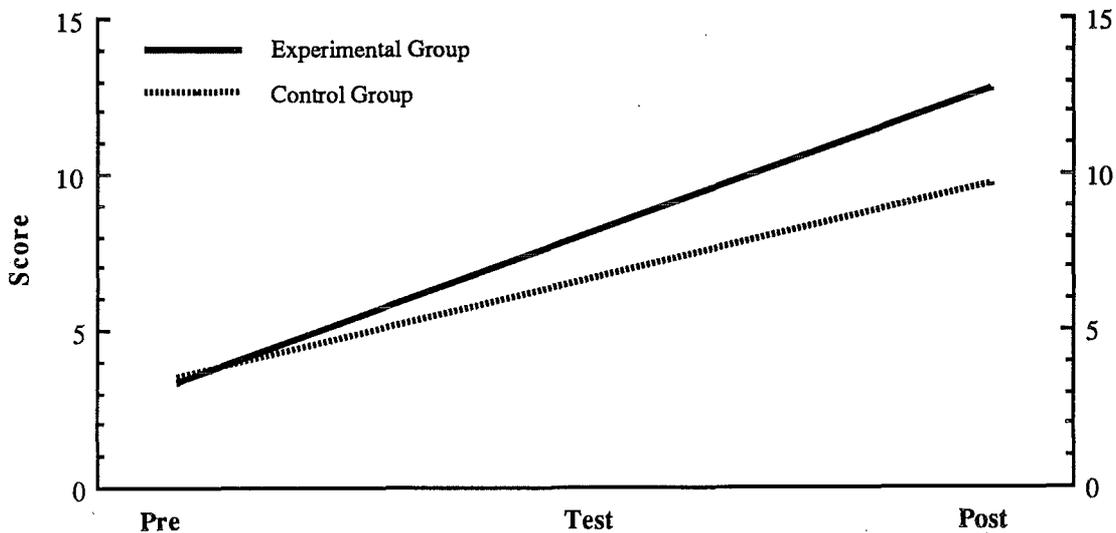
i. Table 4 shows the results on the RPT as post-test.

TABLE 4
Topic Knowledge

RPT	GROUP	
	Experimental	Control
Number	42	39
Mean	12.71	9.69
Standard Deviation	4.09	5.24

It is clear that the experimental group performed significantly better upon the post-test for knowledge of the topic and that therefore they made correspondingly greater gains in knowledge than the control group (see Figure 1). These gains are significant at the 1% level.

FIGURE 1
Gains in Topic Knowledge



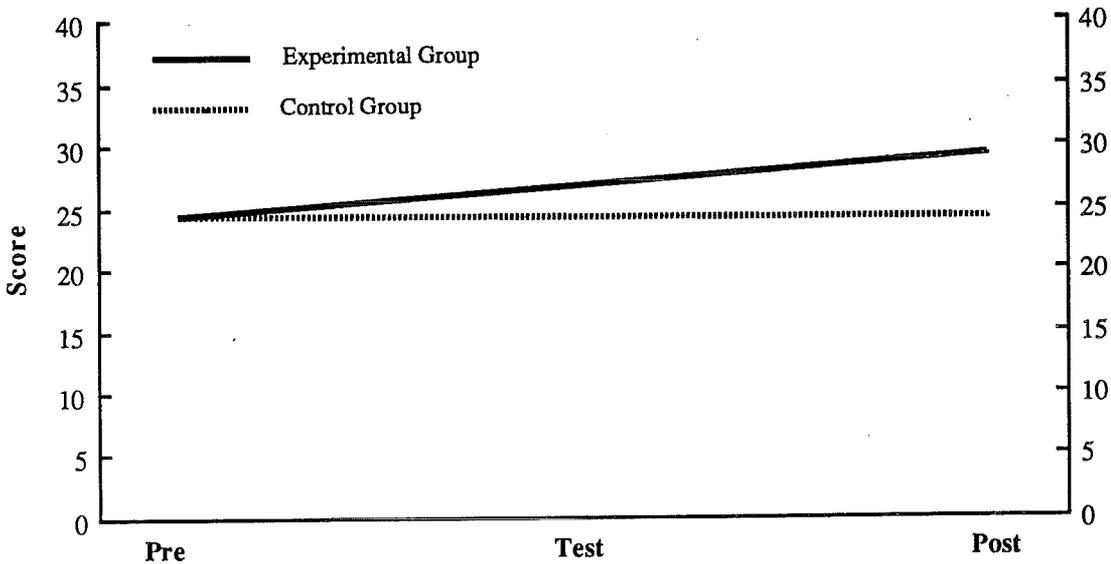
ii. Table 6 shows the results of the LSQ as post-test.

TABLE 6
Learning Skill

LSQ	GROUP	
	Experimental	Control
Number	42	39
Mean	29.18	23.95
Standard Deviation	6.70	9.82

Again, the experimental group had significantly better results on the post-test for skill in learning than did the control group. Their gains in skill as reflected by the LSQ were likewise greater (see Figure 2). These gains are significant at the 1% level.

FIGURE 2
Gains in Learning Skill



C. Item Analysis

- i. To see which aspects of learning had improved most as a result of the work on learning metacognition, the comparative gains on the LSQ of the top 10 students and the bottom 10 students in the experimental group on the 17 response items were examined.
- ii. 10 items showed a better than 25% improvement on pretest scores by the top 10 students. These were numbers 2,4,7,8,10,11,13,14 and 18 (see Appendix 3). Of these, numbers 8,11,14 and 16 were eliminated as not significant because of the number of nil scores on the pretest by the students, low total scores and the effect of one or two high or low scores in such a small sample.
- iii. On the 6 items left, gains by the top group ranged from 25% (No.13) to 100% (No.18). On the same 6 items gains by the bottom group ranged from -5.9% (No.2) to 17.6% (No.10). Very few of the 20 students had a nil score on the pretest on these items: only 5 out of 120 responses. Items 2,4,7,10,13 and 18 would appear to be the ones upon which those who improved most in learning skill made their greatest gains over those who improved least. The gains in mark terms are shown in Table 5 below.

TABLE 5

Major Gain Items of Top Experimental Students

Item No.	Pretest		Post-test	
	Range	Mean	Range	Mean
2	1-4	2.8	3-7	4.4
4	1-4	2.0	1-4	2.7
7	0-3	1.3	0-5	2.0
10	1-3	1.7	1-7	2.7
13	2-5	3.6	3-6	4.2

What these items covered and the significance of such gains upon them is dealt with in the following chapter.

CHAPTER 6: DISCUSSION AND IMPLICATIONS

A. INTERPRETATION OF MAJOR FINDINGS

The two major findings of this research are quite clear. As hypothesized, the experimental group out-performed the control group on the topic test, and their skill in learning as shown by the LSQ improved while that of the control group remained about the same. It does not seem unreasonable to suggest that there is a causal relationship between these two: that the improvement in learning skill brought about the experimental group's better performance. This conclusion is further supported when one sees the character of the LSQ items upon which the highest-scoring experimental students made the greatest gains.

The items upon which the top students improved their performance most are similar in character. The LSQ had 6 items designed to get students to show their ability to put together complete strategies for the kinds of task in each section. For example, question 13 asked students to map out what they would do to get an important piece of research learning under way, and question 18 asked them how they would learn for a test on a major topic they had just completed in class. These same 6 items are the ones in which those greater gains were made.

Below are 3 examples, as written, of the sorts of gains made by the top-scoring students on some of these 6 items. They illustrate the increased depth of these students' approach to learning tasks. (For precise tasks see Appendix 3.)

Student No.	Item No.	Pre-test Response	Post-test Response
76	10	<p><u>Listening: Actors' Moves: Strategy:</u></p> <p>'Jot down main points that may be very important, listen carefully, after he had finished talking make a diagram to help explain what I had written.'</p> <p style="text-align: right;">3 marks</p>	<p><u>Listening: Plot Summary: Strategy:</u></p> <p>'Listen as best I could. Write down the most important parts of his/her explanation. Maybe construct a diagram to help with what I had written - To make it more clearer. Go over what I had written then at the end of the teacher's explanation if there was something I didn't quite understand ask the teacher to quickly summarize or answer my question.'</p> <p style="text-align: right;">7 marks</p>

18	13	<u>Project: Country:</u> <u>Strategy:</u> <u>Switzerland</u> 'I read up about the country = travel brochures....taking down notes then add any further knowledge I or anyone else (family, friends) may have then sort my notes out into the order I wished to write about them, and then commence writing.' 3 marks	<u>Project: Hobby, etc:</u> <u>Strategy:</u> <u>Scuba Diving</u> 'I would write anything I knew about the subject, ask friends and family what they know. Write down the points (I) wanted to cover. Go to a library and get some information on the subject. jotting down information under each point as well adding where it was needed. Then I would write up the project combining all the information I had gathered.' 6 marks
61	18	<u>Learning: Test on Book:</u> <u>Strategy:</u> 'I would read everything I had done on the book over about 2 times and then I would make basic notes on the whole thing so I could remember.' 2 marks	<u>Learning: Test on Play:</u> <u>Strategy:</u> 'I would eliminate the known i.e. what I already know, the basic things about it. I would pick out the main points which different things could go under. I would probably write out the main points. I would have someone test me on the main things.' 5 marks

These answers show improved general learning skill which should be readily transferable across topics and subjects.

It is interesting to note that such a short span of teaching has had such a recognisable impact upon general learning skill. It might have been thought that the approaches to learning sampled in these items had been developed over a considerable period of time (perhaps over the 10 years these students had been at school) and that they would therefore be correspondingly resistant to change, certainly to change in the short term. It may be that significant numbers of students in the middle ability range have a sound basis upon which to build their learning skill and that they are more than ready to do so by the 4th form. The smaller gains at the lower end of the experimental group could indicate that improvement in their skill may take longer for these students.

B. THE TEACHING VARIABLE

It would seem clear that within the teaching of the two groups lies the explanation of the differences in their performance on both RPT and LSQ. The groups themselves were comparable in ability and the testing and marking conditions were constant, as was the total time each group was taught for. It took no more time to give attention to learning skill development with the topic, than to merely teach the topic alone. While teachers at both schools gave me their impressions that there were differences in 'class tone' between the two classes from their school, in the one case that difference worked for the experimental group and in the other against it. It seems likely that whatever effects there were from this aspect cancelled each other out.

In Chapter 4 I described the teaching in some detail and the fleshing out of the conceived differences in treatment (see Appendix 4) in practice. What the control group did not get that the experimental group did was reflective work on learning itself, before during or after the event.

A potential criticism is that consciously or subconsciously I taught the experimental classes better because I was committed to enabling them to do better: that, in fact, the piece of research is a self-fulfilling prophecy. Against that I can only cite the considerable care taken to standardize the course of lessons to the two groups as outlined below.

1. Starting the project with a clear idea of the differences between the two teaching treatments (Appendix 4).
2. Clear planning of the two series of lessons with the same topic content.
3. The keeping of lesson records period by period.
4. Presence of a teacher monitor with the first control class to receive each lesson, acting as a quality control; so that
5. the second control class received the same lesson as the first.
6. All classes receiving exactly the same number of teaching periods.
7. All work done in the classroom, with no homework set.

The difference in the quality of the teaching given the experimental group from that given the control group lay in the results of having different goals for that teaching: with the control group the aim was to increase knowledge and skill in the topic; with the experimental group it was to facilitate the students' learning and knowledge of the topic. The teacher worked more of the time in teaching the control group; the

students did more of the work in the experimental group. It would even be argued that the overtly double purpose of the experimental group's teaching was likely to reduce their performance on the topic with the possibility of the accomplishment of one goal getting in the way of achieving the other - the opposite is, of course, what happened. So, on a lesser quantity of 'direct' teaching, with more complex goals, the experimental group significantly out-performed the control group. Consciously or subconsciously to manipulate the general quality of all the teachings to all 4 classes to that extent would be remarkable. In any case, it is not easy for teachers to bring about gains in students' knowledge and skill merely by wanting to. Something significant has to be done - and presumably done well. In this case, gains in learning skill were reflected in gains in performance as predicted.

C. RELEVANCE TO SCHOOLS

This research aimed to keep its feet on the ground: to be realistic in terms of what schools and classrooms and what happens in them are like. The subjects of the experiment were chosen with that in mind. If something works with the average 4th form under normal conditions, its effectiveness is likely to be fairly high in the rest of the school. And, given that the students knew that a piece of research was being conducted by someone who was not their normal teacher, other things did not change much. It was English subject-matter, in English periods on the normal timetable in the usual room. There were all the normal interruptions with messages, noises outside and the usual administria which I carried out on behalf of their teachers as far as possible. The students knew that marks for the post-test were regarded as ordinary English marks. What was, perhaps, a little atypical was the intensity of the work. There was little room for interesting diversion because of the need to cover a certain amount each period and to keep the treatments parallel in other respects.

Importantly, also, the LSQ is an attempt to capture the realities of classroom learning. The tasks it contains are put within familiar classroom parameters and are appropriate to subject and level. They were also chosen as a reasonable sample of the sorts of tasks that make up a substantial proportion of school learning, irrespective of subject. Their transferability was intended to be high. The LSQ tries to strike a reasonable balance between actual tasks, in whole or in part, and hypothetical tasks within a tolerable time-frame for use with a class of students. The intention was to get closer to the reality than short inventories or somewhat longer multi-choice tests.

If, then, these results could be obtained in some normal classrooms with average students by a practising teacher in his own subject, there should be a high probability that they can be achieved with other students, in other classrooms and subjects, and with other teachers.

D. VERBAL REPORTS AS EVIDENCE

The extent to which we can accurately report our own mental processes is open to question (see Nisbett and Wilson, 1977). Most of us would recognise that sometimes we cannot fully explain how we arrived at a conclusion or worked something out, perhaps because we cannot quite find the words or perhaps the process is not completely accessible to our introspection. It seems plausible, also, that at times we give explanations of what we did that are rationalizations rather than accurate reports.

That the LSQ relies upon verbal report data is readily apparent, but in only 3 questions (2, 8, 10) are the students asked to be introspective about mental processing. Questions 2 and 8 are tightly tied to the strategic task just done with their written evidence immediately in front of them so that the probability of inaccuracy is thereby reduced, and in question 10 the emphasis is on the activity that facilitates the processing rather than the processing itself. Most of the other questions ask students to be strategic or planful about their learning or to reflect to some purpose on what they have done, do or will do. Such reflection must always be a valid part of learning to learn.

It might also be suggested that those who are most literate have scored best upon a questionnaire with this degree of verbal reporting. There may well be some justice in this, but it should be noted that the experimental group still made significant gains over the control group on the LSQ with the same general mix of largely verbal and mathematical ability as is tested by TOSCA.

Finally, if one poses the criticism that an improvement in the ability to write about learning is not the same as improvement in learning itself, then one is faced with providing a reasonable alternative explanation for the fact that the experimental group which performed best in learning skill did likewise on knowledge of and skill in the topic.

E. TRANSFER

Work on study skills in isolation from actual learning tasks within courses has shown little transfer (see Gibbs, 1981). Transfer as a problem appears in another guise when skill is developed in context. Freeing the learning skill from the task and general context in which it was developed and getting its application to similar tasks in other contexts becomes the challenge. Within this project there was room for little more than brief discussion with the students of possibly similar tasks in other subjects to which the general sort of strategy developed might apply, e.g. the memory strategies developed for terms in argument and their meanings in English, might be adapted for the learning of formulae in Science.

That some transfer did occur within the project is clear because of the experimental students' improved performance in the LSQ. While the tasks in the LSQ were still within an English

subject framework they were designed to represent classes of task often undertaken in a variety of subjects. The post-test showed that the experimental group students transferred enough of their skill developed in the teaching phase of the experiment to affect their LSQ performance significantly.

F. DEGREES OF STUDENT AUTONOMY

Inevitably, the constraints of experimentation meant less freedom in how the classes were taught. One of the effects of the time-scale of the research was that even though students in the experimental group did more for themselves than those in the control group, they did less than was ideal to have the maximum effect upon their development of learning skill.

G. LEARNING ENHANCEMENT WITHIN ORDINARY TEACHING

Schools have tended to teach study skills as an extra, rather than learning skill as such, driving an unfortunate wedge between the two for both teachers and students. The results of this project would seem to indicate that it is possible to improve subject topic learning by integrating conscious work on the learning strategies required as part of the normal work in class.

H. MOTIVATION

The matter of students' motivation to learn has not been directly addressed in this project, concentrating, as it does, on learning skill. Nevertheless, these observations are worth making. Firstly, that secondary students do not necessarily welcome work on improving their learning. There is something of an initial reluctance to change learning habits that have developed over a long time.

Secondly, students can be put off by too much work on learning skill too often, or in the wrong way. We should be aware of the paradox of the teachers doing most of the work to help the students become autonomous learners.

Thirdly, and most importantly, the best motivation for work on learning skill is the demonstrable fact that improvement has occurred, is sustainable and can further develop. Not only is students' attitude to work on learning skill affected by such evidence of intrinsic worth, but their motivation for learning a subject is also, as they make personal gains in understanding, skill and achievement.

I. QUESTIONS UNANSWERED

A number of issues warrant further research. High among those must rank the question of the validity of the Learning Skill Questionnaire. A good deal of care was taken to ensure that the tasks included, though bedded in English, were as generally representative of classroom tasks in all subjects as time and space would allow. Nevertheless, to establish definitively that they are so would require further work probably in the form of responses from both teachers and students. Perhaps of more practical benefit would be developing the LSQ in breadth both in terms of the nature of the tasks and in terms of their subject-relatedness so that it becomes more comprehensively representative of general classroom learning. As this would undoubtedly mean lengthening the time required to administer the instrument, an item analysis to reduce it to more manageable proportions would be useful.

Another question would have to be on the durability of the gains made by students in the post-tests, both on the topic, and perhaps more importantly for our purposes, in learning skill. Retesting after a suitable time interval would check this. However, in the normal teaching situation fragile new skill in learning would become more robust as it was employed from the point of acquisition onward in such a way that it became both firmly established and more sophisticated.

Though some degree of transfer of learning skill from the teaching phase is indicated by improved performance upon the LSQ, a more thorough investigation of the range and depth of the transfer is warranted. Is the transfer basically of an attitude or a predisposition towards learning brought about by the teaching phase? Is it a changed perception of learning that is carried to the new task? Has task analysis transferred? Does the student transfer the developed learning skill to subjects with high verbal loadings only, or to those with high practical and/or mathematical content also? These and other questions about transfer need exploration through further studies and analysis of performance in other subjects.

Whether some subjects because of their emphasis upon a particular mix of cognitive, affective or psychomotor goals are better for the development of specific understandings about learning, or skills in it, or attitudes to it remains a matter of conjecture. The present state of our knowledge probably precludes an answer. Similarly, the questions could be asked in terms of subjects' emphasis upon the verbal, the visual, the aural and the practical. To investigate these questions across the whole curriculum would be a massive undertaking, but it might be feasible to explore the possible contribution of an individual subject.

The students' motivation as they worked upon learning is worthy of scrutiny. With what willingness do they explore their own learning and why do they feel that way? Do their attitudes change as work on topic and on learning progresses? Again, how

and why? Are there, in fact, long term motivational spin-offs from increased capability in their learning. A longitudinal study with a variety of measures might provide some answers.

It would be useful to get some objective analysis of what a teacher who is trying to facilitate self-directed learning through work on metacognitive/metalearning/reflective learning actually does. Others may be more sensitive to differences in teaching style than the teacher directly involved. The use of videotape or observers with observation schedules operating over a period of time would seem to have possibilities.

One could go on. Learning strategies and their makeup warrant more work, student perceptions of learning in general and of specific tasks need clarifying.

J. SUMMARY

The implications of this piece of research may be briefly stated.

1. It is possible to help secondary students improve their general learning skill while working with them on ordinary subject content.
2. Improvement in such learning has been shown to benefit their performance in a typical English topic. There is no reason why it should not be applicable in other subjects.
3. It is practicable to accomplish this objective in terms of normal classroom constraints upon time and resources.
4. The gains that can be made are significant and worthwhile in terms of improved knowledge and skill.
5. These gains can be made by 'average' students of 14-15 years.
6. Therefore, it is probable that a majority of secondary students can make gains in this way.
7. The gains can be achieved through a style of teaching that facilitates self-directed learning.
8. That style appears to develop students' ability to reflect upon learning by being planful about it and self-monitoring in it.

If these findings are accepted, the most important implication is that:

9. Students should be exposed to such facilitative teaching.

And as such teaching does not necessarily evolve naturally from current practice, it follows that:

10. Prospective and current teachers need training in this style of teaching.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

If the goal of life-long learning is to become a reality and if schools are to enable students to take increasing responsibility for their learning, both aims promoted in the National Curriculum Statement draft of 1988, then schools must specifically address the question of how to bring these things about. It is not enough to expect them as by-products of teaching certain content, nor to predict that with sufficient time at school they will rub off on students. Many students leave school without the desire or skill to undertake further learning in such a way as to make the best use of their talents, and many enter tertiary study with underdeveloped learning skill. The transfer of responsibility for students' learning from teachers to the students themselves should not happen merely by expecting them to do more of the work as they progress through school. It should be planned and worked for as arguably the most important academic goal of schooling.

Two recent developments in New Zealand education are in harmony with each other and go some distance towards recognising this goal. The Guiding Principles of school charters and the Principles of Assessment for Better Learning of Project ABLE strike similar notes.

The first Guiding Principle in every school's charter states that 'The Board of Trustees will ensure that all schools...are given an education which enhances their learning...' and the first curriculum principle that 'The Board of Trustees accepts that every child in this school shall have the best possible learning opportunity.'

Project ABLE's first assessment principle is that 'The needs of the students shall be paramount. Assessment shall be planned and implemented in ways which maximise benefits for students...', and the fifth principle includes the statement, 'Self-assessment or self-evaluation is the appropriate starting point' (Department of Education, 1989a, p.19). In interpretation, the working party then elaborates, 'Student involvement in the assessment of their own work can help them to focus their own learning efforts better...a goal in almost all educational situations is to

encourage the students to become more perceptive and self-critical so that they can more effectively monitor their own progress and identify their learning needs' (pp.24-25).

Delivery of the 'best possible learning opportunity to students rests heavily upon the learning skill that they have been 'enabled' (rather than 'encouraged') to develop, and self-assessment, monitoring and personal goal-setting are very much part of the self-directed learning that this piece of research seeks to support.

If one accepts the foregoing, there is a temptation to give learning a separate slot of its own in the curriculum, as happens with courses in study skills. The problems of doing this were addressed in Chapter 1. More valid, practical and productive, though perhaps less tidy and easy to manage, is to realise every subject's potential for facilitating students' acquisition of learning skill. Besides, the particular styles and emphases of each subject require somewhat different study strategies.

Every teacher, likewise, is willy-nilly a teacher of learning. What students think learning is will be largely the product of their teachers' handling of it. However, not all teachers are facilitators of learning in such a way that students come to understand more about it and how to engage in it more profitably for themselves. Obviously, teaching practice varies, but the number of teachers who know sufficient about recent developments in our knowledge of the learning process to help students towards autonomy effectively is probably small. Most teachers' priorities in keeping up-to-date are subject-bound, and while many subjects these days pay attention to learning per se, the glimpses those subjects give of the total process are generally fragmented at best.

What, then, is to be done? This research study has shown that it is possible and worthwhile to teach students to learn as they tackle tasks in their ordinary subjects. Teachers can do something constructive to help their students become autonomous learners and some intuitively tend towards that. But a good deal more is necessary.

As is so often the case, a multi-faceted approach holds most promise. The current administrative changes in education make recommendations for action on the national scene more difficult than hitherto. Nevertheless, much can be done at various levels. I would make the following recommendations.

1. At the SCHOOL Level

- 1.1 Schools investigate for themselves the extent to which they develop students' skill in self-directed learning as a base for further action.

- 1.2 Boards of Trustees of schools draw up policies on teaching students how to learn throughout the curriculum for inclusion in their charters, if they have not already done so.
- 1.3 That such policies and strategies to implement them include:
 - 1.3.1 Goals.
 - 1.3.2 Objectives.
 - 1.3.3 How current research on learning and teaching shall affect work in classrooms.
 - 1.3.4 Guidance on general attitudes and strategies to be developed.
 - 1.3.5 A simple vocabulary for discussion of learning to be used in common throughout the school.
 - 1.3.6 How subject departments might contribute towards implementation of the policy.
 - 1.3.7 Means of monitoring and assessing achievement of the goals.
 - 1.3.8 The relationship of the school's assessment policy to its learning policy.
 - 1.3.9 How progress in learning skill will be reported to parents and students.
- 1.4 Subject departments develop and implement sub-policies fulfilling the overall learning policy of the school.
 - 1.4.1 Departments provide for their colleagues in other departments examples of how they fulfil the school policy - to facilitate transfer.
 - 1.4.2 Departments forge links with what other departments do in this regard to reinforce one another's contribution to developing students' learning skill.

2. At the TEACHER Level

Teachers:

- 2.1 investigate their own classrooms continuously to gain a better understanding of learning;
- 2.2 reflect upon their teaching to make the processes involved overt to themselves;

- 2.3 help students set their own goals for learning;
- 2.4 try to be specific about the mental processing needed by students in the learning tasks they set;
- 2.5 become explicit to students about these processes;
- 2.6 help students 'reveal to themselves' what they do mentally in undertaking tasks and to work on that;
- 2.7 help students put together general and specific learning strategies for tasks;
- 2.8 treat all concepts, including those of learning held by themselves and their students, as developing ones, capable of being improved;
- 2.9 use methods that increase student involvement in classroom learning;
- 2.10 develop methods that facilitate conscious transfer of strategies across tasks and subjects;
- 2.11 provide students with the success in learning that leads to positive self-images as learners;
- 2.12 help students to check their own progress and to assess their own achievement;
- 2.13 allow sufficient time for these things to occur.

(See Johnson, 1987, for more detail.)

3. At the SYSTEM Level

- 3.1 The Board of Studies, and succeeding it the Policy Division of the Ministry of Education, provide guidance for the rationalisation of learning development across subjects, including provision for necessary rehearsal and elaboration of skill, and the elimination of subject-matter redundancy in the curriculum.
- 3.2 The Implementation Division of the Ministry of Education promote a project to help schools further develop practices to enhance student learning skill.
- 3.3 The Educational Review Office assess the extent to which schools are equipping students to be more effective learners.
- 3.4 Subject associations, e.g. the New Zealand Association for the Teaching of English and like bodies, examine the contribution made by their subjects towards developing students' autonomous learning, and the potential for its further development.

3.5 Educational Researchers

- 3.5.1 develop a project to provide baseline data upon the learning skill of secondary students at various stages;
- 3.5.2 conduct a survey to provide information upon the depth and range of present efforts to improve learning in various subjects.

Note: Should the proposals of Project ABLE be endorsed and implemented, the logical points for checking upon progress in the learning skills of students would be at Standard 3, Form 2 and Form 5 as part of the national monitoring of educational outcomes.

Finally, if education has to do with the empowering of individuals to make the most of their lives, then equipping them to learn maximises the choices available to them.

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APPENDIX 1

Indicators of Skill in Learning

Towards a pre/post-test to show how well a high school student understands how to learn and applies that knowledge.

The following are indicators of skill in learning (on any given task, and in general) on the part of a student:

1. an understanding of learning that recognises that it may be of different depths, and require different approaches according to task and purpose.
2. recognition that he/she must be active in the process, and that this activity is critical.
3. self-knowledge of personal strengths and weaknesses as a learner.
4. ability to set his/her own purposes for learning.
5. stating the purpose/goal of a task in his/her own terms.
6. relating new knowledge to what he/she already knows.
7. recognition of factors in the environment that will enhance/inhibit his or her learning.
8. the ability to manage these factors.
9. assessment of the difficulty of a particular task for him/her.
10. analysis of a task into appropriate sub-tasks.

11. conceiving alternative ways of accomplishing tasks or sub-tasks.
12. matching appropriate strategies to tasks and sub-tasks.
13. realizing strategies in terms of practical skills or techniques.
14. checking as to whether a particular strategy or tactic is working, and to what extent.
15. reflection upon the reason(s) for a strategy's/tactic's in/effectiveness.
16. alteration or substitution of a strategy/tactic to be more effective.
17. reference to the purpose or goal of the learning or task as a criterion for making decisions on task.
18. assessment of progress/achievement in terms of that purpose/goal as understood by him/her.
19. use of strategies/tactics from other contexts.
20. recognition of other uses for developed strategies or tactics.

APPENDIX 2

Reasoning Pre/Post Tests A and B

ARGUMENTS AND REASONING (A)

- How much do you know?

Number questions carefully, and answer on your own A4 paper.
Put your school code and number at the top of each page you use.
You have this period to complete in.

A. Definitions

Write short, clear definitions of each of the following:

1. analogy
2. induction
3. mud-slinging
4. red herring
5. sweeping statement

B. Examples

Give one example of each of the following. Please number them carefully:

6. circular argument
7. drawing the line
8. circumstantial evidence
9. jumping to a conclusion
10. begging the question

C. Identification

Here are some statements. Do not write them out again.
What are they examples of?

11. The French are very fashion-conscious
12. 'Boys are cleverer than girls - there's always more of them in the computer room!'
13. Decent people know that this is wrong
14. Trouble-makers, agitators and stirrers
15. The army would straighten out New Zealand's gang problem

D. Evaluation

It has been suggested that smoking should be banned in all restaurants.
Write down any strengths and/or weaknesses in these imaginary answers to that.

16. Smoking is not banned in hotel bars, so why should it be banned in restaurants?
17. If smoking was banned in restaurants, they wouldn't be very sociable places, and nobody wants that to happen.
18. People shouldn't smoke anyway. They should give up completely.

E. Extended Argument I

Point out, with reasons, where you think this person is arguing poorly and where s/he is arguing well.

Equality of the sexes is impossible. Men and women are different and that is that. Obviously, they are physically different. But they like to dress differently and to do different things. Men are good at some things and women at others. They really are as different as chalk and cheese and should not be treated in the same way.

F. Extended Argument II

To show that you can argue reasonably and well, write a paragraph for or against raising the driving age to 16.

ARGUMENTS AND REASONING (B)

- How much do you know?

Number questions carefully, and answer on your own A4 paper.
Put your school code and number at the top of each page you use.
You have this period to complete in.

A. Definitions

Write short, clear definitions of each of the following:

1. analogy
2. induction
3. mud-slinging
4. red herring
5. sweeping statement

B. Examples

Give one example of each of the following. Please number them carefully:

6. circular argument
7. drawing the line
8. circumstantial evidence
9. jumping to a conclusion
10. begging the question

C. Identification

Here are some statements. Do not write them out again.
What are they examples of?

11. The French are very fashion-conscious
12. 'Boys are cleverer than girls - there's always more of them in the computer room!'
13. Decent people know that this is wrong
14. Trouble-makers, agitators and stirrers
15. The army would straighten out New Zealand's gang problem

D. Evaluation

It has been suggested that smoking should be banned in all restaurants.
Write down any strengths and/or weaknesses in these imaginary answers to that.

16. Smoking is not banned in hotel bars, so why should it be banned in restaurants?
17. If smoking was banned in restaurants, they wouldn't be very sociable places, and nobody wants that to happen.
18. People shouldn't smoke anyway. They should give up completely.

E. Extended Argument I

Point out, with reasons, where you think this person is arguing poorly and where s/he is arguing well.

Equality of the sexes is impossible. Men and women are different and that is that. Obviously, they are physically different. But they like to dress differently and to do different things. Men are good at some things and women at others. They really are as different as chalk and cheese and should not be treated in the same way.

F. Extended Argument II

To show that you can argue reasonably and well, write a paragraph for or against raising the driving age to 16.

APPENDIX 3

Learning Skill Questionnaires 'A' and 'B'

LEARNING SKILL QUESTIONNAIRE - Form A

Work Sheet - Form A

A. Remembering

1a. Here are some important words you need to know for English.
You will be asked to spell them in 7 minutes' time. Learn them.

- | | |
|----------------|---------------------|
| (1) argument | (8) deduction |
| (2) criticise | (9) advertisement |
| (3) persuasion | (10) evidence |
| (4) opinion | (11) contradiction |
| (5) propaganda | (12) stereotype |
| (6) prejudice | (13) ambiguous |
| (7) factual | (14) interpretation |

1b. Record your answers when the teacher asks for them on the next page in the way you will be told.

A. Remembering (continued)

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)
- (11)
- (12)
- (13)
- (14)

3.

A. Remembering (continued)

2. What did you do to learn to spell the words?
You tried to remember the spellings. In the space below write down as clearly as you can all the things you did in your head, out aloud, or on paper to help you to remember correctly.

Take about 4 minutes.

4.

A. Remembering (continued)

3. If you had another list like that to learn, would you do it in exactly the same way? Why?

If not, what would you change, and why?

You may use 2 or 3 minutes to answer.

5.

B. Reading

- 4a. In a moment, we would like you to read the passage on the next page and make brief notes to remind yourself later of what it tells us about Generalisations.

You will have 5 or 6 minutes for this.

- 4b. Before you start, jot down in this space what you will do to make your notes. (You may look at the passage if you wish). How will you go about it?
Be as detailed as you can.

Take 2 or 3 minutes for this.

5. Now, read the passage and make your notes on the next page, in the way the teacher tells you to.

You have 5 or 6 minutes.

6.

B. Reading (continued)

5. Generalising and Drawing Your own Conclusions

"The English speak in that terrible upper-class accent and say 'ect-u-li', when they mean 'actually'."

"Yes, and the Scots are so unsmiling, the Irish so slow, the Australians so uncouth and the Americans so brash."

Generalising is something we do every day. If we didn't, we probably wouldn't be able to communicate effectively. However, we should be careful about using generalisations. If they include too much, they can be misleading. Some all-inclusive statements are accurate. The statement "All New Zealanders are human beings," for instance, is obviously true. However, the statement, "All human beings are New Zealanders" is not.

Generalisations are often a test of your ability to make distinctions and to sort into categories. Therefore, when you see or hear one, think about it and test it against your experience.

Notes:

7.

B. Reading (continued)

6. Look at your answer to question 4, and what you did in 5. In actually making your notes, did you do anything at all differently to what you had planned to do?

If so, what did you do that was different and why?

Take 2 - 3 minutes to tell us below.

8.

C. Writing

7. Imagine that you have been asked to write an essay of 200 words on either "My thoughts on the 1988 Olympic Games" or "My attitude to sport". It would probably take you quite a long time.

You have 7 minutes to PREPARE your piece of writing in the space below. Do whatever planning or writing of your piece you like.

It is not important to get a lot of the essay written.

9.

C. Writing (continued)

8. Now, in this space describe how you prepared or wrote in the 7 minutes you were given, and why you did it that way.

Take 2 or 3 minutes.

-
9. Why do you think a teacher would ask you to do a piece of writing like this? Give as many reasons as you can.

Please take a couple of minutes on your answer.

10.

D. Listening

10. Imagine that you have been asked to write a plot summary of a play you are studying in class. Your teacher explains step by step how to do it. The explanation is quite complicated and takes about 15 minutes.

In the space below write down as clearly as you can all the things you would do before, during or after the teacher's explanation to make sure that you could write the summary in the way the teacher explained. They might be things you do in your head, out aloud or on paper.

Take 3 or 4 minutes to do it.

D. Listening (continued) (If you don't have enough space, turn over and write on the back of the page.)

11. Do you have to do similar things when teachers are explaining in other subjects?

If you do, give as many examples as you can of teachers' explanations from other subjects where you would use the same approach or a similar one. e.g. 'In Maths when

Take 2 or 3 minutes to describe them here.

12. Suppose you had written your summary, and your teacher asked you to assess it yourself as 'pretty good' (A); 'OK' (B), or 'not so good' (C). How would you go about it? How would you decide how good your work was?

You have 2 or 3 minutes.

E. Project

13. Imagine that you have been given the opportunity to do a project on any country of your own choice other than New Zealand.

Your project may include some of the things you already know about that place, but you must learn more about at least two different aspects of your country as part of the project.

Write down the country you would do your project on and the things you would do to get it organised and under way.

You have 5 minutes to describe your preparation.

13.

E. Project (continued)

14. Write down the sort of things you know about your country already. (Not just everything you know about it)

Take about 3 minutes.

15. There are many aspects of your country that you might want to learn more about. Write down how you would decide which aspects you want to increase your knowledge of. Again, take 2 or 3 minutes.

14.

F. Learning

16. Write down the sorts of things (not the school subjects) you feel you are good at learning. For instance, you might be good at learning how to make things.

Take about 5 minutes.

17. Write down the sorts of things you feel you find it hard to learn. Again, 5 minutes.

15.

F. Learning (continued)

18. Write down how you would learn for a test on a play the whole class had just read, studied, made notes and written on.

Take 2 or 3 minutes.

16.

F. Learning (continued)

19. Finally, write down what you think you are expected to do when you are told to "learn" something. You may write several lines.

Take 2 or 3 minutes to complete.

Thank you for your help.

LEARNING SKILL QUESTIONNAIRE - Form BA. Remembering

1a. Here are some important words you need to know for English. You will be asked the meanings of them in 7 minutes' time. Learn them.

- (1) assumption: something taken for granted.
- (2) imply: suggest
- (3) conclusion: the final result
- (4) ambiguous: can be taken two ways
- (5) conviction: belief
- (6) valid: basically sound
- (7) logical: well reasoned
- (8) distort: twist
- (9) dilemma: choice between two equal things
- (10) analyse: break into its parts
- (11) premise: statement an argument is based on
- (12) induction: working something out from examples
- (13) deduction: working something out from rules
- (14) fallacy: mistaken argument

1b. Record your answers when the teacher asks for them on the next page, in the way you will be told.

2.

Work Sheet - Form BA. Remembering (continued)

- 1b.
- (1) assumption:
 - (2) imply:
 - (3) conclusion:
 - (4) ambiguous:
 - (5) conviction:
 - (6) valid:
 - (7) logical:
 - (8) distort:
 - (9) dilemma:
 - (10) analyse:
 - (11) premise:
 - (12) induction:
 - (13) deduction:
 - (14) fallacy:

3.

- A. Remembering (continued)
2. What did you do to learn the words and their meanings? You tried to remember the meanings. In the space below write down as clearly as you can all the things you did in your head, out aloud, or on paper to help you to remember correctly.

Take about 4 minutes.

4.

- A. Remembering (continued)
3. If you had another list like that to learn, would you do it in exactly the same way? Why? If not, what would you change and why?

You may use 2 or 3 minutes to answer.

5.

B. Reading

- 4a. In a moment, we would like you to read the passage on the next page and make brief notes to remind yourself later of the writer's objections to Capital Punishment.

You will have 5 or 6 minutes for this.

- 4b. Before you start, jot down in this space what you will do to make your notes. (You may look at the passage if you wish). How will you go about it? Be as detailed as you can.

Take 2 or 3 minutes for this.

-
5. Now, read the passage and make your notes on the next page in the way the teacher tells you to.

You have 5 or 6 minutes.

6.

B. Reading

5. Adapted from On Capital Punishment by Clarence Darrow.

Why am I opposed to capital punishment? It is too horrible a thing for a country to do. My opponent says, "The killer does it, why shouldn't the country?" I would hate to live in a country I didn't think was better than a murderer.

But I've told you the real reason. The people of a country kill a man because he killed someone else - just that - for no clean reason, for nothing to do with real life, simply from anger, nothing else!

I am against it because I believe it is inhuman, because I believe that as the hearts of man have softened they have gradually got rid of brutal punishment, because I believe that it will only be a few years until it will be banished forever from every civilized country - even from New York; because I believe that it does nothing to stop murder

In the end, it is simply a matter of humane feelings against brutal feelings. A person who likes to see suffering as a punishment for wrongdoers will hold fast to capital punishment. A person who has sympathy, imagination, kindness and understanding, will hate and detest capital punishment as he hates and detests death itself.

Notes:

7.

B. Reading (Continued)

6. Look at your answer to Question 4 and what you did in 5. In actually making your notes, did you do anything at all differently to what you had planned to do? If so, what did you do that was different and why?

Take 2 to 3 minutes to tell us below.

8.

C. Writing

7. Imagine that you have been asked to write about 200 words on what you like and dislike most about being a teenager. It would probably take you quite a long time.

You have the next 7 minutes to PREPARE your piece of writing in the space below. Do whatever planning or writing of your piece you like.

It is not important to get a lot of your piece written.

9.

C. Writing (continued)

8. Now, in this space describe how you prepared or wrote in the 7 minutes you were given, and why you did it that way.

Take 2 or 3 minutes.

9. Why do you think a teacher would ask you to do a piece of writing like this? Give as many reasons as you can.

Please take a couple of minutes on your answer.

10.

D. Listening

10. Imagine that you have been asked to work out on paper the moves of the actors on stage in a scene from a play you are studying.

Your teacher explains step by step how to do it.

The explanation is quite complicated and takes about 15 minutes.

In the space below write down as clearly as you can all the things you would do before, during or after the teacher's explanation to make sure you could work out the actors' moves in the way the teacher explained. They might be things you do in your head, out aloud or on paper.

Take 3 or 4 minutes to do it.

11.

D. Listening (continued) (If you don't have enough space, turn over and write on back of page.)

11. Do you have to do similar things when teachers are explaining in other subjects?

If you do, give as many examples as you can of teachers' explanations from other subjects where you would use the same approach or a similar one. e.g. 'In Social Studies when'

Take 2 or 3 minutes to describe them here.

12. Suppose you had worked out the actor's moves on paper, and your teacher asked you to assess it yourself as 'pretty good (A); O.K. (B); or not so good (C)'.

How would you go about it? How would you decide how good yours was?

You have 2 or 3 minutes.

12.

E. Project

13. Imagine that you have been given the opportunity to do a project on any hobby, activity or sport of your own choice. Your project may include some of the things you already know about the subject, but you must learn more about at least two different aspects of your subject as part of the project.

Write down what you would do your project on and the things you would do to get it organised and under way.

You have 5 minutes to describe your preparation.

13.

E. Project (continued)

14. Write down the sorts of things you know about your subject already.
(Not just everything you know about it).

Take about 3 minutes.

15. There are many aspects of your subject that you might want to learn more about.

Write down how you would decide which aspects you want to increase your knowledge of.

Again, take 2 or 3 minutes.

14.

F. Learning

16. Write down the sorts of things (not the school subjects) you feel you are good at learning. For instance, you might be good at learning to make things.

Take about 5 minutes.

17. Write down the sorts of things you feel you find it hard to learn.

Again, 5 minutes.

APPENDIX 4

Differences in Style of Treatment:
Experimental vs Control Groups

Experimental Group Emphasis upon the following:	Control Group Emphasis upon the following:
1. Understanding the learning process and the subject-reasoning.	1. Understanding the subject-reasoning.
2. Goal-setting and self-management.	2. Meeting the teacher's requirements.
3. Relating to prior knowledge.	3. Teacher estimating level of prior knowledge.
4. Exploring one's strengths and weaknesses as a learner.	4. Attempting the task.
5. Task analysis - descriptive.	5. Task analysis - prescriptive.
6. Criterion task.	6. Level of performance.
7. Flexibility of approach according to student needs and preferences.	7. Set method instructed by teacher.
8. Risk-taking.	8. Being sure.
9. Monitoring progress against goals.	9. Getting on with task.
10. Continuous feedback on gains and successes.	10. Feedback at point of final assessment.
11. Developing a positive self-image as a learner.	11. Doing one's best.
12. Working for transfer.	12. Transfer assumed.
13. Making own notes.	13. Taking notes.
14. Interaction over modelled strategies.	14. Direction from modelled strategies.
15. Co-operative methods.	15. Individual effort.
16. Valuing the task.	16. Getting the task done well.
17. Intelligence as something developed.	17. Intelligence as 'given'.
18. Getting thinking out - facilitation.	18. Making things clear - instruction.
19. Progress.	19. Achievement.

Note: The differences have been polarised to make them clearer.