

DEVELOPMENT AND EVALUATION OF A MODEL
FOR TEACHING COMPREHENSION
IN ALGERIAN ~~MIDDLE~~ SCHOOLS
SECONDARY

BY

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Thesis presented in fulfilment of the regulations of the
University of London for the degree of DOCTOR of PHILOSOPHY in
Psychology of Education.

June 1988

A B S T R A C T

This study aims at improving reading comprehension in three Algerian middle schools. The investigation begins with an analysis of the problems of falling standards in the Algerian educational system. The conclusion gathered from this analysis was that the problem is best tackled by helping to update and improve the teaching methods so that direct attempt can be made in the classroom to show pupils how to comprehend. This decision is partly justified on the basis of the needs observed in the country and partly by the researcher's own interest.

A programme is developed which incorporates current theories and findings in the field. It is adapted to the particular local conditions by recourse to the concept of 'cognitive apprenticeship'. This conception of the learning/teaching experience fits the traditional Algerian approach to education and provides a mental model for the implementation of the programme. The programme is entitled "Multifaceted Method of Teaching Comprehension (MFM)".

The research then evaluates the outcome of this intervention programme when compared to current teaching methods (Traditional Methods; TM) as a control. A group of 123 pupils in three different schools are taught by the MFM and a control group of 120 pupils from the same schools are taught by the TM.

The quantitative statistical results show that MFM significantly improves pupils' comprehension over and above that of the pupils under the TM on all aspects of comprehension and summary writing. The qualitative data also show the usefulness of the MFM and support the

quantitative statistical data. Schools, age and sex are analysed as independent factors. The results show that schools and age admit of variations and differences whereas the sex factor does not show any significant effect.

The results are discussed in terms of the model and the theoretical positions in the **field**. It shows that the model works and is in accordance with available evidence. Educational implications of the research are discussed in terms of Algerian educational needs.

A C K N O W L E D G E M E N T S

Sincere thanks are extended to the following people, for their help, time and encouragement:

To Dr. F.J. Taylor to whom I am indebted for supervising this research.

To Mounir for the trouble he took in rendering my broken English legible.

To those pupils and their teachers who participated in this study.

To Mrs. Mandy Lam-Hing for the effort she put in typing this thesis despite other pressures and commitments.

To the Algerian Government, represented in the Ministry of Higher Education, for their financial support during the most part of this research.

To the Arab-British Chamber of Commerce Charity, the Drapers Company and others who would wish to remain anonymous (individuals and institutions) for financially supporting me at times of hardship.

To my family, particularly my father, for their unfailing moral support.

Last, but not least, to my wife and our daughters (Fatima, Asma, and Meriem) who provided continuous encouragement, support and sacrifice they have shown throughout, no words of thanks can repay them.

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CHAPTER 1

BACKGROUND TO THE STUDY

1.1 Introduction

Any developing nation aims at providing education that would lead it to prosperity. In that sense, education is seen as a vehicle for economic, moral, and social mobility and success. It is not surprising then that all educational systems develop and change in line with changes in the aims and goals of the society. (Kouloughli, 1985).

The current Algerian educational system is no exception. It inherited, at independence, a whole structure of education with defined goals and aims which served the objectives of the past colonial powers (Bendahmane, 1981). The question had to be asked: to what extent these objectives reflect the needs, hopes and aspiration of the new Algerian nation? It would seem that these objectives have become somewhat anachronistic with these new aspirations

It is easy then to understand the will and zeal of the Algerian leadership, since independence, to change the educational system in a way that would be more in keeping with the nation's present and future needs. Many attempts have been made in this respect. The Algerian official documents (the official journal of the Algerian Government, 1976; National Charter, 1963, 1976) reveal over four such attempts within the time span of twenty years. One of the concerns in this study is to see the extent to which these aspirations have been fulfilled in practice. This is done with a hope to redress the situation where there is failure.

The philosophy of the Algerian educational system is discussed, some problems are identified and the focus of the study is defined on the basis of a possible way of tackling the problem.

1.2 The Philosophical view of the Algerian Educational System

The Algerian Charter (1963,1976) stresses that Algeria is an Arabo-Muslim socialist nation. This was the driving motive which, serving as an ideal, sparked off the revolution of 1954. In trying to achieve the dual objectives of religion (i.e. a Muslim nation related to the Arab and Muslim worlds) and of politics (i.e. a socialist economic orientation), the Algerian leadership placed particular emphasis on education as the means towards achieving this goal.

This philosophy is presented in the Charter and can be summarised as follows:

The Algerian school should educate the Algerian individual to be Algerian, Muslim and economically socialist as well as to be open to the world. This meant the build-up of the structures of religiously inspired society based on traditional norms but which is modern in its outlook and orientation. Thus, the major goals of the educational system were stated as follows:

1. Arabisation: the language of instruction should be the Arabic language;
2. Democratisation: every Algerian should have access to all levels of education (whether compulsory or not);
3. Algerianisation of Personnel: All staff in education should be Algerian so that the social and cultural side may not be imbalanced.

1.3 Changes in the Algerian Educational System:

Since 1962, the schools had been assigned the task of realising these national objectives. The changes introduced from the outset were geared towards adapting the new educational system to the set objectives. However, in order to prevent utter chaos, changes from the inherited colonial system had to be gradual enough to preserve the essence of the system and maintain its organisational structure. This was also true for the grading of teachers according to professional status and for general conditions of schools (Bendahmane, 1981).

Thus, the early changes tended to be superficial and not to achieve much of the goals aimed at. However, the pace of change itself accelerated and later (1972 & 1976) more serious attempts to modify the system were tried. One such attempt was the introduction of the fundamental school (L'ecole fondamentale). This system was specifically aimed at realising the goals set out in the Algerian Charter. It came into effect initially in 1976 as a pilot scheme and is now almost fully operational.

The fundamental school sets out to realise the following three objectives:

1. Democratisation: the school is open to all children of school age (6-15 years) and each child has the right to education;
2. Unification: the school should provide a unified schooling system using the national language (Arabic) as the medium of instruction.
3. Modernisation: By using a polytechnic approach, the school ensures a scientific and technical emphasis in instruction.

This school should offer each child the possibility to continue his

or her education to as advanced a level as he or she is able to. It also should prepare him/her to be incorporated into the professional and employment worlds. This is what is meant by unification and differentiating it from the old system where there were two kinds of schooling. The general was theoretically and academically orientated. The technical was vocationally orientated to prepare students for professional, generally manual, employment.

According to the goals assigned for education, the school has become the place where the person is forged according to the traditional norms as well as the goal of realising progress and new norms which permit a continuous adaptation to the evolution and progress of sciences and technologies. To achieve practical results, these global and schematic objectives have become more precisely defined. In turn, the different levels of schooling came to be defined in terms of the schematic objectives. From these objectives, the functions of each level of schooling was determined.

1.4 The Consequences of Change:

A system that has been changing so rapidly is definitely set to face many problems. The Algerian system is no exception. The problems have been numerous and multifaceted. The problems are of three types. First, the political and philosophical; then the economic or financial; next there are problems of professional quality control. They can be summarised as follows:

1.4.1. The changing political and philosophical ideals are bound to influence aspects of the educational system, since the objectives of education are an embodiment of a nation's concept of man. There are, in Algeria, three ideological tendencies contending for hegemony, namely,

the secular (socialist), the fundamentalists (Islamic advocates) and the moderates (seeking a compromise between secular principles and religious ideals (Abbassi, 1978)). These conflicting tendencies add to the complexity of the stakes behind the decision making in Algerian politics.

1.4.2 The other problem is the cost of providing for the realisation of these objectives in terms of buildings, furniture and all related infra-structure. This already appears in overcrowdedness of the classes.

1.4.3 The problems of professional quality control are themselves many faceted. On top of the list comes teacher training and qualification. School materials are another problem, especially their appropriateness and relevance to the goals as set. Most important of all is the quality and the standard of education.

1.4.4 Falling Standards in Schools: Of central interest to the research is the problem of falling standards. Many causes have been attributed to it. Very little objective scientific investigations have been devoted to it.

The hypothesised causes of the fall in standards are numerous. Amongst these, teachers' qualifications are considered as the biggest and the most serious (Abbad, 1983; Bouzida, 1976; Haddab, 1979). It should be remembered that a large percentage (70%) of teachers joined the profession when the entry requirement was not strict (a primary education level). It is believed that standards are falling because such teachers have a low level of training and qualification. This is seen in the numbers of "instructeurs" in the profession (1962-1980). These were people with the minimum of academic qualifications (primary) who were recruited to meet the urgent need to expand education. Some

claim that a high proportion of teachers dropped out of the schooling system having failed to obtain the higher levels of education and being unable to find employment elsewhere. The low level of salary attracted only these candidates. Although the proportion of such teachers tended to be restricted because of the improvements which were introduced into the teacher training system as well as the material inducements which were implemented (Government official publication, 1976), the problem still obtains (Abbad, 1983)

In view of their being the responsibility of the National Institute of Education, the methods used are unified all over the country. The lessons are typified. The teachers have the programmes planned and the teaching guides in the actual class are defined. The emphasis seems to be on surface learning. The stress is on what the child has learned rather than how he does it. Many feel (eg Bendania, 1982, Foudil, 1972) that this is a factor that has always been omitted in the research in the Algerian educational system todate. There has always been an emphasis on the external factors which cause standards to fall. The concern is more on the quantity than the quality of experience. Factors frequently cited are, teachers' qualifications, i.e. years of training, illiteracy of parents, socio-economic factors and so on. (eg Bekri, 1981, Foudil, 1972). It seems that to one's best knowledge, there is not a single study that deals directly with the problem of standards from the point of view of quality of training given to teachers.

If one wants to improve these standards one has to focus on comprehension and a deeper level of learning both in the training of teachers and in the learning of the pupils themselves. Research (see Review by Doyle, 1983) has shown that it is more appropriate to focus on

comprehension than on routine retention. A well understood piece of information will surely be better retained for a longer time and maybe used independently in other contexts (Paris, 1973, 1975; Brown et al, 1984, Entwistle et al, 1979,a). The argument that might be put forward for focussing on comprehension, to improve standards, is that retention or memory is based on surface information, while comprehension goes beyond that to the conceptual level of that information (Doyle, 1983). Also taken in its deeper level, comprehension would call for better strategies for processing information (Brown, 1975, Craik, 1977a).

It is apparent from the observation and interviews (see following chapters) that many teachers have been trained to rely on delivering information in a standardised way, lacking variation and with little inducement for pupil participation. They rely heavily on asking children, if ever, about what they may remember or know about the topic they happen to be studying. No attempt is made to focus on the pupil strategies of approaches to the learning task.

Examinations taken by the children appear to assess learning at a superficial level. If a pupil's performance shows that s/he has learned by heart without necessarily having a real understanding of what s/he memorised, s/he can pass with a distinction.

Another suggested indicator of fall in standards is the quality of school leavers' performance. The employers complain that schools are inadequate and are not fulfilling their tasks (Lacheraf, 1977). These criticisms are frequently made, but there is a shortage of serious studies undertaking, to verify or investigate the causes.

Such evidence as exists supports the fact the standards are indeed falling. Educationalists like Bekri (1981) show that the rates of failure and drop out (Wastage) are rising significantly (Abassi, 1978,

Abtad, 1983).

Nevertheless, these studies remain at the survey level identifying trends and providing counts of instances without giving any clues concerning the reasons for the falling standards. Of all these suggested reasons, it is safe to conjecture that they each play some part in the problem. Their relative merits need to be determined by future research.

This research accepts the difficulty of investigating all these likely factors in one study and has focussed on the fundamental issue of how pupils are taught to learn.

CHAPTER 2

RECENT ADVANCES IN THE CONCEPTION OF ACADEMIC WORK2.1 Introduction

Traditional research (Anderson et al, 1969; Rosenshine, 1971) tends to focus on characteristics of teachers or instructional programmes constituting the classroom reality. It is true that these factors represent part of the classroom reality but there is more to it than that. These studies are based on the realisation that pupils are recipients. Once it is understood that the learner plays the major role in classroom reality, the situation changes. For this reason, the focus has recently turned to pupils and what they do in classrooms, such as cognitive operations involved in school learning (Anderson et al., 1977a; Doyle, 1977; Weinstein, 1982). Two main areas of research interest have been directed towards knowledge about academic work and how it operates in the classroom, namely, the nature of academic tasks and how they are viewed, how these operate in real classroom situation and how this situation bears on them.

2.2 Nature of Academic tasks:

The interest in learning tasks as they occur in the classroom represents a new research focus. The underlying rationale for this focus is the professionals' conviction that the type of learning taking place in classrooms is largely determined by the actual task the teacher sets, the way the pupil perceives the task, the social constraints on the curriculum and the quality of the pupil-teacher and pupil-pupil interactions. A leading exponent of this approach is Walter Doyle (Doyle 1979, 1980).

The usual approach to the curriculum is to treat it as divisible

into traditional subject disciplines. Within each subject discipline, pupils are exposed to tasks set by teachers. The criteria on which such tasks are constructed seem to vary from teacher to teacher and discipline to discipline. There are, however, some recognisable trends in determining what constitutes a classroom task. Some subjects have so-called basic skills associated with them. Examples of these are spelling and reading in the study of language and adding and multiplying in the study of maths. These basic skills are so called because of the implied principle that they form the foundation on which more complex and advanced performance is built. There is also the unexamined assumption that each basic skill contains a major cognitive process. More attention is paid to the former assumption than the latter. The emphasis on basic skills as foundations for complex performance is apparent in the way time is allocated in teaching at any stage of learning (Borg, 1980, Rosenshine, 1980: descriptions of teacher evaluation study). It was reported that approximately 55% of the day is spent in language and maths in the second and fifth grade classes. This emphasis shifts as the pupil progresses through the grades from concentration on basic skills to a more focussed attack on content knowledge and method of inquiries.

However, the second underlining principle for subdividing a school discipline, i.e. that each subdivision is associated with a cognitive process, has received scant attention in the literature and this, notwithstanding Gagne's attempts since the early seventies (Gagne, 1976; 1977) The fact is that teachers assign tasks within a subject with little sense of the inherent demands of that task. What the more recent investigations seem to suggest is that there is a need for a new view of

the curriculum as a collection of academic tasks each associated with some cognitive psychological criterion reference.

According to Doyle (1979, 1980), the term "task" focusses attention on three aspects of the pupils' work; namely, a) the products pupils are required to produce such as an essay or answer to a set of questions i.e. the end result of the pupils' endeavour; b) the operations that are to be used to generate the product such as memorising, classifying and analysing, and c) the given resources available to the pupils while he is generating the product. An example of this is a model of the finished essay as supplied by the teachers. From the pupils' point of view academic tasks are defined by the answers they are required to produce and by the resources available to them to produce these answers. Classroom communication, like all other communication, is determined by the perception of the recipient. What a learner does to a poem is determined by his/her understanding of the word 'learn' in the directive 'learn this poem'. For this reason, serious attention has been given to classifying the cognitive operations involved in accomplishing academic tasks. (Greeno, 1976; Merrill & Boutwell, 1973). The more or less agreed categorisation proposed by Doyle (1983) will be adopted here.

1. A memory task is one in which a pupil is required to recognise or recall information previously encountered. This is more akin to the term memorisation than the more general term of memory. By this it is meant that there is an emphasis on perfect reproduction. Such tasks are commonly seen in spelling lists, lines of poems and formulae.

2. An interesting point appears at this juncture. This concerns the latent assumptions which lead to confusions in the classroom. Where one teacher presents a poem or a formula as a memory task, another may well

present it as a comprehension or understanding task in which the pupils are expected to recognise or produce paraphrased versions of the same information or to apply procedures to new problems or in a third case to draw inferences from given information.

3) Both these cognitive demands are distinguishable from what is known as procedural or routine tasks for which the requirement is to apply a standardised predictable formula or algorithm to generate answers. As for the other two categories, the pupil may be simply asked to learn the task. The focus is then on the pupil to identify the appropriate category to which the task belongs and to then apply the cognitive operations appropriate to that category. It is not acceptable for a pupil simply to memorise a formula when comprehension is being asked for, nor is it in some cases appropriate for a pupil to understand a poem when the teacher desires memorisation of it.

4) Opinion tasks make the last category identified by Doyle in such tasks pupils are expected to offer a preference for something. The example given is "select a favourite short story". This is a particularly interesting category of tasks because it introduces a demand for the learner's initiative and deserves to be more fully treated than is apparent in the literature to date. It should not be simply confined to an expression of preference but should encompass judgments which the learner is required to make on the basis of insufficient or incomplete data. Under this heading would be put estimates and subjective evaluations. It is unfortunate that sufficient work has not been done in this field. However, it may well be the case that a failure to employ this category of task may lead to a failure on the part of the pupils to exercise their own initiatives always

accomplishing tasks with a view to meeting the external criteria set by the teacher. It is reasonable to suggest that the task of setting an internally constructed criterion for a learning product is a vital part of classroom practice.

From this analysis a number of practical issues arise. Firstly, faced with the lack of precision in words like "learning" and "understanding", teachers are required to ensure that their pupils are given enough information to recognise the intended category of the task. It is not sufficient, therefore, for unverified assumptions to be made in communicating academic tasks to pupils. Secondly, it is suggested that each category is characterised by its appropriate mental operation. Pupils should, therefore, be appraised of the required mental operations and trained in the efficient ways of executing them. Procedures for example, for the proper completion of a comprehension task may well be the opposite of those required for an opinion task. Opinion tasks, however, cannot be simply random statements of learners since they require training in the acquisition of reasoned decision-making skills. Thirdly, it should be recognised that the philosophy and cultural tradition operating in the classroom have a strong bearing on the case with which these categories are accomplished by the learner. In some cultural milieu, opinion tasks are contrary to the expected role of the learner. This is much more apparent in the developing countries than the western ones. If the development of the ability to accomplish opinion tasks is important for the development of the learner, it is not difficult to see how certain traditions can militate against efficient learning. Lastly, from this analysis, the complexity of learning becomes both more manageable and more challenging. It becomes more manageable to the extent that it offers a model for breaking down the

more complex classroom tasks into recognisable categories. Since it is not unusual to find a classroom task which involves two or more of the basic categories, it will be more challenging if the benefits of this analysis are practically applied to the classroom in that it will highlight the possibilities of higher cognitive achievement.

Based on the work of Doyle (1983) and similar studies, examination will be conducted to determine how academic tasks are influenced by the particular atmosphere in the classroom and to analyse the practice in the secondary schools of Algeria.

2.3 Academic work and the classroom context

Academic work has been looked at out of the classroom reality. Yet, academic tasks take place in a classroom. The classroom represents a group or a team cooperating to carry out academic tasks. The first thing that evolves from this is classroom management. Doyle (1979) has argued that the immediate task of teaching in classrooms is that of gaining and maintaining the cooperation of pupils in activities that fill the available time, not forgetting that pupils form a social group. These factors have a bearing upon the tasks that go on in the classroom.

The implications of the classroom context is that academic work is transformed fundamentally when it is placed in the more complex social structure of the classroom. Firstly, the teacher has to organise the pupils into work-units which should ideally increase their chances of learning. Failure to acknowledge this could lead to a lack of efficient or effective learning.

In addition to the sheer size and mix of the work units of the classroom, attention must be paid to the information processing task of the learning groups. Groups must be formed to capitalise on the nature

of information processing mechanism, as Doyle (1983) would maintain, if a presentation of a procedure in the class draws attention to understanding as a cognitive process. Little or no benefit can be derived by setting assignment asking for the solution of computational problems.

Secondly, accountability plays a central role in classroom interaction. In other words, accountability serves as the driving force behind the system. Pupils are known to be sensitive to cues of accountability. They tend to take seriously only work for which they are held accountable. If no answers are required then pupils are less likely to attend or be involved. Because of the central role of accountability, pupils pay less attention to the content of information than to the form of answers which teachers are seen to like. It appears that pupils sometimes invent strategies for producing answers in a way that circumvent the information processing demands of academic work.

Thirdly, according to Doyle the basic task in the classroom is answering. One may regard answering as the main index of education and ability. Davou (1987) reformulated the concept of intelligence in terms of question answering behaviour. Of interest, there is the chance to focus educational endeavour on the single objective of getting pupils to answer questions. Because of the key roles of accountability and question-answering in the pupils' perception of things, they try to provide acceptable answers which satisfy the demand of accountability without going through the intervening stages of information processing that the answer would normally demand. These efforts are seen in copying, offering provisional answers, requiring the teacher to make instruction more explicit, demanding models to follow and so forth. It is the pupil's insight into these two key concepts in the classroom that

lead them to adopt these economic, effort-avoiding strategies which produce these acceptable results. It is clear, therefore, that only when accountability is linked and seen to be linked to cognitive processing rather than to the production of answers will such strategies cease.

Fourthly, a most illuminating analysis of classroom to academic tasks, in terms of the two dimensions of ambiguity and risk, is offered by this line of investigation. Thus, each academic task can be placed on a scale of ambiguity and risk. Risky tasks are those which are less clearly defined and less open to concrete representations. Memorising two lines of poetry carries less risk than analysing them. Similarly, higher-level cognitive processes are more ambiguous, in the expected product, than lower-order ones. Pupils face these ambiguity and risk dimensions in trying to accomplish such tasks. It is a logical outcome for them to prefer those tasks which, in psychological terms, are at the lower end of these dimensions. It is not surprising, therefore, where the accountability system is lax, that pupils will convert an understanding task into a memory task and an opinion task into a routine task, because as a task moves towards memory or routine procedure both ambiguity and risk are reduced (figure 2.1). For the classroom, the important point is that the type of tasks which will have the greatest long term benefit for learning are precisely those which are the most difficult to control in the classroom and most likely to be evaded.

Figure 2.1 Outlines diagrammatically the above mentioned levels of ambiguity and risk related to academic tasks in classrooms (from Doyle, 1983 p 183)

		RISK	
		HIGH	LOW
HIGH AMBIGUITY	HIGH	UNDERSTANDING	OPINION
LOW	LOW	MEMORY TASK	ROUTINE TASKS

Fifthly, the consequence of accountability, ambiguity and risk is that the emphasis on classroom management is to focus attention on getting work done rather than on the quality of that work. In arriving at this conclusion, the critics of falling educational standards are themselves partly responsible for this slippage. By placing too much stress on the number of tasks performed by the pupil, as an index of accountability, they unwittingly force the classroom towards the quantity of the product rather than its quality.

To summarise the main points, it is argued that since academic tasks in the classroom are embedded in evaluation, they represent ambiguity and risk for pupils (Doyle, 1979). This refers to precision in the definition of an answer or formula designed to generate the required response. This ambiguity seems to be inherent in academic work. Risk refers to the stringency of the evaluative criteria used by the teacher and the likelihood of their being met.

Different academic tasks differ in their degree of ambiguity and risk. Pupils, however, seem to invent strategies for managing the ambiguity and risk indirectly associated with classroom tasks (Dillon & Searle, 1981; Edwards & Furlong, 1978; Harrod, 1977; Sinclair & Coulthard, 1975; Graves 1975; Rosswork, 1977). They may also attempt to increase the explicitness of a teacher's instructions or increase a

teacher's generosity in grading final products (Davis & McNight, 1979; Wilson, 1976; Brause & Mayhen, 1982).

It is clear that the properties of the classroom environment shape academic work in fundamental ways. Classrooms provide a continuity of experience as well as particular resources that can be used to accomplish academic tasks.

In that sense, it can be seen how it is possible for one to identify some causes of falling standards. Classroom properties as presented above may have a great deal of influence on children's achievement. Factors such as the way classrooms are organised, the negotiation of turn-taking, the way in which the evaluation system is viewed all have a bearing on the end product and the process of pupils' learning.

The Classroom in the Algerian middle school, is seen to be a room where there are two parties. The teacher is the authority providing the knowledge, imposing discipline and giving orders. The pupils receive that knowledge, submit to his authority and execute orders. They seem to take a very negative attitude. The answers they give to questions seem most of the time superficial possibly because of the type of questions posed.

Teachers seem to deliver information in a lecturing way without going into the process of deeply anchoring them. There is very little attempt to seriously use teaching of materials to probe into the pupils' higher-level processes. Usually the excuse given is that the big number of pupils in the classroom does not allow the feasibility of such an exploration. Besides, there is no guarantee, it is claimed, that the majority of the class will follow. Therefore, it appears from this that

the classroom environment bears a lot of responsibility for the quality of education pupils receive.

2.4 Academic Work in the Algerian Classroom

To the best of one's knowledge, no attempt has apparently been made to apply these recent conceptions to the context of the Algerian classroom. It follows without a doubt that the parameters of classrooms interaction would vary across countries and cultures.

The organisation of pupils into work units has the potential effect either to hinder or to facilitate efficient learning. On the basis of 20 observational visits made to the three experimental schools and from interviews with the regional inspector of the Ministry of Education and the headteachers of the three schools, (see Chapter 9) it has become clear that no systematic attempt had been made to harness the social force present in the classroom by group organisation into work units. Where teachers may of their own accord utilise such divisions, they lack a scientific basis on which to form these work groups. There is no evidence of groups established to capitalise on the nature of the information processing mechanism. What seems to be lacking in the existing teaching methods is particularly the lack of systematicity.

The fact that classes tend to be larger and the work tends to be even more varied are added complications highlighting the necessity to form work units. Yet one repeatedly finds presentation of lessons whose basic objective is to teach thinking and encourage understanding followed by discussions and assignments more appropriate for testing memorisation.

Accountability of teacher and pupils currently occupies the centre stage of educational discussions, but no evidence exists of Doyle's dictum "accountability drives the system". Nor is there any evidence of

any serious attempts to link pupil accountability to information processing. Countless examples exist of pupils avoiding the rigours of cognitive processing by such well known techniques as reproduction, inactivity, keeping out of the way, obtaining right answers from others and all other such procedures known throughout the world.

The conflict between the need for high-level learning and an ambiguity/risk avoidance, takes on a particular pattern. The teachers themselves reduce this conflict by lowering the demand for deep learning and emphasising reproduction. The criterion for satisfying accountability is therefore reduced by the teacher.

A straight application of these new concepts to the Algerian classroom reveal a lack of attention to fundamental issues of classroom work units, little if any linking of social classroom organisation with cognitive objectives and the lack of serious programmes to minimise the impact of large classes, no matching of cognitive objectives of learning with the academic task presented in assignments and subsequent assessment procedures, and a lack of proper criteria for determining teacher and pupil accountability in the educational endeavours.

To give substance to these theoretical conceptions, a survey was carried out to explore the pupils' and teachers' approaches to the teaching/learning processes. Having previously supported a general disquiet about the social groupings in the classrooms by observation and interviews, an attempt was made to find empirical support for the prevailing view in Algeria that the teaching approach as well as the learning approach have fallen behind contemporary thinking in the field. Needless to say, very little attention was given to the teaching of learning as an objective in itself as distinct from the teaching of the

subject content

The six teachers of the six research classes were given inventories designed to assess their conceptions of the appropriate methods of teaching the techniques of learning. This was followed by another inventory aimed at assessing their practice in this regard. These two detailed inventories provided a data base from which it became possible to assess not only the quality of thinking about the teaching of learning but the quality and extent of its application in the classroom. Above all the data permitted an assessment of the gap between teachers' knowledge and what they actually do in the classroom.

For the pupils a similar procedure was adopted to survey their conceptions about their own learning. Both sets of data and the research procedures are described below.

2.4.1 A Survey of teachers' approaches to teachings

The inventory used was adopted from the approaches to learning measure by the learner's particular style in pursuing the learning task. The approaches to teaching are intended to reveal what the teachers regard as optimal procedures for assisting learning. The modification is achieved by prefacing achieved by Entwistle's (1981) (Appendix I1) items with the statement "In teaching, I see it as my duty to.....". Thus for item one the teachers had to say whether they regarded it as their duty to help students organise their study time effectively, while the original inventory required the learner to state whether s/he found it easy to organise her/his study time effectively. The results were calculated as recommended by Entwistle to obtain the following scales: an A scale indicating an achieving orientation, a B scale describing a reproducing orientation with attendance to surface learning, a D scale

which is an index of the deep processing. Scale E involved operational learning with emphasis on use of logical approach in dealing with factual details. Scale F is reserved for measuring of improvidence which shows lack of deep porcessing by remaining trapped at the surface level of details. Scale G is Globetrotting and marks a tendency to prematurely jump to conclusions without sufficient evidence. By combining scales C and G one obtained a measure of tendency towards comprehension learning. Combining E and F one obtained the measure of operational learning and by combining D, C and E an index of versatile learning. Combination of B, G and F pathological signs of learning could be attained. These indices provide an objective way of assessing the teachers' own perception of what their approach should be and the pathology scale in particular offers an insight into the state of teaching of learning. The table below summarises the mean values with comparative figures derived from the UK. Only the more relevant scales are used. (The raw data are reported in appendix II 1) see talbe 2.1 below.

TABLE 2.1 TEACHERS' PERCEPTION OF TYPES OF LEARNING TO BE ENCOURAGED

Approaches to learning	Perceived duty	classroom Practice	UK Practice
Achieving (A)	15.8	15.1	12.5
Reproducing(B)	14.6	15.1	11.9
Meaning(D)	12.0	11.8	15.2
Pathologies(P)	30.3	30.8	23.0

This survey of six teachers was not intended to be more than supporting data for the observed lack of attention to the teaching of learning. No attempt was, therefore, made to increase the size of the sample or to generalise from these data. What can be said, however, is that the interview with the inspectors and the observations in schools show that these teachers were by no means atypical. They provided examples of the normal classroom approaches.

Returning to the data, there is some evidence that the teachers saw it as their duty to de-emphasise the more risky and ambiguous types of learning like understanding and opinion tasks in favour of more reproductive and surface tasks like memorising. Where the Algerian teachers gave a mean reproduction orientation of 14.6, the UK figures were 11.9. This indicates a lower emphasis by the latter group on the reproductive form of learning.

The scores for actual application to the classroom show no significant difference from the teachers' perception of their duties.

The pathology scores are very revealing. Teachers' perception of their duties show a pathological style in teaching their pupils. The mean pathology score was significantly higher for the Algerian teachers' perception of the teaching of learning than those seen in the scores obtained from self-rating in the UK. It is difficult to obtain stronger evidence of the lack of attention to this)central process of learning to learn.

2.4.2 A survey of pupils approaches to learning

The inventory used was the translation of Entwistle's (1981) approaches of learning (see Appendix I2). The inventory was introduced

in order to find out the pupils' approaches to learning. Since, it is believed that teachers adopted a surface approach to teaching, children were expected to support that conception of learning (i.e. performing superficially themselves)

TABLE 2.2 (PUPILS' APPROACHES TO LEARNING).

Approaches	Algerian Students (n=243)	UK Figures * (n=490)
Achieving (A)	16.8	12.5
Reproducing (B)	16.1	11.9
Meaning (D)	11.2	15.2
Pathologies (P)	29.2	23.0

*Figures taken from Entwistle (1981).

The data support the hypothesis that the Algerian surface teaching results in a surface conception of learning on the part of the pupils. The survey shows a high emphasis on achievement and high-surface orientation with a low attention to tasks of meaning on the part of the Algerian sample. The UK figures are significantly higher in the treatment of meaning task and significantly lower in the attention to the other surface elements of learning (See appendix II.2)

Summary

The study can now be summarised as an interest in solving a practical educational problem in the Algerian secondary schools. Both the theoretical analysis, supported by Doyle's formulation, and the emperical data, from the inventories, give eloquent testemony to the existance of a gap in the method of teaching in those schools. This

consequently leads to the belief that the teaching of comprehension and learning to learn are low in the priority listing of these teachers.

It is essential to this study, however, that the problem of the teaching of comprehension be investigated further and suggestions made for dealing with it.

Next the study concentrates on approaches to the task of dealing with poor teaching and learning of comprehension by firstly formulating a conceptual model of the process based on current theories of comprehension, then, secondly attempting to empirically evaluate it. It is, therefore, necessary to briefly summarise the theories of comprehension on which the proposed model will be based.

CHAPTER 3

THEORIES OF COMPREHENSION

3.1 Overview

The last two decades have been a turning point for psychology as far as comprehension is concerned. Unlike the traditional laboratory nonsense syllables studies of Ebbinghaus and his tradition, the new trend of cognitive psychology focuses on comprehension of meaningful material in its natural setting(s) such as the classroom.

However, the study of prose comprehension had not been seriously taken by psychologists for quite a while, from the original work of Bartlett (1932) through the late sixties, until recently (eg Anderson, 1977; Kintsch, 1974; Kintsch & Van Dijk, 1978; Sachs, 1967; Zangwill 1972). This might be due, as Reder (1980) argues, to the problems accompanying the use of long units of language which make difficult the control of the subject's processing of the material. The second difficulty is that it is hard to define similarities and differences among passages. This difficulty is acknowledged whenever comparison between experiments (or generalization) is involved.

Despite these difficulties and others that face researchers, a new surge of interest in prose comprehension has recently emerged. The major thrust of this new interest has consisted in a particular focus on aids to comprehension processing, schema theories, text representation models, story grammars, constructions, reconstruction, role of inference theories, a detailed analysis of the Kintsch and Van Dijk (1978) model of text comprehension and production and so on. For instance, Reder (1980) argues that this renewed interest is due to the common dissatisfaction with the generalisation of results from research done on material ranging from small units of prose (letters, sentences) to

larger meaningful units. Another stimulus to study prose processing is the development that occurred in the field of linguistics (eg. Lakoff, 1972; Van Dijk (1977)).

This concern in the learning activity and both the factors and processes it involves has come to be broadly seen from two angles. A group of researchers have focussed on textual structures as the determining factor in the learner's comprehension. (Kintsch, 1974; Kintsch and Van Dijk, 1978; Mandler and Johnson, 1977). On the other hand, the tradition inspired by Bartlett's (1932), schema theory focusses on the role of background knowledge in determining the comprehension of text (Anderson, 1977, 1984; Rumelhart, 1981; Spiro, 1977).

3.2 Studies Focussing on Prose Processing and Comprehension Aids

Within the textually-oriented tendency, two major directions could be discerned, namely, the work focussing on external facilitators to comprehension, known as "signalling techniques" and the explorations into story grammars respectively.

3.2.1 Signalling Techniques

3.2.1.1 Advance organisers

Processing as related to the amount of recall is the work dealing with the improvement of the learners' comprehension and ability of retention. Ausubel (1963, 1978) developed the term "advance organisers". It is believed that introducing the material and previewing its content improves and helps the learners to organise and enhances their comprehension and retention of that material. These advance organisers are thought to stimulate a cognitive structure that helps to anchor newly come information within the frame of the existing

knowledge (cognitive structure). In spite of the usefulness of Ausubell's work and its stimulation of a lot of research (see Review by Hartley and Davies, 1976; Mayer, 1979), it has been criticized for its lack of appropriate experimental controls and objective measures of its stimulus variables (eg Frase, 1973; 1975). Moreover, Gagne and Wiegand (1970) in examining Ausubel's claim found that advance organisers may facilitate retrieval rather than encoding at the acquisition phase.

3.2.1.2 Questions as aids to comprehension and Processing of text

One of the methods used as facilitators of recall was the question used subsequent to testing. These questions were used in different locations (before reading or listening) in prose, between the different chunks of the text, or at the end, (eg Frase 1973; 1975; McGraw & Grotelueschen, 1972; Rothkopf 1966, 1972; Watts & Anderson, 1971). These kind of studies used questions as independent variables. They were to answer the question: how useful is it to introduce questions prior to (or in different locations) reading (listening to) prose. In other words, how better will recall be if some questions are posed and these same questions are to be answered in the recall of the text. Reder (1980) in his review states that "it seems that priming questions (asked before the text or in between the text) do more than provide focus; they force subjects to process the text in a certain way" (p.9). It was found that questions help review the critical information (Frase, 1967). Not only was that the case, but also when questions remind subjects of information in the text, this information is better recalled later than other information.

It seems obvious enough that not all questions that are asked help the subject process and later on recall certain materials. Therefore, to improve performance, the question must guide the subject to process

the material in a relevant and useful manner. An example of this is to ask questions that make the subject more active by requiring some activity from them such as integrating information or making some inferences. In fact, Watts and Anderson (1971) reported that their subjects performed better on passages when asked questions that require integration of material.

3.2.1.3 Pictures, summaries and titles as Facilitators of text processing and Comprehension

Among the other aids of comprehension and improvement of retention are pictures, titles, summaries etc. Although this trend of research is more related to comprehension aids, it does also touch upon retention and prose processing. For example Bransford and Johnson (1972) and Bransford and McCarrell (1975) found that the ability to remember a passage and comprehend it improved dramatically when a relevant title or a picture was presented before it. That means that a reader (listener) has a referent to which he links what is read or listened to.

There have recently appeared other methods of aiding comprehension and retention. They consist of giving summaries of what is to be read or listened to. The summary may take different locations (before and after) (Hartley et al; 1979; McLaughlin Cook, 1981 and Hartley and Trueman, 1982). It seems that summaries help readers to organise their thoughts and process the text and help them to look for what is in the summary (eg Hartley & Burnhill 1977). Hartley et al (1979) argued that summaries in the end of text produced better recalls than summaries before a text or a text without a summary.

McLaughlin Cook (1981) argued that having a summary before a text may be confused with the text itself. What he did in his experiment as to separate the summary from the main text was putting it on a separate

page (in both cases of prior or after the passage). The reported results showed that summaries both in the beginning and the end (on separate page) differed significantly in their effect on comprehension from no summary. However, when the summary was on the same pages as the text, this difference from the no-summary condition was diminished. It could be said, then, that summary does help retention and recall regardless of its location (before or after text) as long as it is made clearly different from the text. This was in fact demonstrated by Hartley and Trueman (1982).

What has been discussed so far dealt with research concerning the improvement of prose material comprehension. The discussion has not dealt as yet with the way people understand or why certain ways or techniques are used. It would, then, be relevant to look at some other ideas that suggest some ways of how a learner approaches prose.

3.2.2 Story Grammars:

Story grammars are systems of parsing the text in propositional structures generated according to a number of transformational rules (Sanford & Garrod, 1981).

3.2.2.1 Text Representation and its relation to Comprehension & Retention

Giving a representation to prose passages is considered as a prerequisite to research on prose comprehension. Meyer (1975) maintains that structural variables may influence the learning and retention of prose passages which actually can be items in a word list. If this is so then it could be possible, theorists (eg Crothers, 1972; Frederiksen, 1975) argue, to get to know the processes involved in text comprehension. That is done by the resemblance of memory protocols (what a person remembers) of a passage to its representation.

The text representations may take different ways. One of these ways is the logical representation. (Dawes, 1964, 1966, Crothers 1972). The latter, for example, measured the possibility of predicting prose recall through its logical representation (see also Frederiksen, 1972, 1975). The idea is useful as Reder (1980) argued, but it misses the other points in prose, (except of those logical ones).

Kintsch (1974) proposed a more advanced and a more comprehensive theory (developed later with Van Dijk 1978). He assumes that the basic elements in a text are the propositions. This proposition is composed of sets of relation and arguments. A hierarchical structure is formed through repetitions of propositions or similarity among them. These will be discovered by use of subordinate rules. The person then seizes upon the propositions of a text, studies the relationships among them. Whenever this is done the person tries to substitute one proposition to represent a class of propositions when there is a list of class of things a generalization rule is used.

Meyer (1975) used a hierarchical network representation of the text. That representation is like a passage outline. The importance of the proposition in the text is the dependency of its indentation. It is the functional relationship to other units, rather than the content, Meyer concluded, that determines the frequency or recalling an idea in a paragraph.

3.2.2.2 Summarisation as a Measure of Prose Processing and Comprehension

Van Dijk (1977) and Van Dijk and Kintsch (1975, 1977) were concerned with the elaboration of a general theory of discourse Van Dijk undertook to incorporate Kintsch's (1974) work into his proposed theory of semantic representation for sentences and sequences of sentences. He

then called this microstructure. The overall meaning (semantic representation) would then be represented by macrostructures. Macrorules were then devised. Subjects were given stories to recall and summaries. Results showed no differences among recall and summaries.

Three macrorules were generated: generalisation, deletion and construction. These are supposed to transform a textbase to its core macrotext (gist).

In their (1978) version Kintsch and Van Dijk further emphasised a model of text comprehension and production. Accordingly, the process is held to be working in cycles; three types of operations are proposed: organisation of meaning elements into a coherent whole, condensation of full meaning into a gist and the generation of new text (summary).

3.2.2.3 The Kintsch and Van Dijk (1978) Process Model.

The input the model takes is the list of propositions that represent the meaning of a text. It is assumed that this is taken in propositional notation which represents the meaning of the text via structured lists of propositions. They in turn, consist of concepts and include predicated or relational concepts and arguments. The first step the processor takes is to find or to form what is termed as a coherent text base or checking out for its referential coherence. That is the relatedness of the text units.

As it is assumed that there is a memory constraint, the referential coherence and inference making cannot be reached on the basis of the whole text. It would be logical then to assume that a text is processed sequentially in pieces of several propositions at a time.

The model proceeds through the whole text, constructing a network of coherent propositions. Propositions in this manner represents presuppositions of their subordinate propositions due to the fact that

they introduce relevant discourse referents. From that it is relevant to say that this represents a coherent text base connected graph.

In the production side, it depends on the process used to predict which proposition(s) be recalled better. For these to occur, different strategies may be used. However, a good strategy may select the important propositions and use recently read proposition (if 2 propositions are important) for the next input cycle. That takes place on the microstructure level. The macrostructure levels goes on at the same time. Macro-operators transform the propositions of a text base into a set of macropropositions that represent the gist of the text.

The schema determines which micropropositions or generalisations of micropropositions are relevant and thus, which parts of the text form the gist. The schema specifies both the schematic categories of the texts as well as what information in each section is relevant to the macrostructure. If a person reads with a clear well defined purpose a well defined schema exists.

As these active interventions from subjects are apparent it is suggested that a recall or a summarisation obtained are newly reconstructed texts reflecting the core of the original one. This summary satisfies the conditions of the particular task content. This condensed new text is reproduced probably because of the difficulty of reproducing all that exists in memory. This reproduction contains reconstructively added details, explanations and various features that are the results of output constraints characterizing production in general.

The transformations occurring on the text are known to happen as seen in summaries. However, it is not known where they happen, at the

microstructure level; macrostructure level or at the schematic structure. These transformations can be reordering, explication of coherence relations among propositions, lexical substitutions and perspective changes.

The production (recall and summary) is memory based. This memory for a text is a memory episode containing types of memory traces. These traces are from various perceptual and linguistic processes involved in processing, comprehension processes and contextual traces.

This is the side of production, that is when it is possible to retrieve information of a given text from memory. However, when this is difficult or say when microinformation is not directly retrievable, the person starts to reconstruct the information needed by making use of inference on the basis of the still available information. Three reconstruction operators are proposed by Kintsch and Van Dijk, which they state, are inverse to macro operators. They are the addition of plausible details and normal properties, particularization and specification of normal conditions, component or consequences of events.

From this quick review it appears that ability to summarise is linked to comprehension and retention to important points of a text (eg Brown & day 1983). The summary seems to be a good measure both of memory for text and comprehension (Anderson, 1980; Kintsch and Van Dijk, 1978). It looks as if the same processes are involved in the comprehension of both reading and listening as parts of the same production (summaries) are obtained (Kintsch & Kozminsky, 1977). Indeed, the structure of the text (Kintsch & Yarbrough, 1982) its content variables (Kintsch et al, 1975) and the schema one holds at the time of reading or listening or the cultural one in general (Kintsch et al 1977; Kintsch and Greene, 1978) interfere in the process of

comprehension and retention.

There is some agreement therefore that the mental activity of summarising has a powerful influence in the process of understanding. It is not surprising to find a few attempts to improve comprehension skills by training in summarising. This will form part of the conceptual model for training. (Brown & Day, 1983; Day, 1980)

3.3 Schema Theories and their Role in Prose, Processing, Comprehension and Retention:

This kind of trend started with the influential work of Bartlett (1932) who introduced the concept of schema as a way of approaching information. A comprehender does not only receive information and store it, to be reproduced later, as was the common belief at the time. Rather, the subject deals positively with the material that is read and heard. The subject is thus an active agent. Some experiments were conducted according to which people were made to listen to a given story (Folktales of the Ghosts); when they were required to reproduce it from their memory, as a measure of comprehension, they tended to reproduce a very typical version. People reconstructed the story in a manner that would make sense to them, but different from the original material. Bartlett's "schema" theory advocates that people approach the story armed with a ready mental framework which is then imposed on the material under study so that their comprehension is determined to a large extent by that framework. To put it in a nutshell, memory is a constructive process. Stored information is too large to be remembered and has therefore to be organised and made manageable (it has to be structured). What gives structure to that organised mass is the "schema".

Since the early work of Bartlett (1932) and others (Piaget), the schema theory has been taken further and applied to research in prose. Anderson (1977), Spiro, (1977) and others (see Anderson, 1977) discussed the schema as being the general guiding framework that helps the person understand. Which schema a learner activates depends on the purpose he or she has. If a person for instance, is thinking of buying a house, he will be looking for its appropriateness to his use, location, and other needs, but if the person is a thief he will look at other things such as valuable things in the house and how easy it is to take them as well as the possible exits that help him get away easily. The individual establishes a purpose which in turn determines the schema he calls up which will guide selection in comprehending meaning and the memory of the event.

The schema is flexible and allows for new situations to fit in. It has slots that are filled in whenever new situations arise. If a person has, so to speak, a wrong schema about a piece of knowledge this may be corrected until the person forms congruent schema. The schema develops all the time whenever faced with new situations.

3.3.1 Ways of Representing Background Knowledge

The term schema has been given several names by other theories e.g. "frames" (Minsky, 1975) or scripts and plans (Shanks and Abelson, 1977). There are other theorists who used the term in relation to prose processing and comprehension (e.g. Chafe, 1976 and Winograd, 1977). Despite their differences in the operationalisation of the term, they agree about the fact that the schema is a "mental framework".

3.3.1.1. Frames

Minsky (1975) developed his "frame-theory" according to which our knowledge is stored in memory in the form of data structures or "frames"

representing stereotyped situations. In Minsky's view a frame is construed as a remembered framework adaptable to fit new incoming reality by merely changing details as necessary. In other words, it is a process of fitting newly derived information into the framework already established by what one knows beforehand.

3.3.1.2. Scripts

Schank and Abelson (1977), in an analogy with Minsky "frame-theory", developed a "theory of scripts" specialising in events and sequences. Schank's 1972 concept of "conceptual dependency" argues that our understanding of what we read or hear is very much expectation based; but these expectations are conceptual rather than lexical.

3.3.1.3 Mental Models

Johnson-Laird (1980) developed a theory of what he called mental models, he argues that understanding involves the construction and manipulation of mental models. Mental models are models of reality. They represent the way the world is perceived to be and may thus differ from one individual to another.

3.3.1.4 Summary

All these ways of representing background knowledge are useful in that they have presented some insights into the way information is processed. However, as Brown and Yule (1983) have pointed out, the problem is they do not answer how it is only some of our pre-existing knowledge is involved and not all of it. It seems that there is need for a working compromise representation. With enough richness of detail to capture the potential complexity of our stored knowledge of the world; yet with enough constraints in the selection of the relevant details only.

Although the schema approach gave a boost to research it has not clearly answered what process and activities are involved when a person is reading or listening to a prose material. It is not enough to claim that a person's interpretation of a written or oral message depends on his mental frame. It still remains to be seen what kind of mechanisms are generated in the comprehension process.

3.3.2 The role of Inference-Making in Text Comprehension

One of the fruitful implications of Bartlett's theory is that while recalling a story a person does reconstruct what is learnt in a wholistic manner. The person does not only recall what is said or read as it is presented but acts, distorts, and reconstructs it to make it congruent with one's experience. This suggests that when a person processes a prose or tries to comprehend it, one inevitably invests it with one's inference. Many studies were done on inference as an integral process in text comprehension. There are many in psychology that attempted to explain the processes and structures involved in prose comprehension and retention (eg Kintsch, 1974; Frederiksen, 1972; 1975; and Thorndyke, 1976).

Most of these studies assume that the comprehender makes inferences to integrate and comprehend the prose. In this studies Frederiksen, (1975) found that subjects' recall contained a considerable amount of inferred semantic relations.

If such a claim is true, is it then the case that inference making is used as a means of comprehension? Thorndyke (1976) in studying the role of inferences in comprehension of discourse found that they indeed play an important role in the comprehension of prose passages. Subjects were asked questions either inducing inferences or not. The question calling for inferences yielded better comprehension. Frederiksen (1975)

in studying the processes involved in prose, addresses the question of whether over generalisation (and inferences) can reflect procedures for processing discourse. He found that inferred information integrated when repeated exposure and sequential recall were involved.

Anderson (1977) argues, that it is true that inferences can be made while processing prose but these are made within a context. People make use of their world knowledge (schema) to infer consequences, relationships and other types of information not revealed by the source of communication. On this basis Masson and Kendall (1979) found that when a specific context is derived at encoding, incidental learning paradigm cues based on inferences relevant to the target aided recall to the same extent as cues that explicitly appeared in the sentences, then, inferred information is integrated in memory representations of linguistic inputs. Paris and Upton (1976) wanted to find out whether children understood inferences. An inference is some process which is embarked on with a view of understanding. They chose four linguistic inferences to study. They were contextual (semantic entailment and implied instruments). Six paragraphs were read to children. Subjects were then asked eight 'yes-no' questions related to the story. Four of the questions were asked to test verbatim information. The other four were related to the above inferences. The performance of children seemed to apply with age development. The rate of correct answers was apparent more on the inferential questions than on those verbatim ones. It was concluded that children are able to construct inferential relationships in their effort to comprehend and remember information. Tzeng (1975) found the same results with undergraduates.

There is a lot of research dealing with inference as a way of

processing and understanding prose (eg Bendania, 1982; Clark, 1977; Liben and Posnansky, 1977; Moeser, 1976; Paris and Carter, 1973; Russel, 1981). However, although inference plays an important part in comprehension it is by no means the complete picture.

3.3.3 Integration of knowledge and comprehension

The idea of inference making leads one to think that while a person reads or listens to prose, he is integrating that knowledge. Some of the studies have demonstrated that adults remember the semantic relationships expressed in sentences longer and better than the syntactic ones from prose (eg Sachs, 1967). It is believed that not only is the semantic content more important than the syntactic, but also that the process of deriving meaning is not one of passive interpretation. People integrate the meaning and relationships into wholistic situational descriptions and forget the syntactic ones such as which relations occur in separate sentences (Bransford, Barklay and Franks, 1972; Bransford and Franks, 1971).

Hayes-Roth and Thorndyke (1979), for example, proposed that to claim that a learner remembers the gist of the prose and forgets or loses the identities of original facts is a false idea. Indeed remembering the gist is nothing but the integration of two constituent facts. They then suggested that integration is a verification of inferences drawn from separately acquired facts which benefits from identical, rather than paraphrased wordings of the common information in related facts.

3.4 Summary

This chapter can therefore be summarised as follows:

Some theories of comprehension have been briefly reviewed. It is clear that the comprehension process has come to be considered as a

mental activity that the learner exercises on the material to be learned. It is true that the material itself imposes constraints and guides the process of comprehension. However, the learner by bringing his experience and knowledge to the learning situation does play a role in manipulating the material in order to learn it. Some of these manipulations are dealt with in this chapter; others relevant to the conceptual model for this study will be dealt with in a forthcoming chapter. Next the study analyses the application of some of those theories

CHAPTER 4

THE TEACHING OF COMPREHENSION

4.1 Introduction

Ideas about improving comprehension through teaching have been advanced all the time albeit without being tested. However, since positivism has been developed experimentation has taken the bulk of research in psychology and education. (Campbell & Stanley, 1963; 1966). The teaching of comprehension is relatively new. The attempt that is usually made, in teaching comprehension, is to test the educational efficacy of theoretical ideas. Those have usually stemmed from developments in reading theory and/or research about basic cognitive processes or learning theory (Pearson and Gallagher, 1983).

Despite the difficulty of dividing the topic into categories due to their interrelatedness, it is still helpful to do so for the sake of clarity. Three categories can be adduced (see Brown et al 1981). The first represents the removal of the difficulty (blind training). The second consists of teaching techniques to students (informed training). The third, the most advanced, is the teaching of monitoring strategies (self-control training). All these have been derived from theories of learning and comprehension. The chapter then concludes with some programmes as applied examples of these attempts.

4.2 Removing Difficulty

This group of studies has been introduced to evaluate hypotheses about the improvement of performance on some tasks as well as the sources of developmental and comparative differences on those tasks (see Belmont & Butterfield 1977, Butterfield et al 1980). These studies have proven successful in this respect. One impressive feature of a number of them is the finding of large improvements in performance (see

Brown et al; 1983(a) p129). Students have been instructed or induced to perform particular processing routines but have not been, however, helped to understand the significance of such activities.

4.2.1 Advance Organisers

This well known tradition bases its facilitating of comprehension on providing an introduction to or an overview of the passage to be read and then evaluating its effects on comprehension. This tradition is that of the Ausubel's (1963;68;78) advance organisers which has been thoroughly developed and assessed by leading scholars (see Barnes & Clawson, 1975; Faw & Waller, 1976; Hartley & Davies, 1976; Lawton & Wanska 1977; Mayer, 1979; Moore & Readance 1980; Sledge 1978). However, it is not easy to draw generalisations from advance organisers studies. This is mainly due to the variability of trends. Barnes & Clawson (1975) see that advance organisers generally do not facilitate learning. They conclude:

"the efficacy of advance organisers has not been established. Of 32 studies reviewed, 12 reported that advance organisers facilitated learning, and 20 reported they did not. When the variables - length of study, ability level of subjects, grade level of subjects, type of organisers, and cognitive level of the learning tasks - were analysed separately, no clear patterns emerged regarding the facilitative effects of advance organisers. We must conclude from this review that advance organisers, as presently constructed, generally do not facilitate learning" p. 651.

This view is supported by Hartley and Davies (1976) who argue that research in the field of advance organisers seems confused.

These studies (especially, Barnes and Clawson, 1975), propagating the unworkability of advance organisers, seem to suffer from many inaccuracies (Ausubel, 1978; Lawton & Wanska, 1977; Mayer, 1979.) They fail to show sensitivity to the theoretical predictions of Ausubel's theory. In fact, Barnes and Clawson (1975) are mistaken to believe that advance organisers must always produce learning outcomes. Ausubel's theory of subsumption and Mayer's assimilation theory both propose that advance organisers should have an effect only under the condition where the learners have no prior knowledge subsumers available during learning. The theory assumes that advance organisers are given to help learners with unfamiliar technical, or otherwise difficult material. The advance organiser then becomes a facilitating mediator that helps the learner to relate the material at hand to the learner's existing knowledge.

Critical studies of Advance organisers, secondly, are usually not precise in testing "what is learned". They do not adequately test for assimilation theory; data in many studies, those which critics review, are not sufficiently analysed. The two main predictions of assimilation theory concerning the effects of organisers are conceptual anchoring and the obliterative subsumption. The conceptual anchoring refers to the idea that fundamental conceptual ideas from the text will be integrated with the existing knowledge and thus lead to better transfer. The obliterative subsumption is the idea that minor details and technical facts may be lost in this assimilation process. Therefore, to usefully evaluate advance organisers on 'what is learned', the test must be sensitive to the prediction that advance organisers can lead to an increase in conceptual retention and for transfer but to a decrease in retention of

specific technical details. The critical studies, however, use retention measures (recall or achievement test) based on overall 'amount retained' contrary to the tenets of Ausubel's theory.

The studies cited by Barnes and Clawson, as proof of inadequacy of advance organisers, fail to control the amount of information presented to subjects in different groups. For example, in most studies a group given an advance organiser is compared to a group not given an organiser or to a group that is given a control organiser. Since subjects do not receive identical information it is possible that any subsequent differences in performance are due to the content included in the organisers. In addition, the design described above does not provide any information concerning whether organisers influence mainly encoding or retrieval. For instance, presenting a thematic title before a metaphorical story increases comprehension and recall but does not aid performance if presented after the story, thus suggesting that the locus of the effect of titles is at encoding rather than retrieval (Dooling & Lachman, 1971; Dooling & Mullet, 1973). Although the locus of the effect seems to be encoding for title biasing studies, reviews of organiser studies have failed to emphasise a correspondingly direct test.

It appears, then, that there is no clear generalisable effect of advance organisers that can hold universally. Examining some 135 studies using Glass's (1977) technique of meta-analysis, Luiten's et al (1980) review shows an overall positive effect for advance organisers, a tendency for their impact to increase with time, and a variable impact on student's aptitude with greater benefit for lower-aptitude students.

On the whole, this kind of intervention, that is provision of advance organisers, seems helpful. The effect of intervening in the

instructional environment to activate or provide background knowledge of one kind or another does not appear to be strong as to clarifying the relationships between these indices of background knowledge and comprehension. The theory of advance organisers seems to leave a shady area failing to precisely identify the how, i.e. the advance organisers affect comprehension. In Pearson and Gallagher's words:

"This means that knowledge acquired gradually over-time in whatever manner appears more helpful to comprehension than knowledge acquired in a school-like context for the purpose of aiding specific passage comprehension. (1983, p.328").

The conclusion that can be drawn from this is twofold. For those who relatively lack in the relevant background knowledge (geared towards understanding a given text), the appropriate way is to gradually build up their background knowledge and instill in them appropriate schema (see for eg. Anderson et al, 1977, 1978) that would help them in comprehending what they read. But, for those who already have acquired the adequate background knowledge or schemata, the appropriate way to aid their comprehension is to provide them with a proper way to activate that background knowledge. A way of achieving this is posing questions.

4.2.2. Inserted Questions & Mathemagenic Behaviours

What has been said about advance organisers and background knowledge can also be said about other ways of facilitating reading comprehension. Those include questioning techniques or what are technically known as mathemagenic behaviours (Rothkopf, 1966, 1971) and the related inserted questions (Anderson & Biddle, 1975). On the sphere of asking questions, it is found that:

"higher level questions can have facilitative effects on both

reproductive and productive knowledge, but that the conditions under which such facilitation occurs are not well understood". (Andre, 1979, p.28).

For one, there is lack of specification of the levels of questions, second, data on performance is not always provided. Third, there is a lack of provision for appropriate measures. there is also a need for appropriate controls. These are some of the reasons for the unclarity or non exclusiveness of the results obtained from this trend on prose learning research.

4.2.3. Other Facilitating Factors

There have also been some other related techniques and facilitators to teaching reading comprehension. Those represent note-taking (Howe, 1977), underlining, titles, summaries and so on (Hartley et al 1979). Those relating to the way the text is written are generally known as signalling techniques (Loman & Mayer, 1983). They serve to make the outline structure of the passage more clear and thus they provide a conceptual framework for the reader to use in selecting relevant information and in organising the information into a coherent representation. (Loman & Mayer, 1983).

4.2.3.1. The Effect of Headings

The effect of headings, in different situations, was studied by Hartley and Trueman (1983). They found that headings aided recall, search and retrieval from the text. Whether the titles had been embedded in the text or marginal had no effect. No effect was produced whether the titles were statements or questions. Low-ability students seemed, though not significantly, to benefit more from question-like headings.

There has also been other research on the effects of headings on learning with mixed results. The issues looked at varied. Some studies dealt with single issues while others looked at more than one issue at a time. Most studies, however, focussed on the effects of headings on recall of information (Dee-lucas & Divesta, 1980; Doctorow et al, 1978; Hartley et al, 1980; Holley et al 1981, Klare et al, 1958; Landry, 1967; Robinson & Hall, 1941), whether immediate or delayed. Other issues are effects of unfamiliar text (Hartley & Burnhill, 1976; 1977), frequencies of headings (Klare et al, 1958) effects of readers' ability (Hartley et al, 1980; Klare et al, 1958), instruction to use headings or generate them (Brooks et al, 1981; Dee Lucas and Divesta, 1980; Doctorow et al, 1978; Holley et al, 1981), effects of headings on preferences for text (Klare et al, 1958) and effects of the positions of headings (Hartley and Trueman, 1983).

4.2.3.2. Note-taking may be one of the most popular activities in the educational setting at all levels. It is believed that note-taking has besides the recording of information, a bearing facilitating effect. This is the factor that is of interest here. Howe (1977) argued that research on note-taking may take two lines. The first concerns straightforward questions that are of interest to teachers. The second deals with note-taking in the general field of theory making in learning and cognition. Many of the early studies in this area have busied themselves with the first part. The basic question in this is; 'does one learn more by taking notes?' However, the second tendency is more concerned with note-taking in a theoretical sense. It looks for ways in which note-taking is best useful and what they are related to. What kind of note-taking leads to better learning under which circumstances and what factors influence them.

Studies comparing the activities of note-taking with no note-taking or other activities seem to yield no advantage to note-takers. This remains true whether the test is given to subjects immediately after the lecture (McLendon, 1958; Eisner and Rohde, 1959) or after some time has elapsed. (MacManaway, 1968, Howe, 1970). The problem with this kind of research is that it is not clear how note-takers are compared to others. It is necessary to know whether students who took notes had the chance to look back (review) their notes or not. It is also necessary to know whether one is told about being tested after the lecture (Weener, 1974). No serious attention has been paid to the quality of note-taking. It could be the case that a bad note-taking habit produces interference while a good method facilitates comprehension.

There has, however, been some studies where note-taking is found to be beneficial. Two groups of note-takers and no note-takers were compared on recall as well as true/false items (Crawford, 1925). Note-takers were superior to recall groups but the two groups were equivalent on the other factor.

It transpires that, like many other schooling activities taken for granted as enhancing learning, note-taking is one of the learning aids whose effectiveness is still to be demonstrated. Despite the fact that intuition seems to support the belief that note-taking aids learning, the research done on this area, like in this area of inserted questions and advanced organisers, remains inconclusive.

4.2.4. Summary

These kinds of facilitators as studied seem to be of some use to the learner in a way or another. They do not, however, show clearly how they do influence recall or learning in general. they do not seem to

base their effect on any sound theoretical basis, as Hartley and Trueman (1983) recognise:

"we have not been driven by any particular notions about text structure, or by any strong views about mathemagemic or cognitive psychology" p.213.

Put differently, these studies demonstrate that inducing students to use certain activities during the acquisition and retrieval of to-be-learned material has produced effects. However, these studies are not without limitations. The facilitative effect has not been generalisable to all learners in all situations. Moreover, the transfer in these activities has been negligible. From this an interest was developed in the transfer of learning. Before considering this problem, researchers had to identify appropriate learning activities. They had to show that teaching them would result in enhancement of learner's performance. As investigators shifted their critical task, seeking transfer rather than only task-specific improvement, they also searched for suggestions about how to go about modifying instructions. The conceptions of strategies and metacognition were introduced as a consequence. The two following sections deal with this.

4.3 Explicit Teaching of strategies as Aid to Comprehension

Strategies are taught to help students to better understand and remember expository texts. The study of strategies is a new trend in cognitive psychology. It appeared in the research in the seventies when the study of prose learning was at its peak of activity (eg Dansereau et al, 1979).

Strategies are used to mean the ways students deal with learning matter.

Jonassen (1985) defines strategies as follows:

"Learning strategies, or cognitive learning strategies, represent

complex mental operations that assist learners to perceive, store, retain and recall different forms of knowledge or performance". (p26).

These strategies have been identified in learners usually through verbal reports (Ericsson & Simon, 1980), which were taken as guides and consequently an intervention research sprang from them, especially what is termed as "informed training " (Brown et al 1981). This area of intervention in strategy is meant:

"to enable any student to select an appropriate strategy for organising, making personally meaningful, and integrating any instructional material they encounter". (Jonassen, 1985, p26)

The training of strategies in this sphere would go beyond mere training or including students to use certain strategies. Rather, the students are told and informed about these strategies. Thus students are aware that they are using those strategies to help their learning. For example, Kennedy & Miller (1976) were able to show that an instructed rehearsal strategy was more likely to be maintained in the absence of experimenter prompts if it had been clear to the subject that the use of the strategy did result in improved recall.

Another good example which represents a complete programme in strategy training is MURDER (Dansereau et al 1979). They argue that there are two interrelated strategies; namely the primary and support strategies. Primary strategies encompass different categories; comprehension (retention, recall and transformation), and retrieval/utilisation strategies. The support strategies are designed to help the student in developing and maintaining a good internal state a favourable learning disposition. They include goal-setting and scheduling, concentration management, monitoring and diagnosing the dynamics of the learning system.

These strategies are executed via a series of sub-strategies. This is realised through the above mentioned programme (MURDER). This programme resembles somehow Robinson's (1946) SQ3R, but differs from it as it specifies the strategies students use. The programme (MURDER) includes; M= setting the mood to study, U- read for understanding, R= attempt to recall, D= digesting, E= expanding and elaborating knowledge, and R= reviewing mistakes to correct them.

This example, is a general framework for getting students to tackle the learning task in its generality. Some more specific examples of strategies used to aid comprehension are in order. Meyer et al (1980) found that good readers rely in their recall more on the text structure than do poor ones; and the former remember greater amounts and more important information than the latter. Also Bartlett (1978) took this idea and trained junior high-school students to use some text frames (cause-effect, compare-contrast, description, and problem-solution) to help students organise their recalls of the text. Trained students were able to produce recall with more information than their untrained counterparts. Another example of this is a series of studies conducted by Taylor and her colleagues (eg Taylor, 1982). They trained intermediate grade students to relate superordinate to subordinate information to produce balanced summaries of texts. The results, on the whole, seemed to support some transfer effects to novel passages.

Another way of aiding comprehension of a text is to map that text. Mapping is the selection of main ideas of a text and then putting them in a kind of visual representation, such as boxes or circles, in which relationships are made explicit. As this has proved to play a facilitating role in comprehension, some researchers have taught some

form or another of it to aid comprehension (Armbruster, 1979; Geva, 1983; Holey et al; 1979)). This strategy is carried out as follows. After a student reads a text, he is asked to select the main ideas and then put them in a visual display where ideas are seen clearly as to how they are related as represented by the text or how they create that relationship if the text does not explicitly make these connections. Although the effects seem to have produced modest results, they seem however, to be more favourable than the more traditional study techniques, such as reading, rereading, and note-taking.

Children's ability to draw inferences and their predisposition to do so has been well supported as a strategy for learning and comprehending. (Bransford et al, 1972; Paris, 1973). Consequently, training studies have used inference making as a comprehension facilitator. It has been observed that children's best recall was for literal questions. It was not known whether this is because of more exposure to literal questions or because of unawareness of how to draw inferences (Guszek, 1967). To answer this, Hansen (1981) devised three instructional treatments. In the first, students were given a usual way of questions where 80% are literal and 20% are inferential, along with ordinary story instructions. In the second, practice-only treatment, students received only inferential questions after their stories together with introduction to the story. In the third, called "strategy- training group", students received the school usual way of 80% and 20% of literal and inferential questions consecutively. However, before each story they were given an alternative story introduction in which they were, 1) to relate their prior knowledge to the experience of the characters, 2) to predict what the story protagonist would do when confronted with these critical situations from

the to-be read story, 3) to write down their prior-knowledge answers on a sheet of paper and their predictions on another. They were then told to weave the two together to make them realise that reading involves relating what is known to what is read. Then they read the story and compared it with what they predicted. This was done to make them change their conceptions about reading in order to become aware of the principle of "known to new" and to allow them to apply it. On a standardised reading comprehension test, the two experimental groups did better than the control group. This shows that training in inference making can be undertaken so as to induce better performance and to improve inference making.

The study has been followed up further (Hansen and Pearson, 1983) in a treatment containing strategy training and question practice approaches (only inferential questions) and combined (the last two treatments of Hansen described above). Teachers were trained to introduce the treatments. Good and poor fourth-grade readers participated in this experiment. The combined approach induced favourable results for the experimental good readers group on measures of inferences where instruction was imbedded and on other passages where no instruction was offered. The conclusion was that poor readers benefitted only from explicit instruction to alter comprehension strategies. Older good readers did not seem to benefit much from explicit instruction. Their strategies seemed to have already been developed.

In a more explicit way Gordon & Pearson (1982) trained students in inference making to facilitate comprehension. A group explicitly trained in inference making for a period of eight weeks was contrasted

with a control group that received language experience and immersion activities. Another experimental group was trained in activating and fine-tuning of content schemata and structural schemata before and after reading. The results were consistent with those obtained by Hansen (1981) and Hansen & Pearson (1983). The inference trained group performed better on new inference items derived from the instructional stories. High achievers did better on inferences in novel passages without instruction. The schemata activation group performed best on free recall protocols, especially where recall was sensitive to the development and use of story schema.

The conclusion that can be drawn is that the specificity of transfer of training does yield good results. Students trained to draw inferences got better at it while those under the condition of schema activation got better at storing and retrieving story information.

4.3.1. Summary

The strategy training examples described earlier represent some of the learning strategy programmes. However, the process is more complex than simply providing some instruction on how to perform some information processing tasks. What must be considered is the following (as Brown et al 1981 argued):

1. learning activities and their nature must be known (strategies, rules, procedures);
2. a lot needs to be known about the learners' characteristics if the training is to be successful;
3. of equal importance is the nature of the material (type, context, structure of text etc);
4. the nature of the task for which the learners are studying (level or recall, applying rules etc.)

It is needed to make learners aware of strategy - training programmes since different instructional outcomes are required by different content and that they require the use of different strategies for different learners. Any learning situation involves the interaction of these variables (Jonassen, 1985). For this to be appropriately undertaken, it is needed that students be made aware of their processes and have control over them. This leads us to deal with what is known as metacognition and training students to better learn and understand, being fully aware and in control of their processes.

4.4. Teaching of Monitoring Strategies to Aid Comprehension

This section deals with what is termed as "metacognition". However, the definition of the term does not seem to be watertight.

"Various forms of metacognition have appeared in the literature and some of these instantiations are puzzling and mysterious" (Brown et al., 1983a; p. 106).

Metacognition is defined as one's knowledge and control of the domain of cognition. However, two main problems arise with this definition. First, it is sometimes difficult to distinguish between what is metacognitive and what is cognitive. Second, there are many roots from which this area arose. It is not the intention here to go into the details of what is taking place in this area of inquiry. It is rather just a drawing of attention to issues and problems related to metacognition.

Related to the first point, there is some confusion about what is metacognitive and what is cognitive. One factor leading to this confusion consists of many researchers loosely considering as metacognitive, any strategic action. The processes or activities of establishing the purpose of reading, identifying important ideas,

activating prior-knowledge, compensating for failure to understand, and assessing one's level of comprehension are some of those processes that are mentioned as metacognitive skills of reading. However, which of these activities should be taken as cognitive and which can be taken as metacognitive or even which components of these complex activities are metacognitive is not clearly defined. (Baker & Brown, 1984). A second factor behind the confusion appears in two areas of modern psychology literature, namely, knowledge about cognition and regulation of cognition which are closely related. However, the two are distinguishable and have different historical roots (Brown et al, 1983a; Yussen, 1985).

Knowledge about cognition is the information human thinkers have about their own cognitive processes and those of others. They are relatively stable, storable, often fallible and late-developing (Flavell & Wellman, 1977). Regulation of cognition refers to those processes that include planning activities, monitoring activities and checking outcomes. It has been assumed that these activities are not necessarily storable, somewhat unstable, and relatively age dependent, that is, task-and situation-dependent (Brown, 1978; 1980; 1982).

4.4.1

Roots and components of Metacognition

As far as the historical perspective is concerned, there are four roots from which metacognition stems. First, there is "the verbal-reports-as-data" tradition (Ericsson & Simon, 1980). Second, is the issue of executive mechanisms within an information processing model of human and artificial intelligence (Brown, 1978; Boden, 1978; Klahr & Wallace, 1976; Siegler, 1981). Third, is the issue of self-regulation and conceptual reorganisation during learning and development (Gardner,

1978; Karmiloff-Smith, 1979, a & b; Marshall & Morton 1978). Fourth, is the transference from other-regulation to self-regulation (Brown & Ferrara, 1985; Brown & French, 1979; Wertsch, 1978; Vygotsky, 1978).

4.4.1.1. Verbal Reports as Indication to Metacognition: (conscious reporting)

The metacognitive research using verbal reports as data reveals that old children have knowledge in memory (Flavell & Wellman, 1977), attention (Miller & Bigi, 1979), communication (Yussen & Bird, 1979), reading (Baker & Brown, 1984; Markman, 1979, Myers & Paris, 1978), studying (Baker & Brown, 1984; Paris & Myers, 1981), and Problem solving (Piaget, 1976). However, there are many problems attached to verbal reports. One is the difficulty of asking subjects to report about their conscious processes especially children. The second most obvious problem is the degree of reliability of verbal reports. What is the relationship between what the subjects report (say) and what they really do? This problem may be partly resolved in the analyst's perception of what s/he categorises as stable cognitive processes generalisable from the reporter's discourse.

However, the problem of reliability does not lend itself more easily to such a solution particularly in processes that can be considered transient. In that case, they are likely to require adjustment to criteria and task demands. (Flavell, 1981; Flavell and Wellman, 1977). To solve this problem of reliability Brown et al (1983a) propose that:

"an adequate theory of relation of verbal reports to actual performance should include some a priori predictions of when verbal reports will be related to, or will influence performance, and when they will not" (p.109).

Thus,

"desperately needed in the developmental literature are systematic evaluations of children's verbal reports on their own cognitive processes when stringent attention is paid to (1) the temporal relation between their reports and the cognition in question (2) the nature of the cognitions under evaluation; and (3) the influence of reflection on the operations of thought" (Brown et al 1983a p.110).

4.4.1.2. Control over Processes as indication to Metacognition

The executive control, taken from information processing models of cognition, is considered to be performing intelligent valuation of its own operations. This control is assumed to be able to predict capacity limitations, be aware of heuristic routines and their appropriate ways of utility, identify and characterise the problem at hand, plan and schedule appropriate strategies, monitor and supervise the effectiveness of routines called into service, evaluate operations dynamically in case of success or in failure so that termination of activities can be strategically timed (Brown, 1978). This indicates that many complex operations are taking place within a part of a system; namely the executive system. Theoretically (Boden, 1978; Dennett, 1978), this system is assumed to be automated and controlled, which causes long standing problems known in the cognitive information tradition. Under this, many processes are identified such as automatic and controlled processes (Brown, 1975; James, 1890; Norman, 1981; Schneider & Shiffrin, 1977), planning (Hayes-Roth and Hayes Roth 1979; Newell & Simon, 1972; Selfridge, 1959), developmental studies of monitoring (eg. Brown, 1978; Brown & Campione, 1981; Markman, 1981; Norman, 1981), comprehension monitoring (eg. Baker & Brown, 1984; Flavell, 1981, Markman, 1981) and effort and attention allocation (Belmont & Butterfield, 1977; Brown, 1981; Hale & Alderman, 1978).

The ability to control and monitor one's state of learning depends

on the sensitivity one has to factors such as strategy, knowledge, material and task demands all influence the degree to which a learner will be able to coordinate his plans and engage in active monitoring (Brown et al 1983a).

4.4.1.3 Regulation of own Processes

The self-regulation is the subjection of thought processes to examination and treatment of own thinking as an object of thought (Gardner, 1978). Hence the correction and detection of errors (Brown & Deloache, 1978; Clark, 1984) have been included in metacognition. Piaget (1976) distinguished between three primary types of self-regulation. First, autonomous regulation is an inherent part of any knowing act. Learners continually regulate their performance by fine-tuning and modulating their actions. Second, active regulation consists of the principles of trial and error in learning. The learner is engaged in constructing and testing theories in action (Kormiloff-Smith & Inhelder, 1974/5). Third, conscious regulation involves the mental formulation of testable hypotheses. Thus, the developmental progression is from unconscious autonomous regulation to active regulation. In other words, self-regulation processes have different levels. They are considered as central mechanisms in metacognition (Brown & Deloache, 1978).

4.4.1.4 Transeference from other regulations to Self-Regulation

This is a central issue in metacognition. Here it refers to the fact that self-regulation in learning contexts is influenced greatly by the regulation of others (see, Vygotsky, 1978, "Theory of Internalisation"; Deloache, 1984 "mother-child reading dyads"). In many studies, the child is taken through a learning task where the adult,

parent or teacher, regulates learning for the child. Ideally, adults here function as mediators in the learning process, acting as promoters of self-regulation by nurturing the emergence of personal planning as they gradually cede their own direction to that of children themselves (Brown et al 1983a, Brown et al, 1984, Collins & Stevens, 1982; Palincsar & Brown, 1981; Schallert and Kleiman, 1979).

In cases where the teacher plays the role of other-regulator the goal would be the learner's self-regulating his learning. It is hoped that the student learns to perform comprehension-fostering activities in interaction with his tutor and be able to internalise the procedures as part of his own cognitive processes in case of reading (Brown et al 1984) where this has been achieved .

Interactive learning experiences are intended to mimic real-life learning. Mothers (Wertsch, 1978, 79), teachers (Schallert & Kleiman, 1979) and mastercraftsmen (Childs & Greenfield, 1980) all function as the supportive other. They provide the environment for the learner in a way that is interrogative and regulatory. This becomes internalised by the learner during the process. The learner, then, fulfils some of these functions for him/herself through self-regulation and self-interrogation:

"Mature thinkers are those who provide conflict trials for themselves, practice thought experiments, question their own basic assumptions, provide counterexamples to their own rules, and so on" (Brown et al, 1983a, p 124).

4.5 General summary of the three Categories of teaching Comprehension

Three types of teaching comprehension, or what is generally termed intervention research, have been dealt with. These research orientations tend to point to the following conclusions. Learning activities seem to determine performance. Some activities can be

specified, for example, asking of questions, (Anderson, Biddle 1975) making the text coherent (Kintsch, 1974; Kintsch & Van Dijk, 1978; Van Dijk, 1977) activating one's schemata relating content to previous knowledge (Glaser, 1984 Jayaraj, 1981) monitoring one's activities, (Brown et al 1984). Evidence indicates the existence of both specific sets of activities, powerful and limited to some circumstances, as well as more general ones, which are weaker but broadly applicable and possibly necessary for effective use of, or access to, the more specific routines. So, it is obvious that what is needed is provision of appropriate instructional programmes to these findings. It is not however necessary for the learner to be aware of what is being done in order to ensure the effectiveness of learning for those effects to be obtained (Brown et al 1983a).

There are expected limitations to these effects. Knowledge differences can limit the benefits that could result from inducing the subjects to carry out reasonable learning activities (eg Siegler, 1976, 78). Another limitation is the transfer of training to novel situations. More ambitious research has started to programme transfer (Stokes and Baer, 1977). In these efforts, the major factor has been an increasing attempt to foster the understanding of the specific skills being taught, both by providing knowledge about the skills or by explicitly including general self-regulatory or executive, functions in the tutorial interaction.

4.6 Programmes Reflecting of Different Approaches to Learning and Higher-level processes: Teaching of Comprehension

These programmes reflect the different approaches mentioned earlier. They are seen to encourage thinking, problem solving and abilities to learn. They differ in the amount of emphasis they put on

knowledge content.

4.6.1 Process-oriented Programmes

Whimbey and Lockhead (1980) developed a programme in analytical reasoning with the aim to counteract the assumption stipulating that good problem solvers are more aware of and use more self-monitoring procedures than poor problem solvers (Bloom & Broader, 1950). The analytical reasoning programme assumes that most mistakes are made because of failure in reasoning, such as the failure to systematically approach the problem or represent it.

The programme elicits procedures for reasoning and problem solving that avoid these errors through carefully designed step by step problem exercises. The learner would loudly report how s/he is thinking to a partner who points out any mistakes without giving corrections.

Feuerstein's attempt is more widespread and has a longer period of application. It is the Instrumental Enrichment Programme (Feuerstein et al, 1980). The programme is based on three different theories of psychology; namely, psychoanalysis, behaviourism and psychometry. It assumes that it is possible to modify people's cognitive structure. Cognitive capabilities are seen as dynamic and modifiable, contrary to what many theories advocate. The person is helped by the programme to adapt to the environment. This is achieved through cognitive modifiability, which entails that the concern is not the acquisition of some knowledge or parts of academic skills but the ultimate destiny of helping the retarded performer. Retardation is not necessarily hereditary. It may well be because of lack of mediated learning experience. This term refers to:

"The way in which stimuli emitted by the environment are transformed by a mediating "agent", usually a parent, sibling, or

other care-giver. This mediating agent, guided by his intentions, culture, and emotional investment, selects and organises the world of stimuli for the child. The mediator selects stimuli that are most appropriate and then frames, filters, and schedules them; he determines the appearance or disappearance of certain stimuli and ignores others. Through this process of mediation, the cognitive structure of the child is affected. The child acquires behaviour patterns and learning sets, which in turn become important ingredients of his capacity to become modified through direct exposure to stimuli" (Feuerstein et al, 1980 p. 15-16).

Thus, Mediated learning experience represents an interaction between the child and his environment.

The goal of the programme, as has already been made clear, is to increase the capacity of the learner to be modified through direct exposure to stimuli and experiences with life events and with formal and informal learning opportunities. The goal is realised through the fulfilment of subgoals. First the deficient cognitive structure is corrected. Second, basic concepts, operations and other components necessary for the programme are acquired. Then habit formation creates intrinsic motivation. Fourth, while confronted with success and failure in the behaviour tasks of the programme, the students should be able to produce reflective and insightful processes. Fifth, there is the creation of task-intrinsic motivation. This is apparent in the enjoyment of a task and the social meaning of success. The last but most important sub-goal is the generation of autonomous cognitive behaviour, that is, the attitude of the student towards his ability to generate information and his readiness to function as such, as a result of this self-perception.

The material is instrumental in the sense that it is devised to have an effect. It is also content-free. This stance is taken because of some resistance due to the inhibiting factor of content in the modification of cognitive behaviours if content were used. The learner

may resist modification because of many reasons, such as lack of activity, lack of ability to relate stimuli to specific concrete tasks or difficulty of selecting and using relevant elements from a given set of data. The resistance to the material comes from the content of the curriculum which may have its own organisation that would consist of the organisation of the programme. The resistance from the teacher comes from his role as representative of a system that demands a certain degree of efficiency and an identifiable end product as a result of the process of teaching. Previous failure could also be a source of resistance to content.

The programme consists of 15 instruments of paper and pencil exercises. Each instrument focuses on a specific cognitive deficiency and addresses the acquisition of other prerequisites of learning. The programme provides a one-hour lesson per day for three to five days a week over a period of two to three years. These exercises can be divided into two categories. Exercises are accessible to even the more or less totally or functionally illiterate individual and those that require a relatively proficient level of literacy and verbal comprehension. The programme provides systematically ordered and intentionally scheduled opportunities for reasoning and problem solving. This is achieved through didactic techniques and exercises which are gradual in their difficulty. These sets of tasks encourage cognitive activities like perceptual organisation, problem representation, planning goal analysis and problem restructuring.

4.6.2 Programmes that use Generally Familiar Knowledge

Other programmes teach thinking in the context of general knowledge (eg stories). Covington et al (1974) devised a programme where thinking is taught in a context of stories that would present a challenging

problem. The students are put in a situation where they have to state the problem, formulate questions about it, analyse the information, generate new ideas, test hypotheses and evaluate possible courses of action. These are formulated as thinking guides.

Based on every-day-life situations, a self monitoring strategies-programme was developed by de Brono (1985). The programme is content free. It is based on real-life situation such as how to spend one's holidays, changing to a new job etc... The programme helps the learner to go through these situations, think about what one could do, question one's way of going about them and so on.

4.6.3 Problem-solving in Well-Structured Domains

Some programmes teach general problem solving in well-structured domains such as physics and mathematics. An example of this is Polya's (1946) book on "how to solve it". He proposes that explicit attention be paid to process as well as to content. He suggests helpful ideas such as looking for analogical situations; looking for solutions to partial auxiliary problems, decomposing a problem and recombining elements. There are also other ways of fostering general heuristic processes such as introducing students to specific problem-solving techniques that can be used in various specialisations they encounter (Rubenstein 1975). Another way is to teach more general methods in solving problems, which is assumed to help in more specialised subjects (Wickelegren, 1974; Hayes, 1981).

4.6.4. Logical Thinking in the School Curricula

Of interest are those programmes that foster thinking skills in the specific context of school curricula. (Lipman et al 1979, 1980). The argument is that basic skills and complex processes are hierarchically

ingrained in educational philosophy and in educational research. This makes it difficult to conceive of the interdependency of basic skills and the skills of reasoning and thinking. The authors state that the pragmatic nature of inquiry must be made apparent in the course of acquiring knowledge.

4.6.5. Comments on the Programmes

The programmes are designed in an attempt to encourage different high-level cognitive processes in school contexts. Those programmes are of two different categories, those devised to improve general metacognitive and self-monitoring of one's mental processes while learning and those which elicit thinking skills in problem solving of formal well-structured domains such as mathematics. The programmes seem to share the assumption that teaching thinking skills to students will help one overcome the failures and inadequacy of solving problems they face in school and in everyday settings. This stems from the following assumptions:

- if one is aware of one's processes and their weaknesses one can correct them, subsequently;
- general cognitive processes can be taught through training;
- if so then this training can be transferred to more specific ones.

In evaluating these programmes, Glaser (1984) finds that they generally emphasise the teaching of general processes that could possibly be acquired as a result of thinking. They suffer misrepresentation of complexity of real-life situations as well as their use of abstract tasks and puzzle-like problems. There have been little attempts to connect thinking and problem solving to learning of relevant background knowledge.

These problems seem to be due to the fact that these programmes are derived from early theories of cognitive psychology (psychometrics & basic information processing) which seem to operate in situations where there is little specialised knowledge and skill as well as knowledge domain. They ignore those features which make the learners use general methods when faced with novel situations. They seem to be less powerful in the context of acquired knowledge and specific task structures. Their lack of focus on domain specificity is due to their wide applicability and generality (Newell, 1980). These methods used relatively knowledge-free problems which reveal little about learning and thinking that require domain-specific knowledge.

These programmes show how they might have improved the basic skills. However, they fail in improving higher-level cognitive processes such as thinking and deeper understanding. The kind of programmes described above leave much to be desired. They need to incorporate more of the knowledge that the person possesses and to implement them in real-life situations. For these to be achieved, it is necessary to look at the theories that have dealt with learning in general and comprehension in particular. From those theories practical programmes and workable models in the classroom environment can be derived.

CHAPTER 5

ELABORATION AS COMPREHENSION FACILITATOR

Elaboration is the process of additions of a meaningful mediator to a text to clarify or relate it to the reader's own background knowledge. This mediation is expected to help retention and comprehension since it generates associations, relates the stimuli to existing schemata and knowledge. It may offer and can be used in different forms such as giving examples, drawing analogies, making inferences and so on.

5.1 Script Elaboration Model

A script elaboration model is offered by Reder (1980) as an explanation of reading comprehension. It is an hybrid form of Schank and Abelson's (1977) concept of 'script'. This model emphasises the role of elaborative processing the reader must perform to make sense of texts.

The reader must infer any missing links or omitted information. The reader must detect anomalies and propose mediating links that resolve them. S/he must also generate expectations about subsequent input.

Elaboration benefits both comprehension and long-term retention. The notion is that the more extra processing one does that results in additional related or redundant propositions, the better will be memory of the material processed (Reder, 1980).

If the view that reading is generating meaning is accepted, then the author's message(s) as well as the inferences made and the embellishments that are added to what is read all become part of the process of comprehending text. These take different forms. They are

generated meanings that can be constructed at different levels of abstraction. They can also appear as derived interpretations and understandings.

This is similar in approach to what is termed the "generative model" (Wittrock, 1974, 1978). In this model meaning is actively generated by relating the text to memories and schemata. To construct meaning from a text, readers attend to the text; they perceive its written symbols as characters in language. They decode or transform these linguistic representations into semantic units that can have meaning in them. They encode language by relating it to their knowledge and their memories or experiences. From their relationships comes reading comprehension (Wittrock, 1981). She argues that:

"Reading comprehension is the generation of meaning for written language" (Wittrock, 1981 p.254)

These models make positive suggestions for teachers to facilitate comprehension. They break down the comprehension process into definable units and open the possibility of identifying areas of weakness for remedial attention. The major inspiration of such suggestions is that by breaking down comprehension processes into identifiable / teachable units, it has been made possible to devise a model consisting of step-by-step procedures for teachers, in Algeria, with a view to helping them help their student to understand better (see Chapter 8).

5.2 Evidence for Elaboration as Facilitating Comprehension:

Studies on memory have shown the importance of elaborations in retention of information read. A sample of these studies is reviewed here.

In their seminal work Craik and Tulving (1975), while reviewing their position on the levels of processing approach (Craik &

Lockhart,1972 p.291) concluded that

"memory performance depends on the elaboration of the final encoding. Retention is enhanced when the encoding context is more fully descriptive".

Explaining this view, Anderson and Reder (1979) hypothesised that **manipulations** designed to affect what has been referred to as depth of processing are having their effect by changing the number and type of elaborations stored. Both, above, suggest that there is a relationship between the number of elaborations readers make about specific information during encoding and the subsequent memorability of that information (Palmore et al 1983).

To support this claim, Palmere et al (1983) conducted a five-experiment study to examine the effect of elaboration. Twenty-two undergraduates were made to read a 1,200-word passage containing thirty-two paragraphs. Each paragraph consisted of one main idea sentence and three equally subordinate idea sentences. The text was then divided into four sections of eight paragraphs each. The paragraphs of section one remained intact. The paragraphs of section two were shortened by randomly eliminating one subordinate sentence. Section three had two subordinate sentences eliminated from each of its paragraphs. Section four had all three subordinate sentences eliminated from each of its paragraphs.

If taken as elaborations, main ideas supported by more subordinates were found to be better recalled than those with less subordinates. The results, in fact, showed that more was recalled about these main idea sentences. The more elaborated an idea was the better it was recalled.

A set of alternative hypotheses may be advanced to explain the improvement of recall. One is that surface structure (paragraphs spaced

as a cue) may be behind recall improvement. Other alternatives are the time spent on processing material and reprocessing of main ideas supported by subordinate sentences.

To rule these alternative interpretation out another experiment was conducted to see how different adjunct questions calling for different amounts of information, as degrees of elaboration, influence subsequent recall. Three different types were advanced. The first asked about information from one, the second from two and the third from three subordinate-idea sentences. Note that each type of the above questions followed a paragraph. It is to be remembered that the text is the same as above (4 sections with paragraphs all similar to section one). The questions were asked for each sections, as explained, except for the last section where no questions were asked. As adjunct questions required more elaboration of the main idea of paragraphs, recall of those increased.

The results extended the findings reported by Craik and Tulving (1975) to more complex and educationally relevant materials. They are also consistent with the view that recall of any particular proposition depends on the amount of elaboration made during study (Anderson and Reder, 1979).

This research leads to the conclusion that the more elaborations a learner makes, or is induced to make, about an idea(s), the more likely s/he is to remember it (them).

5.3 Elaboration and Learning

Related to elaboration usefulness in learning, Stein and Bransford (1979) have studied the effects of elaborations on learning. They assume that elaborations that readers make are essential parts of the learner's activities, which have an effect on learning

(retention/comprehension). Here, elaborations are conceived as means of utilising knowledge to interpret new information. The most effective elaborations are those that involve knowledge of the learners that clarifies the significance or relevance of concepts relative to the events in which they occur. Usually the experimenter provides these elaborations. The study shows that this type of elaboration helps learners to learn and recall the information they study (O'Neil, 1978). However, it does not clarify the constraints which determine the effectiveness of self-generated elaborations.

5.3.1 Experimenter's-vs-learner's and Precise vs Imprecise Elaborations

Stein and Bransford (1979) conducted a study of two experiments to answer this question. The first experiment was carried out to partly replicate Stein et al's (1978) study. Four groups participated. The first group was assigned to read some sentences with a view to learning them. The second read the same sentences with imprecise elaborations; the elaborations were, however, semantically and grammatically congruent with the base sentences. The third group read sentences with precise elaborations provided by the experimenter. The fourth group, the added element on top of Stein et al's (1978) study, were given the sentences and were asked to generate their own elaborations.

The hypothesis is that 'precise' elaboration would yield better retention. Note that the quality of precision of subjects' elaboration is defined according to their relevance or significance as related to the target concepts in the acquisition sentences.

The results showed that the comprehensibility rating for groups one, two and three was 4.10, 3.48 and 3.43 respectively. The recall means showed the highest performance was recorded for group three followed by group four then group one and lastly group two. This shows

that the more precise the elaborations the more enhanced the learning.

Moreover, when results were analysed for precision, they indicated that subject-generated elaborations facilitated recall performance, relative to subjects who heard only the base sentences (group one), only when the elaborations clarified the precise significance of target concepts.

In their discussion, Stein and Bransford, state that their study replicates and extends Stein et al's (1978) study. Semantic continuation congruent with the basic sentence would facilitate or debilitate retention compared to the basic sentence alone. When elaboration helps to clarify the precise significance of those words in the acquisition sentences, the retention is enhanced. Then, if a self-generated elaboration is to be effective in producing a good performance, it has to be of a good quality as defined above. As the analysis suggests that quality of elaborations is dependent on questions asked, the precision is based on asking the relevant questions.

5.3.2. Adjunct Questions and Precision of Elaborations

The second experiment was set to look at relations among question asking, precision of elaboration and subsequent retention. Four groups participated in the experiment. Group one was given sentences with imprecise elaborations (IE). For group two, sentences were provided with precise elaborations (PE). Groups three (IG) and four (PG) were encouraged to generate elaborations. Group (IG) were prompted to elaborate with the question "what else might happen in this context"? Subjects in the (PG) group were prompted to elaborate with the question "why might this man be engaged in this particular type of activity"? The second question was meant to produce more precise self-generated

elaborations.

The results of an ANOVA analysis showed a significant main effect for the type of elaborative context. The PE group showed higher retention results than the IE group (both experimenter-generated elaborations). Also the PG group performed better than the IG group (elaborations generated by subjects in both groups). The results also indicate that subject-generated elaborations which are rated imprecise were more effective than imprecise experimenter-provided elaborations.

It is clear then, that the elaboration in learning is done for two reasons:

- 1) "people who ask themselves relevant questions may be more likely to notice situations where they need further clarification.
- 2) an emphasis on the types of questions students ask themselves may also have important implications for understanding individual differences in learning and retention". (Stein and Bransford, 1979 p.775)

5.4. Inference Making and Elaboration

As it appears from the above pieces of evidence, elaborations facilitate comprehension and retention. This, viewed in a wider theoretical context, can be well understood. Elaborating is related both to inference making and schema embedded in the text processing models.

Related to inference making, many positions assume that comprehension of text requires one to make inferences. This activity fulfils two functions: First, it fills any missing slots in the structure of the text being read. Second, it connects elements in the text structure with other events in order to provide a higher-level organisation. On that basis a learner may make two kinds of inferences. S/he can make connecting inferences and, s/he may make predicting or

explanatory inferences. Warren et al (1979) have developed an inference taxonomy based on three main sources of information.

1. "logical relations between events specified in text (causes, motivations, and conditions: why and how?).
2. Informational relations specific people, objects, times, places etc. (who, what, when, where?)
3. Understander's world knowledge about objects, actions and events in the text." (Warren et al. 1979, p27)

Relevant to the present discussion is that while a reader is reading a text to comprehend it, s/he is making inferences to connect what s/he reads to his/her world knowledge (Warren et al 1979; Wittrock, 1974). Second, the extent of the understander's world knowledge of the objects and events is involved (Anderson et al 1976; Pearson and Gallager, 1983). The two factors jointly contain the choice of alternatives and direct inferencing. As far as elaborating inferences are concerned, the readers usually add to the text from their world knowledge by providing details to clarify and make sense of what is being read (Stein and Bransford , 1979, Stein et al 1978).

5.5 Schema and Elaboration

The schema approach stipulates that while one reads a text, one imposes one's world knowledge frame and sees the text in that light. A schema is an hypothetical knowledge structure which represents an organisation of comprehender's experiences with the real world (Anderson, 1978, Bartlett, 1932). Schemata do not correspond to one particular experience but rather to a common set of features (Blackowicz, 1982). As has been developed in Chapter three, this schema structure is most interesting to reading comprehension in that it allows for enrichment of the text through elaboration and inferences.

There are three characteristics related to schema processes.

First, is schema availability (or prior knowledge); that is the knowledge that one possesses of the world and brings to bear on the situation or influences the passage to be read (Dansereau et al 1979; Pearson et al 1979). Second, is schema activation (Spiro, 1975) Whose role lies in triggering the schema processing. The background knowledge here guides the interpretation of the text at hand and helps the reader to see the information in the light of the existing schema which in itself may be modified and refined (Norman, 1978). Third, is the schema maintenance (Sprio et al 1980). Here, the schema is made more general and has a well defined structure and skeleton rather than the information from specific or few instances. It becomes a higher-order presentation of the world against which different pieces of information are represented and interpreted. One can consider that such conditions are closely related to metacognitive strategies (Brown and Simley, 1978; Myers and Paris, 1978).

Research has shown that the notion of schema has advanced our understanding about reading comprehension in practice. Pearson (1985) stated that:

"prior knowledge (in the form of schemata) influences our comprehension to greater degree than earlier research would have suggested" p17.

Anderson (1984) summarised the influences that schemata have on comprehension as follows: The schemata

1. provide ideational scaffolding for assimilating text information.
2. facilitate the selective allocation of attention,
3. enable inferential elaboration,
4. facilitate editing and summarising,

5. allow for orderly search of memory, and
6. permit inferential reconstruction.

Moreover, prior knowledge has a very powerful influence on comprehension. Johnston and Pearson (1982), Johnston (1984) found that prior knowledge of a topic is a better predictor of comprehension than is either intelligence test score or a reading achievement test score (see Pearson, 1985 pp 17-19)

This model of schema is much inter-linked with the process of inference-making. It is usually not possible to make inferences about a text without having the appropriate activated schema. For example, when inferences are made to produce elaboration and those are not precise, this does not facilitate the subsequent learning as much as when the elaborations are more relevant to the schema bearing on the information under study (Stein and Bransford, 1979). On the same token, it is very difficult to make a schema relevant to a given stimulus if no inferences are made.

The point that can be made from all this is that the outcome of reading whether recall or comprehension consists of more than a reconstruction of the author's meaning. Rather, within the constraints of the lexicon and syntax, readers construct one or more messages consistent with their knowledge structures and those they perceive to reflect that of the author. For this, reading is seen to be a generative process. This will be discussed in the next section when the teaching of comprehension is done through this model.

Adapting the results of the concepts of elaboration making and their usefulness in learning, as and when related to precision, inference-making and schema, the model developed in this research takes

full advantage of the results reached in the west (mainly America,) to be pragmatically implemented in Algerian schools in order to improve teaching and learning processes. The model (see Chapter 9) will include procedures for encouraging elaboration-making inferred from the pupils' experiences. Not only will the procedures try to induce pupils to elaborate but by requiring them to justify their responses, they are encouraged to benefit from their background knowledge, to give and make elaborations that are precisely inferred. The model benefits from practical research applied in the U.S.A (Linden, 1979). This will be discussed in the next section when the teaching of comprehension is done through the elaboration model.

5.6 Teaching of Reading Comprehension: The Generative Model:

5.6.1. What is the Generative Model of Learning?

The foregoing review emphasised the main processing activities a learner needs to perform in order to achieve understanding of a text. S/he must elaborate the message by referring it to past knowledge. Elaboration is only effective to the extent that it is precise. Elaboration is enhanced by asking questions to clarify the text. Clarifying questions guide elaboration towards greater precision. Elaboration is also improved by inferences; or it may be seen as part of the same process. The reader must spot inconsistencies and "logical" gaps and attempt to fill them as well.

We are now in a position to construct a procedural heuristic model aimed at guiding classroom learning and comprehension of text. This model should engage teachers in the activity of pupils' comprehension rather than leave them as passive irrelevant bystanders. It is intended to remove the apparent helplessness implied by such widely quoted

teachers' statements like "I can do no more; the pupil either can understand or can't understand".

This model stipulates that reading comprehension is achieved when 1) readers build relationships between the text and their knowledge and experience, and 2) among the different parts of the text. This has been experimentally supported (Bull and Wittrock, 1973; Doctorrow, et al, 1978; Wittrock and Carter, 1975; Wittrock et al 1975).

It is well known that cognitive theory implies that learning is predictable and understood in terms of:

1. what the students bring to the learning situation;
2. how they relate stimuli to their memories and
3. what they generate from previous experiences.

Berliner and Gage (1976) assert that the emphasis is placed on the students' receiving, perceiving and organising ideas found in the instruction and/or the instructional material. Learning, then, becomes the active restructuring of perceptions and concepts (Good and Brophy, 1977). Instruction, according to cognitive theory, should activate, facilitate, maintain and enhance the learner's perception and organisation of information (Resnick and Beck, 1974, Gagne, 1976). Instruction should serve to facilitate the learner's construction of meaning from his/her experience (Wittrock, 1974; Wittrock et al, 1975).

If learning, is seen to be the active restructuring of perceptions and concepts (Good and Brophy, 1977), this, then will lead to the understanding that reading with comprehension would be the active association of the text serving as the stimulus to the reader's stored information (Carroll, 1964; Barbe, 1968; Russell, 1970; Dechant, 1970; Dolch, 1970; Miller, 1971; Goodman, 1973; Singer, 1973; Wittrock, 1973; Dechant & Smith, 1977).

To sum up, the generative model, then assumes that reading with comprehension would seem to occur when the generative, or constructive, cognitive processes have been activated and maintained during reading. (Kohlers, 1968; Wittrock, 1974)). When instruction is described as involving the stimulation of relations between the stimuli and stored memories by inducing verbal or imaginal elaborations, reading comprehension could be enhanced. This is realised when the instruction enables the students to utilise their generative cognitive processes.

5.6.2 The Generative Model Applied in the Classroom

Linden (1979) and Linden et al, (1981) carried out a study to investigate the effects on reading comprehension of an instructional sequence derived from conclusions about the generative model.

After reviewing the literature, Linden (1979 p33-34) made some generalisations stating that:

1. "reading comprehension may be facilitated when the individual associates the text with prior experiences.
2. Verbal and imaginal elaborations seem to be those instructional events that emphasise appropriate past experience.
3. A sequence of instructions that proceeds from imaginal tasks to verbal, or simple to complex may enhance the production of elaborations".

Then she concluded that "for reading comprehension to occur the following should be fulfilled:

1. availability of relevant experiences;
2. associations of those experiences with text;
3. elaborations should facilitate this association;
4. this association is to facilitate comprehension of text".

The purpose of her study was to develop a set of instructional principles and procedures upon which an effective method of teaching reading could be determined.

The study considered the following:

- enhanced level of reading comprehension through scores;
- instructional events: activating generative cognitive processes;
- transfer of meaning from experience to text;
- instructions that relate to production of - experience
- text;
- order or sequence of instruction". (Linden, 1979 p4)

Based on the above, questions were posed in an experimentally verifiable manner. (eg. what instructional activities best enhance association of previous experiences with the text?).

This study (Linden, 1979) emphasised instruction to elaborate as the principle feature, based on the consideration that elaborations aid in the association of memory (past experience) with the text, thereby enhancing comprehension.

Four hypotheses were formulated:

- H1 : Text-relevant generations enhance reading comprehension;
- H2 : When teaching proceeds from imaginal to verbal generative activities, more text-relevant generations are constructed. Consequently, the text is better comprehended;
- H3 : Text-relevant generations are more enhancing of reading comprehension as compared to generations not relevant to the text;
- H4 : The number of text-relevant generations correlates positively with reading comprehension.

58 fifth grade public school pupils (30 boys and 28 girls) from Los Angeles neighbourhood participated in the experiment. They were randomly allocated to four groups as follows:

1. Imaginal to verbal generations;
2. verbal to imaginal generations;
3. No instruction to generate;

4. Classroom teacher taught control.

Three stories were given to children to read. On each story one of the above (1-3) procedures was applied. Each story was read for 45 minutes, then followed by a test on factual information and a test of story comprehension (15 minutes) Each story was read in a different day over three days.

In the imaginal generations (1): the teacher gives instructions to make mental images and draw pictures. In the second story (2) the teacher instructs pupils to divide text into sections and summarise each one. In the third story (3) the teacher tells the pupils to make verbal elaborations. These include: descriptions, analogies, metaphors etc. involving the stories and the pupils' own experiences.

For group one, the sequence was (1,2,3). For group two the sequence was (3,2,1). Group three did not have any of these instructions although they read the three stories in the sequence group one did. They received their instruction in the conventional reading techniques and objectives, namely, main ideas, events and characters, vocabulary, etc. This group was a control to measure the effects of generative activities, using the same teacher as was used in groups one and two. Group four, as another control, was taught by the children's regular teacher where instruction related to the three stories was left to the teacher's discretion. The intention of the procedure was to provide a basis for comparing the results of the experimental procedures with more conventional techniques.

Three judges rated the relevance of questions of the two posttests to the text. Firstly, multiple-choice questions for fact-retention were used. Secondly, a completion test was used as a comprehension measure. A third measure was the number and type of generations the learners made.

A third measure was the number and type of generations the learners produced during instruction. The number of generations accepted are those considered by the three judges as being relevant. The relevance was appropriate to the conditions that the elaboration made should meet:

1. that it contains an element of text (eg. character or object);
2. contained at least one event or activity of the text;
3. it described a relationship between text and the child's experience.

By making an analysis of variance, results showed statistically significant differences among the treatment groups on the fact retention test ($p < .01$) and the comprehension test ($p < .01$). The correlation between the number of generations and comprehension was .44 ($p < .01$) for all treatments combined. The first hypothesis was supported. The learner's text-relevant generations do enhance reading comprehension. The second hypothesis, namely that the sequence from imaginal to verbal generations would produce more-text related generations than from verbal to imaginal, was partly supported. This has, however, failed to significantly produce an increase in comprehension. Hypothesis three was not possible to test. The three judges rated all generations produced to be text-relevant. The fourth hypothesis stating that the number of text-relevant generations correlates positively with comprehension of the text was supported.

The generative model of learning (Wittrock, 1974) as Linden and Wittrock (1981) argue, assumes that:

"teaching which induces learners to perform generations, relating the parts of the text to one another or to reader's background and experience, enhances comprehension (Linden, 1979) p.54.

The generative teaching procedure (generation of metaphors,

analogies, summaries, pictures and inferences), compared to two controls, increased the number of generation and enhanced comprehension. The correlation of generation with comprehension showed relatedness of generations and comprehension. This improvement in comprehension can only be attributed to the generation performed since all other factors were controlled. Also, it was clear in this study that it was those activities that the learners performed that constituted the factors contributing comprehension improvement.

The conclusion is that, taken together, the data on which Linden's study is based indicate that without any increase in the time given to instruction, reading comprehension among 10-year-old children can, sometimes at least, be enhanced sizeably by generative teaching activities that induce the learners to construct analogies, summaries, pictures and inferences as they read.

When the readers cannot adequately attend to the text, and cannot generate elaborations from this model, then elaborations to present its meaning are appropriate for facilitating comprehension. However, when readers attend to the text and can, but do not, spontaneously generate a meaning for it, instructions to elaborate it verbally, to create images, to draw pictures, to construct inferences, applications and analogies, or to assimilate it with higher-order concepts seem appropriate. The objective is to induce the readers to construct the relations between the text and their knowledge and experience (see Wittrock, 1981; see Also Stein et al, 1982).

The multifaceted model, based on the results of the studies reviewed in this chapter, will include - as part of its procedures - the concepts of elaboration making. Procedures will specify ways of finding out whether pupils, in the Algerian schools, make elaborations and will

induce them to elaborate cases where pupils fail to do so. The teacher poses a series of questions and instruct pupils to give answers which would ensure participation in the class and hence produce elaborations that are inferred by pupils relating the information in the text to their personal experiences (see Chapter 9 section 9.5.3).

CHAPTER 6

SUMMARISATION

Research in the fields of learning, memory and education has always looked at summary as an important research tool and a way of reflecting learning (Entwistle, 1979; Brown & Day, 1983b; Brown et al; 1981, Taylor, 1982; Garner, 1982, 1984).

6.1 Summaries as advance organisers:

Many studies used summaries as advanced organisers meant to facilitate learning of texts. (Hartley et al, 1979; Glynn & Di Vesta, 1977; McLaughlin Cook 1981; Vezin et al 1973). In this capacity summaries are said to fulfil three main functions:

- "1- they clarify the content of an article and thus help readers decide whether or not they want to read it;
 - 2- they help readers organise their thoughts about what is to follow, and
 - 3- they aid the recall of important features in the Article"
- (Hartley et al? 1979 p.60).

In the advanced organisers field, it is assumed that facilitators used are tools that help make associations between the facilitator and the material to be read. The facilitator plays the role of an anchoring factor in the sense that it triggers off the relevant knowledge structure (Ausubel, 1963) as well as the direction of attention and guidance to the important factors of the text (eg Rothkopf, 1971; Anderson & Biddle, 1975). This is the light in which summary, as a facilitator of text comprehension, is seen.

Hartley et al (1979) carried out a study to explore the role and position of summaries. Three groups were allocated to three treatments. The first read a text without a summary. The second and third read a text with a summary at the beginning and the end of the text

respectively. The results showed that the group who read the text with a summary at the end performed better on questions on the passage. These results seem to support other existing evidence (Vezin et al, 1973).

This can be explained by saying that a summary at the end had a recency effect since it reviewed the main ideas of the text. The subject had to use these ideas to reconstruct the details. Hartley et al (1979) stated that, "the summary at the beginning of the passage,...., seemed to be redundant in that its effects were no different from when it was omitted" (p.63). It would, however, be explained to be in contradiction with the claims of advance organisers (Ausubel, 1960, 1963). According to this view, the summary should have helped to better understand parts of the text.

Hartley and Truman (1982) carried out a series of five experiments on the effects of summaries on the recall of information in a similar way to Hartley et al (1979) and found that summaries enhanced recall of information regardless of the position of the summary. There were no significant effects due to the position of the summary as related to the text (eg at the beginning, or at the end).

The failure of summary, in the study of Hartley et al (1979), to produce any significant effect when placed before the text is apparently due to the fact that the summary hindered the students' normal strategies of learning. Having read the summary, the readers only concentrated on what the summary contained. This put them at a disadvantage by not paying attention to other contents of the text.

Further, McLouchlin Cook (1981) suggests that there is a possible reason for the beginning summary to be ineffective. The summary in such

a position is more difficult to read than a full passage. This may make the reader give just a quick look at the summary and go on to read the text more carefully since the main ideas are all explained and supported by details. However, if the summary is at the end, its comprehension is facilitated since there has been a prior exposure to the passage.

As it was clear to experimenters in the studies of Hartley et al (1979) and the ones quoted (Vezin et al 1973-74; Glynn and Di Vesta, 1977), there were no steps or instructions made to make readers see the importance of the summary. McLaughlin Cook (1981) used the same studies with some variation. He presented summaries at the beginning and the end in separate sheets and in sheets where the summary and a piece of the text were on the same page. Also a control was provided without a summary.

The predictions were:

- 1) end summary will produce more recall than no summary;
- 2) beginning summary on a separate page will produce more recall than no summary;
- 3) the recall would be stronger on the points mentioned in the summary.

The outcome showed that for the recall of summary-mentioned items, the results were exactly as predicted (McLaughlin Cook, 1981). The beginning summary condition on the same page as text did not significantly differ from the no-summary condition. This suggests that it is necessary to make readers aware of the usefulness of a summary and to ensure that they make use of it by highlighting it and distinguishing it from the text (eg on a separate page).

The present lack of consistency in research findings owes something to the following methodological points:

1- very little attempt has been made to relate the content of the summary to the test, be it comprehension or recall. Only McLaughlin Cook (1981) made this relationship clear when he mentioned that the results were significant only when the questions were related to the information in the summary.

2. It is not always clear to learners what type of test they should expect. McLaughlin Cook (1981) and Glynn & Di Vesta(1977) studies show that when students are made aware of the importance of the summary, the recall improves as compared to no summary. This awareness seems to have given some indication to what type of test is expected: McLaughlin Cook's subjects' recall is relevant to this point.

3. It is also important to know whether the summary was constructed in a manner that represents all main ideas of the text or only represents the overall issues. The other related point is the question of the nature of beginning and end summaries. One would expect, as experience and practice show, that a beginning summary should give a general introduction and feel of what is to be expected. The end summary should be one that pulls the details, points, ideas etc., together and reach a conclusion about what has been discussed. Putting this into research would be most revealing.

4. These studies have failed to make comparisons as related to students backgrounds, ages, education, experiences and how these factors may affect their use of summary. For example, would the results of McLaughlin Cook (1981) or Hartley et al (1979) or Glynn & Di Vesta (1977) have shown the same results if these factors had

been introduced?

To sum up, these studies are related to the advanced organisers tradition. There are many unclear facets in their methodology since they are not linked to proper theoretical positions or psychological models. The second point that can be made about these studies is that they are implicitly based on the assumptions coming from an old tradition (or belief) that the learner is only a recipient and has no active role in the process of learning. It would be useful to see what happens if the learners are to use the summary as a learning technique and prepare their own summary.

It seems here that there is scope for benefit from such findings to the major concerns of the present discussion, namely, that summarisation techniques could be taught to the pupils with a view to enhancing their learning process. It will be argued later in this chapter that summarisation is a necessary part in the overall strategy of inducing students to be more active in their decoding the meaning of the text.

6.2 Summaries as Study Techniques:

Early studies have looked into the effects of summarisation as a method of study or performance. This was usually considered as study skill (technique), such as advanced organisers, underlining, note-taking etc... Dynes (1932-33) compared summarisation to rereading as methods of study by making subjects read the text and reread it. As a second method, students were made to read the text, reread it with attention to important parts to be underlined along with taking notes. Then, students were to review notes and do some underlining on them. At the end students were required to write a summary of what had been read. The results showed that the summary group were significantly superior to those who read and reread the passage without having had to produce a

summary. It should be noted that the second method was a multidimensional one. It involved, beside summary writing, the underlining of important ideas and taking notes. It is not easy to say which method produced the effect of superior learning.

Another study was carried out by Dyer et al, (1979) to compare three study skills (note-taking, summarising and rereading). It predicted that summarisation would be the most effective of the methods. However, results showed that rereading was most effective in recalling text information. Note-taking seemed also effective; it, apparently, gave more chance to spend time on the task of dealing with the content. It is worth mentioning that summary helps more towards mastery of the idea of a passage than towards factual learning.

It appears according to the two above mentioned studies and others that using summarisation as a learning technique does not seem to be effective in the way it was used. This may be explained in that these studies did not put these techniques into theoretically relevant models of text processing and comprehension. They also failed to compare those techniques with other measures such as the conceptual understanding of the text. It is believed, for example, that a summary may better trigger a deeper comprehension (Day 1980, Brown & Day, 1981). It is easily conceived that rereading or taking notes would recall more factual information since the students' activity is more directly related to text content, while a summary is more of a mental activity involving different activities that go beyond the text itself which would lessen the chance of being constantly in contact with the factual contents of the text. That is why these techniques should be considered within a framework.

6.3 Relationship of the constructive view of Comprehension to Summarisation

Theories of comprehension have different perspectives (see earlier chapter on comprehension theories) and standpoints. Theories related to summarisation processes are dealt with here. The "constructivist view" is very briefly mentioned; then Kintsch and Van Dijk's model is dealt with in some detail since it offers some relevant ways of approaching a text which will prove to be useful in the formulation of the model for teaching comprehension (See Chapters 8 and 9 expounding the MFM).

Bartlett's (1932) seminal work on memory was the motor for the new trend in text processing and comprehension. This consists of a major hypothesis that comprehension is a "constructive process" involving an interaction between text and knowledge of the comprehender. It has come to be usually known as "schema theory" (See Chapter 3). One of the merits of Bartlett's theory is the introduction of the concept of inferring as a necessary component in the reader's drawing on his/her background knowledge. This concept is of particular relevance in the present study since inference-making is a vital process for the elaboration of text (See Chapter 5). The trend stemming from Bartlett's theory assumes that when people read a text, they construct the meaning by relating the incoming information to their background knowledge. Inferences that are not stated in the text but are consistent with its meaning are usually made (Bransford and McCarrell, 1975; Kintsch, 1977).

This emphasis on the reader's active tackling of text must not give the impression that the importance of the text as an equally determining factor in comprehension is in any way underestimated. Indeed, one is aware of the existence of major contributions to the theory of textual structure from a wide range of interests in text grammar (eg.

Linguistics and Psychology).

The search for structures underlying diversity informs a whole trend which has come to be known as "structuralism". This trend is presently informing many disciplines. For instance, in literary criticism, French structuralists such as Bremond and Todorov, have produced story grammars inspired by Propp's pioneering "Morphology of the Folk-tales" (1968). In Anthropology, one could name the work of Levi-Strauss on the structure of the myth. In linguistics, theorists like Colby (1972), Lakoff (1972), Van Dijk (1977), to name but a few, are inspired by this search for underlying structures.

In the field of psychology, the work of Rumelhart (1975) and Thorndyke (1976) has contributed to a better understanding of textual structures. Johnson (1970, 1976), in particular, proposed what he termed "pausal units" methodology. Students of different age levels were shown (in his experiments) to have been able to categorise the verbal units according to what he considered to be their structural importance. He concluded, thus, that there is some relationship holding between structural importance and recall.

The position adopted in this thesis takes the reading process to be a dynamic interaction between two poles, namely, the reader and the text. It takes its inspiration from Iser's (1978), (1980) "theory of the reading act". In view of its importance, it is quoted here.

"The dynamic nature of that interaction is shown by the continual temporal evolution not only of the text, but also of the systems of norms, values, and meanings that provide the foundations of reader understanding. The central question for a theory of reading is therefore: how much control does the actual text exert on reader response, and in what fashion? We suggested that responses cannot be random or arbitrary because reader strategies must be suitable for the tasks which a text imposes: wetting a viewpoint, forming ideations, constituting or formulating oneself as subject,

dealing with empty slots or negations, and co-ordinating foreground with background, theme with horizon, and current perspectives with those adopted on other text segments". (1980: p341).

These proposed measures will be of paramount importance in inspiring the practical steps proposed in the MFM model aiming at facilitating the task of the teacher in trying to improve pupils' understanding.

6.4 Summarising as Process and Product of Comprehension

(Kintsch and Van Dijk (1978) Model)

Kintsch and Van Dijk's (1978) model deals with processes involved in comprehension of text as well as production and recall of it. The model deals with three major issues:

- 1 the organisation of a text base into a coherent message;
- 2 condensation of the whole meaning into a gist, and
- 3 generation of a new text (summary).

A discourse is accordingly viewed as a set of propositions that are related by semantic relations either explicitly (through discourse markers and linkers, Halliday and Hasan, 1976) or implicitly (chiefly through inferences, Brown and Yule, 1983). These semantic relations operate on the two levels of what they call microstructure and macrostructure respectively.

The microstructure is the local level of the discourse, that is, the structure of the individual propositions and their relations. These are not unrelated lists of propositions. They are coherent structured units at local micro level.

The macrostructure, on the other hand, is of a more global nature. It characterises the discourse as a whole. This is necessary to establish a meaningful whole, which is defined in terms of a discourse

topic or topic of conversation. the notion of a discourse topic is made explicit in terms of propositions and proposition sequences. There may be several levels of macrostructure represented in specific semantic mapping rules; called macrorules.

Macrorules are of a recursive nature generating more than one macrostructure. The general constraint is that any proposition which is a presupposition for a subsequent (macro) proposition in the discourse may not be deleted. The function of these rules is to reduce text information. Thus, the readers condense the microstructures by applying macrorules.

Kintsch and Van Dijk (1978) defined these rules as follows:

- 1) Delection: propositions that denote an incidental property of discourse referents may be deleted. (Under the general constraint if not necessary for the interpretation of a following proposition).
- 2) Generalisations: are such that within a sequence of propositions, an immediate super-concept may be substituted for a sequence of micro propositions.
- 3) Selection rule is used within a sequence of propositions where all propositions which represent a normal condition, components or sequences of a fact, may be deleted if denoted by another proposition.
- 4) Construction is a rule that denotes normal conditions, components or consequences which may be substituted for a sequence of propositions that make them explicit.

Thus, according to their model, an individual trying to comprehend discourse establishes a microstructure or text base. Simultaneously, the reader chunks micropropositions into story categories such as

setting, complication, resolution, evaluation and moral (Kintsch, 1974). Once a category is identified, the reader forms the macroproposition for it by applying the macrorules. It is in this way that the macrostructure representing the structure and gist of the story is constructed. The reader builds the macrostructure during decoding, not at the time of recall or summarising (Kintsch & Van Dijk, 1978).

6.5 EXPERIMENTAL EVIDENCE RELATED TO SUMMARISING

6.5.1. Summarisation as strategy

6.5.1.1. Developmental Aspect:

Discussing the issue of relatedness of summary to recall and comprehension, Brown, Day and Jones (1983) carried out a study of summarisation from a developmental perspective. The study was motivated by the view that:

"current theories of text understanding assume, at least implicitly, that higher-order representation of the super-sentence structure of the text is "automatically" abstracted during comprehension, and it is this macrostructure that guides the production of recall and summarisation (Kintsch & Van Dijk, 1978; Rumelhart, 1977)" (Brown et al 1983 p 968).

If the ability to summarise information is important for understanding and remembering texts, the development of this ability in children should be of considerable pedagogical interest. However, there is ground to examine children's summarisation ability.

Recall efficiency has usually been reported from studies based on story grammars (Mandler and Johnson, 1977); Stein and Glenn, 1978; Stein and Trabasso, 1982). When stories conform to story grammars, children tend to recall excellently. What happens if stories do not conform to an internalised story grammar outline?

There is evidence that children's recall and processing of less ideal text material (lacking in coherence and relevance to the reader)

is not optimal. It is reasonable to suggest that recall of stories not conforming to well known story grammars and conventions requires effort and judgement. Methodologically, this poses a constraint on research in the field. Studies on summary should distinguish recall from summary writing. Summary requires judgement and effort. Summary is an index of understanding and recall (an index of memory). It should be clear that the summary is an ability to condense intelligently what is retained of the gist (Brown et al 1983b).

To study children's summarisation, as different from their recall, it is needed to make sure that they can recall much of the information they are required to summarise. One way is to use a lengthy and complex story that requires them to memorise the text according to a given criterion before preparing a summary. Under these circumstances it would be possible to examine the students' judgements concerning what elements to include or omit without confounding memory and selection (Brown et al, 1983). One can also let the children have the text in front of them while summarising to disregard or control the influence of memory.

Four age levels formed four groups (from age 10 to 16), in a study by Brown et al (1983b). Six stories of about 500 words and 60 idea units were selected. Each student was given two stories to take home and learn perfectly (ie all idea units of the story should be remembered; however recall in one's own words was allowed). A week later, subjects were to write down all they could remember. After a break, one of the two stories was selected to be summarised by the subject. Then after another break, they were told that the summary should be shortened to 40 words. (This number was based on the average of summaries of experts

which was 42 words). At a later stage, the summary was cut down to 20 words. After completion of summarisation, subjects were asked to divide the second story into idea units and sort ideas according to their importance.

The recall data showed that 65% of the subjects recalled 70% of the story. An analysis of variance revealed that there was more recall for important ideas as compared to less important ones. Summarisation data showed significant effects of age, importance level (of ideas), as well as interaction of the two. The important ideas were represented in the summary while the trivial ones were dropped. These results were the same for both free summary (no restriction on length) and the 40-word-limit summary. However, no interaction was found for the 20-word summary.

Thus, students as young as ten years old were able to attempt a written summary of lengthy texts, but clear developmental trends were detected in them. College and older higher-school students out-performed younger children in their propensity to plan ahead, in their sensitivity to fine gradations of importance in the text, and in their ability to condense more idea units into the same number of words. Under circumstances when a summary is not just a measure of automatic retention, the ability to work recursively on information to render it as succinctly as possible requires judgement and strategies (Brown et al, 1983b).

The merit of Brown et al's (1983b) study is that it does undertake to make explicit the instructions involved in training in summarisation techniques. Therefore, they provide a ready model that could easily be adapted for the purposes of the present study.

6.5.1.2 Improvement (Enhancement) of Learning

To improve students comprehension and recall of content materials and write better organised compositions, Taylor (1982) developed a hierarchical summary procedure that directs students' attention to the organisation of ideas in content textbook selections. This procedure was thought to improve students' recall of content textbooks and indirectly develop their skill in organising their own expository composition. The procedure involves five steps: previewing, reading, summarising in the form of an outline, studying and retelling orally. The procedure was found to have a positive effect on recall of content area reading materials as well as on improving the quality of expository composition.

Another study was conducted by Garner (1982) to find out whether the efficiency of a summary (proportion of a number of ideas judged to be important to be included to total number of words in each summary) played any role in facilitating verbalisation of the components of a successful summary and more importantly whether it had an effect on understanding and recall.

Twenty four undergraduate subjects participated in the experiment. They were given a 167-word scientific text to read. Then they were required to rate each sentence according to its importance (very important: that could be included in a summary; mildly important: that might or might not appear; and unimportant information: that should not appear in the summary). Then they were asked to read the text (as often as they wished) then write a summary of the information in it.

Five days later, they were given two additional tasks. The first was a recognition task where synthesis sentences were given to them to rate as "old" if they were included with passage they had read and "new"

if they were not. This was done according to the constructivist view of memory paradigm (Bransford, 1979; Bransford et al, 1972; Bransford and Franks, 1971). Subjects were required to answer either "yes" or "no" and express their degree of confidence in their judgement on a 7-point scale. The second task required the subjects to verbalise the ways (rules) they used to summarise the text.

As the text contained three main ideas, the summaries were scored for efficiency. Eleven subjects included all three elements in their summary, nine of which included two and the remaining four included only one. The efficiency was calculated according to the proportion of important ideas to the number of words included in the summary (range of proportion .02 to .12). Out of this data two sub-groups were generated; high (.12 to .06) and low (.04 to .02) efficiency.

As the range of confidence of recognition ranged from -6 to +6, results showed a significant difference between the two groups on the "new" syntheses (\bar{x} = .89 for high and -2.67 for low efficiency). The highly efficient recognised the syntheses "new" as being part of the text they read. The same result was found to be for the "old" syntheses (-2 for high & -4.56 for low). It seems less likely that high efficient summarisers, as compared to low ones, reject as "old" the material in the two sentences that were constructed from actual text information.

The subjects' verbalisation of rules of summarisation was analysed as against the rules of summarisation developed by Brown, Compione and Day (1981). There was no difference between the two groups on deletion of trivia rule. They differed, however, significantly on the rules of redundancy, substitution of items and actions, and selection of topic sentences. None of the subjects mentioned the invention rule despite the fact that some have actually done so in their summary of the text (6

out of the 11 subjects who included all main ideas in their summary used the invention rule).

This study shows that there was variation in summary among undergraduates. High efficient summarisers included more of the important ideas in their summary than did the low efficient ones. This difference was also clear in the verbalisation of summary strategy. When it comes to recognition performance, one gets a picture of understanding and remembering patterns for high and low efficient groups. It appears that high efficient summarisers process and store information more efficiently (Garner, 1982).

6.5.2 TRAINING SUMMARISATION

If the ability to provide an adequate summary is a useful tool for understanding and studying texts (Kintsch and Van Dijk, 1978; Brown & Day, 1983, Day, 1980), then training learners in summarisation would be a useful way to help their comprehension of text. This is very much related to strategy and strategy training.

There are three possible ways of training strategies (Brown, Compione and Day, 1981)

- 1) Blind Strategy: students are told what to do without their active participation or being told why it is so;
- 2) Informed training: students are told what to do and are told about the significance of what is done to help them better learn;
- 3) Self-control training:: Students use the strategy and are encouraged to understand, employ, monitor, check and evaluate it.

Research has been done on all the three categories whether in memory, comprehension or learning. Examples for these, are the studies of advance organisers, note-taking, underlining and the like for the

first category. For the second category one can list these same strategies whereby the students are told about their usefulness in helping them to better learn. For the third category we find those studies that are known in metacognition research.

A study is here reported on summarisation as strategy and based on a strong theoretical model (Kintsch and Van Dijk, 1978) and using the above strategies together. This is done because ability to summarise is an important skill dependent on correctly identifying and concisely relating main ideas. Studies (Kintsch and Van Dijk, 1978; Day, 1980; Brown and Day, 1983) developed five rules that could be used to condense text material. These rules were deletion of trivia, deletion of redundancy, substitution of a superordinate term for a list of examples, locating topic sentences for paragraphs and inventing topic sentences for paragraphs that lack them. The last two rules involve identification of main ideas at the paragraph level. Junior college students failed to use the last two rules well when asked to summarise. To improve the junior college students summarisation skill, Day (1980) conducted a study to train college students in improving their summarisation.

Two experiments were made. In the first experiment two ability levels of junior college students received four treatments to summarise two texts. The treatments were:

- 1) Self-management: students were given general encouragement to write a good summary, to capture main ideas. They were not, however, told anything about how to achieve that;
- 2) Rules alone: students were asked to summarise and then were given a sheet containing the five rules of summarisation to help them.

3) Rules plus self-management. students were given the instructions of self-management and were also given the five rules to help them make their summaries. They were not told how they could incorporate the two.

4) Rules plus self-management integrated: this group was specifically told how they could benefit from the rules if they integrate them with self-management instructions.

In the second experiment a group of poor students were given the same treatments as above but were more explicitly trained. The hypothesis was that more explicit instruction would result in greater improvement and that better students would improve more and would require less explicit instruction to do so.

The results were as follows: two deletion rules were easy to apply and performance was nearly perfect before, during and after training. Performance on the subordination rules was very good after only minimal instruction in its use and all students regardless of ability learned to use it well. Although selection rule use was improved in all rule training conditions, the more explicit the instruction, the more students improved. Further, it took two days of training and practice for students to show large gains; even then performance on the selection rule was not as good as performance on superordination. Average writers were more adept at selection rule use but all students seemed to try. Finally, the invention rule was very difficult for all subjects. Training in its use was helpful but students required extensive training and practice before they could use it consistently. As with the selection rule, average and poor writers might start out at the same level, but better students tended to benefit more from training (Day,

1980).

This study (Day, 1980) showed that it was possible to improve summarising abilities of junior college students. Straightforward training in the specific strategies needed for problem solution can lead to better performance, as it did in the rules alone condition (for deletion and ordination). However, on difficult concepts and with slower learning students, explicit training in strategies for accomplishing the task coupled with routines to oversee the successful application of those strategies were clearly the best approach.

It is apparent then that if one wants to understand how people summarise texts, then one must focus on the selection and invention rules. These harder rules involve the recognition and restatement of main ideas and so are at the heart of summarising, studying and comprehension monitoring.

Many implications can be drawn from the studies reviewed in this chapter. First, it is necessary to explicitly spell out main idea identification techniques and instil them in pupils (Garner, 1984). Secondly, pupils must be trained in the ways of selecting relevant clues which contribute to the identification of the main ideas of the text. Thirdly, they are to be encouraged to get used to invention techniques. The aim is to develop in them initiative-taking, self-reliance and independent thinking.

CHAPTER 7

SELF-REFLECTION: "METACOGNITION"

7.1 Definitions

Self-reflection (used interchangeably with metacognition) plays an important role in learning. The learner has to learn to examine his or her own problem solving processes and to use the information provided by such examinations to improve his or her cognitive structures. (Dörner, 1978).

Metacognition therefore, refers to the deliberate conscious control of one's own cognitive actions (Brown, 1978, 1980). Flavell (1976) includes under metacognition one's knowledge concerning one's own cognitive processes and products or anything related to them, eg. the learning-relevant properties of information or data. He stated that:

"Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective" (p.232).

Metacognition is formed of sets of knowledge, this should be taken within a framework of a theory of mind. These components are interrelated (Wellman, 1985) but consist of:

- 1- Existence: where a person is supposed to know that thoughts and internal mental states exist;
- 2.-Distinct processes: humans can engage in many cognitive processes. That is, there is a variety of distinct mental acts, and a reasonably comprehensive theory of mind must distinguish between different mental acts and capture the distinctive features of different mental processes;
3. Integration: while there are numerous possible distinctions

among different mental acts, all mental processes are also similar and related;

4. Variables: any mental performances are influenced by a number of other factors or variables.

5. Cognitive monitoring: humans are often able to "read" their mental states, or monitor their ongoing cognitive processes. Cognitive monitoring refers to abilities to accurately assess the state of information within one's own cognitive system.

7.2 METACOGNITION AND READING: Metacomprehension

Metacomprehension refers here to knowledge and control over thinking and learning activities as related to reading. There are two distinguishable but related phenomena in metacomprehension (Baker & Brown, 1984; Brown et al 1983a; Flavell, 1976):

- 1) One's knowledge about cognition; that is, the awareness of one's own resources and capabilities relative to the demands of a variety of thinking situations, and
- 2) one's conscious attempts in regulating cognition, and the self-regulatory mechanisms such as checking, planning, monitoring, testing, revising, and evaluating used by an active learner in ongoing attempts at comprehension.

Skill in metacomprehension generally demands an awareness of the interaction between person, task, strategy and the nature of material. Metacognition, therefore, can be redefined as (1) an awareness of one's level of understanding during reading and (2) the ability to exercise conscious control over cognitive actions during reading, by involving strategies to facilitate comprehension of a particular type of text (Gordon and Braun, 1985).

7.3 Research Related to Metacognition:

This section will only focus on three main areas, namely the detection of inconsistency, verbal reports and the awareness of strategies in reading of written discourse (see Wagoner, 1983 for a review).

7.3.1. Detection of Inconsistencies in Reading Studies

The studies concerned with detection of inconsistencies have demonstrated developmental differences as well as ability differences in readers.

Baker (1979) studied the ability to detect different kinds of inconsistencies when reading expository prose by college students. The inconsistencies were either in the main, ideas, details, unclear referents or inappropriate logical connectives. The results showed that confusions were detected more easily in main points than in details, that both inconsistent information and unclear referents were noted more often than were inappropriate connections, and that problem identification could be induced.

Garner (1980, 81, with Kraus, 1982) in a succession of studies, utilised the error detection paradigm but with task and presentation adaptations. Using short passages, she asked upper elementary and middle-school students to assist in editing passages and to rate them for comprehensibility. In one study (1980), some passages contained intrasentential informational inconsistencies. In a second study (1981), some passages contained similar inconsistencies while others contained non-meaning-changing polysyllabic words. Both studies yielded expected results, where the polysyllabic words were identified by poor comprehenders as interfering more with comprehension than were

intersentential inconsistencies. In a third study, Garner & Kraus (1982) found that poor comprehenders were more or less successful at finding intersentential inconsistencies and very successful with intrasentential inconsistencies.

Garner and Taylor (1982) gave children, in grades two, four and six, the intrasentential inconsistency passage and an editing task. Additionally, two sets of probing questions and specific assistance designed to aid subjects in noting inconsistencies were presented. Again, expected developmental and proficiency differences were obtained. Few readers demonstrated spontaneous awareness; attentional assistance appeared to help good comprehenders but not poor comprehenders.

Beebe (1980) using miscue analysis as the dependent measure, found evidence for spontaneous monitoring as well as for linking error detection and correction strategies to comprehension. She found spontaneous reader connections of substitution errors to be positively correlated with both a conventional comprehension measure and retelling. The similarity of results from these measures was interpreted to lend support to the premise that oral and silent reading comprehension processes are similar, and therefore that silent reading comprehension and comprehension monitoring can be investigated using oral reading comprehension.

Paris and Myers (1981) used oral reading of material containing nonsensical words and phrases to investigate the spontaneous monitoring of comprehension by good and poor fourth-grade readers. In a second similar passage, readers were prompted to underline those nonsensical words. The quantitative occurrence of spontaneous monitoring was similar for both groups although good readers were more accurate.

It appears, then, that a developmental sequence is discernible

across oral and reading problem detection studies. The reader, also, seems to monitor for consistency within the text itself. (Wagoner, 1983).

7.3.2 Verbal Reports as measure of Detection Strategy (Comprehension Monitoring)

These studies, unlike the error detection studies, take a more direct approach to readers by asking them to tell what they know about their own monitoring behaviour. They take two forms; protocol analysis and interview

7.3.2.1 The Protocol Analysis consists of asking readers to read passages aloud. They stop at frequent pre-determined and cued points to think aloud about what was going on in their minds as they attempted to comprehend these passages (Wagoner, 1983).

The historical studies were conducted but were not using the terms "comprehension monitoring". They were interested in strategies. The first study (Smith, 1967) demonstrated that good readers showed more awareness of processes which made greater use of specific strategies such as reading, relating ideas, and reviewing responses than did poor readers. The second study (Olshavsky, 1976-77) looked at comprehension strategies in tenth-grade good and poor readers to identify and solve problems in comprehension. Analysing the protocols, Olshavsky found two kinds of strategies used by readers which seemed to be related to problems in comprehension. Problem identification was observed at both word and clause levels. Problem-solving was the second strategy used to describe various comprehension strategies at word, clause, and story-levels. Ten strategies were identified. These ten strategies were grouped under three levels. At word level, three strategies were

identified, namely, use of context, synonym substitution and stated failure to understand word. Strategies, at clause level, were six and were as follows: rereading, inference, addition of information, personal identification, hypothesis, and stated failure to understand clause. Lastly, at the story level, the strategy of use of information about the story was identified by analysing reading within Newell and Simon's (1972) theoretical framework and methodology. These strategies were said to provide new information in reading in two ways. Firstly, the study showed that readers used strategies; second, the types of strategies identified supported the theoretical position that reading is a problem solving. A reader with given abilities and goal of comprehending identifies problems and applies strategies to solve these problems. The types of strategies do not change with the situation, but the frequency of use of strategies does change (Olshavsky, 1976-77).

This paradigm was replicated (Olshavsky, 1978) with eleventh grades using texts increasing in difficulty. The results showed that only a limited number of the ten identified strategies were being used as the texts become more and more difficult. This was interpreted that text comprehension does not necessarily need all comprehension strategies.

Hare and Pullian (1980) used Olshavsky's paradigm with a larger sample of college students to detect subjects' awareness of reading comprehension and their consciousness of compensatory strategies. Reading achievement seemed to be predictable by four variables; namely, reading for meaning, rereading, selectively reading, and adjusting reading speed. They concluded that this self-report retrospective paradigm was useful, that the existence of a causal link between metacognitions about reading behaviours and reading behaviour itself was

supported and that readers who read more consciously and actively read better than readers who do not.

Prior knowledge seems to play an important role in determining reading problems and strategies, also the quantity of comprehension monitoring comments and the number of strategies used (Hare, 1981)

Despite the problems and difficulties related to verbal reports, this line of study throws some light on the understanding of people's use of strategies and their awareness of their usefulness in comprehension of texts (Ericsson and Simon, 1980).

7.3.2.2. Interview Data:

As the protocol analysis data, the interview studies tend to identify the readers' awareness of metacognitive aspects of reading and their use of strategies to achieve comprehension. Usually the interview was a separate phase of study which also included a reading task.

Myers and Paris (1978) used a conversational scripted interview inquiring into second and sixth-grade students' awareness of certain person, task and strategy variables which relate to metacognitive aspects of reading and use of strategies intended to restore comprehension. At the word level, younger readers said they relied more on sounding out, while older readers indicated greater use of the dictionary. At sentence and passage levels, sixth-grade students were able to suggest more strategies for resolving comprehension failures than were second-grade students.

Canney and Winograd (1979) found that older and better comprehenders gave more "meaning-oriented" responses to metacognitive questions about reading than did younger and poorer comprehenders. Meaning-oriented responses could be divided into word, discourse and beyond text responses. Good comprehenders were far more likely to imply

that reading involves thinking beyond the text than were poor comprehenders.

Poor and good upper-elementary readers seem to be different at recognising required strategies for proficient reading as well as their awareness of their level of reading comprehension (Thomas, 1980). An eight-item interview was used to examine seventh-grade good and poor comprehender's awareness of comprehension difficulty and their knowledge of strategies for comprehension. The results showed a difference between good and poor readers in meaning-oriented responses. Good comprehenders' comments focussed on meaning and overall comprehension, while poor readers' comments reflected concerns with decoding, understanding of words and oral fluency. This suggests that good and poor comprehenders use different criteria in comprehension monitoring.

The problem that faces the credibility of the results of verbal data consists of asking of information from young children that might not be well understood (Nisbett and Wilson, 1977). However, self-report studies' contribution is that they have aided in the identification of specific monitoring strategies used by readers which need further investigation (Wagoner, 1983). This is resolved by studies dealing with monitoring strategies.

7.3.3 MONITORING STRATEGIES:

These are studies where learners use strategies that help in the comprehension of a text; that is the use of compensatory comprehension strategies. The possible factors that can be used as problems to involve those strategies are things such as internal consistency or external consistency of a passage (Olshavsky, 1976-77), hierarchical organisation of a passage to prerequisite target and other information

(Alessi et al, 1979), close task (Di Vesta et al, 1979) and goal orientation (Rothkopf and Billington, 1979).

Raphael et al (1981) explored the relationship between comprehension and comprehension monitoring under varying task conditions of word frequency, prior knowledge, and text structure. They found that, in general, these factors affected both measures similarly. Good readers demonstrated better comprehension than did poor readers. Poor readers were affected more negatively by poor text structure than were good readers. Raphael et al concluded that comprehension and metacomprehension overlap.

In a series of studies investigating students' use of specific comprehension monitoring strategies, Garner and Reis (1981) developed a segmented story task to answer certain questions. In addition to the students' responses to the questions, non-verbal monitoring behaviours, such as hesitations, facial distortions etc... were also coded. Findings indicated that good comprehenders in grades six, seven and eight all demonstrated monitoring behaviour but that only the oldest group used the look-back strategy successfully, even though all students had been instructed to look back as needed.

Garner and Alexander (1982) used a written protocol analysis of the undergraduates' reflections on a reading task to ascertain and evaluate the students' spontaneous utilization of a question-predicting strategy. Half of the subjects did verbalise a question-formulated strategy, or a recall question; they significantly outperformed subjects who did not verbalise such a strategy. Eight other strategies were verbalised, namely, 1) focussing on detail; 2) personalising; 3) adjusting pace; 4) reading affectively; 5) reading for gist; 6) reacting to structure or style; 7) rereading and 8) using pictures or captions. Among all these

strategies, only the question-formulation strategy positively differentiated groups of subjects. Some strategies such as reading for gist and adjusting pace were negatively related to performance.

Garner and Alexander (1982) presented the same subjects, in the study above, with text based recall questions for which half were given an explicit criteria for comprehension, particularly for classroom practice in the area of studying.

In summary, studies investigating strategy use show effective comprehension and monitoring strategies to be goal-based and highly active (Hickman, 1977, Garner & Alexander, 1981). Many strategies are available to readers and individual learning style strongly influences that person's strategy use (Rothkopf and Billington, 1979). Useful strategies were detected such as rereading (Alessi et al, 1979; Garner, 1984; Garner and Reis, 1981), and goal determination (Garner & Alexander, 1981; Hickman, 1977). Developmental and proficiency differences appear not only in knowledge about strategic behaviours (Myers & Paris, 1978; Olshavsky, 1976-77) but in the kinds of behaviours reported (Canney & Winograd, 1979; Garner & Kraus, 1982) and in the apparent maturity of strategies used (Di Vesta et al, 1979; Garner and Alexander, 1982). If metacomprehension is existent, and that is what the available evidence suggests, and can be expressed by most good comprehenders and, to some extent, poor ones, it would then be feasible to think of the possibility of training subjects in metacognition, in general, and metacomprehension in particular. Before embarking on training metacomprehension, discussion of self-questioning becomes necessary since asking questions is part of the strategy awareness process.

7.4 Self-Questioning as Related to Metacomprehension:

There are three theoretical perspectives from which self-questioning has developed. These are active processing, metacognition and schema approaches which are all parts of the cognitive theory tradition.

7.4.1 Active processing:

This assumes that the learners are active comprehenders and independent thinkers. Hence, they generate questions that shape, focus, and guide their thinking in their reading (Hunkins, 1976; Singer, 1978; Tinsley, 1973). Self-questioning, then, is seen to have a crucial role in students' active processing of given materials.

The research, however, lacks conceptual clarity regarding students' active processing of prose. The specifically neglected question is what kinds of psychological processes are students engaged in when it is thought they are actively processing? It is logical to assume that different self-questions may elicit and mobilise different kinds of psychological processes (Wong, 1985)

7.4.2 Metacognitive theory:

Metacognition plays a great role in efficient reading and effective studying (Brown, 1980). This theory plays a great role in the designing of current instructional studies. Specifically, this theoretical approach has highlighted the importance of strategy maintenance and transfer and the inclusion of metacognitive supplements in training (Brown et al, 1983a; Palisicsar, 1982).

Applying the metacognitive theory to self-questioning instructional research entails two instructional implications: a) teaching students to be sensitive to important parts of the text by asking questions such as, what is the main idea in this paragraph? Can

the important points in the paragraph be summarised? b) Teaching students to monitor their state of reading comprehension by asking questions such as, is there anything I do not understand in this paragraph? This is designed to increase awareness of students when they encounter reading comprehension difficulty. (See Brown et al 1983a; Palincsar, 1982; Sternberg 1982).

7.4.3 Schema Theory

The focus of this theory is on how the reader's prior knowledge influences the understanding of the text (Bartlett, 1932, Adam & Collins, 1979). Many studies have shown that readers' prior knowledge governs the interpretations of what they read (Adam and Collins, 1979; Anderson et al 1976; Anderson 1977; Anderson et al. 1977; Bartlett, 1932).

Clearly, then with the lack of appropriate prior knowledge one cannot activate one's schema to ask questions if one is not an active learner or aware of one's strategies in comprehension. One cannot be aware of one's comprehension if one does not actively call on background knowledge (schema) or does not possess it.

7.5 TRAINING IN METACOMPREHENSION

What does reading comprehension actually involve? There are many situations where students must understand what they read when faced with many comprehension tasks. All types of reading, except pleasure reading perhaps, demand a great deal of effort coupled with strategic ingenuity (Brown and Palincsar, 1985)

Learners must simultaneously concentrate on the material they are reading and on themselves as learners, checking to see if the mental activities engaged in are resulting in learning. Effective

comprehension strategies are those that serve this dual function (Collins & Smith, 1980). One's comprehension could suffer from lack of activating prior knowledge through appropriate self-questions to aid the processing of prose.

To recapitulate, the three approaches look at self-questioning as follows: The active learning model compares between the questions that are generated by learners and those that are generated by teachers. The metacognitive model focusses on the learner's awareness and self-monitoring instruction. The schema approach focusses on activating students' relevant prior knowledge. All these, however, aim at a better comprehension of the text (better learning in general). They should be looked at as complementary. One can argue that they are interlinked and whenever one is called for, that would necessitate the presence of the other(s).

7.5.1 Reciprocal Teaching of Comprehension Monitoring Activities (Palincsar & Brown 1983)

This study used a reciprocal teaching method incorporating four commonly used comprehension enhancing activities, namely, summarising, questioning, clarifying, and predicting. If these activities are engaged in while reading, they help enhance comprehension and give the student the opportunity to check whether comprehension is occurring. That is the student can be both comprehension-fostered and made to monitor his or her own activities if the method is properly used.

This study did the following:

- 1) trained the students in skills and gave them practice in a form of explicit instructions;
- 2) students were all the time reminded to engage in these activities while reading;

- 3) students were reminded that these activities are to help monitor and enhance comprehension; and to monitor the level of comprehension (Brown and Palincsar, 1985; Brown et al, 1984; Palincsar & Brown, 1983).

It is these comprehension-fostering and monitoring strategies that are to be reported. So to obtain academic improvement, the following are needed:

- 1) The detailed specification of the processes underlying adequate performance and correspondingly detailed task analysis for an instructionally relevant activity. (Resnick & Glaser, 1976).
- 2) Adequate diagnosis of the student (Brown et al, 1983a; Klahr & Seigler, 1978);
- 3) Clear criteria of success should include factors such as interpretability, reliability, durability, and transferability of any effects of the intervention (Brown and Compione, 1981). The research to be reported below recognises all these factors and incorporates them in a package.
- 4) They are also told that they should engage in them while reading for academic purposes. This is related to awareness of training.

A reciprocal teaching method was opted for to form the package to teach those activities. This package consisted of three studies. The first study focussed on comparing reciprocal procedure to locating information in improving reading comprehension. The second and third studies focussed on the reciprocal teaching. In the first study, the teaching was of individuals, in the second each two learners would teach

each other with the teacher present there to provide guidance and help and in the third, the method was applied in classrooms.

Thirteen poor comprehenders were chosen. 102 four hundred-word-passages were used. Ten questions were formulated for each passage, namely, text-explicit and text-implicit questions (according to Pearson and Johnson, 1978).

The procedure was as follows. Each day students read silently a 400-word-passage to answer 10 questions from memory. This was the base-line assessment passage.

In the intervention phase, the assessment passage was preceded by a training passage on which the investigator and the student interacted in two forms of intervention, either locating information or using reciprocal teaching.

In the reciprocal teaching intervention, the students were told about the four activities they were to engage in. If the text was new, they were prompted to activate all knowledge about it. When the passage was read, the student was asked to recall and state the topic. Then the teacher asked the student to teach the paragraph. So the teacher and the students took turns until the text was read. Both would read silently. Then either the teacher or the student (in the second phase two students took turns in teaching whilst the teacher provided guidance) asked a question about what was read, summarised it and offered predictions and asked for clarification when appropriate.

The "real" teacher helps students in activities through:

-prompting, eg. what question did you think about?

-instruction eg. remember a summary is a short version of the information read.

-modifying the activity, eg. if you find it difficult to ask

question, summarise first.

Throughout the intervention, the students were explicitly told that these activities were general strategies to help them understand better as they read and that they should try to do something like this when they read silently. It was pointed out that being able to say in your own words what one has just read, and being able to guess what the questions will be on a text, are sure ways of testing oneself as to whether one has understood.

Maintenance followed immediately a day after the intervention to see whether these activities were maintained. Students in this study showed a dramatic improvement in their ability to answer comprehension questions on independently read texts. This improvement was durable after six months. It also tended to be generalised to the classroom setting. In addition, qualitative improvement in the students' dialogue reflected their increasing tendency to concentrate on questions and summaries of the main ideas.

The reciprocal teaching procedure was a powerful intervention method for improving comprehension, whilst locating information was a simpler procedure to implement and was superior to no intervention despite the absence of specific explicit instruction on skills which students might actively engage in while reading.

The second study, replicated the first concentrating only on reciprocal teaching. It differed from the first in the following:

- a) only the reciprocal teaching training was given;
- b) a criterion level of 70% correct on four out of five consecutive days was established.
- c) students received explicit (graphed) knowledge of results;

d) tests of transfer were included.

The activities on which the reciprocal teaching concentrated were:

1) Summarising main ideas: this was a simplified version of the study of Brown and Day (1983) and dealt with the students' use of various macrorules (Kintsch & Van Dijk, 1978) for condensing texts.

2) Question predicting: the ability to generate important and clear questions was a skill which received considerable focus during training. To assess the accuracy with which students could identify and construct "teacher-like" questions, students were given four randomly assigned passages, two prior to and two following the study. They were asked to predict and write ten questions that a classroom teacher might ask if testing the students' knowledge of the passage. The passages were taken from material written at seventh-grade level (Fry, 1977)

3) Detecting incongruencies: One popular index of comprehension monitoring is the ability to detect errors or anomalies in text (Baker & Anderson, 1981; Garner, 1980; Harris et al, 1981; Markman, 1977; 1979). The students were encouraged and prompted to see whether the text formed consistent meanings and ideas or contained any incongruencies that they could detect and, if possible, give reasons why they thought so.

4) Rating thematic importance: Four passages prepared for the Brown and Smiley studies (1977; 1978) and selected as measures of sensitivity to main idea and detail information were randomly administered to each student. Two were administered before the intervention and two after the intervention. The students were told that the stories were to be rewritten for the purpose of fitting them into tiny doll house books and that they were to choose only the most important lines.

The students diagnosed and experiencing problems with reading

comprehension improved considerably as a result of taking part in the reciprocal teaching sessions. All students reached criterion in twelve days. All students maintained their levels well.

In addition to the increase on the daily comprehension measures, the students improved their percentile ranking in the classroom, gaining an average of 37 percentile points. The quantitative improvement in the ability to answer comprehension questions on texts read in a variety of settings was accompanied by a qualitative improvement in the students' dialogue. Main idea statements and summaries became predominant. Unclear, incomplete or detailed responses dropped out.

There was also transfer evidence. Reliable improvement was found in the ability to use condensation rules for summarising, the ability to predict questions that a teacher might ask concerning a text segment and in the ability to detect incongruous sentences embedded in prose passages.

In study three, the reciprocal teaching procedure was applied in real classroom situations using the same procedures as in study 2. The results of study three were similar to those in study 2. The effect of the reciprocal teaching intervention was reliable, durable, and transfer to tasks other than training vehicle.

To sum up, using Palinscar and Brown's (1983, p54) words, it can be said:

"From these studies it can be claimed that the direct instruction of skills of comprehension, monitoring, coupled with the subjects' understanding of the reasons why these activities are necessary and work, resulted in the impressive performance reported above".

CHAPTER 8DERIVING A PRACTICAL MODEL FOR TEACHING COOMPREHENSION8.1 Characteristics of the Model:

A fundamental assumption guiding the theoretical formulation of this research is that a strong distinction must be drawn between a model and a theory. A theory purports to describe relationships existing in reality independently of the thinker. This is to say, the theory aims at what linguists describe as "God's truth". Such theories must be subjected to rigorous demonstration of their validity. It follows that a theoretical pronouncement relating to elements of reality is acceptable if and only if the link can be empirically demonstrated. The need for empirical justification, therefore, rests on the peculiar characteristic of the theory, i.e. the fact that a theory is intended to describe reality as it is independent of the thinker. Other characteristics of a theory are well known and will not concern us here as they are not germane to the distinction between a theory and model. They include such attributes as testability and falsability, ability to generate predictions, generalisability and ability to tie together apparently unrelated observations. (Snow, 1973).

More relevant to our concern is the fact that models do not purport to describe reality as it is. Heuristic models are devices that help us to conceptualise complex phenomena by relating them to some well known phenomenon. All such models are based on a theoretical metaphor. The metaphor declares that the phenomenon under study is better conceptualised "as if" it were some better known relationship. An example would be "teaching" as if "lion taming". This model of teaching conjures up an image of teaching which is teacher led authoritarian,

harsh and offensive on the part of the teacher. It has no room for learning initiative on the part of the learner. It seeks to identify and eradicate at an early stage the first signs of independent thinking. It seeks uniformity and high predictability of behaviour leaving the learner with a narrow scope for operation and minimises exploration. It places fairly stringent limits on class size and so on. All of this and more can be immediately deduced from the five-word-phrase "teaching as if lion taming". The sheer communicative power of such a metaphor allows the reader to fill in unspoken relationships and apply them to the context of teaching with no other input of information. It also provides the reader with a fairly clear guidance for action imparting a criterion of what is acceptable and what is non-acceptable behaviour.

In the same way a different constellation of meaningful relations, criteria, behavioural patterns and acceptable limits would be imparted if the model was "teaching as if mother-child relationship".

The essential characteristics of a model are the existence of a known metaphor; the lack of any claim to describing reality as it is; the willingness to be jettisoned when its usefulness is outlived; its ability to clarify the conceptualisation of complex phenomena; that usefulness is the main test of its acceptability; that it does not require empirical testing of its metaphor since the metaphor does not purport to be true; that the implied relationships resulting from the metaphor can and should be supported by empirical observation controlled or uncontrolled, and that the origin of the metaphor is irrelevant to its usefulness.

A number of important applications follow from this distinction. Since a model is dependent on its usefulness, then it can inform action

before its empirical validation provided that some feedback mechanism is in place as a monitor of the effectiveness of whatever action stems from the model. It is with this in mind that a multifaceted model for teaching comprehension was devised. Before describing the model it would be useful to summarise positive suggestions (whatever practical suggestions that come from the literature review).

8.2 Summary of Recommendations from Literature:

8.2.1 Elaboration

1. The more elaborations a learner makes or is induced to make about an idea, the more likely s/he is to remember it;
2. For elaboration to be effective, it must be good in quality;
3. The quality of elaboration depends on its precision in clarifying the significance of the text i.e. it should be relevant.
4. Questions before, during, and after reading can be used to improve the quality and precision of elaboration;
5. Training in the proper use of self-generated questions can improve comprehension.
6. Elaborations by inferences have been shown to improve comprehension.
7. Inferences or reality testing can improve with training;
8. Schema development and application improve comprehension;
9. Schema application is achieved when the learner builds a relationship between the text and his/her knowledge or experience.
10. Comprehension requires a mental activity on the part of the learner.
11. Among the activities known to improve comprehension are the construction of analogies, summaries and mental pictures.

8.2.2 Summarisation:

1. Usefulness of summaries is related to their perceived importance;
2. Summaries are, therefore, better used as study techniques rather than

mere advance organisers;

3. It is felt that the processes of making a summary simulate those of comprehending;

4. Training in summary writing, therefore, should generalise to comprehension tasks;

5. Four identifiable rules for comprehending can be isolated and practised independently or together. These are deletion, generalisation, selection and construction.

6. Identifiable weaknesses in any of these rules can be given remedial support.

8.2.3. Self-reflection

1. This may be the most important ingredient in the development of an active decision making function during learning. This is variously described as self-reflection, metacognition and executive cognitive function.

2. Training in self-reflection is rewarding;

3. Training in relating and integrating different aspects of cognition, e.g. memory understanding and imagination, has been shown to be effective.

4. Specific strategies for dealing with attention, personalising of information, pacing of tasks, extraction of gist, rereading, using captions and pictures have all been shown to be useful.

5. The 'teach-back' technique involving reciprocal teaching in reality or in imagination improves comprehension.

8.3 The Multifaceted Model:

8.3.1 Guideline of the Model

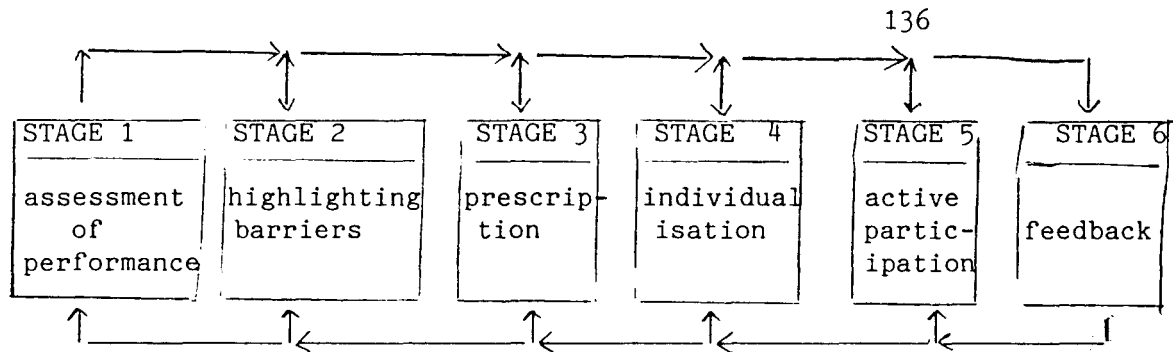
Combining the knowledge gleaned from about the cultural and

contextual background in which the schools operate with these research recommendations, it is possible to develop a heuristic model for teaching comprehension. The guidelines for constructing such a model are:

1. That a model must build on existing strengths in the current system;
2. Should make use of advances in knowledge of learning and schooling;
3. It must be acceptable to both those whose job it is to implement it and to those who have to learn from it;
4. Where there is a clash between the latest research findings and cultural or contextual acceptability, the latter takes precedence
5. There should be prescribed criteria for the evaluation of the usefulness of the model.

In brief, the multifaceted method starts with a stepwise procedure which first establishes the learner's level of performance; then, secondly it identifies barriers to performance; then, thirdly, with the aid of the current theories, it prescribes effective procedures for the improvement of understanding. Fourthly, allowance could be made for the procedures to be partly adapted to the particular needs of pupils and context since, in the course of time and depending on the size of the group, the teacher can develop some awareness of such needs. Then, fifthly, active participation is encouraged through appropriate exercises. Sixthly, feedback is given from observations during active participation which allows correctives at two levels; at the level of the learners' endeavours, i.e. the teacher advises the learner about what he or she is doing wrong; and at the level of prescription, which occurs at stage three, i.e. revaluation of the best techniques for the learner is made.

Thus, this six-tier procedure can be represented schematically:



8.3.2 Stages of the Model:

Stage 1: To implement this stage, teachers were required to combine past knowledge of their pupils with new insight obtained from their training. The procedure was as follows:

- a) each pupil read a suitable text, paragraph by paragraph.
- b) teachers checked understanding after each paragraph.

Stage 2: Teachers noted presence, absence and relevance of elaboration techniques, i.e. analogies, illustrations, relation of information to experience, mental images etc.

Stage 3: In this stage, teachers concerned themselves to work out the most effective programme for the particular problems a learner is experiencing. In most cases the barriers to learning will be more than one if not many. Therefore, an evaluation of the relative importance of each barrier and a judgement about sequencing of solutions must be made;

Stage 4: Here the prescription is tailored to the individual learner. It is only at this point that the teacher is able to work out the best examples of elaboration, question-asking, summarising, etc., that should be applied to fit the individual pupils' cognitive structure.

Stage 5 : Here children are made to actively participate in the learning process through the following steps:

- a) children are encouraged to apply elaboration by drawing analogies and finding examples from life experiences.
- b) teacher probes how particular understanding example or analogy is

finding examples from life experiences.

b) teacher probes how particular understanding example or analogy is considered right, relevant or helpful

c) children summarise by giving gist of text applying rules of summarising by giving examples of main ideas of text.

d) Pupils are encouraged to ask questions to make them aware of their learning and comprehension processes.

Stage 6: This stage is like a revision stage. Children are given feedback through the questions and discussions that their teacher and other pupils engage in. When a pupil gives an answer either the teacher asks why or how this is the case, or some other pupils agree or disagree with the answer. This in itself provides a feedback to the pupil. The teacher also gets his feedback from stages 4 and 5 where the answers and participation of pupils show him whether stages 1 to 3 are well founded. Otherwise he has to go back and redress his programme to fit his pupils either to lower or to improve his assessment, diagnosis and prescription stages. If those are not well planned and applied, stages 4 and 5 may not properly take place. Hence the programme will not produce its effect of improving comprehension.

CHAPTER 9

METHODOLOGY9.1 Purpose:

This study was aimed at improving reading comprehension in three Algerian middle schools. Accordingly, a programme was designed combining three different techniques known to have been experimentally tested and to be theoretically sound. These consisted of training in elaboration techniques (Bransford et al, 1982; Linden, 1979; Wittrock et al 1979), summarisation skills (Day et al, 1983) and self-reflection or meta-comprehension (Brown et al 1983a & 84).

This investigation began with an analysis of the problems of falling standards in the Algerian system. It was then apparent that many contributing factors could be identified as barriers to efficient learning in the Algerian schools. A discussion was made of the influences which were the sequels of the transition from a colonial system to a modern science orientated system with respect for its Islamic and other cultural traditions. Mention was also made of factors like poor quality of staff and teacher training; a unified and inflexible lesson plan adopted throughout the country; an emphasis in the classroom on the surface tasks involving low risks and low levels of ambiguity for the learners and such socio-economic influences as parental illiteracy.

The conclusion gathered from this analysis was that the problem would best be tackled by helping to update and improve the teaching methods so that direct attempts can be made in the classroom to show

pupils how to comprehend. This decision concentrating on teaching comprehension, is partly justified on the basis of the needs observed in the country and partly by the researcher's own interest.

The teaching of comprehension from text was singled out, therefore, as the major focus of this study which used a multifaceted method of teaching.

A group of 123 pupils in three different schools were taught according to this method and a control group of 120 pupils were taught according to the traditional method.

9.2 Subjects

243 subjects from three different schools participated in the study. The three schools were selected from the same educational and administrative district of the South Eastern Region of Algeria. The schools differed in the size of their population. The biggest school had a population of 1800 pupils, the second 1200 pupils and the third 980 pupils.

9.2.1 The age of pupils ranged from 13 to 17 years (See table 1 below). The average age was 14½ years. There were very few at the extreme ages of 13 and 17. Only 10 pupils (4.12%) in the whole sample (5 in school 1, none in school 2, and 5 in school 3) reached the age of 17. 12 pupils (4.94%) belonged to the youngest age of 13. Those who were 17 should really have been at the end of middle school. This means that they could well have entered school late, say, at the age of 8 or have repeated some classes at least twice. Those who were born in 1970 could have repeated a class or entered school at the age of 7. Those born in 1971 and 1972, especially the latter, are those who entered school at the normal age of 6 and had not repeated any class. The youngest age of 13 were those who entered school a year earlier than the normal age

entry.

TABLE 9.1 Distribution of population in experimental and control groups according to age.

SCHOOLS	1		2		3		TOTAL
AGE (YEARS)	EXP	CONT	E	C	E	C	
13	1	0	0	1	5	5	12
14	13	21	39	24	17	22	136
15	13	07	3	12	10	7	52
16	10	8	1	4	6	4	33
17	2	3	0	0	3	2	10
TOTAL	39	39	43	41	41	40	243

9.2.2 As to the sex of the subjects, the participating population consisted of 126 (51.85%) males and 117 (48.15%) females. They were distributed as follows (see table 9.2). In schools one and three (experimental group only), there were more males as compared to females. However, in schools two and three (control group only), the number of females was higher than that of males.

TABLE 9.2 Distribution of sample according to gender.

SCHOOLS	1		2		3		TOTAL
	EXP	CONT	E	C	E	C	
MALE	25	24	17	18	23	19	126
FEMALE	14	15	26	23	18	21	117
TOTAL	39	39	43	41	41	40	243

The number of males or females in the multifaceted and traditional methods were fairly well balanced. For males it was 65 to 61 and for females it was 58 to 59 for multifaceted and traditional methods respectively. (see table 9.3)

TABLE 9.3 Distribution of pupils' sex across methods.

SEX/METHOD	MULTIFACETED	TRADITIONAL	TOTAL
MALE	65	61	126
FEMALE	58	59	117
TOTAL	123	120	243

9.2.3. The ages of the population as related to sex and methods were distributed as in table 9.4 below.

TABLE 9.4 Pupils' age and sex distribution according to methods

SCHOOL	AGE	13	14	15	16	17	TOTAL
1	METHOD SEX						
	M	0	10	6	8	1	25
	MFM						
	F	1	3	7	2	1	14

M	0	12	4	5	3	24	
2	TM	0	9	3	3	0	15
	M	0	16	0	1	0	17
	MFM						
	F	0	23	3	0	0	26

M	0	11	6	1	0	18	
3	TM	1	13	6	3	0	23
	M	3	8	6	3	3	23
	MFM						
	F	2	9	4	3	0	18

M	2	12	2	3	0	19	
TOTAL	TM	3	10	5	1	2	21
		12	136	52	33	10	243

9.3 Sampling System

The inspector of the language curriculum was approached. The research rationale and sampling systems were discussed with him. He assisted in obtaining the samples by randomly pulling a number of 3 schools out of 8 in the region. This was done by writing the names of the schools on pieces of paper from which three were picked out. These chosen three were taken as those schools participating in the sample and as a random selection from the total in the district.

It was agreed with the inspector, after a discussion of the research proposal and after inspecting the material and techniques to be used, that the level of class to be chosen should be the second class of the middle school system. The level of the material was just right for them, they were not fresh from the primary, and even more importantly, they were not expected to take the final exams of the middle school that year. These exams are to decide entry to the secondary school or to take up employment.

Next the inspector assisted in the selection of the classes to be included in the experiment. He provided the list of teachers of the Arabic language, because reading comprehension is included in that curriculum. Their names were written down. Three teachers were randomly selected for each school. There was a meeting of teachers at which three were randomly selected from each school.

Each of the selected teachers had at least two classes at the selected level. The class with its teacher was randomly selected as part of the experimental or control groups. The teachers were also randomly allocated to either the experimental class or control one. In all, six teachers were selected, three to experimental and three to control.

The experimental and control groups, then, consisted each of three classes in three different schools. Thus, we have an experimental group matched with its control in each school (see table 9.5). Each selected class, in both experimental and control groups, was taught by its usual teacher.

TABLE 9.5 Distribution of the population across methods and schools.

SCHOOL/METHOD	MULTIFACETED	TRADITIONAL	TOTAL
1	39	39	78
2	43	41	84
3	41	40	81
TOTAL	123	120	243

9.4 Material

Eight texts were selected for the purpose of this study (see Appendix III). Three were chosen from "O Level texts" and were then translated into Arabic by the researcher and approved by judges including, a professional translator, the inspector of Arabic and teachers in the region where the study took place. The remaining five texts were selected from "Reading and texts" (1984-1985) produced by the "National Educational Institute" to cover the curriculum for the Arabic language. The Institute is responsible for programme planning and development in Algiers. The programme was meant for the level under study. The texts contained three to four paragraphs and an average of 350 words. (See Appendix XIV)

9.5 Procedure:

The procedure was divided in two separate sections. The first dealt with the training of both sets of teachers. The experimental teachers received training in the multifaceted method, while the control teachers were given the same time with the experimenter but received general instruction on the importance of teaching for comprehension and

were referred to the inspectors' handbook which provides suggestions for the teaching of reading comprehension.

The second dealt with the actual application of the intervention programme. Each teacher in the two methods across the three schools was to teach the selected texts. Tests on some texts were introduced to pupils.

The procedure is presented in a stepwise form in tables 9.6 and 9.7 respectively.

TABLE 9.6 Plan of Procedure for Selection of Samples and Training of Teachers.

EVENTS	EXPERIMENTAL GROUP	CONTROL
1.	Aims of the study explained and groups divided 1 week interval	same as multifaceted method. 1 week interval
2.	A talk about the multifaceted method, its rationale and procedures, and a demonstration lesson. 2 day interval	talk about teaching for comprehension and its importance; no techniques were suggested.
3.	Trial exercise applying the multifaceted method (lesson plans given to help in preparation). The classes used were not the ones included in the final study. 2 day interval	Trial exercise in teaching for comprehension using own method. Classes used not included in the final study.
4.	Trial exercise applying the multifaceted method (lesson plans given to help in preparation). The classes used were not the ones included in the final study. 2 day interval	Trial exercise in teaching for comprehension using own method. Classes used not included in the final study.

5. Trial exercise applying the multi-faceted method (lesson plans given to help in preparation). The classes used were not the ones included in the final study.	Trial exercise in teaching for comprehension using own method. Classes used not included in the final study.
2 day interval	
6. Meeting with teachers in which: a) researcher gave a talk to remind of the purpose and method of the experiment. b) drawing up the research time-table c) researcher identified five passages chosen from class text-book and handed out three other passages for use in study))))) -Same as multifaceted))))))
24 hours interval	
7. Administration of teaching strategy Questionnaire	Same

The time intervals shown in Table 9.6 above designate the time lapse between events of the training programmes of teachers and preparation for the main study.

9.5.1 Comments on Events of Table 9.6: Training Teachers

Event 1 During event one teachers were called by the inspector for a meeting with the researcher. At this meeting, the latter explained the general purpose of the research. Then there was a general discussion about the running of the experiment and what each teacher had to do. Care was taken not to reveal the comparative nature of the study so that no teacher would feel that his usual method of teaching was being evaluated. Each teacher was informed that we were interested in how pupils learned from the text. What was explained was that teachers were

either to teach some texts to their pupils in their normal teaching methods or using a new method. Each teacher was then told which method he had to use on a specific occasion. Sampling was done at the meeting with the teachers and the inspector as explained earlier.

Event 2

In the second event experimental and control teachers met the experimenter separately. This meeting was dedicated to the explanation of the two methods, the rationale and the theoretical background.

a) For the experimental group, the discussion focussed on the multifaceted method, its rationale, its theoretical background and the procedure of its application. Time was allowed for discussion of the method. When teachers grasped the rationale and theory of the method a model lesson was given to them by the researcher as an example for the application of the method on a text. Then some discussion followed.

b) As for the control group, the meeting was dedicated to the discussion of the importance of teaching for comprehension. The views about comprehension, and its importance were discussed and points of view about its realisation were expressed by the teachers present. The experimenter did not suggest any specific strategies. He only suggested that, the inspectors' handbook of teaching methods might be useful. Then a volunteer teacher taught a text for comprehension for his colleagues. A discussion followed.

Event 3-5

In these events, teachers were given the chance to apply the methods on their classes. The classes they used for their training were ones that were not to participate in the study.

In the multifaceted method teachers were given lesson plans prepared

by the experimenter to help them in the preparation of their lesson and to make sure they had a general guide as to what was required to apply the method.

The control group were referred to the teacher's handbook for teaching reading comprehension for the plans of preparing lessons (Teachers' book of the National Institute of Education).

Event 6

Soon after a two week holiday, the teachers met the researcher. They were reminded of what was required and were provided with a detailed timetable showing them when and what text they were to apply and when tests were to be introduced to the pupils. Care was taken so as not to reveal to the teachers the texts on which their pupils would be tested.

The five passages that the teachers were to teach were identified (for those in class textbook) and copies of three others (not in class textbook) were handed out.

The control group were reminded, in handouts, of the importance of the teaching for comprehension and of what they should be trying to do (this was for text 2; not from the class textbook). As to the five texts from the class textbooks, they were referred to the book of lesson plans (teachers' handbook and techniques where the plans of teaching those identified texts would be found).

As for the experimental group, the experimenter prepared plans for lessons on the texts to be taught along the lines of the multifaceted method and handed them out to the teachers applying this method. It was made clear that these plans were to help them prepare the lessons for the texts on which they were to apply the multifaceted method.

Event 7

Teachers were given the Entwistle's inventory (1981) in an adapted form to identify their teaching strategies.

TABLE 9.7 Plan of Intervention Programme

EVENTS	MULTIFACETED METHOD GROUP	TRADITIONAL METHOD
0	Administration of study technique to pupils	Same as multifaceted group
1	PRETEST on text ₁	PRETEST on text ₁
	48 hour interval	
2.	First experimental teaching on text (T) 2	1st control teaching T2
	24 hour interval	
3.	TEST 1 on T2	TEST 1 on T2
	48 hour interval	
4.	Second experimental teaching on T3	2nd Control teaching on T3
	24 hour interval	
6.	Third experimental teaching on T4	3rd control teaching on T4
	24 hour interval	
7.	TEST 3 on T4	Test 3 on T4
	one week interval	
8	POSTTEST ON T5	POST TEST on T5
9.	Pupils reactions about the method. Written as a report	General discussion about reading for comprehension

Notes on Table 9.7

1. each test event encompassed multiple-choice questions on the text (35 min) and a short summary about it (25min)
2. Time intervals: this shows the time gap between a particular event and another

9.5.2 Comments on events of Section 2 (Table 9.7) intervention programmeEvent 0

0:1 The pupils were given the Entwistle's (1980) questionnaire to fill in. This was done in the classroom to ensure that any difficult statement was explained if need arose and that all questions were answered.

0:2 The teachers were handed out an adapted form of Entwistle's questionnaire to fill in. This was labelled "Questionnaire for teaching strategy". It was introduced in the same session that the Entwistle (1980) Original Questionnaire was introduced to pupils.

Event 1

All pupils who participated in the study took a pretest on test 1. This test consisted of multiple-choice comprehension questions related to the text.

Events 2,4, and 6

On all those events teachers applied their respective methods on the texts specified and in the following day all pupils were tested (events 3,5, and 7) on those texts as in event 1.

Event 8

This took place a week after event 7. All pupils took a test on a passage (text 5) that was not taught to them (as in the pretest : event 1). This was considered as a second control, the first being the

traditional method, and as a test of transfer to the use of multifaceted method.

Event 9

After eight days from event 7 pupils wrote a report about the method and what they felt about it. The control group were made to discuss reading from comprehension.

9.5.3 Application of the multifaceted Method

The experimental group received the multifaceted method. The timetable for each lesson was devised in a manner that ensures the presence of the researcher to allow him the chance of observation and to offer to give feedback to the teachers.

The lessons were all prepared in detail on each text according to the programme developed. Teachers always shared in discussions about a lesson plan before delivering the lesson to their pupils. This sharing of preparation was strictly adhered to in the programme.

The lesson in the experimental groups started with an introduction about the method as a reminder to pupils. The children then read the text, paragraph by paragraph. The children then expressed what they felt they understood as they read along. Then, they were asked how they arrived at what they had understood. Then in line with the elaboration theory the children tried to relate their understanding to their experience by drawing analogies and examples from their life experiences. The examples and analogies they gave were, according to the teachers, good indices of their pupils' understanding. Some of the main ideas were discussed afterwards between the teacher and pupils. Next the procedure consisted in the summarisation method. This occurred across the different paragraphs of the texts.

When all the paragraphs of the text were dealt with, the teacher

gave the chance to the pupils to read the passage in one go. This was the second reading. The first reading had been performed paragraph by paragraph. In the second reading, pupils were instructed to read with a view to understanding. This could be achieved, they were told, by remembering the discussions, the examples that took place while the paragraphs of the text were being dealt with. The instructions included the attempt to mentally summarise what was being read and asking oneself how understanding was achieved.

9.5.3.1. General Summary of the procedures for the Multifaceted method

The procedures can be conveniently summarised as follows:

1. cognitive reminder of procedures of multifaceted method;
2. pupils read paragraphs of the text one by one;
3. teacher checks understanding after each paragraph;
4. children apply elaboration by drawing analogies and finding examples from their life experiences;
5. teacher probes how particular understanding, example or analogy was considered right, relevant or helpful. (This was used for metacomprehension purpose).
6. application of summarisation rules by giving short summary of main gist with examples of most important ideas of paragraph/text;
7. Reading whole text by pupils at own pace and steps 3-6 reapplied but briefly.

9.5.3.2 Questions frequently used

The questions used under each of the stages of the method are listed below:

1. checking for understanding

-what did you understand from this paragraph/text?

- what is the general idea(s)?
- is there anything that is not clear?

2. Integration

- what did that remind you of?
- does drawing analogies and comparisons help?
- can you ask a question whose answer clarifies or reflects the meaning of the paragraph/text?
- can you predict what comes afterwards?

3 Interpreting

- what other interpretations can you see for this passage?
- if you were to teach this paragraph to other pupils how would you go about it?

4. Metacognitive Perception:

- How do you know that you understood?
- Do you ask yourself questions when you read?
- Does this method help you in understanding, how and why?
- Does it make comprehension for you any easier?
- would you use it and would you like your teacher to use it in other subjects? Why?

9.5.4 Application of the Traditonal Method

The control group teachers used their own methods aided by their teacher's handbook which contained plans for lessons related to the curriculum. These handbooks are devised to help teachers carry their teaching painlessly and successfully. The lesson layout is all planned and teachers are specifically told what to do, what to say, what questions to ask and so on. The lessons were prepared along the lines of those teacher handbook guides with allowances for teaching for comprehension. The lesson in the control groups started with an

introduction about the text and that what was important was its comprehension. The teacher told his pupils to read the passage silently. He then asked whether everybody had the chance to read. He then read the text loudly. Next few pupils read the text each reading a few sentences. In between, the teacher asked questions about the text such as: "what does this word mean"? "Who can explain this sentence"? and such questions that more or less tested children's knowledge. Teachers always posed direct questions relating to the content of the text.

This pattern was carried over to all the paragraphs of the text. When each paragraph was discussed, the teacher asked what the main idea of the paragraph was. Upon receiving answers then he selected one answer and wrote it on the blackboard. Then the reading by pupils was carried on as well as the discussion, until the whole text was all dealt with. The teacher reread the text aloud and gave some children the chance to read aloud. Then he asked questions about the content of the text and whether any had not understood anything. He last asked about the important ideas in the text and tried to summarise the text.

9.5.4.1. Summary of the procedures for the Traditional Method

1. cognitive reminder that the lesson was about reading for comprehension;
2. pupils read the text silently at at their own pace;
3. teacher read the text aloud.
4. Individual children read aloud. While doing so the teacher asked questions checking for comprehension.
5. text reread aloud by teacher and some pupils and general discussion

followed;

6. summary of the main ideas of the text.

9.5.4.2 Questions frequently used:

1. checking for understanding

-what did you understand from this?

-what does this sentence/word mean?

2. Integration:

-can you give examples to explain this?

9.6 Testing

9.6.1 The study technique Questionnaire

A 5-point-scale of 30 questions questionnaire developed by Entwistle (1981) was introduced to all the 24 pupils in the three schools. They were required to answer questions as quickly as they could to ensure that the answers given were their spontaneous impressions.

9.6.2 Adapted Questionnaire to Teaching methods

The above mentioned questionnaire was adapted to capture the teachers' teaching strategies. Each of the 30 constituent questions asks whether a teacher sees the statement as his duty to perform and whether he does it practically. Also teachers were asked to give their spontaneous reactions to each question by answering as quickly as they could.

9.6.3 Interviews

The general Marton (1976) interview form was used to ask 9 pupils from each class-3 from each ability level (high-medium-low)-on the basis of attainment on the pre-test results as well as the teachers' marks on the exam of previous terms.

The interview was based on the following:

i) how did you read the text?

ii) some specific questions are asked.

iii) is that typical way of study?

In between these Morton type questions and probing through the answers given, the interview which was based on information theory tried to extract the following:

- How was the pupil trying to concentrate on the text and reading through keeping attention focussed?
- How was the pupil relating ideas, coming back and asking himself-herself, what did the text talk about so far, rehearsing what was said, summarise etc.
- How did the pupils relate ideas of their own understanding? What information did they want to initiate (schema)?

9.6.4 Mutliple-choice questions on texts

The questions were based on the theory of degree of comprehension (surface-deep) (Marton & Saljo, 1976; Entwistle et al 1979, 1980). The surface questions were the ones that asked for factual information in the text. The deep level questions asked for more inferential information. These were based on Watson-Galser's (1980) critical thinking appraisal test. Their notion of critical thinking is interpreted and implemented on the questions.

The questions for each text were given to 15 judges (PhD and Master's Students from Child Development and Educational Psychology, Institute of Education) to see whether they were in line with the division deep/surface of the text as well as the Watson-Glaser test. (Appendix IV). The questions adopted were those that reached 90% agreement between judges, that is 14 out 15. However, when the one who

disagreed gave convincing reasons on why s/he disagreed, those views were taken into consideration and the question was modified.

The instruction to answer the test by the pupils was as follows:

"Here is a text, read it with concentration and attention. Try to understand all that it contains. Some questions will follow the text. There are 10 of them. Answer all the questions checking your answers against the text. Each question offers 5 alternatives. There is only one that is right. Circle the letter corresponding to the right answer" Since the number of questions asked on each passage was 10, the maximum number of marks a pupil could get was 10. Any correct answer was awarded one mark and nothing was granted to the wrong ones.

The questions were categorised as surface and deep. These categories had five questions allocated each. The maximum mark a pupil could get on either deep or surface was 5.

9.6.5 The summary writing

After answering the multiple questions children wrote a summary of the text. This usually took about 15-20 minutes.

The summaries were read by the researcher and 5 other teachers who had not participated in the study nor had their school been included. The summaries were marked qualitatively in the first instance with possibility of qualitative marking in mind. As it was found sometimes difficult to decide whether a summary was deep or surface, idea units in pupils' summaries were identified. (Borde, 1983; Fagan & Currie, 1983). It was found that those units never exceeded 9 or 10. It was also observed that both deep and surface idea units were never more than five each. It became then possible on the strength of that finding to quantitatively mark the summaries.

Each summary was divided into idea units. Then each idea was

categorised as deep or surface and awarded a mark. The maximum number of (overall) marks was ten and for either deep or surface the maximum mark was 5.

9.7 Design

The design of the experiment was 2 x 3 x 2 x 5 x 4 analysis repeated measure on the last factor (text scores). The factors included were the two methods of teaching, the three schools, the pupils' sex, ages and the texts. All were covariates with the pre-test. The independent variables were the methods, schools, sex, and age. The dependent variables were the scores on the different texts (comprehension and summary). All the analyses were done by computer using the SPSSx statistical programme (Norris, 1983).

CHAPTER 10

ANALYSIS OF RESULTS

In this chapter, the MFM is evaluated through a three-layered analysis of the results. First, statistical data are examined with a view to answering the following hypothesis: If MFM scores are superior to those of TM, then it should be construed that the MFM is effective. In fact, the statistical results have shown that the MFM significantly improved pupils' comprehension over and above that of the pupils under the TM. The second layer of analysis consists of a qualitative evaluation of the MFM. By looking at both teachers' reports and questionnaires together with pupils' reports and interviews, it is hoped to gather some useful feedback which is designed to complement the quantitative findings of the first layer. Thirdly, an assortment of other factors relating to school, age and sex is examined to find whether they have any bearing on the MFM. Results have shown that schools and age admitted of variations and differences whereas the sex factor did not show any significant effect.

10.1 Pretest Results:

Data were analysed to obtain basic parameters on comprehension, summary writing and deep and surface learning. Tables 10.11 and 10.12 provide an overview of these statistics.

TABLE 10.1.1 Shows Means and Standard Deviations of Pre-test results for Comprehension Scores: Deep, Surface, and Overall.

COMPREHENSION LEVELS	SCHOOLS	METHODS			
		MFM		TM	
		\bar{X}	SD	\bar{X}	SD
DEEP	1	1.56	0.97	1.64	1.06
	2	1.72	0.88	1.53	0.81
	3	1.68	0.93	1.52	0.75
SURFACE	1	2.21	1.08	1.92	0.98
	2	3.00	1.02	2.22	1.01
	3	2.00	1.02	2.22	1.29
OVERALL	1	3.71	1.46	3.56	1.55
	2	4.67	1.27	3.75	1.37
	3	3.68	1.47	3.75	1.69

TABLE 10.1.2 Shows Means and Standard Deviations of Pretest results for Summary Scores: Deep, Surface, and Overall.

COMPREHENSION LEVELS	METHODS				
	SCHOOLS	MFM		TM	
		\bar{X}	SD	\bar{X}	SD
DEEP	1	3.25	0.94	2.23	1.16
	2	3.04	1.07	1.75	1.07
	3	3.00	0.84	1.52	1.04
SURFACE	1	2.46	0.88	2.46	1.04
	2	2.09	1.21	2.53	0.84
	3	2.00	0.74	2.63	0.67
OVERALL	1	5.71	1.47	4.67	1.57
	2	5.11	1.22	4.29	1.01
	3	4.81	1.12	4.15	1.14

The results were presented to make easy comparison between experimental and control teaching methods as well as between the results from the three participating schools. It is worth noting again that the randomisation was done within each school so that an equivalent group would be matched against the experimental group in each school.

With such methodology, a useful step is to ascertain the effectiveness of the randomisation by comparing the pretest scores of experimental and control groups. Performance on pretest should be

equivalent within the limits of sampling error.

The comparison between the pretest performance was done separately for the comprehension and summary scores. The ANOVA analysis was used in both cases. It was analysed as a 2 x 3 x x 2 x 5 design; the first factor being the teaching method with the levels; the second being schools with three levels, the third was sex with two levels then age with 5 levels. The levels of age were categorical with 13 being the lowest and 17 the highest level.

The pretest comparisons supported the equivalence of the groups on the comprehension as a whole. In other words, the groups did not differ in the overall comprehension scores ($F= 3,304$; $df= 1,234$; $p < 0.07$). However, when the comparison was made on the deep and surface items separately the pretest showed a significant difference between the groups on the surface items ($F= 4.21$; $df= 1-234$; $p < 0.041$). Performance on the deep items supported the equivalence of groups. ($F= 0.63$; $df=1-234$; $p < 0.43$). (See appendices VI 1.3 and VI 1.2, for ANOVA Tables). The picture was therefore a complex one and required the extra precaution of a covariate analysis with the intention of removing pre-existing inequalities before proper comparison of the methods could be made.

Tables 10.1.3 and 10.1.4 illustrate the complexity of the situation. At overall comprehension scores, the pretest showed a difference in performance between schools and between different ages. Boys and girls performed similarly.

TABLE 10.1.3 ANOVA Table for Overall Comprehension. Pretest Scores only.

SOURCE OF VARIATION	SUMS OF SQUARES	DF	MEAN SQUARE	F	SIG.OF F
Meth	7.041	1	7.041	3.304	0.070
Sch	15.168	2	7.584	3.559	0.030
Sex	4.742	1	4.742	2.225	0.137
Age	23.888	4	5.972	2.803	0.027
Residual	498.630	234	2.131		
TOTAL	549.786	242	2.272		

Non-significant interactions pooled with residual variance

TABLE 10.1.4. ANOVA for Overall Summary Writing Pretest Scores:

SOURCE OF VARIATION	SUMS OF SQUARE	D.F.	MEAN SQUARE	F	SIG.OF F
Meth	43.160	1	43.160	28.000	0.000
Sch	30.518	2	15.259	9.899	0.000
Sex	0.008	1	0.008	0.005	0.944
Age	21.760	4	5.440	3.529	0.008
Residual	360.691	234	1.541		
TOTAL	446.296	242	1.844		

Non-significant interactions pooled with residual variance

When one saw that a similarly complex picture appeared for the summary writing scores (see table 10.1.4; appendices VI 2.2 and VI 2.3),

the decision to employ the covariance analysis was doubly reinforced. The analysis had also taken a detailed form for all the factors under both comprehension and summary writing.

10.2 Analysis of the Results for the Method

The analysis proceeds in line with the research questions being tackled.

10.2.1. The Effects of Quantitative data

The first research question is; "is the experimental multifaceted method more effective at improving comprehension scores than the traditional teaching methods"? Using the pretest scores as the covariate, the cumulative improvement over the teaching sessions is compared for both methods of presentation. The Mancova was carried out using the comprehension scores first and then was repeated with the summary scores as the second index of understanding. This type of analysis combines the effects of all teaching sessions into one unified influence and provides an overall assessment of the series.

The results show that the method had a highly significant role in improving the comprehension scores of the experimental group over the control group. All results are reported at statistically high levels of confidence ($F=49.698$; $df=1,197$; $p < 0.001$) (Table 10.1.5 and appendices VII.1.2 & VII.1.3)

The analysis for the summary scores confirmed the findings of the comprehension scores. The experimental group were significantly better than the control group ($F= 165.434$; $df=1,197$; $p < 0.001$) see table 10.1.6 and appendices VII.2.2 & VII.2.3

We are now in a position to answer the first question. The teaching method advocated by this approach does lead to a significant improvement for the pupils concerned.

TABLE 10.1.5 ANCOVA OVERALL COMPREHENSION SCORES

..... ANALYSIS OF VARIANCE

Tests of Significance for SCOTEXT2 using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	1089.13203	197.	5.52159		
Regression	132.40407	1	132.40407	23.95425	.000
CONSTANT	1303.38091	1	1303.38091	235.34333	.000
METH	274.76502	1	274.76502	49.59294	.000
SCH	30.35307	2	15.02654	2.71797	.061
SEX	.70303	1	.70303	.10143	.739
AGE	59.71675	4	14.92919	2.70327	.032

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.03021	.30343	12.00	574.00	.913
Hotellings	.03021	.49272	12.00	574.00	.917
Wilks	.97005	.49283	12.00	574.00	.913
Roys	.01746				

Univariate F-tests with (4,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	4.47511	467.15243	1.11378	2.36745	.47217	.753
SCOTEXT4	3.53491	404.99777	.87223	2.06344	.43372	.761
SCOTEXT5	6.29119	514.12778	1.57280	2.59367	.60571	.539

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.04312	2.94413	3.00	176.00	.034
Hotellings	.04312	2.94413	3.00	176.00	.034
Wilks	.95688	2.94413	3.00	176.00	.034
Roys	.04312				

Univariate F-tests with (1,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	3.74173	467.15243	3.74173	2.36745	1.56556	.197
SCOTEXT4	12.57797	404.99777	12.57797	2.06344	6.08324	.014
SCOTEXT5	2.30146	514.12778	2.30146	2.59367	1.07397	.303

EFFECT .. SCH BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.05211	2.10434	6.00	176.00	.052
Hotellings	.05211	2.10733	6.00	176.00	.051
Wilks	.93549	2.10703	6.00	176.00	.052
Roys	.05211				

Univariate F-tests with (2,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	5.36760	467.15243	2.68380	2.36745	1.13614	.174
SCOTEXT4	2.49122	404.99777	1.24561	2.06344	.60377	.543
SCOTEXT5	20.48231	514.12778	10.24116	2.59367	3.94406	.021

EFFECT .. METH BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01753	1.30122	3.00	176.00	.273
Hotellings	.01752	1.30120	3.00	176.00	.273
Wilks	.98247	1.30122	3.00	176.00	.273
Roys	.01753				

Univariate F-tests with (1,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	2.24786	467.15243	2.24786	2.36745	.94953	.331
SCOTEXT4	.38207	404.99777	.38207	2.06344	.18413	.661
SCOTEXT5	7.36443	514.12778	7.36443	2.59367	2.83537	.034

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.30737	67.32313	3.00	176.00	.000
Hotellings	1.03317	67.32313	3.00	176.00	.000
Wilks	.69263	67.32313	3.00	176.00	.000
Roys	.30737				

Univariate F-tests with (1,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	.00192	467.15243	.00192	2.36745	.00011	.977
SCOTEXT4	353.34797	404.99777	353.34797	2.06344	172.74163	.000
SCOTEXT5	79.10450	514.12778	79.10450	2.59367	30.46313	.000

Tests of Significance for SAMALL2 using UNIQUE Sum of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	507.40153	197	2.57565		.000
Regression	59.47595	1	59.47595	23.06260	.000
CONSTANT	1032.00235	1	1032.00235	400.51980	.000
MEAN	426.26597	1	426.26597	163.43606	.000
SEX	79.07365	1	79.07365	30.66520	.000
AGE	15.81153	1	15.81153	6.12742	.019

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. P	Hypoth. DF	Error DF	Sig. of F
Pillais	.76117	1.03331	12.00	326.00	.417
Hotelling	.36323	1.32372	12.00	326.00	.423
Wilks	.93971	1.32331	12.00	326.00	.421
Roys	.36227				

Univariate F-tests with (4,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	4.71165	242.74353	1.17791	1.22701	.31737	.575
SAMALL4	3.71772	285.57364	.92393	1.44755	.56226	.533
SAMALL5	1.16562	221.58442	.23016	1.12363	1.32165	.126

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. P	Hypoth. DF	Error DF	Sig. of F
Pillais	.32333	1.70103	3.00	176.00	.163
Hotelling	.22906	1.70103	3.00	176.00	.163
Wilks	.77562	1.70103	3.00	176.00	.163
Roys	.02533				

Univariate F-tests with (1,176) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	1.74241	242.74353	1.74241	1.22701	1.42304	.235
SAMALL4	3.72361	285.57364	3.72361	1.44755	2.57152	.110
SAMALL5	2.13511	221.58442	2.13511	1.12363	1.90523	.167

EFFECT .. SCH BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. P	Hypoth. DF	Error DF	Sig. of F
Pillais	.20867	17.10794	6.00	326.00	.000
Hotelling	.35953	11.39277	6.00	326.00	.000
Wilks	.73553	10.79238	6.00	326.00	.000
Roys	.24753				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	26.31551	242.74353	13.15776	1.22701	10.71257	.000
SAMALL4	15.54147	285.57364	7.77074	1.44755	5.37123	.004
SAMALL5	47.95512	221.58442	23.97756	1.12363	21.40144	.000

EFFECT .. MEAN BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. P	Hypoth. DF	Error DF	Sig. of F
Pillais	.18251	5.37350	3.00	176.00	.001
Hotelling	.08993	5.37350	3.00	176.00	.001
Wilks	.91749	5.37350	3.00	176.00	.001
Roys	.05251				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	4.73133	242.74353	4.73133	1.22701	3.85597	.051
SAMALL4	7.26065	285.57364	7.26065	1.44755	5.00827	.023
SAMALL5	6.92334	221.58442	6.92334	1.12363	6.17807	.014

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. P	Hypoth. DF	Error DF	Sig. of F
Pillais	.44324	53.07562	3.00	176.00	.000
Hotelling	.31233	53.07562	3.00	176.00	.000
Wilks	.55176	53.07562	3.00	176.00	.000
Roys	.44324				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	2.53911	242.74353	2.53911	1.22701	2.05264	.154
SAMALL4	177.01364	285.57364	177.01364	1.44755	122.57759	.000
SAMALL5	45.34303	221.58442	45.34303	1.12363	40.44765	.000

The next step in this research (as the second research question) is to attempt to identify which type of learning is promoted by the multifaceted method.

In principle, the method was designed to improve the pupils' performance in achieving depth of comprehension and learning. The results showed that pupils benefitted in their understanding of both deep ($F= 58.003$; $df= 1, 197$; $p < 0.001$) and surface ($F= 17.672$, $df= 1, 197$; $p < 0.001$) items. (See appendices VII.1.2 and VII.1.3). These results are, somewhat, unexpected in that they contradict the usual research findings (eg Sachs, 1967; Bendania, 1982). The normal pattern is for presentation techniques to favour either deep or surface processing. The methods which encourage the learner to go beyond the information presented and to seek to relate the incoming knowledge with past knowledge and to set it in a wider context are those methods which militate against simple focus on surface learning (Anderson, 1977; Day, 1980; Brown et al 1983a). Here, however, the multifaceted method facilitates both types of learning.

When summary writing was used, the experimental group showed higher performance on deep scores ($F= 289.227$; $df = 1,197$; $p < 0.001$) without affecting surface learning. On the latter, the experimental group did not clearly outperform the control group ($F= 1.096$; $df= 1,197$; $p < 0.296$). (See appendices VII.2.2 and VII.2.3). This pattern of results is more in keeping with traditional findings.

The Difference between the results on these two criteria measures may well be determined by the relative sensitivity of each measure to the depth of processing. Where comprehension was geared to clearly distinguish between performance on both types of items individually, the

summary writing task would not necessarily record slight differences in processing dealing with surface items. This may be explained by saying that the summary, by its nature, does not allow much for surface items which are usually disregarded.

The weight of available evidence is towards an improvement in comprehension in both deep and surface items. Although this is seen only with the comprehension test, nothing in the results of the summary scores contradicts this finding.

10.2.2 Comparison between Pretest and Posttest Scores for MFM

The results on the previous sections have shown that the pupils given the multifaceted method outperformed the control group pupils who received traditional teaching. That superiority of the experimental group was observed both on the surface and depth items.

To reinforce these results a second control was built into that design. This was the pretest-posttest approach. There were, therefore, two ways of checking the effect of the proposed method of teaching comprehension. The literature on designs varies in the support given to each of these two methods in evaluating programme effects. The strength of the approach used in this study is, in fact, that it allows both methods to be used on the same data.

Using the between group comparisons, the improvement over the control group has already been established. It now remains to compare pretest scores with the posttest ones. This is done to find out whether there is improvement in the same pupils after exposure to the multifaceted method. T-tests showed that in all aspects of comprehension and summary, the posttest results differed significantly from those of pretest (See tables 10.2.1. and 10.2.2. below, see also appendix IX).

TABLE 10.2.1 shows means and Standard deviations.

		PRETEST			POSTTEST		
		DEEP	SURFACE	OVERALL	DEEP	SURFACE	OVERALL
COMPREHENSION	\bar{X}	1.66	2.41	4.04	2.09	3.12	5.11
	SD	0.92	1.12	1.47	1.67	1.16	1.77
SUMMARY	\bar{X}	3.09	2.18	5.20	3.75	2.75	6.23
	SD	0.95	0.98	1.32	1.12	1.78	1.58

TABLE 10.2.2 shows a two-tailed t-test for comprehension and summary scores pre-post tests.

SCORES	DEEP	SURFACE	OVERALL
COMPREHENSION	2.59**	5.44***	5.50***
SUMMARY	4.92***	5.50***	5.53***

** $p < 0.01$; *** $p < 0.001$; $df = 122$ in all cases.

This within subject comparison helps to clarify the discrepancy observed when summary scores were used as a measure of change in surface processing. The results were ambiguous in that comprehension showed the improvement while the summary scores did not. Here results are unambiguous. The experimental pupils improved over the initial position

in both deep and surface items.

One interesting observation which arises from the use of the within and a between subject design is the possibility of asking about the educational meaning of the observed improvement. It is possible by comparing a control group with the experimental group to obtain statistically significant differences between them which have little or no educational impact. For example, the difference between the groups can arise because of a deterioration of the control group rather than because of an improvement in the experimental group. This is not an unusual finding in educational psychology. The significance can also arise because of slight but insignificant improvement in the experimental group coupled with slight but insignificant deterioration in the control group. The aggregate of both these positive and negative movements can result in what appears to be a significant improvement of the experimental over the control subjects.

The design adopted in this study allowed a direct assessment of the absolute change in the experimental group irrespective of what happened in the control group. Since the comparison showed large and substantial changes in the experimental group, we are in a better position to argue that the multifaceted method achieved an effect which was not only statistically significant but also educationally meaningful. The detailed analysis also reveals that the MFM heightened the pupils' attention to surface details as well as improving their appreciation of the underlying message. The expression "toning up" is used to dramatically describe the influence of the method. This expression is used by analogy with Norman's (1977) idea of "tuning". In this case "toning up" refers to an overall heightening of the learner's awareness which shows itself at all levels.

To sum up the MFM has been shown to have led to improvement in the pupils' comprehension and summary writing in two respects. First by comparing MFM to TM, MFM proved to be more effective. Second, within the MFM, a comparison between pre-and post-test corroborated this finding by showing a clear improvement. Thus, there is ample statistical evidence that the MFM has been successful.

However, these findings notwithstanding the statistical evidence only tells that comprehension and summary writing have improved but it falls short of answering questions as to how that improvement was brought about. There is a need to have a deeper insight into further indicators of the success of the method, hence the need for qualitative feedback which reveals the activities that the MFM has generated in pupils and helped to improve their comprehension and summary writing.

10.2.3 Qualitative Analysis of the Effect of MFM:

Since the model outlined in chapter eight gives a prominent place for feedback, an analysis emphasising the role of feedback is therefore needed. This is what is termed here as qualitative analysis; feedback comes from the two main interactants, namely, the teachers and the pupils.

10.2.3.1 Qualitative data related to teachers

A common pitfall arising from intervention programmes of this type is that the teachers who implement the new programmes fail to do so wholeheartedly and sometimes are incapable of adjusting their old techniques to the new method.

It was necessary therefore to support the objective measures with a richer set of qualitative reactions of the teachers themselves. A subjective set of scales was therefore devised to collect the views of

the teachers and their pupils towards the new method. It aimed at getting more insight into 1) the teachers' reactions, 2) the pupils' reactions and 3) the perceived improvement or otherwise for the specific processes or classroom factors that were judged to be involved.

Two data-gathering techniques were used with the teachers; a short structured questionnaire and an unstructured open-ended report.

10.2.3.1.1. Teachers' Questionnaire

After each lesson the teachers received a short questionnaire containing seven items (see appendix XI). Each item was answerable by placing a tick in front of the most appropriate of three alternative choices. The questions were placed in three categories. Category 1 contained questions 1 and 2 which dealt with the difficulty or ease of preparing the lesson using the new method (MFM). Category 2 contained questions 4, 5 and 6 which related to perceived pupils' benefit from MFM. Category 3 included questions 3 and 7 which assessed the teachers' final judgment of the efficacy of the MFM especially in relation to the old method (TM). These results (See appendix XIA) were examined by categories.

Category 1 (Question 1 and 2), dealing with reactions to preparation, showed a strong positive attitude towards the method when used in preparing lessons. Out of 9 reactions given to question one, 8 showed that the preparation guideline was helpful. No one said that it was not and 1 said he did not know.

The preparation of the method was judged reasonable because it had well defined steps. Out of 9 reactions, 5 said it was reasonable, 2 said it was difficult and 2 said it was easy. Those who said it was reasonable or easy were 7, which gives a positive attitude on the part of the teacher to the preparation to teach with the method.

Category 2 (Questions 4,5,& 6) probe the teachers' perception of pupils' performance after they were taught the MFM method. Out of 9 reactions obtained, 7 reactions said the pupils accepted the method (Question 4), 2 said they did not know and none said the method was faced by rejection by pupils. This suggests positive acceptance of the method by the pupils. They also suggest that the method was beneficial across all levels of ability (Question 6). Out of 9 reactions, 5 showed that all levels of ability had to gain from the method, 2 said low ability gained and 2 said high ability gained. Lastly, on question 5, teachers gave a rating for the amount of improvement they perceived in pupils. Out of 9 reactions, 6 said the improvement was excellent (over 70%). Actually the smallest percentage given was 76%. 3 gave the percentage of between 70-80, 2 gave the percentage between 81-90 and 1 gave the percentage of 90-100. The rest, 3, showed an average improvement 50-60 and none said that there was no improvement.

Category 3 (Questions 3 & 7) concentrates more on teachers' final judgment about the method. Question 7 took the data at a finer grained level by eliciting from the teacher the judgment as to the specific aspects of classroom activity that were influenced by the method. Again, the results were positive in the teachers' reactions to the method.

- a) Out of 9 reactions, 7 reported that the new method was more beneficial for the comprehension of their pupils compared to their traditional method. 2 reactions reported that both were equal in terms of comprehension, none said that the old method was better.
- b) As for participation of their pupils the reactions of the three teachers were as follows:

Out of 9, 6 said that the multifaceted method led pupils to participate in the lesson, and 3 said both methods were equal in the participation of the pupils in the lessons.

- c) Regarding which method motivate the pupils most, 8 said that it was the multifaceted method that motivated their children to learn and participate, and 1 said both traditional and multifaceted methods were equal in terms of motivating their pupils.
- d) The precision of the pupils' answers to the questions posed by the teachers was considered next. Out of 9 reactions, 6 showed that answers were more precise when under the multifaceted method; 2 said the precision of answers were equal under both methods and only 1 reaction reported that under the traditional method the answers were more precise.
- e) Prompted as to when there was more clarity of thought of their pupils, teachers reported that clarity of thought appeared more under the multifaceted method. Out of 9, 7 said it was under the multifaceted method that more clarity of thought was shown as against 2 who said both were similar for this matter.
- f) Whether pupils discussed the answers offered during the lesson was among the elements of which that teachers were asked to give their opinions. The results showed that more discussion took place under the multifaceted method. In fact the number was 7 as against 2 who said the discussion was equal in both traditional and multifaceted methods.

In conclusion the subjective data gathered from the teachers' questionnaire supported the finding of the quantitative data. The teachers had a positive attitude towards the method. They regarded it as helpful in preparing the lesson and in its actual teaching. They felt

that pupils benefitted in knowledge, attitude and strategies.

10.2.3.1.2 Teachers' Open ended Report

Having applied the method on the selected texts, teachers were asked to write a report on what they thought of the method. The instructions were general and unguided. No clues were given as to what the researcher was looking for. This was purposely done to ensure the unbiased reactions of the responding teachers. There were three areas of interest: 1) Did the method work? 2) What practical aspect of pupils' learning was influenced? 3) Which other aspect of classroom behaviour, if any, was influenced by the method?

All the teachers submitted reports three days later.

A. Teachers' comments strongly suggested that the method did indeed improve pupils' performance. Typical comments (translated from Arabic) made were: (See appendix XII).

"It demonstrates how great improvement can be made even with these pupils".

"The method helps the pupils to concentrate, to understand better".

"I noticed that the improvement was better every time".

B. The method, as perceived by the teachers had its effect on the thinking and learning strategies of the pupils. The general opinion was that pupils made greater use of their life experiences, related the text to past knowledge, made more metacognitive judgments, were generally more active and questioned themselves much more under this method.

Typical comments (translated from Arabic) were:

"By this method pupils have been made able to relate and compare what they understood from the lesson and real-life situations in which they live.... Pupils seem to assess their own answers... The method seems to uncover some of the pupils' personalities".

C. The consensus was that pupils were more motivated and showed this by an increase of involvement and participation. Some illustrative teacher responses read as follows:

"the involvement of the pupils and participation with the method was a thing that struck me and surprised me comparing to my old way of teaching".

"This method helps pupils to discuss and participate effectively in the lesson".

"One positive aspect of this method is that of the participation of pupils in the lesson especially those of low ability who usually do not (in the old method) participate".

10.2.3.1.3 Negative observations or criticism of the method by the teachers:

-The method is time consuming, so it needs cutting off some details and shortening of elaboration. Two of the three teachers reported this point.

-There is need for some teaching aids. The three teachers brought up this remark.

-It seems only useful for reading comprehension and needs to be more general as to be applicable to other school programmes. One of the 3 teachers noted this.

Again, the reports submitted by teachers support the usefulness of MFM. The reports especially mentioned the positive aspects of this method; namely, pupils' performance, teaching and learning strategies and motivations and participation of pupils.

10.2.3.2. Qualitative data related to pupils:

10.2.3.2.1 Pupils Reports

Pupils were asked at the end of programme to note in an open ended

way what they felt about the programme (See appendix XIII). 123 pupils completed reports, which were analysed to elicit an overall reaction to seven different aspects of the programme. These seven aspects were preference or otherwise of the method as an attitudinal index of the way pupils perceived it; the effects they perceived on their comprehension; their inclination to be actively engaged with the method as an index of the method, again as perceived by the pupils; the impact of the method on the pupils' motivation to learn as indicated by their increased willingness to talk about, think about, explain and generally carry on with the method outside their class context; the level of confidence in themselves when presented with a similar comprehension task as compared to their previous level before the MFM; lastly the pupils' perception of the contribution of the method to the teaching/learning process. Not surprising, this last category was scantily reported on.

It is interesting to note how these seven categories arose. Along traditional lines, the responses of the teachers provided a useful framework for the content analysis of the pupils' responses. Over and above the main categories, especially in the open-ended report, the content analysis threw up an additional four categories. The method, therefore was a mixture of a pre-existing category scale derived from empirical data (teachers' report) and an emergent category system which is thrown up by the data.

One methodological remark ought to be made here. It goes without saying that, in essence, these reports are relatively subjective. In fact, many factors enter into play to apparently lessen the degree of reliability of such reports. One is that the pupils were inevitably aware of the hierarchy teacher/pupil and would not normally question the

innovations brought before them. Secondly, at their age, they tend to welcome any change in the status quo and will take it to be an improvement (things do not go backward!). thirdly, the nature of the task allotted to them unwittingly compels them to take a positive stand, since they naturally wish to display in their academic reports, their intelligence and ability to appreciate the change.

Having granted these reservations, there are many reasons why such reports still remain useful. Despite the above-mentioned mediating factors, the reports do reveal some interesting aspects of pupils' perception of this change (since they are bound to respond). Research in the field of cognitive psychology (Brown et al; 1983a); Ericsson and Simon, 1980) shows that verbal reports can be relied on as valid data. Moreover, the pupils' reports are in agreement with the teachers' reports and reactions as well as with the statistical data which give weight to their reactions. In addition, the perusal of the reports shows that there are recurrent patterns underlying many declared appreciations so that a number of vital generalisations can be made. These generalisations can be classified along the following indices:

1) Preference:

There was a strong tendency (95%) to refer spontaneously to the traditional method, by way of comparison. This was done by 117 of the 123 pupils although no comparison was asked for. The drift of nearly all the judgments tended to favour the new method. Examples of typical responses are:

"In fact everytime I was comparing the old method to the new one and I found that the new is better because...."

"I see a difference between the old and new method, the new one is better.."

This new method is better than the old one. the old one did neither give chance to pupils to participate nor to understand well".

"My view of this new method is that it is an excellent method and better than the old one".

2) Improvement in Comprehending:

99 of the 123 pupils (80%) reported that the method helped to improve their comprehending ability. Here are some examples:

"... and it is also a method that made comprehension lessons easier and deeper for me".

My view on the method is that it facilitates comprehension for children".

by comparing between the old and new methods, I find that the new method makes comprehension better and helps all pupils to understand".

"I liked this method because it developed my knowledge and it made us understand better".

"I feel that I understand the lessons better under the new method than the earlier weeks".

3. Participation in the Lesson

The method seems well favoured by the pupils when it came to the participation in the lesson. Out of 123 pupils 117 said that they were made to participate more under the new method. (a high 95%). This confirms the teachers' view. They had reported earlier that one of the advantages of the method is pupils' participation.

Examples of pupils' reactions are as follows:

"This new method, in my view, can attract pupils because it gives

them freedom to express their views".

"In my view this method encourages participation in the classroom".

"In the old method, the teacher would deliver the lesson, and though he explained well but many pupils are not attentive because the method is not attractive. On the contrary this new method attracts attention to the lesson and makes one participate and pay attention"

"This method helps in comprehension and participation"

"This method has made me more daring and positive to work and participate in the classroom".

4) Relating the Lesson to Real-life Situations:

Many of the students expressed the fact that there was a lot of scope of relating what they read and discussed to real-life situations. In fact, out of the 123 pupils, 96 (78%) said that the method gave them scope to relate what they understood to life-situations.

"this method besides helping in comprehension, makes the pupils benefit in their daily life".

"Thanks to this method, I can now solve and understand some problems in real life".

"I also like this method because it relates to many real life problems and the pupils can bring to the lesson real-life examples".

"This method encourages one's view and by this draws one nearer reality outside the classroom. One can express the view in society and defend it".

"This method broadens the pupils' horizons and that is by introducing the real life into the lesson where the pupil has more

choice and chance to understand".

5) Motivation

One of the apparent features of the method seems to be the motivation factor. Out of the 123 pupils, 75 (60%) said clearly that they were motivated by the method. It should be noted that this was well apparent, although not all the pupils reported it because so many were talking about how the method encouraged them to participate (95%). This in itself can be taken as motivational. The teachers said clearly that their pupils were better motivated under the multifaceted method (see section 10.2.2.1.1. teachers' questionnaire, Category 3 C)

Here are some examples:

"This method attracts the pupils' attention and make them more attentive and participate in the lesson".

"This new method encourages everybody to pay attention and participate".

"This method gives a lot of enthusiasm to be attentive in the whole lesson and to participate".

".....it is a method that makes pupils express their feelings and encourage activity and liveliness in the classroom".

6) Confidence

Some students have talked in their reports about the confidence that the method had generated in the classroom. The number of those who reported such a factor is relatively low; 50 of the 123 pupils reported this factor (40%). Looking carefully at those who said that, one can notice that most of them were middle or low ability pupils. Indeed, the teachers have clearly mentioned that.

One teacher categorically said: (See appendix XII.3)

"The fact that the method encouraged the pupils to express their views freely heightened their self-esteem".

Here are some examples of the students' reports

"This method is a good one because it gives the pupils confidence in themselves...."

"The method supports and builds confidence and helps one to be more enthusiastic to participate...."

"Because of its allowing pupils to express their views, it makes them feel that they can talk in the classroom."

"...Makes the pupils more proud because it allows free expression of view and makes them all participate without fear of being looked down at".

7) Contribution to teaching/learning processes

Those were reported scantily by some pupils. They, however, show that some of them are aware of some important influences that the method plays on some of classroom processes related to performance. Most of those who reported those seem to be of higher ability pupils.

-37 out of the 123 pupils (30%) said that the method made their thoughts more precise.

-30 out of the 123 pupils (24%) said the method develops their ideas or stimulates them.

-15 (12%) reported that the method helps the teachers to easily explain the lesson to the pupils.

-13 (10%) expressed the view that the method makes the teacher recognise those who understood from those who did not.

Here are some quotes:

"This method can be considered as a method that develops the pupils' ideas as well as their knowledge".

"This method helps the pupils as to how to think".

"This method has taught us how to give precise answers because of the type of questioning of why we give an answer we learnt to ask ourselves and this made us give precise answers".

"This method has in my view helped the teacher to explain the lesson well to the pupils. I am now able to know when I understood and not before the teacher tells me".

"The teacher in this method can easily recognise those who have understood from those who have not because everybody participates and from their answers pupils can be seen to have understood or not."

To recapitulate, the main mechanism advocated by the MFM, as could be deduced from the pupils' reports worked as follows: the method emphasised first and foremost a need to relate textual data to the pupils' real-life situations. This made them participate more thus leading to greater active interaction with the text. This in turn strengthened their motivation and built up their confidence, which led to considerable improvement in their comprehension and their grasp of learning processes. This may explain perhaps their professed preference for the new method (MFM) to the old one (TM)

10.2.3.2.2 Interview data (pupils) to assess the viability of the MFM

At the end of the application of the new method 27 pupils representing three levels of ability (high-medium and low) were randomly selected from the three experimental groups. This interview was structured in a way which was adapted from the Morton and Saljo (1976)

interview technique. this technique aims at inducing the learner to reveal in his or her own words, the way s/he perceives her/his approach to learning.

The interview has been conducted so as to provide an insightful feedback as to the actual success, or otherwise, of the MFM after it has been tested. It is theoretically rewarding to examine this question from different perspectives. The point of view of the recipients seems to be justifiably important since the method aims not only at helping the teacher by providing him with a better teaching approach, but it primarily sets out to make learning more accessible to the pupils.

The findings of the interview fall into a pattern that could be structured as follows:

1. Attention controlling devises:

What are the mental processes at work underlying the pupils' effort to focus attention on the text being read? Mental processes are used here in the context of information processing theory (Hunt, 1979, Baddely, 1976). General-type questions such as "how did you read the text?" are asked with the intention of eliciting as much information from the pupils as possible. In view of its open-ended nature it allows for various answers. When the pupils' answers tend to be imprecise and lack clarity, a further step is taken to narrow down the potential answers by asking the pupil specific questions such as "what do you mean when you say you read with attention"? or "could you tell me how exactly you went about doing it?".

Seeing that the common answer that pupils were giving tended to be too general - a typical answer would be "I was reading with attention" - a further set of questions were put to them in order to make them spell

out how they did that. What was aimed at was to ascertain whether or not pupils had goal set before reading. Confronted with this information seeking type of questions, pupils varied in their responses. their answers fell into the following categories:

- a) The first group, 7 out of 27 pupils, reported that they were asking themselves questions and looking for what they called important ideas whilst reading the text. This tendency to ask questions could be construed as a measure of tendency to be precise. Thus they confirm the view that says that setting a goal before oneself when engaging in the reading process leads to better attention control (eg Brown et al 1983a; Rothkopf, 1978; Wittrock, 1981).
- b) The second group, 12 out of 27 pupils, reported that they were looking for what they called important ideas but they failed to report whether they had been asking themselves questions and on cross examination they showed a marked lack of precision. this lack of precision suggests that, although they could have set themselves one objective, their grasp of it was fluctuating. Therefore, their degree of attention must have been lesser than the first group. The fact remains, however, that there is an undeniable measure of attention control.
- c) The third group, 8 out of 27, gave general answers which failed to refer to any particular activity or objective. Such answers are indicative of a certain lack of attention controlling principle. Such pupils lack both precision and objective setting.

These findings show that having a goal set before reading the text is a determining factor in attention control. Since, among its priorities, the MFM sets itself the task of encouraging both teachers and pupils to set themselves goals by concentrating on questions and

predicting information, these results could be seen as evidence as to the success of the MFM on this aspect. This view is more substantiated by the pupils when they reported that this was not their typical approach to learning. This was an answer to a question whether that was typical of their learning. Only 5 (1 from category 1, 3 from category 2 and 1 from category 3) said that it was their typical way of learning. This leaves 80% of the sample who say that the MFM influenced their way of learning.

2. Decoding

This concentrates on the factors involved in the process of pupils' understanding. It particularly looks for the schemata underlying the pupils' discourse when answering the questions. The reading process necessarily involves the interaction between textual data and the pupils' active drawing on stored information (Rumelhart, 1976,; Kintsch and Van Dijk, 1978; Anderson et al 1977).

Pupils normally relate the information they gather from the text to real-life situations stored in their memories. Their response is affected by various factors such as social belonging, geographical location, personal history and so on and so forth. For instance, the text presented at the interview had its subject matter the theme of the market in medieval England, the pupils immediately responded, albeit to different degrees, by drawing on their mental presentation of the way markets are run. Some of them would elaborate and go into details specifying whether talk was about fruit markets, animal markets, mixed markets and their placements. In this they drew on their background knowledge of the subject at hand. Another interesting area which captured their imagination was the comparison in the time of prayer

between Christian Sunday and Muslim Friday - Analogies were made between Churches and Mosques as different places of worship. Similarly, a comparison was drawn between the two systems' different ways of calling for prayer. However, a general conclusion was reached to the effect, perhaps, that we might be worshipping one Lord, just in different ways.

All the 27 pupils who were interviewed did not fail to respond one way or another to the stimulus of the text. They only differed in matters of degree. This is hardly surprising since the topics, namely markets and prayers, referred them back to their immediate experience. All pupils also revealed that they learned to link their experiences to what they read from the MFM.

Aware of the great benefit that comes from these interactions between textual data and the pupils' schemata, the aim of the MFM has been therefore to encourage children to embark on such interactions by stimulating their associations and suggesting potential scope for comparisons and analogies.

3 Level of Comprehension:

In the reading process pupils interact with internal structure of the text. The text is built on the basis of a given patterning, a certain sequencing of ideas structured in such a way as to serve the writer's ends. Pupils vary in the degree of their sensitivity to this sequencing and therefore react differently in the text; that is, they have different degrees of detachment from the structure underlying the text (Taylor, 1980, 1982). A good detector of this degree of sensitivity is to allocate to the pupils the task of summarising the text. by conducting such an enterprise it is hoped to have an insight into the pupils' styles of learning (Entwistle, 1979; Biggs et al 1982; Marton and Saljo, 1976; Pask, 1976) Since it is an established view that

summary is a reflection and measure of comprehension (Borde, 1983; Brown and Day, 1983; Day 1980; Kintsch and Van Dijk, 1978). The summary informs the analyst of the pupils' grasp of what they take to be the most important ideas of the text, their development and the final aims they serve. The steps taken by the pupil will be measured against the model propounded by Kintsch and VanDijk (1978) and developed by Brown et al (1981). Accordingly, the analyst evaluates the pupils' ability, which may lead to classifications such as the one advocated by Entwistle et al. (1979).

As the result of the interview, children's answers revealed basically two styles of learning in terms of Entwistle et al 1979 and Marton and Saljo, 1976), namely, deep and surface. This classification is based on the pupils' conformity to a combination of five rules of summarising which are deletion of trivia, deletion of redundancy, substitution (using one word to substitute for a class of things or a series of examples or actions), selection (adapting main ideas from the text into the summary) and invention which reveals a higher degree of detachment on the part of the pupils. Depending on the pupils' ability to satisfy these conditions, they are classified either as deep or surface comprehenders. Surface comprehenders are those who stay at the level of the rules of deletion and substitution. They are trapped at the surface level of the text. They cannot go beyond the textual internal structure. On the other hand, deep comprehenders are those who reach the level of invention. They can transcend the constraints posed by the surface structure of the text and go beyond it to link textual data with experience. The fact remains, however, that the level of selection is a borderline case since it depends on the pupils'

consistency in drawing on this process in their comprehension. Cutting across these two categories, there is a second classification in terms of active and passive involvement. Accordingly, children's answers in the interview could be classified in two groups, one deep and one surface both of which are active.

a) Deep Active

19 out of the 27 pupils interviewed could be said to roughly fall into this category. This is based on their using the above-mentioned rules and their showing a clear tendency to be more or less able to grasp the plot informing the text, as shown from their ability to orally summarise in their own words what they took to be the main ideas of the text and their relating such ideas to their own experiences. It goes without saying that there are degrees of depth so that not only is there a spectrum informing the ability of these 19 pupils but the very notion of depth is relative, of course, to their age and level of knowledge.

b) Surface Active:

The remaining 8 out of the 27 pupils interviewed could be said to roughly fall into this category. Despite their use of rules up to selection, their overemphasis on detail prevented them from actually digging deep enough to grasp the plot informing the structure of the text and its main ideas. To put it in a nutshell, they nearly made it but they fell short of what is required. Yet they were classified as active since they managed to relate these details, however, superficially, to their own life experiences.

The common denominator between these two categories, it will be noticed, is that they both involve the active participation of the pupils, which has always been one of the primary objectives of the MFM. These findings, the findings already highlighted in the teachers' and

the pupils' reports, substantiate one basic conclusion, namely that the MFM has been effective in its priority of setting into relief the active participation of pupils in text comprehension.

The strength of the MFM derives from its being based on the active involvement of the pupils in the learning process. First, in view of the need for the active and positive role of the readers when tackling the text, the pupils are encouraged to set themselves goals before and in the course of the reading process by asking specific questions and probing into the internal structure of the text which would lead to greater focus on the text. Secondly, since personal experience has been shown on vital importance in understanding the text, the pupils are encouraged to make associations and they are made to draw on such personal experiences which would lead to greater depth of comprehension.

10.2.3.3. General Summary of the Qualitative Data

It has been the aim of the analysis of the qualitative data to examine the feedback both from teachers and pupils. Since teachers and pupils are partners in the teaching/learning process, it seems fruitful to evaluate the MFM from their respective perspectives. It goes without saying, however, that the teachers and the pupils could not be expected to give the same data nor could their respective data be dealt with on the same footing.

As for the teachers, seeing that they have high degree of consciousness of the teaching/learning process in the classroom, they could be safely expected to elaborate on more theoretical lines. This is why they were asked to report on indices such as participation, motivation, precision of answers, clarity of pupils' thoughts and their discussion of the topic at hand. This justifies the procedures adopted

in conducting the teachers' questionnaires and reports. It is interesting that both questionnaires and reports yielded virtually the same results to the effect that they are satisfied with the workability of the method.

As to the pupils, the need is greater to look through and go beyond their discourse, searching for clues or indicators of classroom activities amounting to their comprehension improvement. In essence, their data confirmed the conclusion that the MFM effectively led to a clear improvement in their comprehension through greater participation, a more active role in relating textual data to their personal experience and stronger motivation and confidence. These findings were corroborated by the interview conducted with children. The researcher has been satisfied that, when cross-examined, pupils showed signs of greater attention, better decoding competence and a high level of comprehension.

Consequently, it transpires that both sets of data do converge to confirm one major conclusion, namely that, thanks to the emphasis laid on the classroom activities enumerated above, the MFM has been successful in contriving procedures which have been shown to be conducive to a better comprehension.

10.3 Analysis of Results for Schools

This analysis is undertaken for the purpose of finding out whether the schools differed in their performance. One expects such a difference because pupils in the different schools come to their respective classrooms with various experiences and personal and cultural background. The teachers approach the task of teaching in different ways and may interpret the same material differently.

The analysis of results for schools looks at the pretest and

posttest results since they are the starting point and the finish point of the application of the teaching sessions. It is interesting to make such a comparison if schools differ at the pretest level and perform similarly at the end (posttest) this would be interpreted as follows. It can be argued that the MFM has influenced the pupils approach and narrowed their differences. If the differences remain this can be taken as the MFM influence different pupils differently. In fact the analysis shows that schools performed differently in many instances.

10.3.1 Pretest Results for Schools

The analysis starts with comprehension first, then summary writing.

10.3.1.1. Comprehension pretest scores

10.3.1.1.1. Overall comprehension pretest scores

Although the two main groups MFM and TM did not show any differences on pretesting, schools were significantly different ($F=3.559$, $df, 2,234$, $p < 0.003$) (see table 10.1.3 in section 10.1).

NEWMAN Keuls test table

Schools	Ordered Means				Calculated NK		
		1	3	2	R p	0.01 p	0.05
1	3.64	-	0.08	0.57*	3	0.58	0.46
3	3.72		-	0.49*	2	0.49	0.39
2	4.21			-			

*significant at $p < 0.05$

School 2 made the difference since its pupils received the highest scores. Schools 1 and 3 did not differ from each other.

It would be interesting to find out whether schools differed on the

indices of comprehension i.e. deep and surface.

10.3.1.1.2 Deep Pretest Comprehension Scores

Analysis of variance did not show any differences between schools on this aspect of comprehension (F=0.058; df=2, 234; p < 0.943). See appendix VII.1.2.

10.3.1.1.3 Surface Pretest comprehension Scores:

ANOVA analysis on surface scores showed that schools were different under this aspect of comprehension (see appendix VII.1.3)

Newman Keuls test

Schools	Ordered Means	1 2.06	3 2.11	2 2.61	calculated NK				
					r	p	0.01	p	0.05
1	2.06	-	0.05	0.55**	3	0.49			0.40
3	2.11		-	0.50**	2	0.44			0.33
2	2.61			-					

**significant at p < 0.01

Again school 2 is the school making the difference by performing the highest.

10.3.1.2 Summary Pretest Scores

10.3.1.2.1 Overall Pretest Summary Scores

ANOVA on the overall summary scores showed that the schools were different from each other (F= 15.259; df=2,234; p < 0.001) See table 10.1.4 section 10.1; pretest results.

Newman Keuls Test table

Schools	ordered means				calculated K		
		3 4.48	2 4.70	1 5.19	r	p	0.01 p
3	4.48	-	0.22	0.71**	3	0.58	0.46
2	4.70		-	0.49**	2	0.51	0.39
1	5.19						

*significant at p 0.05; ** p < .01

School 1 in overall summary scores performed the highest as compared to schools 2 and 3. Schools 2 and 3 did not differ from each other.

It is interesting to look whether there are any differences between the schools on deep and surface aspects of summary.

10.3.1.2.2 Deep Summary Pretest Scores

ANOVA showed significant differences between schools on deep summary scores ($F = 7.715$; $df = 2, 234$; $p < 0.001$). See appendix VII.2

Newman Keuls test table

Schools	ordered means				calculated K		
		3 2.26	2 2.40	1 2.74	r	p	0.01 p
3	2.26	-	0.14	0.48**	3	0.45	0.36
2	2.40		-	0.34**	2	0.40	0.30
1	2.74						

**significant at p 0.01 p < 0.05

Again it is school 1 which made the difference and it scored highest compared to schools 2 and 3 which did not differ among themselves.

10.3.1.2.3 Surface Summary Pretest Scores:

The ANOVA did not show any differences on surface summary scores between the three schools. ($F=2.533$; $df=2,234$; $p < 0.08$). See appendix VII.2.3.

To summarise, the schools showed differences in the pretest scores. As for comprehension scores, it was school 2 which was different from the other two schools. When the overall results were broken down, surface scores of comprehension appeared to be responsible for the difference between the schools. Schools did not differ under the deep aspect of comprehension.

The summary scores showed that school differences were due to the deep scores. Here is school 1 which differed from school 2 and 3.

10.3.2. Posttest Scores Related to Schools.

10.3.2.1. Comprehension Scores

The ANOVA test showed no significant differences between schools ($F= 1.288$; $df=2,234$; $p = 0.278$; see appendix VIII.1.1.) when the two methods were analysed together. However, when the two methods were looked at separately, the results revealed that the schools under the multifaceted method did differ significantly ($F=9.222$; $df=2,115$; $p <$

0.001). See table 10.3.1. below. This was not the case for the traditional method where the schools did not differ ($F = 2.477$; $df = 2, 112$; $p < 0.089$) (appendix IX.2.1.1). This means that the method interacted with the schools, i.e. the benefits of the MFM were not equally obtained by all the three schools. One or more schools were better prepared to use the MFM.

Table 10.3.1. ANOVA overall comprehension; MFM only

Source of Variation	Sum of Square	df	mean Sq.	F.	Sig of F
Age	12.773	4	3.193	1.265	0.288
Sex	7.134	1	7.134	2.825	0.096
Sch	46.575	2	23.287	9.222	0.000
Residual	290.387	115	2.525		
Total	382.407	122	3.134		

Newman Keuls Test Table

Schools	ordered means				calculated K		
		3	2	3	r	p 0.01	p 0.05
1	4.00	-	1.53**	1.73**	3	1.05	0.84
2	5.54		-	0.53	2	0.92	0.70
3	5.73			-			

**significant at $p < 0.01$

School 1 is making the difference since it differed from both

schools 2 and 3. Those two were not different from each other. Pupils in school 1 gained the lowest scores in comprehension.

10.3.2.1.2. Deep Posttest Comprehension Scores

Anova analyses showed similarity in performances between schools when both methods were combined together ($F=1.670$, $df= 2.234$, $p < 0.190$) (appendix VIII1.2). This was also true with the TM ($F= 1.680$, $df= 2.112$, $p < 0.191$) (appendix IX2.1.2) Under the MFM, however, schools did differ ($F= 5.113$, $df= 2-$

Table 10.3.2 Anova Deep Comprehension Scores for MFM

Source of variation	sum squares	df	mean squares	f	sig. of F
AGE	0.456	4	0.114	0.096	0.983
SEX	2.915	1	2.915	2.461	0.119
SCH	12.111	2	6.055	5.113	0.007
RESIDUAL	136.184	115	1.184		
TOTAL	152.992	122	1.254		

Newman Keuls Test Table

School	ordered means				Calculated NK		
		1	2	3	r	p 0.01	P 0.05
		1.64	1.88	2.44			
1	1.64	-	0.24	0.80**	3	0.71	0.57
2	1.88		-	0.56*	2	0.63	0.46
3	2.44			-			

** significance $p < 0.01$, * $p < 0.05$

The difference is due to school 3. Scores in this school were the highest. Schools 1 and 2 did not differ.

10.3.2.1.3 Surface Post test comprehension scores

ANOVA analyses showed that schools were different under the two methods combined ($F= 3.064$, $df= 2-234$, $p < 0.049$) Table 10.3.3. When one looked at the results of ANOVA analyses for each method separately, schools differed under the multifaceted method ($F= 9.713$, $df= 2-115$, $p < 0.000$) Table 10.3.4

They, however, perform equally under the traditional method ($F= 0.703$, $df= 2-112$, $p = 0.497$) (appendix IX 2.1.3).

Table 10.3.3 ANOVA posttest surface comprehension scores MFM and TM combined.

Source of variation	Sum squares	DF	Mean Square	F	Sig.of.F
Meth	12.938	1	12.938	11.073	0.001
Sch	7.160	2	3.580	3.064	0.049
Sex	0.189	1	0.189	0.162	0.688
Age	23.848	4	5.962	5.103	0.001
Residual	273.409	234	1.168		
Total	327.218	242	1.352		

Newman Keuls test Table

Schools	Ordered Means	1 2.54	3 2.93	2 3.17	Calculated NK r p 0.01 p 0.05	
1	2.54	-	0.39	0.63**	0.50	0.40
3	2.93		-	0.24	0.44	0.34
2	3.17			-		

**significant at $p < 0.01$, $p < 0.05$

The difference here was due to school 2 performing better than school 1 but was not different from school 3. Schools 1 and 3 were not different from each other.

TABLE 10.3.4 Anova surface Posttest comprehension scores, MFM

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Age	9.149	4	2.287	2.211	0.072
Sex	0.929	1	0.929	0.898	0.345
Sch	20.092	2	10.046	9.713	0.000
Residual	118.944	115	1.034		
	165.171	122	1.354		

Newman Keuls Test Table

Schools	Ordered Means	1 2.34	3 3.29	2 3.65	Calculated NK r p 0.01 p 0.05	
1	2.34	-	0.95**	1.31**	3 0.67	0.54

3	3.29	-	0.36	2	0.59	0.45
2	3.65		-			

** significant at $p < 0.01$

Again the difference was due to school 1 showing the lowest performance scores since both schools 2 and 3 differed from it while they did not differ from each other.

To summarise, for comprehension posttest, the results showed that schools differed under all aspects of comprehension. This difference between schools was only significant for the MFM. This means that different schools benefitted differently from the MFM. Different schools gained differently on different aspects of comprehension. This can be interpreted in the light of the explanation offered highlighted in the qualitative analysis of the method. (See section 10.4 Teachers' and pupils' data).

10.3.2.2. Summary Posttest Scores for differences between schools

10.3.2.2.1 Overall Scores:

Schools performed differently when MFM and TM were combined as well as when MFM and TM comprehension scores were analysed separately, ($F = 10.74$; $df = 2, 234$, $p < 0.000$), ($F = 12.087$; $df = 2, 115$; $p < 0.00$) and ($F = 4.0005$; $df = 2, 112$; $p < 0.021$). Tables 10.3.5; 10.3.6 and 10.3.7.

Table 10.3.5 ANOVA Overall summary scores for both MFM and TM combined

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Meth	145.954	1	145.954	79.162	0.000
Sch	39.605	2	19.803	10.740	0.000
Sex	1.199	1	1.199	0.651	0.421

Age	16.892	4	4.223	2.291	0.060
Residual	431.434		1.844		
Total	652.379		2.696		

Newman Keuls Test Table

Schools	ordered means				Calculated NK		
		1 4.79	2 5.55	3 5.97	r	0.01	0.05
1	4.79	-	0.76**	1.18**	3	0.62	0.50
2	5.55		-	0.42*	2	0.55	0.41
3	5.97			-			

** significant at $p < 0.01$, * $p < 0.05$

All the three schools differed from each other. School 3 scored the highest and 1 the lowest and 2 in between.

Table 10.3.6 ANOVA Overall Posttest summary scores for MFM only

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effects	78.626	7	11.232	5.741	0.000
Age	7.024	4	1.756	0.898	0.468
Sex	2.164	1	2.164	1.106	0.295
Sch	47.298	2	23.649	12.087	0.000
Residual	225.000	115	1.957		
Total	303.626	122	2.489		

Newman Keuls test table

Schools	ordered means	1	3	2	Calculated NK		
		5.13	6.73	6.74	r	0.01	0.05
1	5.13	-	1.60**	1.61**	3	0.97	0.73
3	6.73		-	0.01	2	0.80	0.62
2	6.74			-			

**significant at $p < 0.01$

School one was different from both schools 2 and 3. The pupils scores for that school were the lowest. Schools 2 and 3 were not different from each other. Pupils' scores in schools 2 were the highest.

Table 10.3.7 ANOVA Table, Overall Pottest summary scores for TM only

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Age	5.774	4	1.443	0.899	0.467
Sex	0.037	1	0.037	0.023	0.880
Sch	12.860	2	6.430	4.005	0.021
Residual	179.821	112	1.606		
Total	202.325	119	1.700		

Newman Keuls test table

Schools	ordered means	2	1	3	Calculated NK		
		4.36	4.46	5.20	r	0.01	0.05
2	4.37	-	0.09	0.83**	3	0.88	0.66
1	4.46		-	0.74**	2	0.74	0.56
3	5.20			-			

**Significant at $p < 0.01$

School 3 was different from both school 1 and 2. Pupils in school 3 performed highest. School 1 and 2 were not significantly different in their performance.

10.3.2.2.2 Deep Posttest Summary Scores for Schools

ANOVA results on deep posttest summary scores show that there is a significant difference between schools ($F = 0.477$, $df = 2-234$, $p < 0.032$).

Separate analyses of variance showed that schools differed under the MFM ($F = 5.955$; $df = 2,551$; $p < 0.003$) but not so for TM ($F = 1.892$; $df = 2,112$; $p < 0.156$). See tables 10.3.8 and 10.3.9; and appendix IX 2.2.2.

Table 10.3.8 ANOVA table for Deep Posttest Summary Scores; MFM and TM combined

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effects	183.436	8	22.929	19.021	0.000
Meth	170.297	1	170.297	141.271	0.000
Sch	8.459	2	4.230	3.509	0.032
Sex	0.085	1	0.085	0.071	0.791
Age	2.300	4	0.575	0.477	0.753
Residual	282.079	234	1.205		
Total	465.514	242	1.924		

Newman Keuls test table

Schools	ordered means	1	2	3	Calculated r	NK 0.01	NK 0.05
		2.756	2.763	3.210			
1	2.756	-	0.007	0.454**	3	0.49	0.40
2	2.763		-	0.447**	2	0.44	0.33
3	3.210			-			

**significant at $p < 0.01$

School 3 differed from both school 1 and 2. It scored the highest on summary scores. School 1 scored the lowest. Schools 1 and 2 were not significantly different in their deep summary scores.

Table 10.3.9 ANOVA TABLE for deep posttest summary scores for MFM

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effects	22.635	7	3.234	2.848	0.009
Age	3.178	4	0.794	0.700	0.594
Sex	1.760	1	1.760	1.550	0.216
Sch	13.521	2	6.760	5.955	0.003
Residual	130.552	115	1.135		
Total	153.187	122	1.256		

Newman Keuls test table

Schools	ordered means	1	2	3	Calculated r	NK p 0.01	NK 0.05
		3.282	3.72	4.22			
1	3.28	-	0.44	0.94**	3	0.71	0.57
2	3.72		-	0.50*	2	0.63	0.48
3	4.22			-			

** significant at $p < 0.01$, * $p < 0.05$

Again, pupils in school 3 outperformed pupils in schools 1 and 2. School 1 scored the lowest. Schools 1 and 2 were not significantly different.

10.2.3.3.2 Surface Posttest Summary Scores

Analyses of variance indicated that the schools were different under combination of the two methods ($F=26.206$, $df=2-234$, $p<0.000$) as well as multifaceted ($F=24.554$, $df=2-1115$, $p<0.000$) and traditional methods ($F=6.032$, $df=2-112$, $p<0.003$) Tables 10.3.10, 10.3.11 and 10.3.12

TABLE 10.3.10 ANOVA Table: surface summary scores for MFM and TM

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effects	65.298	8	8.162	9.094	0.000
Meth	1.154	1	1.154	1.286	0.258
Sch	47.040	2	23.520	26.206	0.000
Sex	0.128	1	0.128	0.142	0.707
Age	7.423	4	1.856	2.068	0.086
Residual	210.019	234	0.898		
Total	275.317	242	1.138		

Newman Keuls test table

Schools	ordered means	1 2.01	2 2.79	3 3.18	Calculated NK r p	0.01	0.05
1	2.01	-	0.78**	1.17**	3	0.45	0.36
2	2.79		-	0.39**	2	0.40	0.30

3 3.18 -

**significant at $p < 0.01$

All the three schools differed from each other. Yet school three remained in the lead and school 1 at the rear.

Table 10.3.11 ANOVA Table, Posttest, Surface Summary Scores for MFM only

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effects	56.762	7	8.109	8.295	0.000
Age	2.364	4	0.591	0.604	0.660
Sex	0.051	1	0.051	0.053	0.819
Sch	48.009	2	24.004	24.554	0.000
Residual	112.425	115	0.978		
Total	169.187	122	1.387		

Newman Keuls Test Table

Schools	ordered means	1 1.795	2 3.02	3 3.37	Calculated NK r p	0.01	0.05
1	1.79	-	1.23**	1.58**	3	0.46	0.37
2	3.02		-	0.39*	2	0.41	0.31
3	3.37			-			

** Significant at $p < 0.01$, $p < 0.05$

Again all schools differed from each other. School 3 scores were the highest whilst scores of school 1 were the lowest.

Table 10.3.12 ANOVA Table, Surface Posttest summary scores for TM only.

Source of Variance	Sum squares	DF	Mean square	F	Sig. of F
Main effect	18.598	7	2.657	3.452	0.002
Age	6.367	4	1.592	2.068	0.090
Sex	0.539	1	0.539	0.701	0.404
Sch	9.285	2	4.642	6.032	.003
Residual	86.202	112	0.770		
Total	104.800	119	0.881		

Newman Keuls Test Table

Schools	ordered means	1 2.23	2 2.56	3 3.00	Calculated NK r p	0.01	0.05
1	2.23	-	0.33	0.77**	3	0.59	0.47
2	2.56		-	0.44*	2	0.52	0.39
3	3.00			-			

** $P < 0.01$, * $p < 0.05$.

School 3 remained the highest in performance as compared to schools 1 and 2. School 1 also remained at the lowest scoring in performance.

To recapitulate, the schools differed on all aspects of summary writing. Except for overall under MFM, school 3 had always been

responsible for the difference. this school had always performed better than the other two schools. It is worth noting that the differences between schools were present under both MFM AND TM.

10.3.3. Interpretation of School Differences:

The results reported above showed clear differences between the schools. These differences were explained in terms of school populations, and teachers' application of the method in the classroom.

10.3.3.1. School population: The schools were different in size and in their backgrounds. School one was a large middle school 1600 pupils drawing its population from a mixed background of farmer families, and civil servants. The second school slightly smaller about 1200 pupils drawing its population from mainly middle educated population of civil servants, teachers and professional people. The fact that the inspector has his office in this school plays a role. The third school is more of a rural one of about 980 pupils. Its population is predominantly made up of farmers and some civil servants of the bottom and average of the ladder.

Therefore, schools two and three are more homogenous in their population, while the first is mixed that explains partly the fact that it was the least in performance.

10.3.3.2 Analysis of teaching techniques between schools

The three schools were observed while teaching in their classes. The teacher were observed in their usual method while they were applying the first text in the programme (fossils). Only data of the TM teachers are included as representative samples.

The teachers were given the text they were to teach in advance and were given the schedule of when each text was to be taught. This was done in a way that the researcher would have the chance to assist all the lessons whether the experimental or control.

All the teachers wrote the title as being reading comprehension. They made an introduction; read the text; then let their pupils read silently; identified some good readers to read aloud then started the lesson.

It is apparent that teachers concentrated on the meaning of words and whether children understood the meaning of the words and paragraphs. Although the teachers seem to follow a rigid plan through the lessons, they show differences among themselves.

All the three teachers asked what is meant by fossils or fossilized animals. They let some children give answers. Those seemed to be almost always the same ones. They were not telling anybody who was right or wrong. Although most of those who answered were giving more or less good answers, it seemed that the teachers had a specific answer they wanted their pupils to arrive at.

When it comes to explaining, some differences appeared however, they all revolved around the meaning mainly surface of the text. These differences in getting the meaning appear in the following excerpts:

Teacher - what does it mean that the animal is fossilised?

P Animals which have vanished.

P animals who ruminant

T No, I do not mean ruminant animals like cows.

P animals which have died and did not leave traces.

T writes the following words on the blackboard;
 vanished; disappeared by the passing of time.

- T what happened to the soft parts of the vanished animals?
- P disappeared, and was stuck to the hard parts.
- T another answer?
- P The soft parts disappeared and disintegrated from the hard parts.
- T Where were the soft parts attached to?
- P they were attached to the hard parts.
- T let us give a sentence reflecting the meaning of the paragraph.
- P disappearance of extinct animals from our lives.
- T Yes, another?
- P disintegration of soft parts.
- T Is there anything left that tells us of existence of soft parts?
- T So we generalise the idea.
- Pupils fossils of extinct animals.
- T Yes; traces left of extinct animals.

And so on, the lessons goes in the same pattern for the whole period. The teacher poses direct questions that require answers present in the text.

Another teacher, teaching the same paragraph has gone like this:

- T which animals was the text talking about?
- P the extinct ones.
- P animals which were born a long time ago
- P the wild animals
- T any other explanation?

T What does extinct mean?

Pupils gave answers such as: gone astray, disintegrated, come apart, avoided, gone forever ceased to exist, etc...

T you are nearer to the meaning! become extinct means it is no more existent; eg because of the environment, (death, heat etc) or because of hunting. For that reason the government does not allow hunting in certain areas and of certain animals.

Let us read the paragraph again. A pupil read.

T What is an animal generally constituted of?

P it is constituted of hard parts.

T Only?

P and soft parts

T What are the parts that vanish?

P the soft parts.

T what are the parts that remain?

P the hard parts

T What is the difference between the soft and hard parts?

P They are attached to each other.

P surround each other.

T The soft parts?

P The soft parts

T Writes the following on the blackboard, hard, strong and soft not strong.

P The soft parts surround or are attached to the hard parts.

T I will try and draw you that so that you get the meaning.

Then remember the example of the text we were reading last term about the remains of the bodies of the martyrs of the Algerian revolution of independence.

T What is the proof that there were soft parts, although when we find the remains they would not be there?

P Because the soft parts are found linked to the hard ones.

T No, you can never find bones with meat linked to them.

P They leave traces.

T Now let us summarise the paragraph.

What is the main idea that can be put as a summary to this text?

Three pupils give close answers: difference between soft and hard parts of fossils, description of dead animal. the soft and hard remains of extinct animals when excavated.

The teacher writes:

The discovery of the soft and hard remains of extinct animals by the archaeologists...

It is seen that this teacher like the first does the same thing generally sticking to the text except when it is necessary to give an example close to the reality.

Despite their similarities, teachers do differ in their way of

explanation of the text. the first was asking question whose answers are clearly found in the text. The second, however despite asking questions related to the text, was trying to exemplify what he was trying to do. eg. what constitute an animal. From which he got the answer of soft and hard parts.

Such differences in tackling the explanation for pupils might lie in the differences found between the three different schools. The two above teachers had the same period of experience in teaching (7 years) as well as ages. (28 and 29 years). These two teachers were not heavily relying on their notes. The third teacher used almost exactly the same way as the first but he was more reliant on his notes. He was not asking as many questions as did the other two. He was rather giving answers and children had the passive role of listening. this does not mean that the other teachers were totally involving their pupils. They were doing most of the talking as well. However, the third teacher hardly involved the pupils.

The teachers, as said earlier, gave an introduction to the text as follows:

Teacher in school 1 gave this introduction:

You all remember last week we talked about the martyrs of the Algerian war of independence. Some of you might have seen the programme on television while remains of those martyrs (dead bodies) were found in a part of the country when some bulldozers were digging to build on a site. What was found were only some bones. The text we are to tackle relates to this.

The teacher in school 2 introduced the text like this:

You have studied some animals last year. The science teacher would have talked to you about some very old animals that do not exist

nowadays. This text deals with such animals; the ones that are extinct now.

The third teacher made the following entry:

The text we are going to read talks about some animals that do not exist anymore. It talks about the remains that were left of them and how scientists find out that they were living some time in history and how they looked like.

It is apparent from their way of teaching and their introduction that the three teachers, despite following the same general lesson layout, were different in the detailed explanation of the same text to their pupils. This may well explain the difference of results in text comprehension and summary writing between the three different schools.

As for the difference between the teachers who applied the multifaceted method, it appeared in their ability to draw from their experiences and on what examples analogies and elaborations they induce and encourage their pupils to make. Their approaches differed on this matter.

Then the way a teachers approached the task of teaching and the way they interacted with the material at hand and how they conveyed it to their pupils as well as the degree and the level of the pupils involvement tended to show that there were differences between schools.

10.4 Analysis of Results of Age:

Many studies show that the age factor plays a role in the learning process (Haysroth, 1970; Day, 1980, Markman, 1977). Here, the age range is not that wide, but if differences are found it can be related to the child having had the chance to have more experiences. Since texts representd similar experience to the child's own environment, the age effect can be seen to play a role on that sphere.

10.4.1. Pretest Results for age

10.4.1.1. Comprehension pretest scores

10.4.1.1.1. Overall comprehension for age.

The ANOVA analysis did show a significant effect due to age ($F=2.803$; $df=4,234$; $p<0.027$). See Table 10.1.3 section 10.1, pretest results.

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13		Calculated NK		
		3.00	3.52	3.73	3.98	4.85	r	p	0.01	0.05
17	3.00	-	0.52	0.73	0.98*	1.85**	5	1.10	0.93	
16	3.52		-	0.21	0.46	1.33**	4	1.06	0.87	
15	3.73			-	0.25	1.12**	3	0.99	0.79	
14	3.98				-	0.87**	2	0.87	0.66	
13	4.85					-				

**significant at $p<0.01$; * $p<0.05$

It is clear from the above table that age 13 is making the difference. This age group performed better than any other group ages. The interpretation for such difference may be due to the pupils'

background or social belonging. Pupils of this age have entered school one year earlier than the others. (See chapter 9). they are usually offsprings of those who are in education (teachers, inspectors, lecturers etc). The law allows those to enrol their children one year earlier than the official age of schooling (age 6). The law assumes that because those children come from an environment where learning is known to them. So those children have the appropriate learning atmosphere. Moreover, since their parents are teachers or related to education, they would be expected to do well at school. In fact most of those at age 13 according to their teachers do well at school.

The only other difference observed between age groups is between 14 and 17. Those of age 14 are the majority forming the sample (normal age of this level of education). See chapter 9 section 9.2; table 9.1). They performed better than the pupils in the age group of 17. The latter are usually those who repeated one or more classes once or twice. It also appears that those pupils usually come from poor families and have entered school late (see Abbad, 1983). Teachers seem to consider those pupils as hopeless cases and that they are not going to succeed in their education. this fact may influence the performance of such pupils. Indeed some teachers reveal that such pupils do say that after a year or two they will leave the school for a job.

It is interesting to find out on which of the indices of comprehension did the age factor differ.

10.4.1.1.2 Deep comprehension Pretest Scores

The ANOVA analysis of deep pretest scores did not show any significant effect due to age factor ($F=0.811$; $df=4,234$; $p < 0.519$). See appendix VI.1.2.

10.4.1.1.3. Surface Comprehension Pretest for Age

Here the age groups differed significantly ($F=3.311$, $df= 2,234$; $p < 0.012$) See appendix VI. 1.3.

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13	r	p	Calculated NK	0.01	p	0.05
17	1.40	-	0.75	0.75	0.94	1.60**	5	1.20	1.00			
16	2.15		-	0.00	0.19	0.85	4	1.14	0.94			
15	2.15			-	0.19	0.85	3	1.07	0.86			
14	2.34				-	0.66	2	0.95	0.72			
13	3.00					-						

**Significant at $p < 0.01$

The only difference that appeared here is between the ages of 13 and 17. The age group of 13 performed better than the age of 17. All other ages performed similarly to age 13.

10.4.1.2 Summary Pretest Scores

10.4.1.2.1. Overall Summary Pretest Scores

The results of the ANOVA showed that there were differences between different age groups ($F= 3.529$; $df= 4,234$; $p < 0.008$) See table 10.1.4 section 10.1; pretest results.

Newman Keuls Test Table

Age	ordered means	17 4.20	16 4.50	15 4.65	14 4.90	13 5.34	Calculated NK		
							r	p	0.01
17	4.20	-	0.30	0.25	0.70	1.14*	5	1.24	1.04
16	4.50		-	0.15	0.40	0.84	4	1.19	0.98
115	4.65			-	0.15	0.69	3	1.11	0.89
14	4.90				-	0.44	2	0.80	0.75
13	5.34					-			

*significant at $p < 0.05$

All age groups performed similarly, except age 13 who performed better than age 17. Again, the difference is due to the good performance of that age (13).

It is worth looking at indices of comprehension to see which aspect is responsible for that difference.

10.4.1.2.2. Deep pretest summary scores

The ANOVA analysis did show significant differences between different age ranges ($F = 4.308$; $df = 4,234$; $p < 0.002$) See appendix VI.2.2.

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13	Calculated NK		
							r	p 0.01	p 0.05
17	1.90	-	0.26	0.40	0.72**	0.76**	5	0.60	0.50
16	2.16		-	0.14	0.46	0.50*	4	0.57	0.47
15	2.30			-	0.32	0.36*	3	0.47	0.36
14	2.62				-	0.04	2	0.53	0.43
13	2.66					-			

**significant at $p < 0.01$; $p < 0.05$

The difference appeared again to be due mainly to age 13 group. they differed from age groups of 15, 16, and 17. There was also a difference between age 14 and 17. No difference was observed between ages 13 and 14.

10.4.1.2.3 Surface Pretest Summary Scores For Age

No differences were observed between age ranges for surface summary scores ($F=0.384$; $df=4,234$; $p < 0.82$) See appendix VI.2.3.

To recapitulate, the results in both comprehension and summary scores showed that the difference between the age group was mainly due to age 13. This was explained in terms of the pupils' background or social belonging. They came from educated families closely related to school life to which they were attached.

10.4.2. Posttest Results Related to Age:

10.4.2.1 Comprehension Scores:

10.4.2.1.1. Overall Comprehension Scores:

The ANOVA results have shown clear differences between different age groups ($F=3.471$; $df= 4,234$; $p<0.009$) See appendix VIII.1.1.)

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13	Calculated NK		
							r	p	0.01 p
17	3.90	-	0.07	0.29	0.79	2.27**	5	2.16	1.81
16	3.97		-	0.22	0.72	2.20**	4	2.07	1.71
15	4.19			-	0.50	1.98**	3	1.94	1.56
14	4.69				-	1.48*	2	1.71	1.30
13	6.17					-			

**Significant at p 0.01; * p 0.05

After the methods have been applied it would be fruitful to find out whether this difference of age is present in both methods. The ANOVA analyses did not show any difference for the MFM ($F=1.265$; $df=4,115$; $p<0.288$) See appendix IX.1.1.1. The traditional method, however, did show a marginally significant difference between different age groups ($F= 2.389$; $df=4,112$; $p<0.055$) See table 10.4.1. below.

Table 10.4.1 ANOVA Overall comprehension for age, TM

Source of variation	Sum of Square	df.	Mean Square	F	Sig.of. F
Age	31.533	4	7.883	2.389	0.055
Sex	0.122	1	0.122	0.037	0.848
Sch	16.342	2	8.171	2.477	0.089
Residual	369.534	112	3.299		
Total	412.325	119	3.465		

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13		Calculated NK	
		3.20	3.44	3.77	4.00	5.67	r	p 0.01	p 0.05
17	3.20	-	0.24	0.57	0.80	2.47**	5	1.32	1.10
16	3.44	-	0.33	0.56		2.23**	4	1.26	1.03
15	3.77		-	0.23		1.90**	3	1.18	0.94
14	4.00			-		1.67**	2	1.04	0.78
13	5.67					-			

**Significant at $p < 0.01$

It is clear that age 13 is the age making the differences. this age performed better than any other age group. The other age groups did not differ from each other.

10.4.2.1.2. Deep Posttest Comprehension Scores

The ANOVA results showed that the different age groups performed similarly ($F=0.890$; $df= 4,234$; $p < 0.471$). See appendix VIII.1.2. However, it is interesting to find out whether there are any differences

between age groups due to either MFM or TM. In fact, ANOVA analyses did not show any differences between different age groups in neither MFM or TM ($F=0.096$; $df= 4,115$; $p < 0.983$ and $F= 1.136$; $df= 4,112$; $p < 0.147$ for MFM and TM respectively) See appendices IX.1.1.2 for MFM and IX.2.1.2 for TM.

10.4.2.1.3 Surface Posttest Comprehension Scores

The ANOVA analysis showed significant differences between different age groups ($F=5.103$; $df= 4,234$; $p < 0.001$) (See table 10.3.3. Section 10.3.2.1.3 Surface Posttest comprehension scores for schools).

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13	Calculated NK	
							r	p
		2.30	2.39	2.55	3.11	3.75	0.01	0.05
17	2.30	-	0.09	0.25	0.81	1.45*	5	1.60 1.35
16	2.39		-	0.16	0.72	1.36*	4	1.54 1.27
15	2.55			-	0.56	1.20*	3	1.44 1.16
14	3.11				-	0.64	2	1.27 0.97
13	3.75					-		

*Significant at $p = 0.05$

The difference between different age groups was due to age group (13), performing better than any other group except age group (14) which did not differ from age group 13. Was that difference due to MFM or was it due to TM or to both?

In fact, while under the MFM the age groups did not differ ($F=2.211$; $df=4,115$; $p < 0.072$; appendix IX.1.1.3) Under the TM, the age groups differed significantly. ($F=2.587$; $df=4,112$; $p < 0.041$) See table

10.4.2 below.

Table 10.4.2 ANOVA Table; Surface Comprehension, TM

Source of Variation	Sum of Square	df	Mean Square	F	sig. of F
Age	12.557	4	3.139	2.587	0.041
Sex	0.155	1	0.155	0.128	0.721
Sch	1.707	2	0.853	0.703	0.497
Residual	135.911	112	1.213		
Total	148.992	119	1.252		

Newman Keuls Test Table

Age	ordered means	17	16	15	14	13	Calculated NK			
		2.00	2.25	2.42	2.83	3.33	r	p	0.01	p 0.05
17	2.00	-	0.25	0.42	0.83	1.33**	5	1.04	0.86	
16	2.25		-	0.17	0.58	1.08**	4	0.99	0.81	
15	2.42				0.41	0.91*	3	0.92	0.74	
14	2.83				-	0.50	2	0.81	0.62	
13	3.33					-				

** p .01; *p .05

Here age group 13 differed from all other age groups by performing better than any of them except age 14 which was not significantly different. The other ages 14,15,16 and 17 did not differ from each other.

10.4.2.2. Posttest Summary Scores

10.4.2.2.1 Overall Posttest Summary Scores

The analysis of variance showed that age groups did not differ in their overall posttest scores ($F = 2.291$; $df = 4,234$; $p < 0.06$) See table 10.3.5. (Section 10.3.2.2.2. Summary Posttest Overall Scores).

It is worth looking at whether this result of no difference between age groups prevails in the MFM and TM when analysed separately. the ANOVA results showed that the age groups did neither differ under the MFM ($F = 0.898$; $df = 4,115$; $p < 0.468$; appendix IX.1.2.1) nor did they differ under the TM ($F = 0.164$; $df = 4,112$; $p < 0.956$; appendix IX.2.2.1)

10.4.2.2.2. Deep Posttest Summary Scores

The analysis of variance on the deep posttest scores showed no difference between age groups ($F = 0.477$; $df = 4,234$; $p < 0.753$). See table 10.3.8; (section 10.3.2.2.2: deep Posttest summary scores for schools). When the MFM and TM were analysed separately, the analysis showed that there was no difference between the age groups neither in MFM ($F = 0.700$; $df = 4,115$; $p < 0.594$) nor in TM ($F = 0.889$; $df = 4,112$; $p < 0.467$). See appendices IX.1.2.2 and IX.2.1.2.

10.4.2.2.3 Surface Posttest Summary Scores

The ANOVA analysis did not reveal any differences between any age groups ($F = 2.068$; $df = 4,234$; $p < 0.086$). See table 10.3.10 (section 10.3.2.2.3 Surface posttest summary scores for schools) When the results were analysed separately for MFM and TM, one at a time, the analysis showed that the age groups did not differ neither under MFM ($F = 0.604$; $df = 4,115$; $p < 0.660$ Appendix IX.1.2.3); nor under the TM, the age group differed significantly ($F = 2.068$; $df = 4,112$; $p < 0.090$, appendix IX.2.2.3)

To sum up the analysis of age groups, the results showed that at the pretest level, the age groups differed under the comprehension

measure. When the levels of comprehension were analysed separately, it was revealed that this difference was due to the surface level. The explanation of this results can be seen in the light of the emphasis of the Algerian educational system on rote learning. This is why the age groups performed differently on that aspect of comprehension. The results reported revealed that age group (13) were learning more. The explanation given was that those pupils were children of teachers and people related to education.

Under the summary writing scores, the difference of age was due to the deep level. this can be explained that since a summary is a condensed form of what is summarised, one expected that it only contains the message (deep level). It can again be explained that because age group 13 was more exposed to different experiences which put them at an advantage over the other age groups to write better summaries at deep level.

At the posttest level, the results again showed differences between age groups. However, when the results were broken down between MFM and TM, the difference between age groups was no more observed under the MFM. Under the TM, however, age groups still showed differences in the comprehension at the surface level. This supports the claim of the emphasis in the Algerian system of education on surface learning.

For MFM, age groups were not different under any level of comprehension (overall, deep, surface). This can be interpreted as follows: the method through its provision of experience and encouragement to relate any experience of the pupils to what they learned reduced the difference between those age groups. This is assumed to be due to the three levels of the MFM, i.e. elaboration,

encouragement of self-reflection and the emphasis on recapitulation to make sure that comprehension was being achieved.

Under the summary, all differences between age groups disappeared for both MFM and TM. This may be due to the exposure to experiences included in the information of the texts. For MFM this can be seen that the method provided experiences to pupils through its different aspects especially, the training in summarising.

10.5 ANALYSIS OF RESULTS FOR SEX FACTOR

No differences were found between boys and girls neither on the comprehension scores nor on scores of summary writing. This is true for both pre- and post-test results of both comprehension and summary writing. Even when the analysis was done separately for the MFM and TM, there were not any differences between boys and girls. See tables 10.1.3 and 10.1.4 as an example see also appendices VI, VII, VIII, and IX.

10.6 Summary of the Chapter

The analysis of results showed that:

1. The MFM was beneficial in both measures of comprehension and summary writing. This was supported through:
 - a. comparison of MFM to TM and
 - b. comparison of pretest and posttest scores within the MFM
2. The MFM improved both indices (levels) of learning: deep and surface.
3. The MFM showed its relevance and usefulness in classroom-learning-related activities.
4. Different schools seemed to benefit differently from the MFM.
5. Age groups benefitted equally from MFM.
6. Boys and girls equally improved in their learning under the MFM.

CHAPTER 11

GENERAL DISCUSSION AND CONCLUSION

11.1 Overview of Results and General Discussion

The main objective of this research has been to develop and evaluate a useful model for improving teaching of comprehension in Algerian middle schools. The thesis has analysed the problems facing the Algerian educational system. It has recognised the difficulty encountered in tackling all the possible problems that the system is facing and has, hence, focussed on improving comprehension as one basic ingredient contributing to the many efforts required for solving the problem of the fall of educational standards.

Practices in the Algerian classroom were monitored by a survey of teachers and pupils. The analysis showed that the problem that pupils and teachers faced was the assumption on the part of teachers that pupils left to their own devices should be able to develop suitable techniques of comprehension. No attention was paid to teaching pupils how to comprehend. The teachers expected their pupils to do well without doing much to gear their activities towards more meaningful (deep) learning that goes beyond the information presented. The idea that pupils have to be shown how to comprehend did not occur to the majority of teachers in the survey.

From the literature and the theoretical positions adopted herein, useful suggestions have been made from which a model has been developed. The model has been devised to respond to the Algerian specific aspects of the problem as well as to reflect current thinking in the field.

The model was applied in classroom and its results have been

analysed. The statistical analysis of results gained from tests of comprehension and summary writing show that this model was working well for the pupils it was meant to help. The pupils taught according to this model showed significantly better comprehension than those who were not. The results can be discussed as follows:

11.1.1 General Improvement of Comprehension:

General improvement in comprehension was assessed by a combined score summing deep and surface understanding. The fact that the experimental group performed so much better can be explained by the combined use of three techniques, namely, elaboration, summarising, and self-reflection. They worked individually in different contexts. For instance, the number of elaborations made is shown in the following studies to be a factor leading to comprehension improvement (Anderson and Reder, 1979; Brown et al, 1984; Linden, 1979; Plamere et al 1983; Reder, 1980; Stein and Bransford, 1979; Stein et al; 1978). At the same time, making one aware of one's processes and the way information is dealt with, does lead to comprehension improvement (Brown, 1978; 1980; Dorner, 1978; Garner, 1980; Hare and Pullian, 1980). This improvement is reached through the subject's awareness of compensatory strategies. Evidence, in the above-mentioned studies and in this study, suggests that when readers read more consciously and actively their understanding is enhanced much better than readers who read without engaging in such activities. This is further corroborated when summarising is introduced. Summarising ideas of a text has been shown (Kintsch & Van Dijk, 1978; Brown et al 1983b; Brown and Day, 1983; Day, 1980; Borde, 1983) to be a good technique as well as a good measure of comprehending that text. If one summarises a text effectively using the rules of summarisation (Kintsch and Van Dijk, 1978; Day, 1980) one's

comprehension improves (Brown and Day, 1981; Brown et al, 1983b).

11.1.2 Improvement of Depth of Comprehension:

Depth of comprehension is a degree within a continuum of effective learning. Understanding can be achieved at different levels as many studies have shown (Ballstaedt & Mandl, 1985; Biggs, 1970, 1976; Biggs & Collins, 1982; Ford, 1981; Entwistle et al, 1979a & b; Marton and Saljo, 1976; Pask, 1976).

Two major levels have been identified, deep and surface levels. The surface level of processing concentrates on obtaining facts or information with the intention to memorise them. The deep level of understanding relates to the attempt on the part of the learner, first, to understand what is read, second, to relate and integrate the different parts of what is read or heard, third, to reach a conclusion of one's own and to make use, in so doing, of personal experience.

Thus, 'meaningful learning' is one in which information is related to existing knowledge (Ford, 1981). The more extensive the links between concepts and those already stored in memory, the more 'meaningful' learning can be said to be (Johnson, 1975). However, because information, as encountered in teaching and learning situations, is unlikely to be presented in a form ideally matched to the learners' existing knowledge structure (Frijda, 1978), some interpretation of the original information is necessary for anything more than nonemantic (syntactic) reproduction from memory. For that reason depth of comprehension, as stated above, should include (see Ford, 1981 p 349):

- clear intention to understand what the author is trying to say;
- an intention to integrate what is being read with other parts of material, with facts, or with previous experience, and

- an intention to try to reach own conclusion or make use of personal experience.

The depth of comprehension is tested in many ways. Depth is achieved when a learner can make inferences and relate what the text entails to personal experiences and hence enrich those experiences or build one's background knowledge (Schema) either through its improvement or solidification. The depth in that sense is not only in getting the message the text tries to convey but also in realising that what has been learned in one specific context can be generalised to and applied in other contexts. This, in itself, is a way of enriching experience. Thus, depth of comprehending broadens the scope of thought and allows the learner to see the link between different pieces of information learned (Eich, 1985; Ford, 1981; Linden, 1979; Nigel, 1981; Palincsar, 1985; Wittrock, 1975). Consequently, a wholistic (General) picture of the world is grasped and what is termed as schema or mental framework (Anderson et al, 1977a & b) is formed. This is rather different from the surface aspect of learning where the learner only understands and/or retains pieces of information as being different or unrelated entities.

The depth of comprehension was seen in scores of both comprehension and summary writing. Although it was not intended to isolate the relative contribution of each technique, one is in a position to say that the combined application of elaboration, self-reflection and summarisation, played a role in producing a deeper level of comprehension in these Algerian schools. Depth of comprehension can be induced in pupils as the literature suggests and this was achieved in the context of these secondary schools as the study reveals.

This study therefore presents a model for inducement of meaningful (deep) learning based on the joint activities taken by the teacher and

the pupils within the specific environment in which these activities take place. To induce deep comprehension there was a sequence of events and an identifiable patterns were designed in the procedure.

The adaptation of the theory to the local culture has been achieved by shifts of emphasis in order to meet traditional expectations.

11.1.2.1 As the teacher is seen, in Algeria, as the regulator of learning in the classroom, s/he is there to instruct in order to help pupils learn. A more positive role is expected of the teacher and accordingly, more positive role is given in the model. The observable teacher's behaviour that was and ought to be observed in training can be summarised in the following:

- The teacher behaves to encourage pupils to use what they already know to make predictions and interpret what they read according to their experiences.
- The teacher provides pupils with or encourages them to use many cues to make comprehension of what is being read or learned more accessible through elaborations, analogies, inferences and different advance organizers and facilitators such as titles, illustrations, overviews etc. All this is designed to help students formulate their questions about the material at hand.
- The teacher follows up the pupils' answers by discussing them and letting other pupils give their views.
- The teacher encourages pupils to summarise the material in their own words to ensure that the message is perceived and not lost while elaborations, inferences etc. are made to clarify the text.

11.1.2.2 As enlightening the pupils is the target of the learning process in school, they are expected to respond to the teachers' initiatives. Here too the tradition is to be respected. The expectation of spontaneous initiatives on the part of the pupils is low and has to be deliverately taught. In the programme pupils are required to concentrate on what seems more vital in the learning process, i.e. to focus on meaning. This is achieved through different observable behaviours.

- Risk-taking behaviour is noticed where pupils venture guesses about the interpretation of the text they read. They advance possible inferences, predictions and use their own experiences, values and ideas to interact with the ideas of the author and the questions and/or directions of the teacher. That is, pupils are made to realise that reading for deep comprehension is not reading for right answers alone; it is thinking and interpreting as they read and reacting to all available cues within and outside of the text.
- Pupils are encouraged within the model to set their own purposes for reading.
- The enthusiasm and motivation pupils bring to the reading instructional activities are noticeably increased when reading and learning are seen to be meaningful to them. The teacher plays an important role in creating the right atmosphere for arousing such enthusiasm and maintaining it through the use of activites mentioned above.

11.1.2.3 For these activities of the teacher and pupils to be useful, the right environment has to be provided. The physical environment of the classroom is a resource for the teaching/learning process. When

these activities are encouraged in the proper way and within the appropriate atmosphere, the learning process results in a deeper comprehension (Huffman & Edwards, 1983; Bullstaedt & Mandl, 1985).

This model is in line with many theoretical positions in cognitive psychology (eg. Brown et al; 1983a). In the review chapters (especially, chapters 5, 6 and 7) it was stated that engaging in activities on the part of the learner and through the help of teachers (eg training pupils in activities resulting in learning) leads to and induces better and more effective comprehension and learning (Day, 1980; Dorner, 1978; Linden, 1979).

Thus, learning at the higher-level of abstraction (deep) correlates with the adoption of different learning approaches (Biggs, 1979; 1980; 1982; Entwistle et al, 1979a & b; Ford, 1981; Marton and Saljo, 1976, Svenson, 1976). These approaches are strategic reactions to particular learning situations (Lauriard, 1979).

11.1.3. The Total Learning Events as Cognitive Apprenticeship:

In this study the conditions of activity on the part of the teachers are available in the model. The teacher starts to ask questions and monitor answers providing ample time for pupils to participate and to have a positive role in the learning process. A lot of scope is given for any elaborations to be made to clarify the meaning. Questions are asked to make sure pupils understand. The pupils themselves are encouraged to represent their comprehension in question forms since it is part of the procedures of the model to make pupils ask questions requiring answers reflecting what is being read. This is an easy and quick to use measure available for the teachers to assess their pupils' comprehension. Moreover, the procedures of the

model included a summary of what is read when the teacher instructs the pupils to summarise a text or part of it to other pupils to give a good idea of what is read. Inducement of awareness of one's learning processes is also part of the model procedures when pupils are required to justify and explain their responses and when they are asked or told what they do or should do to reach a conclusion, make an inference or elaboration or pose a question.

In common with other successful training studies (eg. Brown & Palincsar, 1985; Scardamalia and Bereiter, 1983), this study suggests four essential characteristics. namely, 1) on the job training, 2) imitation learning, 3) practice with realistic and meaningful examples, and 4) the use of domain specific knowledge. These four ingredients are said to summarise the concept of cognitive apprenticeship. This old concept which was traditionally applied to training studies directed to the acquisition of skills or trades is now meaningfully employed to clarify some of the more complex processes involved in classroom learning.

The teachers in this model behaved like the master-craftsman of old (see for eg. Childs and Greenfield, 1980) going through the processes of comprehending from text as a living example to his pupils. In doing this, the teacher made her/his thoughts externally available to the learner by questions and suggestions. The MFM is in a sense a reversal of a trend. The old trend has taken education away from the concept of apprenticeship (Childs and Greenfield, 1980) and training to one of a school system approach which stresses abstract communication on the part of the teacher and less activity on the part of the learner. the multifaceted model of teaching reintroduces apprenticeship and active doing in the classroom. The teacher's task is not merely to leave the

learner to learn but primarily, like a good craftsman, to make the learner him/herself involved in the learning process. her/himself.

Finally, the concept of apprenticeship and giving an essential role to the teacher as master-craftsman to be imitated, is in keeping with the culture in which the study takes place.

11.1.4 Improvement of surface Comprehension:

The interpretation of achievement of depth of processing is thus well supported and is clearly in line with available literature and evidence. It remains to explain the improvement that occurred on the surface level of comprehension. The discussion undertaken this far has shown that depth of comprehension entails integration of information in a wholistic conceptual form that is helped by background knowledge. Such explanation, then, assumes that detail and surface meaning is left out or ignored (eg. Sachs, 1967). Yet, the present research has shown that pupils did do well even on the surface level of comprehension. Pupils did not only remember the text they read in its depth but were also able to do well on the surface level. This can be explained in that this improvement was mainly due to the lengthy discussion and the participation on the part of pupils. Time was allocated for making elaborations which consisted of giving examples, drawing analogies, making inferences and drawing mental pictures of what was read. This is thought to be responsible for the pupils' improvement in surface learning. Indeed this is in keeping with the research evidence available, to the effect that the number of elaborations made is an indicator of good comprehension; that is, the more elaborations one makes about the text, the more likely one is to learn and retain the information in that text (eg. Stein et al 1978).

11.1.4 Summary of General Discussion:

To summarise the discussion thus far, it has been argued that the MFM has improved the pupils' comprehension on both surface and deep levels. This has been explained to be due to elements of the programme derived from available evidence and literature (see chapters 5,6 and 7) and according to the model developed for this research entitled "Multifaceted Model for Teaching Comprehension". The results (Chapter 10) have also shown that this method has indeed induced many important activities, in the learners, that are essential for learning to occur. The conceptual metaphor on which the model is built is one of classroom learning as a cognitive apprenticeship exercise. The many tentative efforts made to relate this teaching model to the cultural environment have also been discussed.

11.2 Educational Implication

This research throws light on theoretical as well as practical issues. Firstly, by amalgamating a number of well founded cognitive theories into a unified model, one was able to bridge the gap between theory and practice. It was in this study and not a question of which factor could, in isolation, be demonstrated to be superior to other factors but which child was better able to improve faced with a psychologically based programme.

The practical implications are many but most salient of all is the attitudinal change in the approach to teaching for understanding. Just to get a restructuring of the teachers approach to comprehension is such a way that they appreciate that comprehension should be taught and is not an automatically acquired skill is educationally most important. To get teachers to accept the concept of teaching as a cognitive apprenticeship and to act this concept out in the realities of the classroom is a second strong educational outcome.

To get the teachers to see that to achieve comprehension, the text should no longer be regarded as the ultimate criterion for defining what good comprehension is, instead the text should be viewed along with students' prior knowledge and strategies, the task and the classroom situation, facets in a complex array, is a third educational outcome of this programme.

Redressing these balances and resolving the situational problems, this research has offered a useful programme for effective teaching/learning of text reading comprehension. The programme has

been shown to improve comprehension as well as elicit the potentials of pupils in the classroom. Hence, the model is proposed as useful basis for rejuvenating the teacher training programmes in Algerian teacher training colleges (Institut Pedagogiques).

The actual programme (Multifaceted, method for teaching comprehension) contained three different but complementary techniques for training pupils to learn effectively. These are elaboration, summarisation and self-reflection. They are put into a practical series of procedures which reflect the situation of the Algerian system - A detailed exposition of the programme is available as a guide for further training and a larger scale evaluation.

A fourth outcome of this research is the usefulness of this programme as an evaluative measurement tool. The qualitative analysis of data (Chapter 10) was revealing. By using different aspects of the MFM, teachers and pupils alike noticed that it was possible to identify those pupils who understood from those who did not. The procedure of the MFM was wide ranging in identifying strengths and weaknesses in the pupils' learning strategies. The teacher could identify, through the inducement of elaborations, the pupils who related the information in the text to their background knowledge. Then s/he could decide whether that knowledge could be relied on and used as a basis for moving on to improve and enrich it. If this background knowledge was lacking, then the teacher had the opportunity to fill the gap and guide the pupils to gain appropriate information to fill the gaps in their background knowledge on the topic being studied.

The teacher's probe in pupils answers and the request to justify their answers gave a chance to the teacher to ascertain whether the pupil really understood what s/he is talking about or s/he was guessing.

The requirement to ask questions by the pupils and to summarise what they read gave good hints and could be again used as measures of comprehension or failure to do so.

Thus, the facets of the MFM, if developed further can be used as a measure of comprehension as well as they have been proved useful in enhancing it.

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APPENDICES

Appendix	II	Teachers' questionnaire on teaching practices.
"	I2	Pupils' " " learning styles.
"	II1	Data on teachers' questionnaire.
"	II2	" " pupils' "
"	II2.1.1	Data on styles of learning for school MFM Gp.
"	II2.1.2	" " " " " " " 2 " "
"	II2.1.3	" " " " " " " 3 " "
"	II2.2.1	" " " " " " " 1 TM "
"	II2.2.2	" " " " " " " 2 " "
"	II2.2.3	" " " " " " " 3 " "
"	III	Texts, related multiple questions and an example on application of MFM on one text.
"	III1	Texts used in the study
"	III2	Multiple questions related to texts
"	III3	Example of the application of MFM on a text
"	IV	Instruction to judgements of question on text comprehension
"	V	Raw data
"	V1	Scores on comprehension and summary writing
"	V2	Means and standard deviations for schools
"	V3	" " " " " age
"	V4	" " " " " sex
"	VI	Anova pretest Tables on comprehension and summary scores
"	VI1.1	comprehension overall scores
"	VI1.2	" deep "
"	VI1.3	" surface "
"	VI2.1	Summary overall "
"	VI2.2	" deep "
"	VI2.3	" surface "
"	VII	Ancova tables for comprehension and summary
"	VII1.1	" " " " overall
"	VII1.2	" " " " deep
"	VII1.3	" " " " surface
"	VII2.1	" " " summary overall
"	VII2.2	" " " " deep
"	VII2.3	" " " " surface
"	VIII	Anova posttest tables
"	VIII1.1	" table comprehension overall
"	VIII1.2	" " " deep
"	VIII1.3	" " " surface
"	VIII2.1	" " summary overall
"	VIII2.2	" " " deep
"	VIII2.3	" " " surface
"	IX	Separate anova tables for MFM and TM posttest
"	IX1.1.1	Anova table comprehension overall for MFM
"	IX1.1.2	" " " deep " "
"	IX1.1.3	" " " surface " "
"	IX1.2.1	" " Summary overall " "
"	IX1.2.2	" " " deep " "
"	IX1.2.3	" " " surface " "
"	IX2.1.1	Anova table comprehension overall for TM
"	IX2.1.2	" " " deep " "
"	IX2.1.3	" " " surface " "
"	IX2.2.1	" " summary overall " "
"	IX2.2.2	" " " deep " "
"	IX2.2.3	" " " surface " "
"	X	T-test tables pre-and post-test for MFM
"	XI	Teacher' questionnaire on the effect of MFM
"	XII	Teachers' open-ended report on MFM effect
"	XIII	Samples of pupils' open-ended report MFM
"	XIIIA	" " " answers in the interview MFM
"	XIV	Samples of arabic texts and questions

Appendix I
Teaching Styles Questionnaire

Please answer all the questions in this questionnaire put a tick under the appropriate choice for both parts of the questionnaire ("my duty is to" and "I generally do").

(//)=Definitely agree

(/) =agree with reservation

(x) =disagree with reservations

(xx)=definitely disagree

(?) =is only to be used if the item does not apply to you or you find it impossible to give a definite answer.

- 1- I see it as my job as a teacher to help pupils to
2- I do actually do it.

	MY DUTY IS TO I GENERALLY DO									
	//	/	x	xx	?	//	/	x	xx	?
	4	3	1	0	2	4	3	1	0	2
1- organise their study effectively.	-	-	-	-	-	-	-	-	-	-
2- relate ideas in one subject to those in others, whenever possible.	-	-	-	-	-	-	-	-	-	-
3- gain a fairly good idea of many things rather than knowledge of details.	-	-	-	-	-	-	-	-	-	-
4- by telling them precisely what to do in essays or other set work.	-	-	-	-	-	-	-	-	-	-
5- understand what technical terms mean by getting them memorise the textbook definitions.	-	-	-	-	-	-	-	-	-	-
6- by encouraging them to aim at good results for their own self-esteem.	-	-	-	-	-	-	-	-	-	-
7- understand thoroughly the meaning of what they are asked to read.	-	-	-	-	-	-	-	-	-	-
8- memorise important facts which may come useful later/when they are reading.	-	-	-	-	-	-	-	-	-	-
9- keep in mind exactly what is required for doing a piece of work.	-	-	-	-	-	-	-	-	-	-
10-be cautious in drawing conclusions unless they are well supported by evidence.	-	-	-	-	-	-	-	-	-	-
11-understand that their reason for being at school is to learn more about the subjects that really interest them.	-	-	-	-	-	-	-	-	-	-
12-understand new ideas by making pupils relate them to real life-situations	-	-	-	-	-	-	-	-	-	-

	//	/	x	xx	?	
1. I find it easy to organise my study time effectively.	4	3	1	0	2	A
2. I try to relate ideas in one subject to those in others, whenever possible.	4	3	1	0	2	C
3. Although I have a fairly good general idea of many things, my knowledge of the details is rather weak.	4	3	1	0	2	C
4. I like to be told precisely what to do in essays or other set work.	4	3	1	0	2	B
5. The best way for me to understand what technical terms mean is to remember the text-book definitions.	4	3	1	0	2	F
6. It's important to me to do really well in the courses here.	4	3	1	0	2	A
7. I usually set out to understand thoroughly the meaning of what I am asked to read.	4	3	1	0	2	D
8. When I'm reading I try to memorise important facts which may come in useful later.	4	3	1	0	2	B
9. When I'm doing a piece of work, I try to bear in mind exactly what that particular teacher/lecturer seems to want.	4	3	1	0	2	A
10. I am usually cautious in drawing conclusions unless they are well supported by evidence.	4	3	1	0	2	E
11. My main reason for being here is so that I can learn more about the subjects which really interest me.	4	3	1	0	2	D
12. In trying to understand new ideas, I often try to relate them to real-life situations to which they might apply.	4	3	1	0	2	C
13. I suppose I am more interested in the qualifications I'll get than in the courses I'm taking.	4	3	1	0	2	B
14. I'm usually prompt at starting work in the evenings.	4	3	1	0	2	A
15. Although I generally remember facts and details, I find it difficult to fit them together into an overall picture.	4	3	1	0	2	F
16. I generally put a lot of effort into trying to understand things which initially seem difficult.	4	3	1	0	2	C
17. I often get criticised for introducing irrelevant ideas into essays or discussions.	4	3	1	0	2	C
18. Often I find I have to read things without having a chance to really understand them.	4	3	1	0	2	C
19. If conditions aren't right for me to study, I generally manage to do something to change them.	4	3	1	0	2	A
20. Puzzles or problems fascinate me, particularly where you have to work through the material to reach a logical conclusion.	4	3	1	0	2	D
21. I often find myself questioning things that I hear in lessons/lectures or read in books.	4	3	1	0	2	C
22. I find it helpful to 'map out' a new topic for myself by seeing how the ideas fit together.	4	3	1	0	2	D
23. I tend to read very little beyond what's required for completing assignments.	4	3	1	0	2	C
24. It is important to me to do things better than my friends, if I possibly can.	4	3	1	0	2	A
25. Tutors/teachers seem to want me to be more adventurous in making use of my own ideas.	4	3	1	0	2	D
26. I spend a good deal of my spare time in finding out more about interesting topics which have been discussed in classes.	4	3	1	0	2	D
27. I seem to be a bit too ready to jump to conclusions without waiting for all the evidence.	4	3	1	0	2	C
28. I find academic topics so interesting, I should like to continue with them after I finish this course.	4	3	1	0	2	D
29. I think it is important to look at problems rationally and logically without making intuitive jumps.	4	3	1	0	2	D
30. I find I have to concentrate on memorising a good deal of what we have to learn.	4	3	1	0	2	D

Appendix II.1

 Appendix IIIA
 Teachers Scores of Modified Inventory
 Assessing Perception of Duty

S C A L E S												
Teachs	A	B	D	C	G	E	F	H	S	V	P	T
1	17	14	13	09	09	09	09	18	18	31	32	64
2	18	14	12	09	09	09	07	18	16	30	32	64
3	17	14	10	09	07	09	09	16	18	28	30	63
4	14	16	10	09	07	09	05	16	18	28	30	63
5	17	14	14	09	09	09	09	18	18	32	32	65
6	12	16	13	07	07	07	05	14	10	25	28	57
Ttl	95	88	72	52	48	50	44	100	94	174	182	375
Mn	15.8	14.6	12.0	8.6	8.3	8.0	7.3	16.7	15.6	29.0	30.3	62.5
sd	2.1	0.9	1.5	0.7	1.0	1.5	1.8	1.5	2.9	2.3	1.8	2.6

 Appendix IIIB
 Teachers Scores Actual Practice
 in Classroom

S C A L E S												
Teachs	A	B	D	C	G	E	F	H	S	V	P	T
1	17	18	12	09	09	09	09	18	18	30	36	59
2	18	17	13	09	09	07	09	18	16	29	35	60
3	17	14	09	09	07	09	09	16	18	27	30	62
4	14	14	11	07	07	09	07	14	16	27	28	61
5	17	18	14	09	09	09	09	18	18	32	36	61
6	08	10	12	07	07	05	03	14	08	24	20	60
Ttl	91	91	71	50	48	48	46	98	94	169	185	363
Mn	15.1	15.1	11.8	8.3	8.0	8.0	7.6	16.3	15.6	28.1	30.8	60.6
SD	3.4	2.8	1.6	0.9	1.0	1.5	2.2	1.8	3.5	2.5	5.7	0.9

Scales

Achievement	A
Reproducing	B
Meaning	D
Comprehension Learning	H
Operation Learning	S
Versatile Approach	V
Learning Pathologies	P
Prediction of Success	T

Appendix II~~2~~

Appendix II.1.1
Scores On Inventory of Approaches to Learning
School Experimental

Pupils	S C A L E S											
	A	B	D	C	G	E	F	H	S	V	P	T
1	24	17	11	05	06	08	05	11	13	24	28	68
2	20	11	10	08	03	04	08	11	12	22	22	68
3	15	17	13	09	02	04	10	11	14	26	29	60
4	18	11	11	03	07	07	05	10	12	21	23	64
5	13	16	13	10	05	03	07	15	10	26	28	59
6	20	22	12	12	08	10	12	20	22	34	42	60
7	21	18	09	09	05	06	10	14	16	24	33	60
8	14	18	10	07	04	08	06	11	14	25	28	59
9	20	18	14	10	05	06	07	15	13	30	30	68
10	19	17	12	11	06	10	11	17	21	31	34	64
11	16	17	13	04	07	07	10	11	17	24	34	54
12	17	18	11	08	03	03	05	11	08	22	26	61
13	12	16	12	09	01	05	09	10	14	26	26	60
14	20	20	10	07	07	06	10	14	16	23	37	54
15	21	24	10	10	05	08	07	15	15	28	36	61
16	19	17	13	07	04	03	09	11	12	23	30	60
17	16	19	14	09	05	06	07	11	13	29	31	62
18	17	17	11	09	04	07	09	13	16	27	30	60
19	16	13	10	07	07	07	08	14	15	23	28	59
20	18	17	13	08	04	04	06	12	10	25	27	64
21	22	18	14	10	03	08	11	13	19	32	32	70
22	21	23	12	12	05	12	12	17	24	36	40	65
23	16	22	13	06	02	09	07	08	16	28	31	61
24	18	24	10	07	04	10	09	11	19	27	37	56
25	19	19	10	04	04	06	07	08	13	20	30	57
26	15	17	12	07	07	08	05	14	13	27	29	61
27	18	24	11	11	11	11	05	22	16	33	40	59
28	20	23	11	11	07	07	12	18	19	29	42	55
29	19	20	11	11	03	09	12	14	21	31	35	63
30	19	20	08	08	06	07	08	14	15	23	34	56
31	21	20	12	07	03	06	08	10	14	25	31	63
32	16	21	12	06	04	06	08	10	14	24	33	55
33	21	20	07	08	05	07	07	13	14	22	32	59
34	24	20	14	04	10	11	12	14	23	29	42	59
35	17	17	10	09	06	08	07	15	15	27	30	62
36	22	21	13	11	08	07	11	19	18	31	40	61
37	21	24	10	10	01	07	07	11	14	27	32	64
38	20	20	14	06	06	10	07	12	17	30	33	68
39	16	17	07	07	05	08	10	12	18	22	32	64
Ttl	721	733	443	317	198	279	326	512	605	1036	1257	2385
Mn	18.5	18.8	11.4	08.1	05.0	07.1	08.3	13.1	15.5	26.6	32.2	61.1
SD	2.8	3.2	1.8	2.3	2.1	2.2	2.2	3.1	3.5	3.8	4.9	3.9

Appendix II.1.2
Scores On Inventory Of Approaches To Learning
School2 Experimental

	S C A L E S											
Pupils	A	B	D	C	G	E	F	H	S	V	P	T
1	18	16	10	11	07	09	09	18	18	30	32	64
2	12	16	12	11	05	11	04	16	15	34	25	69
3	17	19	13	10	05	09	10	15	19	32	34	63
4	18	15	13	10	05	09	10	15	19	32	35	63
5	19	16	14	05	08	11	06	13	19	30	27	70
6	17	16	12	05	06	06	07	11	13	23	29	59
7	16	15	13	12	06	11	12	18	23	36	33	67
8	16	17	13	03	04	08	07	07	15	24	28	60
9	13	18	11	11	06	12	12	17	24	34	36	59
10	14	12	14	11	03	06	06	14	12	31	21	72
11	13	15	12	06	04	10	09	10	19	28	28	61
12	12	12	13	03	01	09	07	04	16	25	20	65
13	18	16	14	10	07	09	07	17	16	33	30	69
14	16	16	10	10	05	06	09	15	15	26	30	60
15	11	15	11	03	08	08	09	11	17	22	32	49
16	17	14	07	07	06	11	09	13	20	25	29	61
17	16	15	10	11	06	09	07	17	16	30	28	66
18	13	13	11	08	05	08	09	13	17	27	27	61
19	11	18	12	12	06	08	07	18	15	32	31	60
20	15	14	12	08	08	06	04	16	10	26	26	63
21	16	16	10	11	04	11	09	15	20	32	29	67
22	18	13	10	11	07	10	09	18	19	31	29	68
23	13	15	11	05	08	09	10	13	19	25	33	69
24	16	17	13	09	06	09	08	15	17	31	31	64
25	15	14	12	12	04	08	08	16	16	32	26	69
26	14	10	11	10	08	11	10	18	21	32	28	66
27	14	18	12	12	06	09	10	18	19	33	34	61
28	16	17	13	12	03	12	12	15	24	37	32	69
29	18	16	08	08	07	00	08	15	08	16	31	51
30	11	13	09	09	07	07	07	16	14	25	27	57
31	14	13	13	10	03	10	10	13	20	23	26	59
32	16	17	12	08	10	08	09	18	17	28	36	56
33	15	16	13	12	07	06	09	19	15	31	32	62
34	13	15	10	10	04	09	10	14	19	29	29	61
35	12	14	12	06	07	11	11	13	22	29	32	57
36	17	12	13	10	01	07	08	11	15	30	23	72
37	15	14	09	10	08	09	08	18	17	28	30	61
38	16	18	12	11	07	12	10	17	22	35	35	64
39	19	18	09	08	07	08	09	15	17	24	34	57
40	18	16	10	07	03	06	05	10	11	23	24	65
41	17	17	11	05	10	09	05	15	14	25	32	58
42	18	15	09	08	01	07	04	09	11	24	20	70
43	16	14	12	11	05	06	05	16	11	29	24	69
Ttl	659	656	491	382	244	370	354	625	726	1232	1258	2713
Mn	15.3	15.3	11.4	8.9	5.7	8.6	8.2	14.5	16.9	28.6	29.3	63.1
SD	2.3	1.9	1.6	2.6	2.1	2.2	2.1	3.2	3.7	4.3	4.1	5.2

Appendix II2.1.3
Scores On Inventory Of Approaches To Learning
School3 Experimental

Pupils	S C A L E S											
	A	B	D	C	G	E	F	H	S	V	P	T
1	21	16	10	12	05	03	09	17	08	25	30	64
2	16	17	11	12	08	12	07	20	19	35	32	67
3	15	14	08	11	01	07	06	12	13	26	21	68
4	18	16	13	10	05	09	09	15	18	32	30	68
5	20	16	11	08	01	06	09	09	15	25	26	67
6	18	15	15	07	03	06	06	10	12	28	24	70
7	19	17	10	11	06	03	07	17	10	24	30	61
8	20	15	11	09	06	05	05	15	10	25	26	67
9	12	18	12	09	04	06	10	13	16	27	32	65
10	16	12	13	09	09	11	10	18	21	33	31	66
11	17	17	14	06	05	03	07	11	10	23	29	71
12	11	17	13	12	01	08	11	13	19	33	29	63
13	16	15	11	08	05	05	08	13	13	24	28	68
14	18	16	12	07	02	03	05	09	08	22	23	65
15	13	17	09	05	05	04	06	10	10	18	29	50
16	19	16	10	12	10	11	05	22	17	33	29	63
17	20	12	09	10	06	05	10	16	15	24	28	64
18	18	16	12	03	03	04	08	06	12	19	27	58
19	19	12	09	11	05	03	02	16	05	23	19	71
20	17	15	08	12	06	08	08	18	16	28	29	64
21	16	16	14	04	02	09	09	06	18	27	27	64
22	13	17	11	11	07	04	06	18	10	26	30	57
23	17	15	10	10	04	06	07	14	13	26	26	65
24	18	14	11	11	01	05	06	12	11	27	21	71
25	16	16	07	11	01	05	11	12	16	23	28	59
26	19	15	10	12	07	09	12	19	21	31	34	64
27	13	15	14	04	06	05	09	10	14	23	30	54
28	19	17	14	11	01	06	09	12	15	31	27	71
29	20	14	07	10	03	07	11	13	18	24	28	64
30	15	13	13	10	02	04	06	12	10	27	21	69
31	12	16	09	09	04	07	11	18	18	25	31	54
32	16	15	11	10	05	08	10	15	18	29	30	61
33	16	15	09	10	05	08	10	15	18	27	30	61
34	16	15	11	10	05	08	10	15	18	29	30	63
35	19	14	09	11	03	04	09	14	13	24	26	65
36	20	13	10	08	06	09	06	14	15	27	25	70
37	19	18	08	09	06	09	07	15	16	26	31	62
38	14	15	12	12	01	05	09	13	14	29	25	66
39	14	16	12	08	05	06	06	13	12	26	27	61
40	20	18	13	12	10	09	12	22	21	34	40	54
41	17	17	12	07	07	08	10	14	18	27	34	58
Ttl	692	633	448	384	202	263	334	576	594	1095	1155	2621
X	16.9	15.4	10.9	9.4	4.9	6.4	8.1	14.0	14.5	26.7	28.2	63.9
SD	2.6	1.6	2.0	2.4	2.6	2.4	2.2	3.6	3.9	3.8	3.9	5.1

Appendix 112.2.1
Scores On Inventory Of Approaches To Learning
School Control

Pupils	S C A L E S											
	A	B	D	C	G	E	F	H	S	V	P	T
1	12	15	11	09	03	12	09	12	21	32	27	65
2	16	16	11	11	07	10	09	18	19	32	27	69
3	15	14	13	09	09	09	11	18	20	31	34	60
4	18	14	12	12	05	07	09	12	16	31	28	69
5	10	16	14	03	03	04	10	06	14	21	29	50
6	16	17	13	11	07	11	07	18	18	35	31	68
7	18	16	11	11	05	05	10	16	15	27	31	62
8	14	15	12	10	03	10	04	13	14	32	22	72
9	18	16	10	11	08	05	08	19	13	26	32	60
10	14	14	13	10	07	06	09	17	13	29	30	61
11	15	16	13	07	06	08	04	13	12	28	26	65
12	17	20	15	11	03	08	08	14	11	34	31	68
13	13	16	13	11	05	10	08	16	15	34	29	66
14	18	17	13	08	05	08	06	13	14	29	28	67
15	19	17	12	03	06	07	09	09	16	22	32	57
16	16	14	11	09	10	04	04	19	08	24	28	60
17	15	17	12	07	04	05	09	11	14	24	30	57
18	18	16	10	10	02	11	08	12	19	31	26	71
19	19	18	11	11	08	08	08	19	16	30	34	63
20	18	20	10	08	05	09	08	13	17	27	33	60
21	12	15	13	07	04	04	09	11	13	24	28	56
22	20	16	09	07	07	12	09	14	21	28	32	64
23	11	13	11	09	05	03	02	14	05	23	30	52
24	20	19	12	11	11	12	12	22	24	35	42	61
25	14	13	11	11	12	10	11	23	22	32	36	58
26	12	10	09	09	03	08	09	12	17	26	22	64
27	13	16	11	11	06	11	11	17	22	33	33	64
28	18	18	12	12	06	11	08	18	19	35	32	69
29	21	16	10	08	05	05	12	13	17	23	33	59
30	14	17	08	10	06	10	05	16	15	28	28	62
31	13	16	12	09	03	06	05	12	11	27	24	64
32	15	17	11	10	01	10	06	11	16	31	24	70
33	18	16	09	11	07	12	08	18	20	32	31	67
34	18	15	10	08	06	05	10	14	15	23	31	58
35	16	18	13	10	05	06	10	15	16	33	33	64
36	18	15	12	10	07	05	09	17	14	27	31	62
37	16	14	10	02	05	10	07	07	17	22	26	60
38	13	16	11	11	02	10	09	13	19	32	27	66
39	20	19	10	11	08	10	11	18	21	31	38	61
Ttl	621	623	444	359	220	317	321	573	629	1093	1169	2451
Mn	15.9	15.9	11.4	9.2	5.6	8.1	8.2	14.7	16.1	28.0	29.9	62.8
SD	2.7	1.9	1.5	2.3	2.4	2.7	2.3	3.7	3.9	5.9	4.0	4.9

Appendix 112.2.2
Scores On Inventory of Approaches to Learning
School2 control

Pupils	S C A L E S											
	A	B	D	C	G	E	F	H	S	V	P	T
1	18	16	11	09	05	06	10	14	16	26	31	61
2	17	15	13	05	08	07	07	13	14	25	30	60
3	12	18	09	09	03	09	01	12	10	27	22	65
4	15	16	11	10	06	04	07	16	11	25	29	59
5	18	16	08	05	03	10	04	08	14	23	23	66
6	16	17	13	07	06	07	09	13	16	27	32	59
7	18	17	11	05	08	06	05	13	11	22	30	58
8	14	16	13	09	03	11	09	12	20	33	28	67
9	17	16	13	06	04	10	05	10	15	29	25	69
10	17	12	12	08	04	07	10	12	17	27	26	66
11	15	15	12	06	03	08	08	09	16	26	27	62
12	20	15	11	09	07	06	05	16	11	26	27	67
13	12	18	10	10	04	08	11	14	19	28	33	55
14	18	15	12	03	05	06	10	08	16	21	30	57
15	10	16	10	08	05	07	10	13	17	25	31	52
16	18	18	09	10	07	09	09	17	18	28	34	60
17	17	18	15	06	07	07	05	13	12	28	30	63
18	19	18	13	06	05	11	12	11	23	30	35	62
19	12	14	12	00	04	08	07	04	15	20	25	55
20	19	16	10	03	07	04	05	10	11	17	28	56
21	16	12	11	10	08	11	08	21	19	32	28	56
22	17	16	13	10	04	06	10	14	16	29	30	64
23	18	15	10	04	05	08	12	09	20	22	32	56
24	18	16	11	10	07	09	09	17	18	30	32	64
25	16	12	08	08	05	06	08	13	14	22	25	61
26	19	19	13	08	04	09	04	12	13	30	27	64
27	18	15	11	09	04	11	05	13	16	31	24	73
28	17	17	12	07	06	09	11	13	20	28	34	59
29	15	16	10	07	03	07	07	10	14	24	26	61
30	20	18	12	09	07	08	07	16	15	29	32	65
31	19	17	08	11	02	08	05	13	13	27	24	70
32	14	13	10	08	04	09	06	12	15	27	23	66
33	17	16	10	12	04	10	10	16	20	32	30	67
34	20	16	11	10	07	08	08	17	16	29	31	66
35	15	16	12	09	03	09	02	12	11	30	21	72
36	13	11	10	07	04	10	10	11	20	27	25	63
37	18	18	12	11	06	12	11	17	23	35	35	66
38	19	15	11	12	04	08	11	16	12	31	30	68
39	17	16	10	09	09	10	09	18	19	29	34	60
40	19	13	11	10	04	10	11	14	21	31	28	70
41	19	17	13	07	05	09	08	12	17	29	30	66
Ttl	668	646	457	322	209	338	321	534	654	1117	1177	2588
X	16.3	15.8	11.1	7.8	5.1	8.2	7.8	13.0	15.9	27.2	28.7	63.1
SD	2.4	1.9	1.6	2.5	1.7	1.9	2.7	3.1	3.4	3.7	3.7	4.9

Appendix 112.2.3
Scores on Inventory of Approaches to Learning
Schhol3 Control

	S C A L E S											
Pupils	A	B	D	C	G	E	F	H	S	V	P	T
1	18	15	07	09	04	04	07	13	08	23	26	63
2	18	16	10	11	05	09	11	16	20	30	32	64
3	15	16	08	09	10	05	10	19	15	22	36	53
4	20	16	11	11	05	10	11	16	21	32	32	68
5	18	15	09	08	08	10	07	16	17	27	30	63
6	19	18	11	11	05	07	11	16	18	29	34	62
7	20	16	10	09	05	07	10	14	17	26	31	63
8	19	15	08	06	03	06	09	09	15	20	27	60
9	20	16	09	10	03	08	09	13	11	27	28	67
10	18	13	11	12	03	11	08	15	19	34	24	76
11	17	15	13	07	02	11	10	09	21	31	27	69
12	19	15	08	10	03	11	08	13	19	29	26	71
13	17	12	12	06	05	08	06	11	14	26	23	68
14	18	15	13	09	04	10	06	14	16	32	25	73
15	14	17	09	10	04	05	06	14	11	24	27	59
16	15	14	13	09	04	08	09	13	17	30	27	66
17	17	16	10	11	06	10	08	17	18	31	30	66
18	19	16	08	07	01	06	08	08	14	21	25	63
19	18	13	11	12	07	10	08	19	18	33	28	71
20	14	17	12	11	05	07	07	16	14	30	29	63
21	17	16	11	10	08	06	07	18	13	27	31	61
22	18	14	10	11	03	10	11	14	21	31	28	69
23	20	16	11	08	03	06	10	11	16	25	29	64
24	15	15	09	10	04	06	11	19	10	25	30	58
25	19	15	12	12	10	12	12	22	24	36	37	66
26	19	17	14	05	01	05	07	06	12	24	25	66
27	19	14	11	11	10	11	08	21	19	32	32	67
28	20	16	09	09	10	11	08	19	19	29	34	63
29	19	18	13	05	01	08	09	06	17	26	28	65
30	19	14	10	05	07	10	12	12	22	25	33	59
31	20	15	16	07	01	08	09	08	17	31	25	74
32	12	14	12	05	03	09	05	08	14	26	22	64
33	09	17	13	05	06	07	07	11	14	25	30	52
34	19	18	14	11	03	06	10	14	16	31	31	67
35	18	12	13	07	04	06	10	11	16	26	26	66
36	13	14	11	09	05	09	10	14	19	29	29	61
37	19	18	10	03	07	07	05	10	12	20	30	56
38	16	16	13	02	06	06	06	08	12	21	28	57
39	23	17	14	12	04	12	11	16	23	38	32	77
40	17	20	10	11	06	12	11	17	23	33	37	61
Ttl	704	622	439	346	194	330	348	546	662	1117	1164	2581
X	17.6	15.6	10.9	8.6	4.8	8.2	8.7	13.6	16.5	27.9	29.1	64.5
SD	2.6	1.7	2.0	2.6	2.5	2.2	1.9	4.0	3.8	4.3	3.6	5.5

Appendix 112.3A
Means and Standard Deviations of Pupils' Scores
On Approaches of Learning For Individual Groups

Scales	Schools											
	School1				School2				School3			
	Expm.Gp.		Cont.Gp.		Expm.Gp.		Cont.Gp.		Expm.Gp.		Cont.Gp.	
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD
A	18.5	2.8	15.9	2.7	15.3	2.3	16.3	2.4	16.9	2.6	17.6	2.6
B	18.8	3.2	15.9	1.9	15.3	1.9	15.8	1.9	15.4	1.6	15.6	1.7
D	11.4	1.8	11.4	1.5	11.4	1.6	11.1	1.6	10.9	2.0	10.9	2.0
H	13.1	3.1	14.7	3.7	14.5	3.2	13.0	3.1	14.0	3.6	13.6	4.0
S	15.5	3.5	16.1	3.9	16.9	3.7	15.9	3.4	14.5	3.9	16.5	3.8
V	26.6	3.8	28.0	5.9	28.6	4.3	27.2	3.7	26.7	3.8	27.9	4.3
P	32.2	4.9	29.9	4.0	29.3	4.1	28.7	3.7	28.2	3.9	29.1	3.6
T	61.1	3.9	62.8	4.9	63.1	5.2	63.1	4.9	63.9	5.1	64.5	5.5

Appendix 112.3B
Means and Standard Deviations of Pupils Scores on
Approaches and Styles of Learning

Scales		Experim. Gp.		Control Gp.		Overall	
		\bar{X}	SD	\bar{X}	SD	\bar{X}	SD
Achievement	A	16.9	2.6	16.6	2.6	16.8	2.6
Reproducing	B	16.5	2.2	15.8	1.8	16.8	2.4
Meaning	D	11.2	1.8	11.1	1.7	11.2	1.8
Comprehension Learning	H	13.9	3.3	13.8	3.6	13.8	3.5
Operation Learning	S	15.6	3.7	16.1	3.7	15.9	3.8
Versatile Approach	V	27.3	3.9	27.7	4.6	27.5	4.3
Learning Pathologies	P	29.9	4.3	29.2	3.8	29.6	4.0
Prediction of Success	T	62.7	4.7	63.5	5.1	63.1	4.9

Appendix III Texts, related questions and an example of the application of MFM

Appendix III.1. Texts

Appendix III.1.1 Towns in Elizabethan Time used in pretest

Most towns up to Elizabethan times were smaller than a modern village and each of them was built around its weekly market where local produce was brought for sale and the townsfolk sold their work to the people from the countryside and provided them with refreshment for the day. Trade was virtually confined to that one day even in a town of a thousand or so people. On market days craftsmen put up their stalls in the open air whilst on one or two other days during the week the townsman would pack up his loaves, or nails, or cloth, and set out early to do a day's trade in the market of an adjoining town where, however, he would be charged a heavy toll for the privilege and get a less favourable spot for his stand than the local craftsmen. Another chance for him to make a sale was to the congregation gathered for Sunday morning worship. Although no trade was allowed anywhere during the hours of the service (except at annual fair times), after church there would be some trade at the church door with departing country folk.

The trade of markets was almost wholly concerned with exchanging the products of the nearby countryside and the goods made by local craftsmen with the result that the genuine retail dealer had very little place. In all goods sold in the market but particularly in food retail dealing was distrusted as a kind of profiteering. Even when there was enough trade being done to afford a livelihood to an enterprising man ready to buy wholesale and sell retail, town authorities were reluctant to allow it.

Yet there were plainly people who were tempted to 'forestall the market' by buying goods outside it, and to 'regrate' them, that is to resell them, at a higher price. The constantly repeated rules against these practices and the endlessly recurring prosecutions mentioned in the records of all the larger towns prove that some well-informed and sharp-witted people did these things.

Nowadays, shopping hours are restricted in the interests of the retailers and not because of the scarcity of the goods. Medieval people restricted the market hours in the buyers' interests, so that every buyer should have an equal chance to buy a fair share of whatever was going and also to enable the authorities to keep an eye on the transactions and make sure that no one made a corner in some commodity and forced up the price.

Every town made its own laws and if it was big enough to have craft guilds these regulated the business of their members and tried to enforce a strict monopoly of their own trades. Yet while the guild leaders, as craftsmen, followed fiercely protectionist policies, at the same time, as leading townsmen, they wanted to see a big, busy market yielding a handsome revenue in various dues and tolls. Conflicts of interest led to endless, minute regulations, changeable, often inconsistent, frequently absurd. There was a time in the fourteenth century, for example, when London fishmongers were not allowed to handle any fish that had not already been exposed for sale for three days by the men who caught it.

In a diet where fruit and vegetables were scarce and poor, fish made a most welcome change and the whole population ate no meat on Fridays and fast days and all through Lent. Fresh fish was very dear and even salted or dried or smoked fish, much more widely eaten, was very expensive. Salt herrings, the cheapest and most plentiful fish, were the universal standby. People who could afford the outlay bought their salt herring by the barrel at the autumn fairs to store for winter and the following Lent.

Appendix III.2 Fossils : test 1st. application of MFM

In almost all cases the soft parts of fossils are gone for ever but they were fitted around or within the hard parts. Many of them also were attached to the hard parts and usually such attachments are visible as depressed or elevated areas, ridges, or grooves, smooth or rough patches on the hard parts. The muscles most important for the activities of the animal and most evident in the appearance of the living animal are those attached to the hard parts and possible to reconstruct from their attachments. Much can be learned about a vanished brain from the inside of the skull in which it was lodged.

Restoration of the external appearance of an extinct animal has little or no scientific value. It does not even help in inferring what the activities of the living animal were, how fast it could run, what its food was, or such other conclusions as are important for the history of life. However, what most people want to know about extinct animals is what they looked like when they were alive. Palaeontologists also would like to know. Things like fossil shells present no great problem as a rule, because the hard parts are external when the animal is alive and the outer appearance is actually preserved in the fossils. The colour is usually guesswork, although colour bands and patterns are occasionally preserved even in very ancient fossil shells.

Animals in which the skeleton is internal present great problems of restoration, and honest restorers admit that they often have to use considerable guessing. The general shape and contours of the body are fixed by the skeleton and by muscles attached to the skeleton, but surface features, which may give the animal its really characteristic look, are seldom restorable with any real probability of accuracy. The present often helps to interpret the past. An extinct animal presumably looked more or less like its living relatives, if it has any. This, however, may be quite equivocal. Extinct members of the horse family are usually restored to look somewhat like the most familiar living horses—domestic horses and their closest wild relatives. It is, however, possible and even probable that many extinct horses were striped like zebras. Others probably had patterns no longer present in any living members of the family. If lions and tigers were extinct they would be restored to look exactly alike. No living elephants have much hair and mammoths, which are extinct elephants, would doubtless be restored as hairless if we did not happen to know that they had thick, woolly coats. We know this only because mammoths are so recently extinct that prehistoric men drew pictures of them and that the hide and hair have actually been found in a few specimens. For older extinct animals we have no such clues. Length of hair, length and shape of ears, colour and colour pattern, presence or absence of a camel-like hump are uncertain inferences at best and downright guesses at worst in most restorations of fossils, especially those of mammals.

Without attempting a restoration much may be learned about the life activities of ancient animals from their hard parts, from shells and other external supports or from reconstructed internal skeletons. In fact even single teeth or parts of dentition or skeletons too incomplete for reconstruction may permit some valid and useful inferences about the living animals. For example, food habits of extinct mammals can be judged in a general way and sometimes very specifically from their teeth. Most fossil mammals with well-developed canine teeth and shearing posterior teeth ate meat by preference. If they had sharp, large canines, only moderately heavy or light jaws and posterior teeth, and had swiftly running or leaping forms they were predacious. If the teeth were heavier and blunter, the jaws more powerful, and the limbs less agile, they probably ate carrion. Mammals with low-crowned teeth and fairly numerous, non-shearing tooth points or cusps generally were omnivorous. Mammals with some sort of cropping apparatus at the front end of the jaws and with heavy, rigid grinding teeth farther back ate plants. Those with relatively low teeth ate mostly leaves and twigs. Land mammals in which the teeth tended to degenerate or were lost altogether were for the most part those eating ants or termites.

Appendix III.3 Motoring offences text used as posttest

There is a basic hypothesis that the majority of serious motoring offences are derived from accidents, and there is nothing in the offender's personality or background that predisposes him to break the law. If an accident is a chance event that happens so quickly and suddenly that it is beyond anyone's control to prevent it, then it is clear that this hypothesis is disproved. For only about 14 per cent of the 653 offences considered in a recent survey could possibly be called inadvertent accidents in this sense, and even this estimate is stretching credulity to its limits. In the great majority of cases the offences were largely of the offenders' own making, and the most obvious explanation seemed to be expediency in the absence of any constraints upon behaviour. In 11 per cent of the 653 cases and 21 per cent of 43 offenders who were interviewed there was evidence of selfish, and even ruthless, self-interest, but it was not possible to infer personality disturbance in more than 25 per cent of the 653 and 39 per cent of the 43 offenders. Though the inferences with regard to personality traits may be an overestimate in the interpretation of qualitative data, they could equally be an underestimate, since so very little was ever recorded about the offenders themselves. The lack of data is a consequence of the almost total lack of interest in motoring offenders as persons.

It must be assumed, therefore, in the absence of evidence to the contrary that the majority of serious motoring offenders considered in the survey were normal people, who succumbed to temptation when circumstances were favourable and it was expedient to take a chance, so perhaps there is something in the normal personality that predisposes a driver to break the law. Whatever it is, its presence is much more evident in males than in females, since the analysis of the national statistics shows a predominance of males over females of between 18:1 and 22:1. The real significance of these figures is hard to assess, because the relative proportions of each sex at risk are unknown. One research worker produced a ratio of six males to one female from his sample of insurance policy holders, but this is almost certainly an underestimate since many females—probably more than males—are likely to be driving on someone else's policy. A ratio of three to one is probably nearer to the real state of affairs. Females reached noticeable proportions only among the hit-and-run drivers, and there seems to be some justification for calling this the 'feminine' offence. The difference between the sexes in their relative propensity to break the law on the roads is important, because it shows that motoring offenders have a characteristic in common with offenders in other fields of criminal activity, where males predominate to a marked degree. One motor insurance underwriter recently announced his intention to offer discounts on premiums where the policy holder or the 'named driver' was a woman.

The basic hypothesis is further disproved by the very high incidence, among the offences studied, of failing to insure against third-party risks. Yet accidents brought to light only a very small percentage of this kind of crime. Moreover, it could not possibly be said that this, the most common of the serious offences, was brought about by providence. On the contrary, it can be regarded as a typical form of economic crime, which, although sometimes committed through inadvertence, is more usually quite deliberate and calculated.

Appendix III2 Mutiple questions on texts

Appendix III-2.1

Questions to text " Towns and markets" Pretest

- 1- The growth of towns before Elisabethan times was determined by
 - A- their comparatively small size.
 - B- their regular markets.
 - C- centrally planned buildings.
 - D- locally produced goods.
 - E- neighbouring tradesmen.

- 2- People up to Elisabethan times are most likely to do their shopping
 - A- fortnightly.
 - B- monthly.
 - C- weekly.
 - D- dayly.
 - E- anytime.

- 3- The tradesmen preferred the work in their own town because they could
 - A- easily find good refreshment.
 - B- sell any kind of produce.
 - C- work in the open air.
 - D- start work early.
 - E- have the best placed stalls.

- 4- If tradesmen sold their produce in a town other than their own they would
 - A- find profitable trade much slower.
 - B- have to pay a special tax.
 - C- need to start work much earlier.
 - D- find local competition too hard.
 - E- have a long journey to work.

- 5- A tradesman was free to sell his goods only
 - A- at certain approved times.
 - B- on special market days.
 - C- at the annual fairs.
 - D- on alternate sunday mornings.
 - E- at the end of services.

- 6- Should trade be allowed during service?
 - A- No, because the place is too small for trade.
 - B- Yes, because it is in the interest of consumers.
 - C- No, because it would disarupt people's prayers.
 - D- Yes, because it makes a lot of prifits.
 - E- No, because it is non commercial.

- 7- The main accusation leveled against retailers was that they
 - A- interfered with market trading.
 - B- reduced the profit of crafsmen.

Appendix III2.1 con.

- C- charged unnecessary high prices.
- D- were basically dishonest.
- E- restricted the trade available.

- 8- Retailers were allowed to sell only when
- A- the market was slack and empty.
 - B- they could not make a quick profit.
 - C- they could hardly make a livelihood.
 - D- they had received formal approval.
 - E- whole salers were prepared to take a chance.

- 9- Retail trade restriction would be rediculous if
- A- the goods were in abundance.
 - B- the prices were to be pushed high.
 - C- it proves the dishonesty of the retailers.
 - D- work opportunities were not offered.
 - E- the goods were brought from far away town.

- 10- In medieval markets there was little ~~re~~tail trade because
- A- money was never used in sales.
 - B- producers sold directly to consumers.
 - C- there were no fixed positions for shops.
 - D- craftsmen preferred wholesale trade.
 - E- buying and selling were heavily taxed.

Appendix 1112.2

Questions to text "Fossils"

- 1- The fossils are
 - A- the preserved bones of dead animals.
 - B- ancient animals excavated by archeologists.
 - C- scientific reconstruction of prehistoric animals.
 - D- carved stones or rock printing of extinct animals.
 - E- rocks bearing the imprinted shapes of dead animals.

- 2- The soft parts of fossilized animals
 - A- can be accurately identified.
 - B- have always vanished without trace.
 - C- can usually be reconstructed.
 - D- have usually left some traces.
 - E- can never be reconstructed.

- 3- The depressed or elevated areas, ridges or groves, smooth or rough patches on the hard parts are helpful in reconstructing
 - A- soft parts.
 - B- hair length.
 - C- colour pattern.
 - D- external appearance.
 - E- eating habits.

- 4- Muscles of fossilized animals can sometimes be reconstructed because they were
 - A- preserved with the rest of the animal.
 - B- part of the animal's skeleton.
 - C- hard parts of the animals body.
 - D- fixed to the animal's skeleton.
 - E- essential to the animal's activities.

- 5- Shape and size of the skull may show the degree of the fossilized animal's degree of intelligence or sophistication because
 - A- the brain is preserved in the skull.
 - B- the brain was lodged in the skull and leaves traces on it.
 - C- the skull when put in a machine gives us reading about its intelligence.
 - D- the brain is on the upper level of the animal.
 - E- the brain is the source of activities of the animal.

- 6- "Fossils with many traces of attachment" suggest that the animal was
 - A- muscular.
 - B- without muscles.
 - C- a shell.
 - D- a fish.
 - E- a snake.

- 7- The reconstruction of fossilized animal's external appearance is considered necessary in order to

Appendix III 2.2 cont

- A- satisfy popular curiosity.
 - B- answer scientific questions.
 - C- establish its activities.
 - D- determine its eating habits.
 - E- discover its agility and speed.
- 8- A fossilized shell can easily be reconstructed because
- A- its colour can be intelligently guessed.
 - B- ancient drawings have left original carving of it.
 - C- its muscles were attached to the skull.
 - D- its hard parts were on the outside.
 - E- its soft parts were external.
- 9- It is difficult to know any thing about extinct animals with no bone structures because
- A- they can be partly reconstructed.
 - B- they do not offer hints for today's animals.
 - C- usually leave traces.
 - D- they do not have any similarities to today's animals.
 - E- they cannot be reconstructed.
- 10- honest restorers face great problems when reconstructing extinct animals which
- A- skeleton is external.
 - B- skeleton is attached to the general shape.
 - C- relatives are living.
 - D- skeleton is internal.
 - E- muscles are attached to the skeleton.

Appendix III 2.3

Question for text " motoring offences"

- 1- When circumstances are favourable and it is expedient to take a chance offenders are tempted to
 - A- commit motoring offences.
 - B- show their abilities to control themselves.
 - C- to behave gentlemenly.
 - D- underestimate females.
 - E- justify their breaking of the law.

- 2- The predisposition of drivers with normal prsonality to break the law is
 - A- twenty times more evident in men than in women.
 - B- indicative of men being more evil than women.
 - C- more evident in men than in women.
 - D- a sign of men taking risks more than women.
 - E- that men find it harder to resist temptation than women.

- 3- predisposition to break the law is highlighted by
 - A- favourable opportunities on the road.
 - B- the personality disturbances of drivers.
 - C- predominance of males over females.
 - D- constraints on drivers' behaviour.
 - E- the drivers background.

- 4- The commonest serious motoring offence committed by women seems to be failure to
 - A- take out proper insurance.
 - B- drive with due care.
 - C- give way to pedestrians.
 - D- observe traffic signals.
 - E- stop after an accident.

- 5- It is unreliable to assess the number of women drivers from the number of policy holders because
 - A- not all women drivers hold policies.
 - B- some women drive without insurance.
 - C- only husbands need to hold insurance policies.
 - D- companies are reluctant to insure women.
 - E- women usually drive someone else's car.

- 6- Women can sometimes get more favourable insurance terms than men because statistically they are
 - A- much better at controlling a car.
 - B- numerically smaller and unimportant.
 - C- less inclined to have serious accidents.
 - D- less likely to commit grave offences.
 - E- unwilling to take out policies themselves.

- 7- The failure to insure against third party risks is suggested to

Appendix III2.3 con.

be a

- A- deliberate conscious law breaking.
- B- driving offence category.
- C- cause of many accidents.
- D- allowed and minor accident.
- E- inflicting damage to a third party.

8- The last paragraph shows that the claim that the majority of motoring offences are derived from accidents is

- A- accurate.
- B- probable.
- C- falsified.
- D- illegal.
- E- acceptable.

9- The main discussion of this passage is largely

- A- mediative.
- B- analytical.
- C- descriptive.
- D- satirical.
- E- apologetic.

10- The subject of the whole passage is best summed up by the phrase

- A- the law and the criminal road offences.
- B- the insurance of motor vehicles.
- C- the causes of road accidents.
- D- the faults of men and women drivers.
- E- the personality of motoring offenders.

Appendix 1113
 An example of the application
 of MFM on the text "fossils"

Paragraph 1:

- Read the first paragraph very carefully in view to understanding.
- Let us discuss the paragraph.
 - What did you understand from it?
 - How did you arrive to what you understood?
 - How can you picture this to yourself?
 - Soft parts represent.....
 - Give examples of soft parts.
 - Give " " similar things that may leave traces and reveal that these things were there.

The last sentence "much can be learned it was lodged." is like saying and that is because....

- _ Now go back to the paragraph.
 - what did you understand from it?
 - what did it talk about?
 - what would that remind you of?
 - what made you (from your experience) understand the paragraph the way you did?
 - did the information and the way we tackled it remind you of anything you knew before but you did not understand well?
 - did the way of discussing the paragraph help in understanding what you were reminded of?
- What different interpretations can we make from this paragraph?
 - can we make inferences and whether a particular sentence have more than one meaning?
 - to make possible inferences
 - " " " interpretations
 - " " " assumptions
 - " ask " questions. etc...

In the first sentence, it can be assumed that the writer is telling us that it is very rare that a soft parts of an extinct animal remain.

- the normal rule is that soft parts disappear.
- soft parts disintegrate more readily than the hard ones.
- hard parts do not seem to disintegrate as soft ones.
- the hard parts are left as clues to living animals of the past.
- these hard parts must be bones and shells.

The paragraph also suggests that these hard parts were not just like that but were surrounded by soft parts.

	{- surround or be incorporated within}
These soft parts{- attached to	}hard parts
{- leave traces on	}

* Now let us look back at the paragraph. What is the general idea?

Appendix III3 con.

- * Are there any ideas, phrases or/and sentences that are not clear? Let's clarify them. Compare them to something similar, draw a picture or a diagram. Does this help?
- * Now ask a question(s) which answer reflect th meaning(s) of the paragraph. E.g. is there a way to identify (reconstruct) an extinct animal?
- * Now summarise the paragraph. Here are some rules to help you.
- * can you make a prediction of what might come ^after that? (what do you expect the next paragraph to be about?)
- * If you were to teach the paragraph to a fellow pupil
 - how would you go about explaining this ^{to} her/him?
 - what do you think the most important idea is?

Paragraphs 2, 3 and 4 were dicussed as 1. For example resoring an ancient building was discussed as an example for restoration(paragraph2).

- * When all the text was discussed in that manner, the pupils were required to read the text in one go and were told to:
 - try and think of what was discussed on each paragraph and remember the examples given.
 - think of possible good questions.
 - try to summarise the meaning in your head as you read trying to relate ideas together.

Let's dicuss the passge as awhole.

- What is the passge about?
- What are the most important points raised?
- How can we best summarise this text?
- How can we relate what we learned to some other experience(s) we already possess?
- To what subject(s) of you studies, for example, can you best relate this text and get you to better understand?
- What lessons (techniques) have you learned from it?
- How did we tackle this text? Is it clear or not?
- How useful was the way the text was tackled?
- Would you like your other teachers to use the method in their lessons.
- Would you be using the method in your subjects of study? Why?
- Will this method, in you opinion, make you comprehension better in future studying.

Appendix IV Instruction to Judgments of
Questions of Comprehension

Dear colleague,

I very much appreciate your help in assisting in my research.

In order to assess middle school pupils' level of text comprehension

I) Here are some passages followed by multiple-choice questions. I would like you to judge the relatedness of these questions to the texts as well as the appropriateness of the alternative answers to each question.

II) Could you judge each question according to
1) Deep or Surface
and 2) Inferential or Factual

As defined below:

Deep: when a question seeks

- the author's meaning
- to integrate important information
- relate important information to previous knowledge
- essential point(s)

Surface: when a question seeks

- specific details (not essential)
- specific information as essential & easy to identify

Inferential: true but not stated specifically as such in the passage.

Factual: true and stated as such or in a paraphrased form in the passage.

APPENDIX V

Appendix VI Comprehension and Summary Scores

Comprehension Scores: School 1 experimental.

Sbj.no. sex age gp.	S C O R E S		
	overall	deep	surface
01021401030301080303	9101940201	0300040102	
02011601030204070105	0202040102	0102030003	
03011401030504100605	0203050502	0301030103	
04011701030403050402	0201020101	0202030301	
05011401030604080505	0402050302	0202030203	
06021501030408080807	0204040403	0204040404	
07011401030305060401	0102040201	0203020200	
08021701030307070306	0304030203	0003040103	
09011401030104070204	0003050000	0101020204	
10011401030605090605	0202050501	0403040104	
11021501030403070401	0302040200	0101030201	
12011401030207060403	0005040101	0202020302	
13011501030404080303	0102040100	0302040203	
14021501030305080305	0104030203	0201050102	
15021401030604080706	0203050402	0401030304	
16011501030203030202	0102010001	0101020201	
17011501030205070402	0004030301	0203040101	
18011401030406080505	0204040202	0202040303	
19011601030405090405	0104050303	0301040102	
20011501030304080303	0103040201	0201020102	
21011501030405090005	0204050003	0201040002	
22021501030507060406	0304030204	0203030202	
23011601030306080305	0104040003	0202020302	
24011601030304060303	0103030200	0201030103	
25011401030403080307	0102030104	0301050203	
26011601030203070404	0101040202	0102030202	
27021501030205080600	0003040300	0202040100	
28021601030507080606	0204040302	0303040304	
29021601030306040504	0103010301	0203030203	
30021401030504050605	0304040303	0200010302	
31011501030107090404	0104040202	0003050202	
32011601030203070606	0101040402	0102030204	
33011601030303040503	0101020301	0202020102	
34021501030504060402	0102030200	0402030202	
35011401030604090303	0202050201	0402040102	
36021301030607080508	0204040203	0403040305	
37021501030604080502	0303040300	0301020302	
38011601030504070302	0103050202	0401020100	
39011401030405080203	00304040201	0101040002	

Appendix V1con.
Comprehension Scores School2. experimental

no.	S C O R E S		
	Overall	deep	surface
01011402030407080605	0104040501	0303040104	
02011402030506100809	0203050404	0303050405	
03021402030506080706	0204050402	0302030304	
04011402030505090605	0003050400	0502040205	
05021502030507091006	0205040502	0304050504	
06021402030606070707	0304040302	0302030405	
07021402030307040705	0203040201	0104000504	
08011602030306050403	0104020200	0202030203	
09021402030307070405	0103040203	0204030202	
10021402030506080703	0304050400	0202030303	
11011402030507090705	0104050502	0403040203	
12011402030508080304	0203040101	0305040203	
13021402030507070406	0104040202	0403030204	
14011402030601070506	0201040303	0400030203	
15021402030205030308	0103030303	0102000005	
16011402030504060403	0304040101	0200020302	
17011402030505080705	0303050500	0202030205	
18021402030507090805	0204050401	0303040404	
19011402030609080707	0204040402	0405040305	
20021402030305080607	0203040303	0102040304	
21021402030406080406	0204040303	0202040103	
22011402030307090808	0104050504	0203040304	
23021402030303070203	0101040101	0202030102	
24021402030606060403	0304040200	0302040203	
25011402030407100905	0103050501	0304050404	
26021402030305090806	0103040403	0202050403	
27021402030504090705	0203040501	0301050204	
28021402030706070406	0205040103	0501030303	
29021402030704060408	0303030303	0401030105	
30021402030606070705	0204040401	0402030304	
31021402030505070405	0203040202	0302030203	
32011402030402060607	0000040404	0402020203	
33021402030303070707	0102050303	0201020404	
34021402030503030305	0202030202	0301020303	
35011402030605080403	0204040301	0401040302	
36011402030404080708	0104050404	0300030304	
37021402030304060405	0002040202	0302020203	
38011402030705080806	0404040401	0301040405	
39011402030507090405	0203040302	0304050103	
40021502030607070505	0204040302	0403030303	
41021402030407080505	0104050101	0503030404	
42021502030605060406	0204040202	0401020204	
43021402030406070706	0104040302	0302030404	

Appendix VI con.
Comprehension Scores School3 Experimental.

sbj. no.	sex	age	sch.	gp.	S C O R E S		
					overall	deep	surface
01021503030407090408					9104040104	0303050304	
02011503030605100605					0202050301	0403050304	
03021503030704090705					0302040402	0402050303	
04021303030405070507					0303040203	0102030304	
05021603030307070305					0204030202	0103040103	
06021403030502060807					0101020403	0401040404	
07021503030002060507					0002040303	0000020204	
08021403030303080505					0202050302	0101030203	
09011503030102060306					0002030103	0100030203	
10011403030505070304					0503050202	0202020102	
11011503030306060604					0203050402	0103010202	
12011303030607090505					0204050403	0403040102	
13011703030207070805					0103040307	0104030707	
14011703030305070506					0101040203	0204030303	
15021403030104050206					0003020102	0101070104	
16011503030504040203					0202020102	0302020103	
17011603030502070705					0301050502	0201020203	
18021603030302060306					0201030103	0101030203	
19011403030505100707					0203050403	0302050304	
20011603030303100303					0101050202	0202050101	
21011603030402070506					0100030203	0302040303	
22011403030508090705					0405050403	0103040302	
23021403030305090808					0103050503	0202040303	
24011503030406100805					0104050401	0302050404	
25021403030407100908					0203050504	0204050404	
26021403030306101005					0202050502	0104050503	
27011403030407100907					0203050402	0204050505	
28021403030203070504					0002040302	0202010202	
29021503030306100707					0203050304	0103050403	
30011403030607050504					0303040301	0304010203	
31021403030302080507					0101030403	0201050104	
32021403030205040606					0103030202	0102010404	
33011703030304090504					0201050301	0103040203	
34011403030304080607					0202040304	0102040303	
35011503030606100609					0303050404	0303050205	
36011303030307090707					0104040502	0203050205	
37011303030407090706					0104040401	0303050305	
38021303030405100707					0202050303	0203050404	
39011403030407100605					0204050302	0203050303	
40021603030404060405					0202040303	0202020102	
41011403030304050302					0104020101	0200030201	

Appendix VI con.

Comprehension Scores School 1 control

sbj no.	sex	age	sch.	gp.	s c o r e s		
					overall	deep	surface
01021401040307100407					0105050203	0202050204	
02021801040402090505					0201040303	0201050202	
03011501040202030103					0001020101	0201000202	
04021401040405070405					0303030101	0102040304	
05011801040503060403					0102040301	0401070102	
06021401040305070706					0103040303	0202030403	
07011501040403090103					0203040101	0200050002	
08021401040705070706					0403030302	0302040404	
09021801040706060208					0403030104	0303030104	
10011401040406090405					0103050303	0303040102	
11011401040104080203					0002040100	0102040103	
12011801040406070404					0104040101	0302030303	
13011401040202040303					0102030000	0100010303	
14011701040304050202					0103030000	0201020202	
15011501040503080406					0202040203	0301040203	
16011801040305020101					0203010001	0102010100	
17021801040303050303					0102020100	0201030203	
18011801040303050202					0203040200	0100010002	
19021401040304070004					0102040000	0202030004	
20021401040206050103					0203030001	0003020102	
21011401040005070305					0003050101	0002020204	
22011801040203060102					0102040100	0101020002	
23011401040405040206					0204030103	0201010103	
24011501040203070702					0002040300	0201030402	
25021501040406070306					0102040103	0304030203	
26011401040303060507					0201030203	0102030304	
27021401040304040203					0202020102	0102020101	
28021501040200010004					0100010001	0100000003	
29011701040304040504					0102030202	0202010302	
30011401040409090607					0305040303	0104050304	
31011401040405080105					0203030002	0202050103	
32021501040705070403					0403040201	0302030202	
33011701040402050105					0302030003	0100020102	
34011401040606070706					0303030302	0303040404	
35011401040506050203					0102020200	0404030003	
36021401040303040505					0102030204	0201010301	
37011401040504070504					0202030201	0302040304	
38021401040405080607					0203040203	0202040404	
39011401040202020201					0102000100	0100020101	

Appendix VI con.
Comprehension Scores School 2 control

sbj.no.	sex	age	sch.	gp.	S C O R E S		
					overall	deep	surface
01011502040605080405					0302050300	0303030105	
02021602040205060203					0103020101	0102040102	
03011502040505070805					0202040502	0303030403	
04011402040402070202					0201040000	0201030202	
05011502040304090203					0202050102	0102040101	
06021402040302070102					0101030000	0201040102	
07021402040204060401					0103030100	0101030301	
08021302040404080605					0203040201	0201040404	
09011502040204060502					0102030309	0102030202	
10011402040406040302					0203020100	0203020202	
11011402040505080403					0203050200	0302030203	
12021502040304070204					0002030000	0302040204	
13021402040305030503					0103010201	0202020302	
14011402040100030102					0100020100	0000010002	
15021502040304070305					0102030101	0202040204	
16011602040404080402					0103030200	0301050202	
17021402040303090706					0101050301	0202040405	
18011402040408090603					0105050500	0303040203	
19011402040205060203					0103040000	0102020203	
20021502040204060606					0103040404	0101020202	
21021602040708060203					0203030401	0505030402	
22021402040404040100					0202020000	0202020100	
23021502040204090303					0102040001	0102050302	
24011402040305040003					0103040001	0202000002	
25011402040603090103					0201050002	0402040101	
26011402040502060206					0402020202	0100040004	
27021402040304080103					0102050001	0202030102	
28021402040304080506					0102040202	0202040304	
29021502040405080501					0204040300	0201040201	
30011402040503100404					0103050000	0400050404	
31011402040203090405					0102050201	0101040204	
32021402040503050405					0302020102	0201030303	
33021402040401090506					0101050301	0300040205	
34021402040303050102					0102020000	0201030102	
35011502040404070103					0202040000	0202030103	
36011502040605070303					0203040201	0302030102	
37021502040406060707					0103030204	0303030503	
38021402040506080705					0204040401	0302040304	
39021402040602060602					0301020200	0301040402	
40021402040403070505					0103030301	0300040204	
41021602040403070303					0102040101	0301030202	

Appendix VI con.
Comprehension Scores School3 Control.

Sbj. no. sex age sch. gp.	S C O R E S		
	overall	deep	surface
01011303040601070507	0201040304	0401030203	
02021503040504070502	0203040201	0301030301	
03011403040504070604	0203040402	0301030202	
04011403040505070505	0303040302	0202030203	
05021403040403060603	0203030100	0200030303	
06021403040404070604	0203050300	0201020304	
07011403040202050301	0202040100	0000010201	
08011503040306060404	0105030302	0201030102	
09011403040405060505	0202040201	0203020304	
10021503040605070406	0303030202	0302040204	
11011403040406040703	0204040201	0202000502	
12011403040606081005	0204040501	0402040504	
13021403040101040102	00000010101	0101030001	
14021403040505070705	0103040301	0402050404	
15011503040301060406	0101040003	0200020403	
16021303040505070406	0203050203	0302020203	
17011603040407070406	0103040302	0304030104	
18021503040202020003	0202020000	0000000003	
19021503040204050403	0202030101	0002020302	
20011403040604080309	0203040205	0401040104	
21011603040404040203	0102030001	0302010202	
22021703040203050002	0102030000	0101020002	
23021403040205070402	0103040200	0102030202	
24011403040304070106	0203040003	0101030103	
25021403040008050505	0005040402	0003010103	
26021303040404070706	0103040303	0301030403	
27021403040303030103	0102010001	0201020102	
28011303040708100705	0204050501	0504050204	
29011403040403050103	0203030000	0200020103	
30021703040300040203	0100040101	0200000102	
31011403040507070505	0102040504	0405030405	
32011403040507070702	0203040301	0304010401	
33011403040603071002	0103040500	0400030302	
34021403040304080002	0102040000	0202040002	
35011503040402050206	0201040104	0201010102	
36021603040004060301	0002030300	0002030001	
37021403040403070602	0202050300	0201020302	
38021403040305020303	0103010001	0202010302	
39021303040504050005	0202030002	0302020003	
40021503040104060400	0003040100	0101020300	

Appendix VI con.
Summary Scores School.1 experimental

no.	S C O R E S		
	overall	deep	surface
0102123	030502090404	0302050303	0200040101
0201160	1030405090206	0301030104	0104050102
0301140	1030705090706	0403050603	0302030203
0401170	1030604060503	0402040302	0202020201
0501140	1030805090606	0503070304	0302020302
0602150	1030609090908	0405060505	0204030403
0701140	1030506070502	0303040301	0203030201
0802170	1030508080407	0305050305	0203030102
0901140	1030305080305	0202040203	0103040102
1001140	1030806090706	0504040504	0302050202
1102150	1030604080502	0402050302	0202030200
1201140	1030408070504	0305040204	0103030300
1301150	1030605090404	0404040203	0201050201
1402150	1030506090406	0303050305	0203040101
1502140	1030805090807	0504040504	0301050303
1601150	1030404040303	0303020202	0101020101
1701150	1030406080303	0204030301	0202030202
1801140	1030607090606	0303040404	0304050202
1901160	1030606090506	0303050203	0303040303
2001150	1030505070404	0203050303	0302020101
2101150	1030606090305	0404050204	0202040102
2202150	1030708070507	0405050304	0303020203
2301160	1030507070406	0304040302	0203030104
2401160	1030505070404	0203030103	0302040301
2501140	1030604090408	0302050206	0302040202
2601160	1030404080505	0202040303	0202040202
2702150	1030406090703	0204030501	0203040202
2802160	1030708090707	0405050405	0303040302
2902160	1030507050605	0204030304	0303020301
3002140	1030705060706	0303030405	0402030301
3101150	1030308090505	0205050304	0103040201
3201160	1030404080707	0202050405	0202030302
3301160	1030504050504	0307030403	0201020201
3402150	1030705070503	0403030301	0302040202
3501140	1030805090404	0402030202	0403040202
3602130	1030808090609	0505040403	0303050203
3702150	1030805070704	0304030504	0301020203
3801160	1030705080404	0403040302	0302040102
3901140	1030606090305	0304030102	0302040201

Appendix VI con.
Summary Scores School2 experimental

sbj.no.	sex	age	s ch.	gp.	S C O R E S		
					overall	deep	surface
01011402030607090705					0305050403	0304040302	
02011402030506090809					0304050505	0205040304	
03021402030606070807					0403040404	0204030403	
04011402030705090706					0405040303	0304050303	
05021502030707050507					0305050504	0404040403	
06021402030806080708					0503040504	0303040204	
07021402030607050706					0403030304	0202020402	
08011602030406050504					0204030302	0201020202	
09021402030507070606					0305040404	0202030202	
10021402030506070705					0203030402	0304040303	
11011402030607050706					0405050404	0204040302	
12011402030409050308					0404040505	0005050303	
13021402030407080607					0304040305	0104040302	
14011402030603070707					0503030204	0102040403	
15021402030305040509					0302020405	0002020103	
16011402030505060505					0403040303	0103020202	
17011402030506080706					0205050403	0303030303	
18021402030607050806					0405050504	0204040302	
19011402030609080809					0304050404	0304030405	
20021402030405060609					0305030303	0103050304	
21021402030406080607					0103050404	0305030203	
22011402030307050608					0205050404	0104040204	
23021402030404080304					0305040302	0103040002	
24021402030604070505					0404040303	0203030202	
25011402030406090606					0004050503	0405040103	
26021402030307030707					0204050304	0104030403	
27021402030505090806					0305040503	0204050303	
28021402030704080507					0202050304	0502030203	
29021402030706070507					0404050304	0302030205	
30021402030504070805					0303030502	0201020303	
31021402030606080505					0304040304	0302040201	
32011402030405060708					0203040405	0202020303	
33021402030304070807					0302040505	0002030304	
34021402030604040605					0302020403	0402020202	
35011402030505070605					0403040303	0102030302	
36011402030504070707					0201030403	0303040304	
37021402030404060505					0201030303	0203030203	
38011402030605080507					0303050304	0102030403	
39011402030507070608					0404050403	0103040205	
40021502030607070702					0104040305	0403030407	
41021402030506080608					0505050403	0201030205	
42021402030305060507					0202040304	0303020203	
43021402030407070809					0404040303	0003030304	

Appendix V₁ con.
 Summary Scores School 3 Experimental.

sbj.no.	sex	age	sch.	gp.	S C O R E S		
					overall	deep	surface
01021503030407090808					0203050505	0204040303	
02011503030605090806					0403050503	0202040303	
03021503030707090706					0404040504	0303050202	
04021303030505020602					0303050405	0202030203	
05021603030407070506					0304040304	0103030202	
06021403030705090808					0403050505	0302040303	
07021503030406060609					0104050404	0302010204	
08021403030505090706					0403050503	0102040203	
09011503030404080707					0303040505	0101040202	
10011403030605060806					0403040505	0202040301	
11011503030506070606					0304040304	0202030302	
12011303030607090707					0404050405	0203040302	
13011703030407080806					0304050504	0103030702	
14011703030405090607					0303050304	0102040303	
15021403030304070806					0203040403	0101030403	
16011503030506070706					0304050402	0202020304	
17011603030505070706					0303040401	0202030305	
18021603030506080506					0304050305	0202030203	
19011403030507090807					0305050505	0202040304	
20011603030505090606					0304040404	0201050205	
21011603030505080507					0304040303	0201040203	
22011403030608090708					0403050405	0203040304	
23021403030506090808					0304050505	0202040304	
24011503030406090908					0102040505	0304050404	
25021403030606090908					0403050504	0203040405	
26021403030406090906					0304050504	0102040405	
27011403030507090708					0305050505	0202040404	
28021403030105040806					0503030503	0402010303	
29021503030406090707					0304050505	0302040204	
30011403030607080606					0205040405	0402040203	
31021403030505090607					0303040305	0202040303	
32021403030505060606					0302040204	0203020402	
33011703030405090605					0204050305	0201040304	
34011403030404080607					0203050404	0201030204	
35011503030606090609					0405050505	0201040104	
36011303030507090707					0305050505	0202040204	
37011303030407090706					0204050405	0203040304	
38021303030505090707					0303050504	0202040205	
39011403030507090607					0305040305	0202050304	
40021603030404060506					0302030301	0102030202	
41011403030304050405					0202030303	0102020102	

Appendix VI con.
 Summary scores School.1 control.

sbj.no.	sex	sch.	pp.	S C O R E S		
				overall	deep	surface
01021401040707090407				0303040203		0404050204
02021601040302080403				0101040303		0201040102
03011501040202040204				0200020002		0102020202
04021401040505070405				0102030101		0403040304
05011601040403060404				0200040302		0203020102
06021401040505070606				0201040303		0304030303
07011501040403080204				0201030002		0202050202
08021401040604070607				0302030204		0302040403
09021601040505050207				0302020004		0203030203
10011401040705080405				0403040302		0302040103
11011401040305090303				0102040200		0203050103
12011601040607080404				0204030102		0403050302
13011401040303050303				0102030103		0201020200
14011701040504070303				0202040201		0302030102
15011501040203080404				0102030203		0101050201
16011601040605030202				0204010100		0401020102
17021601040404080304				0101030002		0303050302
18011601040204060303				0102020503		0102040000
19021401040404070104				0302040103		0102030001
20021401040706050303				0303030202		0203020101
21011401040306070405				0202040202		0304030203
22011601040404070303				0101030100		0303040203
23011401040605050405				0404020204		0201030201
24011501040404060504				0303030302		0101030202
25021501040506060304				0204020103		0302040201
26011401040404070506				0301030202		0103040304
27021401040405040204				0102020001		0303020203
28021501040303030304				0200010303		0103020001
29011701040505040504				0101000402		0404040102
30011401040909080406				0404030003		0505050403
31011401040606070106				0303040102		0303030004
32021501040605080303				0402040202		0203040101
33011701040303060105				0103030002		0200030103
34011401040607060606				0404040304		0203020302
35011401040605060303				0302020300		0303040003
36021401040304040505				0202020103		0102020402
37011401040506060505				0304030204		0202030301
38021401040505080506				0202040303		0303040203
39011401040303030303				0000000000		0303030303

Appendix V lcon.

Summary Scores School2 control.

no.					S C O R E S		
sub.	sex	age	sch.	gp.	overall	deep	surface
01011502040505070505.					5202030203.		0303040302
02021602040404060304					10202020102		0202040202
03011502040606060605					0302020203		0304040402
04011402040503050403					0200020200		0303030303
05011502040305080404					0002030202		0303050202
06021402040404060302					0102020100		0302040202
07021402040304050504					0201020300		0103030204
08021302040505070605					0204040202		0301030403
09011502040405050404.					0202010202		0203040202
10011402040506040404					0304010102.		0202030302
11011402040605070503					0202030300		0403040203
12021502040404070304					0201040001		0203030303
13021402040405040503					0101020300		0304020203
14011402040303050305					0201030203		0102070102
15021502040405070403					0102030200		0303040203
16011602040406060403					0103020101		0303040302
17021402040303080604					00100030202		0203050402
18011402040407070504					0104030202		0303040302
19011402040306060304					0102020102.		0204040202
20021502040405060406					0202030002.		0203030404
21021602040407070604					0203040203		0204030401
22021402040704050403					0402030200		0302020203
23021502040504070404					0301030202		0203040202
24011402040305050305					0002030002		0303020203
25011402040404040305					0102020002		0302020303
26011402040603030507					0203000204		0400030303
27021402040505020404					0303000201.		0202020203
28021402040405050506					0202010202		0203040304
29021502040404040504					0101020202		0303020302
30011402040304030405					0002000203		0302030202
31011402040504060406					0301070104		0203030302
32021402040304050406					0303020202		0001030204
33021402040503060507					0403070303		0100040204
34021402040404070303					0102030100.		0302040003
35011502040303060304					0002020002		0301040302
36011502040405070404.					0102040103.		0303030301
37021502040506080605					0302040203		0204040402
38021402040507060604					0203020201		0304040403
39021402040604070503					0302030200		0302040303
40021402040403060506					0001030303		0402030203
41021602040405070405.					0102030203		0303040202

Appendix Vlcon.
Summary Scores School3 control

sbj.no. sex age sch. gp.	S C O R E S		
	overall	deep	surface
01011403040303070507	0201030203	0302040304	
02021503040504060505	0202030202	0302030303	
03011403040503060704	0301030402	0202030302	
04011403040505070505	0303030202	0202040303	
05021403040404060605	0202030202	0202030403	
06021403040404070605	0102030302	0302040303	
07011403040303060403	0001030200	0302030203	
08011503040305060505	0103030203	0202030302	
09011403040403060506	0203030203	0202030303	
10021503040605060506	0203020302	0402040204	
11011403040406050707	0203020303	0203030404	
12011403040605070805	0202030302	0403040503	
13021403040403050405	0201020203	0202030202	
14021403040505090403	0302040101	0203040502	
15011603040303060505	0000020402	0303040103	
16021303040505060507	0102020103	0403040404	
17011603040406060507	0203030103	0203030404	
18021503040203030307	0000000002	0203030305	
19021503040204050405	0002010202	0202040203	
20011403040604070605	0302030302	0302040303	
21011603040404050507	0201020203	0203030304	
22021703040304040305	0001020002	0303020303	
23021403040305060403	0003030200	0302030203	
24011403040404060403	0202030200	0202030203	
25021403040406050506	0203020303	0203030203	
26021303040404070405	0201040202	0203030203	
27021403040304040405	0001020202	0303020203	
28011303040707090605	0303040303	0404040302	
29011403040404050401	0202040202	0202010202	
30021703040304040504	0001010202	0103030302	
31011403040506060702	0202030303	0204030405	
32011403040506070506	0203030203	0303040303	
33011403040604030703	0301040304	0302040304	
34021403040305070304	0002040202	0303030302	
35011503040404070305	0201040302	0203030403	
36021603040404060504	0102020202	0302040402	
37021403040404060606	0202020703	0202040403	
38021403040306050504	0003020202	0303030302	
39021303040504050405	0202020202	0302030303	
40021503040304060504	0101030302	0203030302	

Appendix VIa
 Description of data for the SPSSX Computer Statistical
 Analysis.

```

1 0 file handle data/ name='compscol'
2 0 title Anova Pre-Postest Overall-Deep Texts
3 0 data list file=data
4 0      /id 1-3 sex 7-8 age 9-10 sch 11-12 meth 13-14
5 0      scotext1 to scotext5 15-24
6 0      deptext1 to deptext5 27-36
7 0      suftezt1 to suftezt5 39-48
8 0      samall1 to samall5 51-60
9 0      samdeep1 to samdeep5 63-72
  
```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE DATA

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
ID	1	1	3	F	3	0
SEX	1	7	8	F	2	0
AGE	1	9	10	F	2	0
SCH	1	11	12	F	2	0
METH	1	13	14	F	2	0
SCOTEXT1	1	15	16	F	2	0
SCOTEXT2	1	17	18	F	2	0
SCOTEXT3	1	19	20	F	2	0
SCOTEXT4	1	21	22	F	2	0
SCOTEXT5	1	23	24	F	2	0
DEPTEXT1	1	27	28	F	2	0
DEPTEXT2	1	29	30	F	2	0
DEPTEXT3	1	31	32	F	2	0
DEPTEXT4	1	33	34	F	2	0
DEPTEXT5	1	35	36	F	2	0
SUFTEXT1	1	39	40	F	2	0
SUFTEXT2	1	41	42	F	2	0
SUFTEXT3	1	43	44	F	2	0
SUFTEXT4	1	45	46	F	2	0
SUFTEXT5	1	47	48	F	2	0
SAMALL1	1	51	52	F	2	0
SAMALL2	1	53	54	F	2	0
SAMALL3	1	55	56	F	2	0
SAMALL4	1	57	58	F	2	0
SAMALL5	1	59	60	F	2	0
SAMDEEP1	1	63	64	F	2	0
SAMDEEP2	1	65	66	F	2	0
SAMDEEP3	1	67	68	F	2	0
SAMDEEP4	1	69	70	F	2	0
SAMDEEP5	1	71	72	F	2	0

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 12:11:56 Institute of Education Pyramid 90x UNIX BSD

END OF DATALIST TABLE.

Appendix VIa con.

```

10 0 variable labels
11 0     id 'subject number'/
12 0     scotext1 'comprehension score overall pretest'/
13 0     scotext2 'comprehension score overall text1'/
14 0     scotext3 'comprehension score overall text2'/
15 0     scotext4 'comprehension score overall text3'/
16 0     scotext5 'comprehension score overall posttest'/
17 0     deptext1 'comprehension score deep pretest'/
18 0     deptext2 'comprehension score deep text1'/
19 0     deptext3 'comprehension score deep text2'/
20 0     deptext4 'comprehension score deep text3'/
21 0     deptext5 'comprehension score deep posttest'/
22 0     suftext1 'comprehension score surface pretest'/
23 0     suftext2 'comprehension score surface text1'/
24 0     suftext3 'comprehension score surface text2'/
25 0     suftext4 'comprehension score surface text3'/
26 0     suftext5 'comprehension score surface posttest'/
27 0     samall1 'summary score pretest overall'/
28 0     samall2 'summary score overall text1'/
29 0     samall3 'summary score overall text2'/
30 0     samall4 'summary score overall text3'/
31 0     samall5 'summary score overall posttest'/
32 0     samdeep1 'summary score deep pretest'/
33 0     samdeep2 'summary score deep text1'/
34 0     samdeep3 'summary score deep text2'/
35 0     samdeep4 'summary score deep text3'/
36 0     samdeep5 'summary score deep posttest'/
37 0 value labels
38 0     sex 01 'male' 02 'female'/
39 0     sch 01 'school1' 02 'school2' 03 'school3'/
40 0     meth 03 'multifacet method' 04 'traditional method'

```

Appendix VIa con.

```

1 0 file handle data/ name='compool'
2 0 Title Break Down of Scores Method And School And Age Sex
3 0 data list file=data
4 0           /id 1-3 sex 7-8 age 9-10 sch 11-12 meth 13-14
5 0           samsurf1 to samsurf5 15-24

```

THE ABOVE DATA LIST STATEMENT WILL READ 1 RECORDS FROM FILE DATA .

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
ID	1	1	3	F	3	0
SEX	1	7	8	F	2	0
AGE	1	9	10	F	2	0
SCH	1	11	12	F	2	0
METH	1	13	14	F	2	0
SAMSURF1	1	15	16	F	2	0
SAMSURF2	1	17	18	F	2	0
SAMSURF3	1	19	20	F	2	0
SAMSURF4	1	21	22	F	2	0
SAMSURF5	1	23	24	F	2	0

END OF DATALIST TABLE.

```

6 0 variable labels
7 0           id 'subject number'
8 0           samsurf1 'pretest surface summary score'
9 0           samsurf2 'summary surface score text1'
10 0          samsurf3 'summary surface score text2'
11 0          samsurf4 'summary surface score text3'
12 0          samsurf5 'summary surface posttest'
13 0 value labels
14 0          sex 01 'male' 02 'female'
15 0          sch 01 'school1' 02 'school2' 03 'school3'
16 0          meth 03 'multifacet method' 04 'traditional method'

```

overall text comprehension scores

	LABEL	MEAN	STD DEV	CASES	LABEL	MEAN	STD DEV	CASES
Pretest SCOTEXT1	ENTIRE POPULATION	3.3683	1.5073	243	traditional method	3.6917	1.5323	120
	multifacet method	4.0407	1.4677	123	school1	3.5641	1.5525	39
	school1	3.7179	1.4681	39	school2	3.7561	1.3744	41
	school2	4.6744	1.2672	43	school3	3.7500	1.6909	40
	school3	3.6829	1.4738	41				
Test1 SCOTEXT2	ENTIRE POPULATION	4.5761	1.7737	243	traditional method	4.1093	1.7286	120
	multifacet method	5.0325	1.7031	123	school1	4.2051	1.7348	39
	school1	4.6667	1.5275	39	school2	4.0000	1.5969	41
	school2	5.5349	1.6381	43	school3	4.1250	1.8836	40
	school3	4.8537	1.8379	41				
Test2 SCOTEXT3	ENTIRE POPULATION	6.9053	1.8772	243	traditional method	6.3417	1.8898	120
	multifacet method	7.4553	1.6998	123	school1	6.0739	2.1199	39
	school1	7.0769	1.5455	39	school2	6.8780	1.7349	41
	school2	7.3953	1.5907	43	school3	6.0500	1.7239	40
	school3	7.8730	1.8867	41				
Test3 SCOTEXT4	ENTIRE POPULATION	4.4815	2.2715	243	traditional method	3.7333	2.3181	120
	multifacet method	5.2114	1.9763	123	school1	3.2821	2.0513	39
	school1	4.0769	1.6604	39	school2	3.7317	2.1567	41
	school2	5.3140	1.8291	43	school3	4.1750	2.6688	40
	school3	5.6535	1.9325	41				
Posttest SCOTEXT5	ENTIRE POPULATION	4.5267	1.9075	243	traditional method	3.9250	1.8614	120
	multifacet method	5.1138	1.7704	123	school1	4.2821	1.8057	39
	school1	4.0000	1.8496	39	school2	3.5366	1.6447	41
	school2	5.5349	1.5016	43	school3	3.9750	2.0815	40
	school3	5.7317	1.4667	41				

Appendix V2 Means and Standard Deviations
School with methods
Overall Comprehension Scores

text deep comprehension score

	LABEL	MEAN	STO DEV	CASES	LABEL	MEAN	STD DEV	CASES
Pretest DEPTEXT1	ENTIRE POPULATION	1.6132	.8991	243				
	multifacet method	1.6585	.9218	123	traditional method	1.5667	.8767	120
	school1	1.5641	.9673	39	school1	1.5410	1.0634	39
	school2	1.7209	.8817	43	school2	1.5366	.8092	41
	school3	1.6829	.9333	41	school3	1.5250	.7506	40
Test1 DEPTEXT2	ENTIRE POPULATION	2.7119	1.0981	243				
	multifacet method	2.9431	1.1330	123	traditional method	2.4750	1.0122	120
	school1	2.8974	1.1191	39	school1	2.5128	.9966	39
	school2	3.3488	1.0208	43	school2	2.3415	.9646	41
	school3	2.5610	1.1412	41	school3	2.5750	1.0834	40
Test2 DEPTEXT3	ENTIRE POPULATION	3.7572	1.0339	243				
	multifacet method	4.0325	.9138	123	traditional method	3.4750	1.0766	120
	school1	3.7949	1.0306	39	school1	3.2564	1.0935	39
	school2	4.1628	.6521	43	school2	3.5610	1.1412	41
	school3	4.1220	1.0049	41	school3	3.6000	.9819	40
Test3 DEPTEXT4	ENTIRE POPULATION	2.2716	1.4744	243				
	multifacet method	2.8293	1.3226	123	traditional method	1.7000	1.4059	120
	school1	2.2051	1.2393	39	school1	1.4615	1.0475	39
	school2	3.1395	1.2646	43	school2	1.6535	1.4766	41
	school3	3.0976	1.2807	41	school3	1.9750	1.6091	40
Posttest DEPTEXT5	ENTIRE POPULATION	1.6749	1.3226	243				
	multifacet method	1.9919	1.1198	123	traditional method	1.3500	1.4357	120
	school1	1.6410	1.1582	39	school1	1.5897	1.2920	39
	school2	1.8837	1.1590	43	school2	1.0732	1.6185	41
	school3	2.4390	.8958	41	school3	1.4000	1.3550	40

Deep Comprehension Scores

Appendix V2 con.

Text Surface Comprehension Scores

	LABEL	MEAN	STD DEV	CASES	LABEL	MEAN	STD DEV	CASES
Pretest SUFTEXT1	ENTIRE POPULATION	2.2716	1.1209	243				
	multifacet method	2.4146	1.1230	123	traditional method	2.1250	1.1043	120
	school1	2.2051	1.0804	39	school1	1.9231	.9337	39
	school2	3.0000	1.0235	43	school2	2.2195	1.0127	41
	school3	2.0000	1.0247	41	school3	2.2250	1.2907	40
b Test1 SUFTEXT2		1.3889	1.1391	243				
	multifacet method	2.1301	1.1232	123	traditional method	1.6417	1.1061	120
	school1	1.8205	.9423	39	school1	1.6923	1.1039	39
	school2	2.2326	1.2313	43	school2	1.6585	1.0151	41
	school3	2.3171	1.1278	41	school3	1.5750	1.2171	40
Test2 SUFTEXT3	ENTIRE POPULATION	3.1358	1.2833	243				
	multifacet method	3.4065	1.2403	123	traditional method	2.8583	1.2722	120
	school1	3.2821	1.0247	39	school1	2.7949	1.4175	39
	school2	3.2326	1.2505	43	school2	3.3171	1.0354	41
	school3	3.7073	1.3328	41	school3	2.4500	1.2184	40
Test3 SUFTEXT4	ENTIRE POPULATION	1.1461	1.2611	243				
	multifacet method	2.2140	2.3577	123	traditional method	2.0667	1.3580	120
	school1	1.7949	.9782	39	school1	1.8718	1.2810	39
	school2	2.6744	1.1489	43	school2	2.1220	1.2287	41
	school3	2.5010	1.1191	41	school3	2.2000	1.5558	40
Posttest SUFTEXT5	ENTIRE POPULATION	2.8930	1.1628	243				
	multifacet method	3.1220	1.1636	123	traditional method	2.6533	1.1189	120
	school1	2.3590	1.1807	39	school1	2.7179	1.0500	39
	school2	3.6512	.8967	43	school2	2.6829	1.2132	41
	school3	3.2927	1.0306	41	school3	2.5750	1.1068	40

Surface Comprehension Scores

Appendix V2 con.

Summary Overall scores

	LABEL	MEAN	STD DEV	CASES	LABEL	MEAN	STD DEV	CASES
	ENTIRE POPULATION	4.7901	1.3580	243				
Pretest SAMALL1	multifacet method	5.2033	1.3180	123	traditional method	4.3667	1.2698	120
	school1	5.7179	1.4681	39	school1	4.6667	1.5784	39
	school2	5.1163	1.2191	43	school2	4.2927	1.0061	41
	school3	4.8049	1.1229	41	school3	4.1500	1.1447	40
	ENTIRE POPULATION	5.1523	1.3927	243				
Test1 SAMALL2	multifacet method	5.7236	1.3201	123	traditional method	4.5667	1.2143	120
	school1	5.6667	1.5275	39	school1	4.6410	1.4777	39
	school2	5.7674	1.3599	43	school2	4.6098	1.1375	41
	school3	5.7317	1.0729	41	school3	4.4500	1.0115	40
	ENTIRE POPULATION	6.9259	1.6448	243				
Test2 SAMALL3	multifacet method	7.8130	1.3328	123	traditional method	6.0167	1.4259	120
	school1	7.8974	1.3337	39	school1	6.3077	1.6728	39
	school2	7.4651	1.3513	43	school2	5.8049	1.4181	41
	school3	8.0976	1.2610	41	school3	5.9500	1.1311	40
	ENTIRE POPULATION	5.2675	1.7196	243				
Test3 SAMALL4	multifacet method	6.2033	1.5469	123	traditional method	4.3083	1.3144	120
	school1	5.1282	1.5590	39	school1	3.5128	1.3352	39
	school2	6.5581	1.2966	43	school2	4.3415	.9902	41
	school3	6.3537	1.2361	41	school3	5.0500	1.1536	40
	ENTIRE POPULATION	5.4609	1.6419	243				
Posttest SAMALL5	multifacet method	6.2276	1.5776	123	traditional method	4.6750	1.3039	120
	school1	5.1282	1.7042	39	school1	4.4615	1.2946	39
	school2	6.7442	1.4490	43	school2	4.3659	1.1566	41
	school3	6.7317	.9493	41	school3	5.2000	1.3243	40

Overall Summary Scores

Appendix V2 Con.

Deep Summary Scores

	LABEL	MEAN	STD DEV	CASES	LABEL	MEAN	STD DEV	CASES
Pretest SAMDEEP1	ENTIRE POPULATION	2.4733	1.2139	243				
	multifacet method	3.0976	.9531	123	traditional method	1.8333	1.1177	120
	school1	3.2564	.9380	39	school1	2.2308	1.1576	39
	school2	3.0465	1.0680	43	school2	1.7561	1.0673	41
	school3	3.0000	.8367	41	school3	1.5250	1.0374	40
Test1 SAMDEEP2	ENTIRE POPULATION	2.7984	1.2907	243	traditional method	2.0167	1.0124	120
	multifacet method	3.5610	1.0570	123	school1	2.1282	1.2178	39
	school1	3.3590	1.0879	39	school2	2.0244	.9351	41
	school2	3.7442	1.1770	43	school3	1.9000	.8712	40
	school3	3.5610	.8674	41				
Test2 SAMDEEP3	ENTIRE POPULATION	3.5062	1.2642	243	traditional method	2.6500	1.0343	120
	multifacet method	4.3415	.8379	123	school1	2.9718	1.1045	39
	school1	4.3846	.9629	39	school2	2.4146	1.0482	41
	school2	4.1395	.8614	43	school3	2.6750	.9167	40
	school3	4.5122	.6373	41				
Test3 SAMDEEP4	ENTIRE POPULATION	2.8107	1.3836	243	traditional method	1.8667	.9867	120
	multifacet method	3.7317	1.0564	123	school1	1.6667	1.1547	39
	school1	3.1282	1.1960	39	school2	1.7317	.8667	41
	school2	3.8605	.8042	43	school3	2.2000	.8533	40
	school3	4.1707	.8917	41				
Posttest SAMDEEP5	ENTIRE POPULATION	2.9218	1.3809	243	traditional method	2.0750	1.0936	120
	multifacet method	3.7430	1.1205	123	school1	2.2308	1.1801	39
	school1	3.2821	1.2967	39	school2	1.8049	1.1878	41
	school2	3.7209	.9083	43	school3	2.2000	.8533	40
	school3	4.2195	.9621	41				

Appendix V2 con, =
Deep Summary Scores

Surface Summary Scores

Surface summary Scores

Appendix V2 con.

	LABEL	MEAN	STD DEV	CASES	LABEL	MEAN	STD DEV	CASES
pretest SAMSURF1	ENTIRE POPULATION	2.3580	.9400	243				
	multifacet method	2.1789	.9337	123	traditional method	2.5417	.8589	120
	school1	2.4615	.8840	39	school1	2.4615	1.0475	39
	school2	2.0930	1.2113	43	school2	2.5366	.8396	41
	school3	2.0000	.7416	41	school3	2.6250	.6675	40
Test1 SAMSURF2	ENTIRE POPULATION	2.5309	.9546	243	traditional method	2.5500	.8968	120
	multifacet method	2.5122	1.0111	123	school1	2.5123	1.0481	39
	school1	2.3333	.8983	39	school2	2.5854	.9994	41
	school2	3.0465	1.1117	43	school3	2.5500	.5970	40
	school3	2.1220	.7482	41				
Test2 SAMSURF3	ENTIRE POPULATION	3.4156	.9069	243	traditional method	3.3607	.8593	120
	multifacet method	3.4634	.9521	123	school1	3.4359	1.0462	39
	school1	3.4872	.9966	39	school2	3.3902	.8330	41
	school2	3.3256	.9186	43	school3	3.2750	.6789	40
	school3	3.5854	.9480	41				
Test3 SAMSURF4	ENTIRE POPULATION	2.4897	.9849	243	traditional method	2.5083	1.0846	120
	multifacet method	2.4715	.8808	123	school1	1.8462	1.1364	39
	school1	2.0256	.7776	39	school2	2.6341	.8876	41
	school2	2.6744	.9186	43	school3	3.0250	.8912	40
	school3	2.6829	.7886	41				
Posttest SAMSURF5	ENTIRE POPULATION	2.6749	1.0666	243	traditional method	2.6000	.9384	120
	multifacet method	2.7480	1.1776	123	school1	2.2308	1.0628	39
	school1	1.7949	.8938	39	school2	2.5610	.7762	41
	school2	3.0233	.9633	43	school3	3.0000	.8165	40
	school3	3.3659	1.0667	41				

Appendix V3 Mean and Standard Deviations
Method with Schools

Overall Comrehension Scores

	multifacet method				traditional method			
	AGE	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES	
Pretest	13	4.5000	1.2247	6	5.1667	1.1650	6	
	14	4.3043	1.4070	69	3.6567	1.4828	67	
	15	3.8846	1.8183	26	3.5769	1.6043	26	
	16	3.3529	.9963	17	3.6875	1.7405	16	
	17	3.0000	.7071	5	3.0000	.7071	5	
Test1	13	6.3333	1.0328	6	4.3333	2.2509	6	
	14	5.1159	1.7196	69	4.2388	1.7589	67	
	15	5.0385	1.6120	26	3.9615	1.3995	26	
	16	4.1765	1.7042	17	4.1875	1.8697	16	
	17	5.2000	1.7889	5	2.6000	1.6733	5	
Test2	13	8.6667	1.0328	6	7.3333	1.6330	6	
	14	7.5652	1.6670	69	6.4328	1.9558	67	
	15	7.4231	1.8799	26	6.4231	1.9631	26	
	16	6.6471	1.5387	17	6.0000	1.5916	16	
	17	7.4000	1.6733	5	4.6000	.5477	5	
Test3	13	6.0000	1.0954	6	4.8333	2.6394	6	
	14	5.5942	1.9503	69	3.9552	2.4768	67	
	15	4.8077	2.2094	26	3.5385	2.1020	26	
	16	4.0588	1.4778	17	3.2500	1.7321	16	
	17	5.0000	1.8708	5	2.0000	1.8708	5	
Posttest	13	6.6667	1.0328	6	5.6667	.8165	6	
	14	5.3623	1.6357	69	4.0000	1.9228	67	
	15	4.6154	2.2285	26	3.7692	1.7506	26	
	16	4.4706	1.2805	17	3.4375	1.9311	16	
	17	4.6000	1.6733	5	3.2000	1.3038	5	

Appendix V3 con. Deep comprehension Scores

Deep Comprehension Scores

	multifacet method			traditional method			
	AGE	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
	Ttl.	1.6585	.9218	123	1.5667	.8767	120
	13	1.8333	.7528	6	1.8333	.4082	6
Pretest	14	1.7246	.9835	69	1.5970	.8539	67
	15	1.5769	.9868	26	1.5769	1.0266	26
	16	1.4118	.6183	17	1.3750	.8851	16
	17	1.8000	.8367	5	1.4000	.8944	5
	Ttl.	2.9431	1.1330	123	2.4750	1.0122	120
	13	3.5000	.8367	6	2.6667	1.0328	6
Test1	14	3.0580	1.0556	69	2.5672	1.0621	67
	15	3.1154	.9519	26	2.3462	.9774	26
	16	2.2941	1.4038	17	2.4375	.8139	16
	17	2.0000	1.4142	5	1.8000	1.0954	5
	Ttl.	4.0325	.9138	123	3.4750	1.0766	120
	13	4.3333	.5164	6	4.1667	.7528	6
Test2	14	4.2174	.7835	69	3.4627	1.2102	67
	15	3.8462	.9672	26	3.5385	.9047	26
	16	3.5882	1.1757	17	3.2500	.9309	16
	17	3.6000	1.1402	5	3.2000	.4472	5
	Ttl.	2.8293	1.3226	123	1.7000	1.4059	120
	13	3.3333	1.2111	6	2.5000	1.6432	6
Test3	14	3.0580	1.3271	69	1.7313	1.4625	67
	15	2.4615	1.3033	26	1.6923	1.3197	26
	16	2.3529	1.1695	17	1.6250	1.2583	16
	17	2.6000	1.5166	5	.6000	.8944	5
	Ttl.	1.9919	1.1198	123	1.3500	1.4357	120
	13	2.5000	.8367	6	2.3333	1.2111	6
Posttest	14	1.9855	1.1047	69	1.1791	1.2300	67
	15	1.9231	1.3542	26	1.6923	1.9752	26
	16	1.9412	.9663	17	1.1875	1.2230	16
	17	2.0000	1.0000	5	1.2000	1.3038	5

Appendix V3 con.

Surface Comprehension Scores

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Ttl	2.4146	1.1230	123	2.1250	1.1043	120
13	2.6667	1.2111	6	3.3333	1.0328	6
Pretest 14	2.6232	1.0850	69	2.0597	1.0854	67
15	2.3077	1.2254	26	2.0000	.9798	26
16	2.0000	.8660	17	2.3125	1.3022	16
17	1.2000	.8367	5	1.6000	.5477	5
Ttl	2.1301	1.1232	123	1.6417	1.1061	120
13	2.8333	.4082	6	1.8333	1.1690	6
Test1 14	2.0725	1.2165	69	1.6716	1.1063	67
15	2.0769	1.1286	26	1.6154	.9829	26
16	1.8824	.6966	17	1.7500	1.3416	16
17	3.2000	.8367	5	.8000	.8367	5
Ttl	3.4065	1.2403	123	2.8583	1.2722	120
13	4.3333	.8165	6	3.1667	1.1690	6
Test2 14	3.3188	1.3116	69	2.9701	1.2305	67
15	3.5769	1.3015	26	2.8462	1.3767	26
16	3.0588	.8993	17	2.7500	1.2383	16
17	3.8000	.8367	5	1.4000	.8944	5
Ttl	2.3577	1.1461	123	2.0667	1.3580	120
13	2.6667	1.0328	6	2.3333	1.5055	6
Test3 14	2.5362	1.1830	69	2.2388	1.4152	67
15	2.2692	1.1509	26	1.9615	1.2404	26
16	1.6471	.8618	17	1.6250	1.2583	16
17	2.4000	.8944	5	1.4000	1.1402	5
Ttl	3.1220	1.1636	123	2.6583	1.1189	120
13	4.1667	1.1690	6	3.3333	.5164	6
Post-test 14	3.3768	1.0724	69	2.8358	1.1755	67
15	2.6923	1.2254	26	2.4231	1.1017	26
16	2.5294	1.0073	17	2.2500	1.0000	16
17	2.6000	.8944	5	2.0000	.0000	5

Appendix V3 con.

Overall Summary Scores							
multifacet method				traditional method			
	AGE	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Pretest	Ttl	5.2033	1.3180	123	4.3667	1.2698	120
	13	5.5000	1.3784	6	5.1667	.9832	6
	14	5.2174	1.4335	69	4.5821	1.3160	67
	15	5.3846	1.2673	26	3.9231	1.2304	26
	16	4.9412	.9663	17	4.0625	.9979	16
	17	4.6000	.8944	5	3.8000	1.0954	5
Test1	Ttl	5.7236	1.3201	123	4.5667	1.2143	120
	13	6.5000	1.2247	6	4.6667	1.3663	6
	14	5.6232	1.3515	69	4.7015	1.2433	67
	15	5.9615	1.2484	26	4.3077	1.0495	26
	16	5.4706	1.2307	17	4.5625	1.4127	16
	17	5.8000	1.6432	5	4.0000	.7071	5
Test2	Ttl	7.8130	1.3328	123	6.0167	1.4259	120
	13	8.8333	.4082	6	6.6667	1.0328	6
	14	7.7971	1.3567	69	5.9254	1.4597	67
	15	7.9231	1.3243	26	6.1538	1.4613	26
	16	7.2941	1.3585	17	6.2500	1.2910	16
	17	8.0000	1.2247	5	5.0000	1.4142	5
Test3	Ttl	6.2033	1.5469	123	4.3083	1.3144	120
	13	6.6667	.5164	6	5.0000	.8944	6
	14	6.4928	1.4914	69	4.5373	1.3743	67
	15	6.0769	1.7646	26	4.0000	1.0954	26
	16	5.1765	1.2862	17	3.8750	1.1475	16
	17	5.8000	1.4832	5	3.4000	1.6733	5
Posttest	Ttl	6.2276	1.5776	123	4.6750	1.3039	120
	13	7.3333	1.0328	6	5.6667	1.0328	6
	14	6.4928	1.4615	69	4.7612	1.4044	67
	15	5.8077	1.9803	26	4.4615	.9047	26
	16	5.5882	1.0641	17	4.4375	1.5042	16
	17	5.6000	1.6733	5	4.2000	.8367	5

Appendix V3 con.

Deep Summary Scores

		multifacet method			traditional method		
AGE	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES	
Ttl	3.0976	.9531	123	1.8333	1.1177	120	
13	3.3333	1.0328	6	2.0000	.6325	6	
14	3.2174	1.0127	69	2.0299	1.2182	67	
Pretest 15	2.9231	.9767	26	1.6923	1.0495	26	
16	2.8235	.6359	17	1.5000	.7303	16	
17	3.0000	.7071	5	.8000	.8367	5	
Ttl	3.5610	1.0570	123	2.0167	1.0124	120	
13	4.0000	.8944	6	2.1667	1.1690	6	
Test1 14	3.5507	1.1185	69	2.1642	.9629	67	
15	3.6923	.9282	26	1.7308	.9616	26	
16	3.2353	1.0326	17	1.9375	1.2366	16	
17	3.6000	1.1402	5	1.6000	.8944	5	
Ttl	4.3415	.8379	123	2.6500	1.0343	120	
13	4.8333	.4082	6	3.1667	.9832	6	
14	4.2899	.8592	69	2.6716	1.0208	67	
Test2 15	4.5769	.8086	26	2.6154	1.0612	26	
16	3.8824	.7812	17	2.6250	.8851	16	
17	4.8000	.4472	5	2.0000	1.5811	5	
Ttl	3.7317	1.0564	123	1.8667	.9867	120	
13	4.3333	.5164	6	2.0000	.6325	6	
14	3.8551	1.0329	69	2.0000	.8876	67	
Test3 15	3.8077	1.1321	26	1.6538	1.0561	26	
16	3.0000	.9354	17	1.6875	1.1383	16	
17	3.4000	.8944	5	1.6000	1.6733	5	
Ttl	3.7480	1.1205	123	2.0750	1.0936	120	
13	4.5000	.8367	6	2.5000	.5477	6	
14	3.8116	1.0040	69	1.9851	1.2732	67	
Posttest 15	3.6154	1.3587	26	2.1923	.6939	26	
16	3.3529	1.1695	17	2.1875	1.1087	16	
17	4.0000	1.2247	5	1.8000	.4472	5	

Appendix V3 con.

Surface Summary Scores

	multifacet method				traditional method		
	AGE	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Pretest	Ttl	4.0407	1.4677	123	3.6917	1.5328	120
	13	4.5000	1.2247	6	5.1667	1.1690	6
	14	4.3043	1.4070	69	3.6567	1.4828	67
	15	3.8846	1.8183	26	3.5769	1.6043	26
	16	3.3529	.9963	17	3.6875	1.7405	16
	17	3.0000	.7071	5	3.0000	.7071	5
	Test1	Ttl	5.0325	1.7031	123	4.1083	1.7286
13		6.3333	1.0328	6	4.3333	2.2509	6
14		5.1159	1.7196	69	4.2388	1.7589	67
15		5.0385	1.6120	26	3.9615	1.3995	26
16		4.1765	1.7042	17	4.1875	1.8697	16
17		5.2000	1.7889	5	2.6000	1.6733	5
Test2		Ttl	7.4553	1.6998	123	6.3417	1.8898
	13	8.6667	1.0328	6	7.3333	1.6330	6
	14	7.5652	1.6670	69	6.4328	1.9558	67
	15	7.4231	1.8799	26	6.4231	1.9631	26
	16	6.6471	1.5387	17	6.0000	1.5916	16
	17	7.4000	1.6733	5	4.6000	.5477	5
	Test3	Ttl	5.2114	1.9763	123	3.7333	2.3181
13		6.0000	1.0954	6	4.8333	2.6394	6
14		5.5942	1.9503	69	3.9552	2.4768	67
15		4.8077	2.2094	26	3.5385	2.1020	26
16		4.0588	1.4778	17	3.2500	1.7321	16
17		5.0000	1.8708	5	2.0000	1.8708	5
Posttest		Ttl	5.1138	1.7704	123	3.9250	1.8614
	13	6.6667	1.0328	6	5.6667	.8165	6
	14	5.3623	1.6357	69	4.0000	1.9228	67
	15	4.6154	2.2285	26	3.7692	1.7506	26
	16	4.4706	1.2805	17	3.4375	1.9311	16
	17	4.6000	1.6733	5	3.2000	1.3038	5

Appendix V4 Means and Standard Deviations
Methods With Sex

comprehension score overall

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
PRETEST						
Ttl	4.0407	1.4677	123	3.6917	1.5328	120
male	4.0000	1.4361	65	3.8852	1.4843	61
female	4.0862	1.5135	58	3.4915	1.5688	59
Test1						
Ttl	5.0325	1.7031	123	4.1083	1.7286	120
male	5.0000	1.7321	65	4.1967	1.8423	61
female	5.0690	1.6844	58	4.0169	1.6134	59
Test2						
Ttl	7.4553	1.6998	123	6.3417	1.8898	120
male	7.7077	1.7205	65	6.4426	1.9020	61
female	7.1724	1.6452	58	6.2373	1.8877	59
Test3						
Ttl	5.2114	1.9763	123	3.7333	2.3181	120
male	4.9692	2.0153	65	3.7049	2.3829	61
female	5.4828	1.9125	58	3.7627	2.2693	59
Posttest						
Ttl	5.1138	1.7704	123	3.9250	1.8614	120
male	4.7846	1.7455	65	3.9672	1.8616	61
female	5.4828	1.7395	58	3.8814	1.8762	59

Appendix V4 con.

comprehension score deep

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Pretest						
Ttl	1.6585	.9218	123	1.5667	.8767	120
male	1.6000	.9650	65	1.6393	.8172	61
female	1.7241	.8745	58	1.4915	.9354	59
Test1						
Ttl	2.9431	1.1330	123	2.4750	1.0122	120
male	2.8462	1.2149	65	2.5410	1.0259	61
female	3.0517	1.0332	58	2.4068	1.0020	59
Test2						
Ttl	4.0325	.9138	123	3.4750	1.0766	120
male	4.1538	.9720	65	3.6557	1.0146	61
female	3.8966	.8312	58	3.2881	1.1150	59
Test3						
Ttl	2.8293	1.3226	123	1.7000	1.4059	120
male	2.8308	1.4955	65	1.8197	1.5331	61
female	2.8276	1.1104	58	1.5763	1.2622	59
Posttest						
Ttl	1.9919	1.1198	123	1.3500	1.4357	120
male	1.8462	1.1351	65	1.4426	1.6281	61
female	2.1552	1.0890	58	1.2542	1.2119	59

Appendix V4 con.

comprehension score surface

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Pretest						
Ttl	2.4146	1.1230	123	2.1250	1.1043	120
male	2.4154	1.0591	65	2.2459	1.1784	61
female	2.4138	1.1999	58	2.0000	1.0171	59
Test1						
Ttl	2.1301	1.1232	123	1.6417	1.1061	120
male	2.1846	1.1844	65	1.6721	1.2479	61
female	2.0690	1.0573	58	1.6102	.9472	59
Test2						
Ttl	3.4065	1.2403	123	2.8583	1.2722	120
male	3.5538	1.1596	65	2.7705	1.3341	61
female	3.2414	1.3154	58	2.9492	1.2095	59
Test3						
Ttl	2.3577	1.1461	123	2.0667	1.3580	120
male	2.1231	1.0384	65	1.9508	1.3469	61
female	2.6207	1.2115	58	2.1864	1.3706	59
Posttest						
Ttl	3.1220	1.1636	123	2.6583	1.1189	120
male	2.9385	1.2485	65	2.6885	1.0574	61
female	3.3276	1.0326	58	2.6271	1.1876	59

Appendix V4 con.

summary score overall

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Pretest						
Ttl	5.2033	1.3180	123	4.3667	1.2698	120
male	5.1231	1.1793	65	4.4754	1.3857	61
female	5.2931	1.4631	58	4.2542	1.1386	59
Test1						
Ttl	5.7236	1.3201	123	4.5667	1.2143	120
male	5.7231	1.3051	65	4.6393	1.3788	61
female	5.7241	1.3481	58	4.4915	1.0234	59
Test2						
Ttl	7.8130	1.3328	123	6.0167	1.4259	120
male	8.0308	1.2370	65	6.0820	1.3940	61
female	7.5690	1.4032	58	5.9492	1.4672	59
Test3						
Ttl	6.2033	1.5469	123	4.3083	1.3144	120
male	5.9692	1.6102	65	4.2459	1.4336	61
female	6.4655	1.4414	58	4.3729	1.1876	59
Posttest						
Ttl	6.2276	1.5776	123	4.6750	1.3039	120
male	5.9846	1.5562	65	4.6721	1.3629	61
female	6.5000	1.5700	58	4.6780	1.2518	59

Appendix V4 con.

summary score deep

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Prtest						
Ttl	3.0976	.9531	123	1.8333	1.1177	120
male	3.0462	.9911	65	1.9016	1.0756	61
female	3.1552	.9139	58	1.7627	1.1647	59
Test1						
Ttl	3.5610	1.0570	123	2.0167	1.0124	120
male	3.5538	1.0611	65	2.1311	1.1177	61
female	3.5690	1.0615	58	1.8983	.8846	59
test2						
Ttl	4.3415	.8379	123	2.6500	1.0343	120
male	4.4000	.8062	65	2.6885	1.0574	61
female	4.2759	.8745	58	2.6102	1.0174	59
Test3						
Ttl	3.7317	1.0564	123	1.8667	.9867	120
male	3.5538	1.1461	65	1.8852	1.0661	61
female	3.9310	.9150	58	1.8475	.9062	59
Posttest						
Ttl	3.7480	1.1205	123	2.0750	1.0936	120
male	3.6154	1.1818	65	2.1639	1.1428	61
female	3.8966	1.0377	58	1.9831	1.0421	59

Appendix V4

summary score surface

	multifacet method			traditional method		
	MEAN	STD DEV	CASES	MEAN	STD DEV	CASES
Prtest						
Ttl	4.0407	1.4677	123	3.6917	1.5328	120
male	4.0000	1.4361	65	3.8852	1.4843	61
female	4.0862	1.5135	58	3.4915	1.5688	59
Test1						
Ttl	5.0325	1.7031	123	4.1083	1.7286	120
male	5.0000	1.7321	65	4.1967	1.8423	61
female	5.0690	1.6844	58	4.0169	1.6134	59
Test2						
Ttl	7.4553	1.6998	123	6.3417	1.8898	120
male	7.7077	1.7205	65	6.4426	1.9020	61
female	7.1724	1.6452	58	6.2373	1.8877	59
Test3						
Ttl	5.2114	1.9763	123	3.7333	2.3181	120
male	4.9692	2.0153	65	3.7049	2.3829	61
female	5.4828	1.9125	58	3.7627	2.2693	59
Posttest						
Ttl	5.1138	1.7704	123	3.9250	1.8614	120
male	4.7846	1.7455	65	3.9672	1.8616	61
female	5.4828	1.7395	58	3.8814	1.8762	59

Appendix VI Anova Tables Pretest Comprehension
and Summary Scores

Appendix VII.1

*** ANALYSIS OF VARIANCE ***

comprehension scores overall pretest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	51.155	8	6.395	3.001	0.003
METH	7.041	1	7.041	3.304	0.070
SCH	15.168	2	7.584	3.559	0.030
SEX	4.742	1	4.742	2.225	0.137
AGE	25.383	4	5.972	2.803	0.027
EXPLAINED	51.155	8	6.395	3.001	0.003
RESIDUAL	493.630	234	2.131		
TOTAL	544.785	242	2.272		

Appendix VII.2

*** ANALYSIS OF VARIANCE ***

comprehension scores deep pretest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	3.233	8	0.404	0.491	0.862
METH	0.521	1	0.521	0.633	0.427
SCH	0.095	2	0.048	0.058	0.943
SEX	0.040	1	0.040	0.049	0.825
AGE	2.565	4	0.667	0.811	0.519
EXPLAINED	3.233	8	0.404	0.491	0.862
RESIDUAL	192.408	234	0.822		
TOTAL	195.633	242	0.805		

Appendix VII.3

*** ANALYSIS OF VARIANCE ***

comprehension scores surface pretest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	33.090	8	4.761	4.139	0.000
METH	4.755	1	4.755	4.210	0.041
SCH	15.370	2	7.635	6.761	0.001
SEX	3.302	1	3.302	2.905	0.090
AGE	15.054	4	3.764	3.311	0.012
EXPLAINED	33.090	8	4.761	4.139	0.000
RESIDUAL	265.984	234	1.137		
TOTAL	304.074	242	1.257		

Appendix VI con.

Appendix VI2.1

*** ANALYSIS OF VARIANCE ***					
summary score pretest overall					
SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	85.605	8	10.701	6.942	0.000
METH	43.160	1	43.160	28.000	0.000
SCH	30.518	2	15.259	9.899	0.000
SEX	0.005	1	0.002	0.005	0.944
AGE	21.760	4	5.440	3.529	0.009
EXPLAINED	85.606	8	10.701	6.942	0.000
RESIDUAL	360.691	234	1.541		
TOTAL	446.296	242	1.844		

Appendix VI2.2

*** ANALYSIS OF VARIANCE ***					
summary score deep pretest					
SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	123.955	8	15.495	15.536	0.000
METH	97.752	1	97.752	98.333	0.000
SCH	15.339	2	7.670	7.715	0.001
SEX	0.009	1	0.009	0.010	0.922
AGE	17.130	4	4.283	4.308	0.002
EXPLAINED	123.955	8	15.495	15.536	0.000
RESIDUAL	232.620	234	0.994		
TOTAL	356.575	242	1.473		

VI
Appendix 2.3

*** ANALYSIS OF VARIANCE ***					
summary score pretest surface					
SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	10.918	8	1.365	1.574	0.133
METH	7.972	1	7.972	9.192	0.003
SCH	1.757	2	0.879	1.013	0.365
SEX	0.299	1	0.299	0.345	0.558
AGE	1.331	4	0.333	0.384	0.820
EXPLAINED	10.918	8	1.365	1.574	0.133
RESIDUAL	202.934	234	0.867		
TOTAL	213.852	242	0.884		

Appendix VII ANCOVA Tables For Comprehension And Summary

Appendix VIII.1 Ancova Overall Comprehension Scores

ANALYSIS OF VARIANCE

Tests of Significance for SCOTEXT2 using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	1087.13203	197	5.52359		
Regression	132.40407	1	132.40407	23.93425	.000
CONSTANT	1303.38091	1	1303.38091	235.34333	.000
METH	274.76502	1	274.76502	49.55294	.000
SCM	30.25307	2	15.02654	2.71797	.061
SEX	.20305	1	.20305	.03645	.979
AGE	59.71475	4	14.92869	2.70027	.032

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.03021	.50345	12.00	574.00	.913
Hotellings	.03022	.49572	12.00	574.00	.917
Wilks	.97005	.49788	12.00	574.00	.913
Roys	.01746				

Univariate F-tests with (4,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	4.47511	467.15243	1.11378	2.36745	.47217	.755
SCOTEXT4	3.35451	404.99777	.89733	2.04544	.43372	.751
SCOTEXT5	9.29119	514.12778	1.57250	2.59567	.59571	.559

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.04312	2.94413	3.00	176.00	.034
Hotellings	.04306	2.94413	3.00	176.00	.034
Wilks	.95333	2.94413	3.00	176.00	.034
Roys	.04312				

Univariate F-tests with (1,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	3.74173	467.15243	3.74173	2.36745	1.56358	.197
SCOTEXT4	12.57797	404.99777	12.57797	2.04544	6.15324	.014
SCOTEXT5	2.30146	514.12778	2.30146	2.59567	1.07393	.303

EFFECT .. SCM BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.75211	2.10454	6.00	374.00	.052
Hotellings	.76470	2.10737	6.00	374.00	.051
Wilks	.93549	2.10703	6.00	374.00	.052
Roys	.05321				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	8.36760	467.15243	4.18380	2.36745	1.75514	.174
SCOTEXT4	2.49122	404.99777	1.24561	2.04544	.60577	.543
SCOTEXT5	20.43231	514.12778	10.21616	2.59567	3.94406	.021

EFFECT .. METH BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01753	1.30123	3.00	176.00	.273
Hotellings	.01772	1.30120	3.00	176.00	.273
Wilks	.98347	1.30123	3.00	176.00	.273
Roys	.01753				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	2.24786	467.15243	2.24786	2.36745	.94953	.331
SCOTEXT4	.38207	404.99777	.38207	2.04544	.18913	.661
SCOTEXT5	7.36443	514.12778	7.36443	2.59567	2.83537	.094

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.30937	67.32313	3.00	176.00	.000
Hotellings	1.03517	67.32313	3.00	176.00	.000
Wilks	.49763	67.32313	3.00	176.00	.000
Roys	.35717				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SCOTEXT3	.30192	467.15243	.30192	2.36745	.12681	.977
SCOTEXT4	35.34797	404.99777	35.34797	2.04544	172.74163	.000
SCOTEXT5	29.10450	514.12778	29.10450	2.59567	112.46313	.000

Appendix VIII.2 Ancova Deep Comprehension Scores

..... A N C O V A D E E P C O M P R E H E N S I O N S C O R E S

Tests of Significance for DEPTEXT2 using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	385.70794	197	1.95792		
Regression	3.35766	1	3.35766	1.71457	.1934
CONSTANT	347.72564	1	347.72564	182.97341	.000
METH	113.36436	1	113.36436	58.30263	.000
SEX	2.39302	2	1.19651	0.62155	.535
AGE	4.76314	1	4.76314	2.51491	.113
	23.92733	6	3.98789	2.11323	.012

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.92323	4.7323	12.00	574.00	.032
Hotellings	.72369	4.6513	12.00	574.00	.035
Wilks	.27195	4.6753	12.00	574.00	.033
Roys	.31787				

Univariate F-tests with (4,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DEPTEXT3	4.31333	254.25452	1.07833	1.32765	.8161	.362
DEPTEXT4	.72369	182.22724	.11337	.71233	.19924	.657
DEPTEXT5	2.23235	233.50665	.55809	1.19743	0.4772	.491

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 2, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.23567	2.41377	3.00	176.00	.065
Hotellings	.23567	2.41377	3.00	176.00	.065
Wilks	.76433	2.41377	3.00	176.00	.065
Roys	.23567				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DEPTEXT3	.18202	254.25452	.18202	1.32765	.1413	.707
DEPTEXT4	6.54702	182.22724	6.54702	.71233	9.21094	.003
DEPTEXT5	.50125	233.50665	.50125	1.19743	.42142	.517

EFFECT .. SCH BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.08493	2.71216	6.00	176.00	.007
Hotellings	.08493	2.71216	6.00	176.00	.007
Wilks	.91507	2.71216	6.00	176.00	.007
Roys	.08493				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DEPTEXT3	3.34903	254.25452	1.67451	1.32765	1.2546	.265
DEPTEXT4	3.72333	182.22724	1.86167	.71233	2.6337	.103
DEPTEXT5	2.22723	233.50665	.91362	1.19743	0.76385	.382

EFFECT .. METH BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.76523	4.56273	3.00	176.00	.006
Hotellings	.76523	4.56273	3.00	176.00	.006
Wilks	.23477	4.56273	3.00	176.00	.006
Roys	.76523				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DEPTEXT3	.95273	254.25452	.95273	1.32765	.7127	.391
DEPTEXT4	.70337	182.22724	.70337	.71233	.9867	.323
DEPTEXT5	14.25383	233.50665	14.25383	1.19743	12.25287	.001

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.52713	72.34522	3.00	176.00	.000
Hotellings	1.11491	72.34522	3.00	176.00	.000
Wilks	.47282	72.34522	3.00	176.00	.000
Roys	.52713				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DEPTEXT3	35.24327	254.25452	35.24327	1.32765	26.52453	.000
DEPTEXT4	156.19177	182.22724	156.19177	.71233	219.29731	.000
DEPTEXT5	19.51444	233.50665	19.51444	1.19743	16.34933	.000

Appendix VIII.3 Ancova Surface Comprehension Scores

Tests of Significance for SUFTEXT2 using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	385.56204	197	1.95717		
Regression	46.32442	1	46.32442	23.92467	.000
CONSTANT	469.03385	1	469.03385	237.54932	.000
METH	34.58644	1	34.58644	17.97163	.007
SCM	7.44495	2	3.72247	1.90703	.151
SEX	1.15575	1	1.15575	.59214	.441
AGE	10.45718	4	2.61429	2.10242	.082

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.98299	1.40322	12.00	574.00	.157
Hotellings	.75032	1.40324	12.00	574.00	.161
Wilks	.91985	1.40334	12.00	574.00	.159
Roys	.05167				

Univariate F-tests with (4,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SUFTEXT3	7.41093	201.63776	2.35523	1.04327	2.31174	.057
SUFTEXT4	3.70459	206.07483	.92515	1.04381	.88727	.473
SUFTEXT5	4.93426	237.26458	1.23353	1.19831	1.02742	.393

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.92747	1.34556	3.00	176.00	.140
Hotellings	.92625	1.34558	3.00	176.00	.140
Wilks	.97253	1.34553	3.00	176.00	.140
Roys	.02747				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SUFTEXT3	.96311	201.63775	.96311	1.04337	.92537	.327
SUFTEXT4	.47925	206.07483	.47925	1.04381	.45052	.503
SUFTEXT5	5.35023	237.26458	5.35023	1.19831	4.46483	.033

EFFECT .. SCM BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.92246	.74577	6.00	344.00	.513
Hotellings	.92179	.74577	6.00	344.00	.517
Wilks	.97765	.74573	6.00	344.00	.513
Roys	.07716				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SUFTEXT3	.87593	201.63775	.43796	1.04337	.43205	.551
SUFTEXT4	1.25457	206.07483	.62728	1.04381	.60133	.541
SUFTEXT5	3.32398	237.26458	1.66199	1.19831	1.38703	.252

EFFECT .. METH BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.90323	.54237	1.00	176.00	.654
Hotellings	.90333	.54237	1.00	176.00	.656
Wilks	.99177	.54237	1.00	176.00	.654
Roys	.09823				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SUFTEXT3	.01543	201.63775	.01543	1.04337	.01481	.939
SUFTEXT4	.21137	206.07483	.21137	1.04381	.20250	.653
SUFTEXT5	1.55227	237.26458	1.55227	1.19831	1.55407	.214

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.28495	26.03701	3.00	176.00	.000
Hotellings	.37353	26.03701	3.00	176.00	.003
Wilks	.71504	26.03701	3.00	176.00	.000
Roys	.28496				

Univariate F-tests with (1,196) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SUFTEXT3	33.22316	201.63775	33.22316	1.04337	37.53263	.000
SUFTEXT4	35.17534	206.07483	35.17534	1.04381	33.69393	.000
SUFTEXT5	22.07446	237.26458	22.07446	1.19831	18.42139	.002

Appendix VII.2.1 Ancova Overall Summary Scores

Tests of Significance for SAMALL using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	507.00153	197	2.57365		.000
Regression	59.47595	1	59.47595	23.08200	.000
CONSTANT	1032.00235	1	1032.00235	400.51980	.000
METH	426.26597	1	426.26597	165.43400	.000
SCM	79.07365	2	39.53682	15.34520	.000
SEX	.19747	1	.19747	.07742	.781
AGE	15.81153	6	2.63525	1.03411	.196

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.76117	1.03331	12.00	574.00	.417
Hotellings	.36323	1.03372	12.00	574.00	.423
Wilks	.93971	1.02931	12.00	574.00	.421
Roys	.04227				

Univariate F-tests with (4,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	4.71168	242.74353	1.17792	1.22701	.31737	.575
SAMALL4	3.71772	286.57354	.92793	1.44755	.56228	.533
SAMALL5	3.16502	221.38442	.78166	1.12363	1.32185	.126

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.02533	1.70103	3.00	176.00	.163
Hotellings	.22504	1.70103	3.00	176.00	.163
Wilks	.77462	1.70103	3.00	176.00	.163
Roys	.02533				

Univariate F-tests with (1,176) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	1.74241	242.94353	1.74241	1.32701	1.32304	.235
SAMALL4	3.72361	286.57354	3.72361	1.64755	2.57152	.117
SAMALL5	2.13511	221.38442	2.13511	1.12363	1.90523	.167

EFFECT .. SCM BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.26367	17.19794	6.00	174.00	.000
Hotellings	.35935	17.19277	6.00	176.00	.000
Wilks	.73356	17.19233	6.00	172.00	.000
Roys	.24753				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	24.31551	242.94353	12.15775	1.22701	10.11257	.000
SAMALL4	15.54147	286.57354	7.77073	1.44755	5.71243	.004
SAMALL5	47.96512	221.38442	23.98256	1.12363	21.40144	.000

EFFECT .. METH BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.18251	5.37557	3.00	176.00	.001
Hotellings	.28993	5.37550	3.00	176.00	.001
Wilks	.91749	5.37557	3.00	176.00	.001
Roys	.03251				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	6.73133	242.94353	6.73133	1.22701	5.55597	.051
SAMALL4	7.70065	286.57354	7.70065	1.44755	5.49827	.023
SAMALL5	6.92334	221.38442	6.92334	1.12363	6.17809	.014

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.44324	53.07562	3.00	176.00	.000
Hotellings	.31235	53.07562	3.00	176.00	.000
Wilks	.55175	53.07562	3.00	176.00	.000
Roys	.44324				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMALL3	2.53911	242.94353	2.53911	1.22701	2.15984	.144
SAMALL4	177.01144	286.57354	177.01144	1.44755	122.57753	.000
SAMALL5	45.34303	221.38442	45.34303	1.12363	40.44765	.000

Appendix VII.2 Ancova Deep Summary Scores

..... ANCOVA DEEP SUMMARY SCORES

Tests of Significance for SAMDEEP2 using UNIQUE Sums of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	242.25333	197	1.22975		
Regression	25.73271	1	25.73271	21.38737	.003
CONSTANT	724.35252	1	724.35252	589.01796	.000
MEAN	355.55152	1	355.55152	289.72767	.000
SCM	14.16425	2	7.08213	5.84500	.001
SEX	.15357	1	.15357	.12437	.724
AGE	7.75715	4	1.93929	1.58305	.180

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.02369	.02269	12.00	374.00	.955
Hotelling's	.02377	.01102	12.00	374.00	.957
Wilks	.97476	.02311	12.00	374.00	.955
Roys	.01763				

Univariate F-tests with (4,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMDEEP3	.29265	173.14275	.07315	.44781	.163	
SAMDEEP4	1.21073	167.38135	.30271	.44759	.537	
SAMDEEP5	2.71163	173.12445	.67792	.45721	.554	

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 3, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01221	.30747	3.00	176.00	.691
Hotelling's	.01235	.30747	3.00	176.00	.691
Wilks	.98779	.30747	3.00	176.00	.691
Roys	.01221				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMDEEP3	.29265	173.14275	.29265	.44781	1.78701	.183
SAMDEEP4	.76125	167.38135	.76125	.44759	1.69366	.195
SAMDEEP5	1.19975	173.12445	1.19975	.45721	1.59634	.207

EFFECT .. SCM BY TEXT

Multivariate Tests of Significance (S = 2, M = 3, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.13462	4.74531	6.00	374.00	.003
Hotelling's	.14527	4.75127	6.00	374.00	.003
Wilks	.86711	4.74752	6.00	374.00	.003
Roys	.09502				

Univariate F-tests with (2,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMDEEP3	7.36487	173.14275	3.68244	.44781	8.23759	.017
SAMDEEP4	4.35937	167.38135	2.17969	.44759	2.66354	.107
SAMDEEP5	11.74212	173.12445	5.87106	.45721	12.83303	.001

EFFECT .. MEAN BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.01637	1.12227	3.00	176.00	.341
Hotelling's	.01713	1.12227	3.00	176.00	.341
Wilks	.98311	1.12227	3.00	176.00	.341
Roys	.01637				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMDEEP3	.36210	173.14275	.36210	.44781	.80824	.461
SAMDEEP4	.30738	167.38135	.30738	.44759	.68533	.513
SAMDEEP5	2.06487	173.12445	2.06487	.45721	4.52567	.037

EFFECT .. TEXT

Multivariate Tests of Significance (S = 3, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.21937	13.35935	3.00	176.00	.003
Hotelling's	.23101	13.35935	3.00	176.00	.003
Wilks	.78363	13.35935	3.00	176.00	.003
Roys	.21937				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SAMDEEP3	1.31127	173.14275	1.31127	.44781	2.92124	.091
SAMDEEP4	25.69773	167.38135	25.69773	.44759	57.46774	.000
SAMDEEP5	11.25795	173.12445	11.25795	.45721	24.61424	.000

Appendix VII.2.3 Ancova Surface Summary Scores

***** QUALITY OF VARIANCE *****

Tests of Significance for SANSURP using UNIQUE Sum of Squares

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
WITHIN CELLS	227.35101	197	1.15271		
Regression	7.13122	1	7.13122	6.18647	.014
CONSTANT	553.73453	1	553.73453	482.11101	.000
TEXT	1.24376	1	1.24376	1.09934	.298
SEX	40.14125	2	20.07063	17.72399	.000
SM	.24429	1	.24429	.21193	.648
AGE	3.11638	4	1.27964	1.11012	.333

EFFECT .. AGE BY TEXT

Multivariate Tests of Significance (S = 3, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	.74731	.79342	12.00	374.00	.458
Hotellings	.04372	.79342	12.00	374.00	.661
Wilks	.75112	.79133	12.00	374.00	.459
Roys	.03555				

Univariate F-tests with (4,194) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SANSURP3	2.44468	147.47305	.21117	.74421	.28057	.603
SANSURP4	3.05763	131.46552	.71252	.55397	1.27799	.263
SANSURP5	1.04764	141.70767	.26186	.71671	.36337	.553

EFFECT .. SEX BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	.21706	1.13382	3.00	176.00	.337
Hotellings	.01735	1.13382	3.00	176.00	.337
Wilks	.78294	1.13382	3.00	176.00	.337
Roys	.21706				

Univariate F-tests with (1,194) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SANSURP3	.00437	147.47305	.00437	.74421	.00590	.939
SANSURP4	2.23307	131.46552	2.23307	.55397	3.34624	.068
SANSURP5	.14292	141.70767	.14292	.71671	.19941	.656

EFFECT .. SM BY TEXT

Multivariate Tests of Significance (S = 2, M = 0, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	.25727	11.21727	3.00	176.00	.000
Hotellings	.33942	11.03104	3.00	176.00	.000
Wilks	.73783	12.42526	3.00	176.00	.000
Roys	.22769				

Univariate F-tests with (1,194) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SANSURP3	31.25732	147.47305	31.25732	.74421	29.74336	.000
SANSURP4	9.74405	131.46552	9.74405	.55397	7.48739	.001
SANSURP5	2.36359	141.70767	2.36359	.71671	3.33377	.002

EFFECT .. TEXT BY TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	.01029	.07734	3.00	176.00	.565
Hotellings	.01040	.07734	3.00	176.00	.565
Wilks	.95971	.07734	3.00	176.00	.565
Roys	.01029				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SANSURP3	.97417	147.47305	.97417	.74421	1.31053	.254
SANSURP4	.97405	131.46552	.97405	.55397	1.1153	.739
SANSURP5	.49374	141.70767	.49374	.71671	.68390	.409

EFFECT .. TEXT

Multivariate Tests of Significance (S = 1, M = 1/2, N = 97)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillai's	.30304	23.40344	3.00	176.00	.000
Hotellings	.43479	23.40344	3.00	176.00	.000
Wilks	.19596	23.40344	3.00	176.00	.000
Roys	.30304				

Univariate F-tests with (1,193) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
SANSURP3	.38352	147.47305	.38352	.74421	.51493	.474
SANSURP4	46.54329	131.46552	46.54329	.55397	70.24739	.000
SANSURP5	15.36762	141.70767	15.36762	.71671	21.43226	.000

Appendix VIII Anova Posttest Tables For
Comprehension And Summary Scores

Appendix VIII.1

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score overall *postest*

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	153.451	8	19.181	6.173	0.000
METH	36.453	1	36.453	27.822	0.000
SCH	8.007	2	4.003	1.288	0.278
SEX	2.840	1	2.840	0.914	0.340
AGE	43.148	4	10.787	3.471	0.009
EXPLAINED	153.451	8	19.181	6.173	0.000
RESIDUAL	727.125	234	3.107		
TOTAL	880.576	242	3.639		

Appendix VIII.2

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score deep *postest*

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	39.675	8	4.959	3.025	0.003
METH	25.341	1	25.341	15.457	0.000
SCH	5.477	2	2.738	1.670	0.190
SEX	0.177	1	0.177	0.108	0.743
AGE	5.336	4	1.459	0.890	0.471
EXPLAINED	39.675	8	4.959	3.025	0.003
RESIDUAL	383.642	234	1.639		
TOTAL	423.317	242	1.749		

APPendix VIII.3

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score surface *postest*

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	53.809	8	6.726	5.757	0.000
METH	12.938	1	12.938	11.073	0.001
SCH	7.160	2	3.580	3.064	0.049
SEX	0.189	1	0.189	0.162	0.688
AGE	23.848	4	5.962	5.103	0.001
EXPLAINED	53.809	8	6.726	5.757	0.000
RESIDUAL	273.409	234	1.168		
TOTAL	327.218	242	1.352		

Appendix VIII con.

Appendix VIII2.1

*** ANALYSIS OF VARIANCE ***

summary score overall Posttest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	220.945	8	27.618	14.979	0.000
METH	145.954	1	145.954	79.162	0.000
SCH	39.605	2	19.803	10.740	0.000
SEX	1.199	1	1.199	0.651	0.421
AGE	16.892	4	4.223	2.291	0.069
EXPLAINED	220.945	8	27.618	14.979	0.000
RESIDUAL	431.434	234	1.844		
TOTAL	652.379	242	2.696		

Appendix VIII2.2

*** ANALYSIS OF VARIANCE ***

summary score deep posttest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	183.436	8	22.929	19.021	0.000
METH	170.297	1	170.297	141.271	0.000
SCH	6.459	2	4.230	3.509	0.032
SEX	0.085	1	0.085	0.071	0.791
AGE	2.300	4	0.575	0.477	0.753
EXPLAINED	183.436	8	22.929	19.021	0.000
RESIDUAL	282.079	234	1.205		
TOTAL	465.514	242	1.924		

Appendix VIII2.3

*** ANALYSIS OF VARIANCE ***

summary score text4 surface posttest

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	65.298	8	8.162	9.094	0.000
METH	1.154	1	1.154	1.286	0.258
SCH	47.040	2	23.520	26.206	0.000
SEX	0.128	1	0.128	0.142	0.707
AGE	7.423	4	1.856	2.068	0.086
EXPLAINED	65.298	8	8.162	9.094	0.000
RESIDUAL	210.019	234	0.898		
TOTAL	275.317	242	1.138		

Appendix IX SEPARATE ANOVA TABLES FOR MFM AND TM:POSTEST

Appendix IX1.1.1 Anova Table Comprehension Overall MFM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score overall

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	92.020	7	13.146	5.206	0.000
AGE	12.773	4	3.193	1.265	0.283
SEX	7.134	1	7.134	2.825	0.096
SCH	40.575	2	23.237	9.222	0.000
EXPLAINED	92.020	7	13.146	5.206	0.000
RESIDUAL	290.387	115	2.525		
TOTAL	382.407	122	3.134		

Appendix IX1.1.2 Anova Table Comprehension Deep Mfm Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score Jeep

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	16.303	7	2.401	2.028	0.057
AGE	0.455	4	0.114	0.096	0.983
SEX	2.915	1	2.915	2.461	0.119
SCH	12.111	2	6.055	5.113	0.007
EXPLAINED	16.303	7	2.401	2.028	0.057
RESIDUAL	136.184	115	1.184		
TOTAL	152.992	122	1.254		

Appendix IX1.1.3 Anova Table Comprehension Surface MFM GP.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score surface

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	46.227	7	6.604	6.335	0.000
AGE	9.149	4	2.287	2.211	0.072
SEX	0.929	1	0.929	0.898	0.345
SCH	29.092	2	10.046	9.713	0.000
EXPLAINED	46.227	7	6.604	6.335	0.000
RESIDUAL	118.944	115	1.034		
TOTAL	165.171	122	1.354		

Appendix IX con.

Appendix IX1.2.1 Anova Table Summary Overall MFM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score overall

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	73.626	7	11.232	5.741	0.000
AGE	7.024	4	1.756	0.898	0.468
SEX	2.164	1	2.164	1.106	0.295
SCH	47.298	2	23.649	12.037	0.000
EXPLAINED	73.626	7	11.232	5.741	0.000
RESIDUAL	225.000	115	1.957		
TOTAL	303.626	122	2.489		

Appendix IX1.2.2 Anova Table Summary Deep MFM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score Jeep

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	22.635	7	3.234	2.848	0.009
AGE	3.173	4	0.794	0.700	0.594
SEX	1.760	1	1.760	1.550	0.216
SCH	13.521	2	6.760	5.955	0.003
EXPLAINED	22.635	7	3.234	2.848	0.009
RESIDUAL	130.552	115	1.135		
TOTAL	153.187	122	1.256		

Appendix IX1.2.3 Anova Table Summary Surface MFM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score text4 surface

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	55.762	7	8.109	8.295	0.000
AGE	2.364	4	0.591	0.604	0.660
SEX	0.051	1	0.051	0.053	0.319
SCH	43.007	2	24.004	24.554	0.000
EXPLAINED	55.762	7	8.109	8.295	0.000
RESIDUAL	112.425	115	0.978		
TOTAL	168.187	122	1.337		

Appendix IX con.

Appendix IX 2.1.1 Anova Table Comprehension Overall TM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score overall

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
MAIN EFFECTS	42.791	7	6.113	1.853	0.084
AGE	31.533	4	7.833	2.339	0.055
SEX	0.122	1	0.122	0.037	0.348
SCH	10.342	2	8.171	2.477	0.089
EXPLAINED	42.791	7	6.113	1.853	0.084
RESIDUAL	369.534	112	3.299		
TOTAL	412.325	119	3.465		

Appendix IX 2.1.2 Anova Table Comprehension Deep TM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score deep

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
MAIN EFFECTS	19.983	7	2.855	1.419	0.205
AGE	13.972	4	3.493	1.736	0.147
SEX	1.036	1	1.036	0.515	0.475
SCH	5.761	2	3.330	1.630	0.191
EXPLAINED	19.983	7	2.855	1.419	0.205
RESIDUAL	225.317	112	2.012		
TOTAL	245.300	119	2.051		

Appendix IX 2.1.3 Anova Table Comprehension Surface TM GP.

* * * A N A L Y S I S O F V A R I A N C E * * *

comprehension score surface

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
MAIN EFFECTS	13.080	7	1.869	1.540	0.161
AGE	12.557	4	3.139	2.537	0.041
SEX	0.155	1	0.155	0.128	0.721
SCH	1.707	2	0.353	0.703	0.497
EXPLAINED	13.080	7	1.869	1.540	0.161
RESIDUAL	133.911	112	1.213		
TOTAL	146.992	119	1.252		

Appendix IX con.

Appendix IX2.2.1 Anova Table Summary Overall TM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score overall

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	22.504	7	3.215	2.002	0.061
AGE	5.774	4	1.443	0.899	0.467
SEX	0.037	1	0.037	0.023	0.380
SCH	12.360	2	6.430	4.005	0.021
EXPLAINED	22.504	7	3.215	2.002	0.061
RESIDUAL	179.321	112	1.606		
TOTAL	202.325	119	1.700		

Appendix IX2.2.2 Anova Table Summary Deep TM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score deep

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	8.357	7	1.194	0.998	0.437
AGE	3.199	4	0.500	0.669	0.615
SEX	0.783	1	0.783	0.659	0.419
SCH	4.526	2	2.263	1.892	0.156
EXPLAINED	8.357	7	1.194	0.998	0.437
RESIDUAL	133.963	112	1.196		
TOTAL	142.325	119	1.196		

Appendix IX2.2.3 Anova Table Summary Surface TM Gp.

* * * A N A L Y S I S O F V A R I A N C E * * *

summary score surface

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	13.593	7	2.657	3.452	0.002
AGE	0.367	4	1.592	2.068	0.090
SEX	0.539	1	0.539	0.701	0.404
SCH	9.285	2	4.642	6.032	0.003
EXPLAINED	13.593	7	2.657	3.452	0.002
RESIDUAL	89.202	112	0.770		
TOTAL	102.800	119	0.831		

----- T - T E S T -----												
VARIABLE	NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	(DIFFERENCE) MEAN	STANDARD DEVIATION	STANDARD ERROR	2-TAIL CORR. PROB.	T VALUE	DEGREES OF FREEDOM	2-TAIL PROB.	
SCOTEXT1	comprehension score overall pretest	4.0407	1.468	0.132								
	123	5.1138	1.770	0.160	-1.0732	2.162	0.195	0.118 0.193	-5.50	122	0.000	
SCOTEXT3	comprehension score overall text4											
DEPTXT1	comprehension score deep pretest	1.6585	0.922	0.083								
	123	1.9919	1.120	0.101	-0.3333	1.430	0.129	0.029 0.750	-2.59	122	0.011	
DEPTXT3	comprehension score deep text4											
SUFTXT1	comprehension score surface pretest	2.4146	1.123	0.101								
	123	3.1220	1.164	0.105	-0.7073	1.441	0.130	0.206 0.023	-5.44	122	0.000	
SUFTXT3	comprehension score surface text4											
SAMALL1	summary score pretest overall	5.2033	1.318	0.119								
	123	6.2276	1.578	0.142	-1.0244	2.054	0.185	0.001 0.989	-5.53	122	0.000	
SAMALL3	summary score overall text4											
SAMDEEP1	summary score deep pretest	3.0976	0.953	0.086								
	123	3.7480	1.121	0.101	-0.6504	1.465	0.132	0.008 0.931	-4.92	122	0.000	
SAMDEEP3	summary score deep text4											
SAMSURF1	pretest surface summary score	4.0407	1.468	0.132								
	123	5.1138	1.770	0.160	-1.0732	2.162	0.195	0.118 0.193	-5.50	122	0.000	
SAMSURF3	summary surface posttest											

Appendix XIA Data From Reactions to MFM
Teachers' Questionnaire

		T E A C H E R S									
		1			2			3			
		OCCASION OF TEACHERS RESPONSES									
Ques.	Choices	1	2	3	1	2	3	1	2	3	Ttl.
1	not helpful										0
	do not know					/					1
	helpful	/	/	/	/	/	/	/	/	/	8
2	easy						/		/		2
	fair	/		/		/		/		/	5
	hard		/		/						2
3	not helpful										0
	do not know	/				/					2
	useful		/	/	/	/	/	/	/	/	7
4	rejection										0
	detachment	/			/						2
	acceptance		/	/		/	/	/	/	/	7
5	bad										0
	average		55				60		58		3
	good	75		85	95	79		90		75	6
6	low ability	/				/					2
	both			/	/		/	/	/		5
	high		/							/	2
7	a old (1)										0
	both (2)		/			/					2
	new (3)	/		/	/	/	/	/	/		7
b	1										0
	2	/				/				/	3
	3		/	/	/	/	/	/	/	/	6
c	1										0
	2	/			/	/	/	/	/	/	1
	3		/	/	/	/	/	/	/	/	8
d	1				/						1
	2	/						/			2
	3		/	/		/	/		/	/	6
e	1						/				0
	2	/			/	/		/	/	/	2
	3		/	/	/	/	/	/	/	/	7
f	1										0
	2		/		/						2
	3	/		/		/	/	/	/	/	7

APPENDIX XII TEACHERS' OPEN-
ENDED REPORTS ON THE MFM

Appendix XII.1
Teacher's open ended report Scool1
Translated from Arabic

This method helps pupils to actively participate and effectively discuss the lessons. It also improves comprehension considerably as well its depth. Pupils are made to compare the text content to their life experiences. In this sense the method seems to reveal the personalities of the pupils through conclusions and contribution made. The aspect of self-reflection is helpful in making pupils learn self-questioning and self-criticism. The use of rules of summarising helps to retain information better.

The teacher, however, should be watchful of the time if the lesson is to be completed because the method is quite time-consuming because it involves a lot of discussion and participation of the pupils. This can be remedied by incorporating some parts of the method into others.

Appendix XII.2
 Teacher's open ended report School2
 Translated from Arabic

Report on the mulifaceted method of teaching.

The traditioanl method of teaching in the Algerian Fundamental School was moderately successful since it helps the high and average ability pupils but the^{low} ability pupils fail to adapt to it. Because the number of high ability pupils is small, there was no competition between pupils to participate in the class. However, when we tried the new method (entitled the multifaceted method), my pupils accepted it happily. It led to the increase in the number of pupils who participated in the lessons more than there used to be. It was revealed to me that the answers pupils were giving were more correct and precise. This view about this method does not mean that it does not have its positive and negative points.

The negative points:

- It is time consuming.
- Too much elaboration seems to bore bright pupils.
- It may be difficult to adapt to some subjects (eg.Grammar).
- May not be as effective in younger pupils.

The positive points:

- Active participation of pupils especially low ability ones.
- Pupils are more certain of and precise in their answers.
- Depth of comprehension.

To solve the negative points, I propose to amalgamate the elaboration phase and the self-reflection fase into one. I would also suggest the introduction of visual aids if this method is to be successfull with younger ages.

This is what I wanted to say about this method. My hope is that you reach the appropriate solutions that make this new method of yours, beside its success, a method favoured and chosen by all teachers to make their pupils reach the wanted goal of better comprehension.

Appendix XII.3
 Teacher's open ended report, Scool3
 Translated from Rabic

I was very pleased to have been chosen among the teachers to apply the multifaceted method which I liked very much. It was for me like a rescue from drowning. I certainly hope this method will be a stone in building up the educational system in our country and a way of improving it.

This educational method is successfull and bears a lot fruits. It will be more so if appropriate atmosphere and means are provided. These seem to be present. I can see, if this method is adopted, an improvement in the standards in our schools. I was fascinated how this method encouraged the shiest of my pupils participate in the discussions. My pupils have become very active learners, they tend to discuss things more than they used to. The other good side of the method is link ~~the~~ made between what is in the text^d the children's life experiences. This is one of the very strong points of the method. I think that the child who does not know his environment may stay weak in his personality. More over such ignorance may be an obstacle in his future life. So as the method links the text content with their real life experiences, pupils' knowledge and thinking improved considerably. The use of summary in a precise way, the use of elaboration, self-reflection, questining, giving interpretations and so on of the terchniques used through this method were not known to me in my teacher- or in-sevice training. The fact^{it} the method encouraged the pupils to express their views freely hightened their sel-esteem. I would like to say that the positive points of this method to me are numerous. However I would like to make some suggestions as to improve the method more.

- It needs more time to be able to get the maximum benfit of the method.
- There should be a stringency in choosing the text; that are more related to the pupils' experiences.
- There^{is} need for visual aids.

These are suggestions rather than criticism.

What I observed of pupils' active participation really astonished me, I never expected many of them could have participated in any lesson. Teir hand were raised to volunteer to answer questions and participate with their views and examples. This I think in itself would encourage the teacher to be more enthusiastic in his teaching. I also noticed new ideas coming from the pupils in a way I was never used to observe. This shows to me that there is readiness and intelligence in the pupils, contrary to what was believed. It can be said then it is the method which makes one learn better and get involved. This new method proved usefull and should be be part of teacher-training programme.

Appendix XIIA Teachers' Open-ended Reports on MFM
Arabic original version from which
the English version was translated.

School teacher

تقرير حول:
طريقة التدريس السندرة الأوجه
إن هذه الطريقة تساعد التلميذ على المناقشة والمشاركة
الفعالة في الدرس، كما أنها تساعد على الفهم الجيد
والتركيز والتحقق، ويستطيع أن يربط ويقارن بين
ما فهمه من الدرس والواقع الذي يعيش فيه، لأن
الطريقة تدعو إلى ذلك بكل تأكيد، ونظراً لشخصية
التلميذ من خلال أسئلة استحثه من النتائج والافتراضات
كما أن التلميذ يعود على محاسنة نفسه بنفسه عندما
يقدم شيئاً ثم يسأل نفسه: لماذا وكيف قد حصلت
بعدها السؤال لم أفهم بشكل آخر، وتساعد الطريقة
على اختزان المعلومات المحصل عليها ويتم له ذلك
بالتخفيف الذي هو أحد مبادئ هذه الطريقة

غير أن الأستاذ يجب أن يكون حذراً وواقعياً من حيث
الوقت المحدد للدرس لأن الطريقة تتطلب وقتاً مقبولاً
وقد يستلزم الإسناد عن الأسئلة التي يراها غير
ضرورية، نقادياً لضياع الوقت، وعليه أو ما أن
هذه الطريقة تصلح للدراسة القصوى الأدبية أو القصوى
للثريّة الدنيّة لاستخراج الأركان، أما دروس القراءة
التي من بين أهدافها التدريس على حسن الاسترسال في
القراءة وتطلب من أدوات فردية كثيرة فإشغالها لا يصلح
بها في كل مراحلها (الطريقة) - وسكراً

Appendix XIIA. cont.

School2 teacher.

تقرير حول طريقة التدريس المتعددة الأوجه.

كانت طريقة التدريس العادية في المدرسة الأساسية الجزائرية تاجه بشك متوسطة حيث أنها تساعد القوي والمتوسط ولا يتساير معها الضعيف ولها لم يكن للأقوياد كثيرين لم يظهر روح التنافس بين التلاميذ. ولما جربنا الطريقة التي انتقيناها (الطريقة المتعددة الأوجه في التدريس) تغيرها تلاميذنا بصبر حيث برز عدد المشاركين أكثر من ذي قبل. وقد تبين لي أي الإجابة كانت أكثرها صحة ومكررة. وإذا كان إقتراحنا هكذا بالسبب لهذه الطريقة لأخيرة فهذا لا يعني أي يكون لها مساوي ومجاسي، فمساويها هي:

- 1- كونها تأخذ الكثير من الوقت منها بسطت
- 2- في المرحلة الثابتة منها يظهر لكل على بعض التلاميذ وتقصد للنبيا منهم.
- 3- لا تتلائم مع بعض النشاطات كالقواعد مثلا إذا طبقت بدورها.
- 4- لو جربت من المستوى الأدنى الساعة مثلا كانت نتائجها غير بارزة كما هي في الثابتة

أما محاسنها فهي:

- 1- مشاركة التلاميذ العالية وبخاصة الضعفاء منهم.
- 2- اليقظة والدقة في الإجابة.

3- الفهم العميق.

الحلول ليست للتقاري عموما. إن غام المرحلة الثابتة مع الأولى ويمكن الإستخاء عن الأولى إذا كانت القواعد واضحة وبهذا انتقادي أيضا للواقع في مشكلة مثل النبيا من التلاميذ.

ولا بد من توفير الوسائل السمعية البصرية لتكون تاجه في المستوى الأدنى (الساعة هذا ما يمكن أن أقوله حول هذه الطريقة، وأمل أن تصلوا إلى حلول تعجل طريقكم علاوة عن كونها تاجه، مختارة ومفضلة عند كل الأساتذة ليصلوا بتلاميذهم إلى الهدف المنشود.

أخيرا أتمنى لكم النجاح في التفكير هذا، وفوقكم الله

Appendix XIIA cont.
School3 teacher cont.

نزن فلهذه اقتراحات وآراء ولا نسئها نداءً أو بياناً سياسياً مباشراً
 للمواطنين
 أما ما آراه من تجارب الثلاثة مع الطريقة فهذا الأمر الذي كنت إليه وابتهون
 به فحلاً مما كنت عليه سائلاً في الطريقة القديمة فأبانا الثلاثة
 تكاد ألاتنزل للإجابة عن الأسئلة المتكررة حول النهج وهذا الأمر يزيدنا بالمراسل
 أيضاً لأنه ينزل للبلد والكتاب في ذلك ثم لا نملك أن نتطور والتجارب
 يزيدنا يوماً بعد يوم وخاصة أنه الدروس كانت وراة بخصراً
 السخفى منه غير تكفى - منه غير بالحقه - وهذا مما يزيدنا إلى القرب
 والاستمئزاز ورغم ذلك فالأمور تبت عادياً مستورة كما كانت عليه سابقاً.
 ومما لاحظته أيضاً ما جاءه التجارب مع الطريقة أدى إلى ظهور أفكار جديدة على الثلاثة
 التي نزل بها ذلك التزم لغير صيدهما وبدأت تتحرك من سياترنا العميق وهذا
 مما دلني على أنه هذا الاتجاه الاستعداد للتقبل والتأمل والوظيفة موجودة بأسرها
 وكما بالتوجه والمهنية في العمل والالتزام والتميز والقدرة على العمل
 الطريقة الترميمية التي هذه الأوجه ناهية وسكيت في المجال التي شأنه الله إذا
 ودرت أصناف الكفاءة والإفلاحي في الميدان التربوي هذا كل ما رأيت
 بصورته بحدودها محلمة وبالطريقة وأقلب من العمل الذي رأته بوقفاً في سرد
 ضطاك وأنه يحق لك كل ما تصيدو إليه كل ذلك ما فيه مصلحة الأمة
 والله هو خير من السير في هذا الاتجاه، بارك في التجارب

Appendix XIII

Samples of pupils open-ended reports.

- 1- My view is that this method is helpful in comprehending the contents of the text read. It gives the chance to the pupils themselves. The method helps us to link the different ideas of the text. I hope that this method will be used by other teachers and in other subjects because as long as it remains effective in developing our thinking and helping us in our studies.
- 2- The old method was generally good but it does not encourage participation and does not help well in comprehension. Comprehension can be ascertained if participation is allowed because the pupils will know whether what they understood is right. The new method is generally speaking excellent. It makes those who usually do not participate to do so. It also makes those who do not understand comprehend. From this their knowledge increases and their ideas broaden. The method makes pupils express their views.
- 3- Right from start, and from the time we were taught the first text, I was awaiting more lessons in the same way the first text was taught. In general, this method broadens the scope of the pupils. It relates the pupil to reality. Because of that the pupil is encouraged to be initiative and it also helps him to differentiate between things. It also helps exercise one's mind.
- 4- Since the new method was applied in our course, I saw in it good points. It made me understand the lessons better. Then, I can say that this method is successful. It simplifies the text. We have learned how to draw analogies and relate what we learn in the class to real life-experiences. As for the old method, there was some difficulty in understanding. The discussion is centered on the text and no relating to real-life example is made. The new method is better than the old one.
- 5- I liked this new method very much because it has improved my knowledge and helped understand better. It has increased our way of understanding. It is a clever method it improves our thinking and our way of increasing our knowledge in the future.
- 6- This method is like the old one as far as participation is concerned as well as many other aspects. The use of summary in this method is better. However, although I like this method, I like the old better because I prefer old things to new ones.
- 7- The new method is excellent especially in comprehension.

Appendix XIII con.

Comprehension is made easier. This method encourages participation. I have started to participate more. I like this method very much so I hope that it will be used in the future.

- 8- My view is that the new method is excellent. It helps pupils understand and participate and express their views frankly and freely.
I cannot say that that the old method did not help in comprehension, however I am sure it did not encourage the participation.
- 9- My view about this method is that it is good, easy and better than the old method. The new method facilitates comprehension. The pupil is helped to think since it encourages him to relate the text content to his own reality and link the ideas and different topics together. The pupil is also given a lot of chances to express his views and this encourages him to answer questions and favour the new method to the old one. The new method is better than the old one because the new one makes learning easier.
- 10-The method is truly excellent. It explains the lesson well in the ideas and paragraphs. The participation has been well catered for. What I liked in this method is that I feel I understand much better. I was not used to participate a lot before but now I participate a lot.

APPENDIX XIII Pupils' Open-ended Reports
Arabic version from which
the samples were translated.

The numbers before each report refer to the
one in the English translation in Appendix XIII.

Report 1

رأيت في هذه الطريقة أنها طريقة سليمة تساعد
على فهم ما يدور حوله النص وجميع الكلمات الصعبة
وتتيح الفوص للتعلم على بعد على فهم وهي طريقة
بواسطتها تستطيع أن تربط بين جميع أفكار النص ولا تأخذ
وقتاً طويلاً

أرجو أن تستمر هذه الطريقة وبصفتها فعالة مادامت

لها فائدة كبيرة في تنمية عقولنا ومساعدتنا في

الدراسة

Appendix XIII cont.

Report No2

المادة : دراسة منهجية
 الموضوع : تلخيص منهجية الطريقة
 الحديثة والتقدمية

الطريقة القديمة عموماً جيدة لكنها تجعل الإنسان
 الذي لم يتشارك في التفكير والتدبير يفهمهم و
 الذي لم يتشارك في أمره الأول يتكلم معلوماته
 بنفسه ومشاركته الدستورية بالحدود والعمل
 أما الطريقة الجديدة عموماً جيدة جداً فهي
 تجعل الذي لم يتشارك في التفكير والتدبير يفهمهم
 بصورتها كاملة وبذلك يتكلم معلوماته ويتوسع
 أفكاره ويجعله يعبر عن رأيه المخفوف عن وكلامه
 يعمل ويتشارك وتفهم من أجل العلم لأن
 العلم نور والجهل ظلام " ونطلب من الله أن
 يجعلنا من الجاهلين لئلا نلحق بالأمم خائفة وكذا
 الطريقة عموماً لا بأس بهم وإنما ينبغي التفرقة
 بين من يدعى على مدى التصور

Appendix XIII Cont.

Report No. 4

تقرير حول الطريقة التدريسه

بعد دخول الطريقة التدريسه المشهورة على راسنا رأيت
 فيما كل الرضاب فاني لم يقم جديتي منهم
 المدرس واللات عبرت علينا بطور كامله فالتحقيقه
 مستطبع انه اقول عنها اننا لم يقمنا صحه
 وهي تستعمل لاطالاف فتم الدرر فيها هجتها
 نتعلم كيف نعيش المواقف وهي الطريقة
 في الدعو ما نعلمنا نسو من تدقك لاجتها اللدريتنا
 ذلكا وبالنت كسيد: تقول هذا انا مواجته لنا ما
 على هذه الطريقه وهي ضريره لس نيه ما يكثر
 على الظلم اريعرف علمه هدي منها؟ متحصنا به
 هرسيت نفهم به كل المنطقه من التي تعلم من علينا
 وطوره كما طلة به اقول وارجو مع الله انه يوعينا
 في دست بعثنا وارجو انه يتي
 للدرسين عوافك على ادخالها
 للدرسين

والله اعلم
 والحمد لله رب العالمين

والله اعلم
 والحمد لله رب العالمين

يعجز اللسان في فهم النظام وتنفذي الاوامر
 على التعبير على مدى صبرك ونظم هذه الطريقه

والله اعلم
 والحمد لله رب العالمين

فوق هذه الطريقه في الارتفاع هبه الوقت ذلكم حسب

الدرسين لس درسا في امثاله بالذات لسه حاله من

المدرسين في حبه في حله
 المدرسين في حله في حله
 المدرسين في حله في حله

Appendix XIII Cont.

Report No. 5

لقد اعجبتني بقده الطريقة اجابا كالياميك لانها ظهرت
 معلو دياتي ومنهوماتي وكذلك في السجلات
 نقشر حيد واهنت لنا الحريته بعد ان كنا مقيدين فاهو من
 اعليها اديت اما المواضع التي احدثها كانت علمية رادسية
 متنوعة وهداتها زادت في تقادتها او سمعت فيها
 حقا طريقة مفيدة مستخرج من السجلات وظهر فيها
 الدكينة هصب في طريقه ظهورها بقا عندنا انشاء الله
 او تسئل الله ان يكون هذا لما نصيبه ودر صحتها

Report No. 6

تقرير

ان موارد الطريقة طال درتة القديمة منا حيث عناصر ووجه
 المشاركة - اما بالنسبة للافكار والتلخيص وهي تشابها
 أيضا فالأد كانت الطريقة القديمة تعجبتني فإلى به الصديرة تعجبتني
 لم تغيرها انه الطريقة فعني للقراءة النصوص وتلخيصها
 للقرات برعم منا اني لها اشارت في التلخيص فإني اعرف
 لطيفة التلخيص وهذا سبب لأنني أنسى ما حقيقته من افكار
 واختصه ولكن هاته الطريقة اصبحت تدرسه اذ ما لم نعد
 نتشوق فاللما بل نتوقنا ان الطريقة القديمة لأنه المشاهير
 القديمة احسنوا اجمل من مامو جديد

Appendix XIII cont.

Report No.7

تقرير عام عن طريقة العمل الجديد

لقد وجدنا العمل الجديد في هذه الطريقة بالدراسة للاطلاع جيداً على ما هو
 سهل الدم وإنتاجه هناك قد نجد في هذا العمل راحة وراحة
 العمل في العمل - العمل في العمل في وقتنا هذا هو أن
 نتابع من العمل في وقتنا هذا في وقتنا هذا في وقتنا هذا
 أي التغيرات التي تحدث في وقتنا هذا في وقتنا هذا في وقتنا هذا
 في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا
 ولقد وجدنا في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا
 في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا
 كثيراً وأعتقد أنه في وقتنا هذا في وقتنا هذا في وقتنا هذا في وقتنا هذا

Report No. 8

تقرير في الطريقة الجديدة

والتي في هذه الطريقة هي ادما لمرة فقط جيداً حيث

تساعد المصالح في الفهم والمشارطة في وقتنا هذا

بما أنه بطل من جهة حرية

في حين أن الطريقة التي كانت مستعملة لا

أقول أنها لا تساعد المصالح في الفهم والمشارطة

و لظن ليس لها فيها حماس للمشارطة كلها بالنسبة لي

ومن المستحسن أن نسير على هذا المنهج لأنه جيد وممتاز

Appendix XIII cont.

Report No. 9

التقرير

رأى في هذه الطريقة أنها طريقة جيدة و
سهلة و أحسن من الطريقة القديمة بل
تسهل للتلميذ على الفهم
و يسد جميع التلميذ أن يفكر
حيث أنها تجعله يربط بين المواضيع
و يربط الأفكار و تجعله كذلك يفسر عن
رأيه بكل سهولة يتحمس للاجابه
و كذلك تجعله يفسر الطريقة الجديدة
عن الطريقة القديمة لأنها تسهل
له الدراسة أحسن من الطريقة القديمة

Report No. 10

الرأى

إن الكلمات والتعابير يعنى على حسب المستوى
فهى حقيقه ثم يفسر جيداً و على حسب المستوى
المطلوب إلى أنها كانت فيها بيان من
شرح الكلمات والتعابير والمحل والأفعال
الأساسية التي لها أهم الأستاد لتفقرات المسئلة
و زدها مشار كذا (اللامسة) التي اعجبت بهذا
الطريقة التقى الجيده التي فهمت جيداً
فمن قبل لم اكن اشارك بكثرة اما الآن الحمد
لله اصبحت من المحباب الاقربى الى النفس
حين لك الله فليعلم بالأساسين و يتأثر بشكر
لك الهما يتر يدك و نردنا علمنا و شتمالك
البحا في دكتور

Appendix XIII A
Sample of pupils answers on the interview

- 1- I read the text trying to understand, I was also reading with some questions in my mind. I try to concentrate by thinking about nothing else but the text.
I tend to read many times until I feel confident that I will be able to answer any questions that I may be asked about the text I read.
To keep the flow of ideas in my head, I tend to summarise the ideas and try and make a link between them and try to make a whole picture in my mind.
To make sure that the link of ideas and summaries are right, I refer constantly to the text. When I abstract an idea from a paragraph, I always refer back to the paragraph to make sure that it does represent it.
I try to make a link and draw analogies between what I read in the text and my life-experience. It was not my habit to do this. Now I can see how it helps to understand better and even understand reality one lives. Thanks to the new method which opened my eyes to something that was there but I did not take advantage of.
I summarise the text by selecting the main ideas of each paragraph, then I form a summary. When I have the summary done I refer back to the text to see whether the summary reflects the meaning of the text. The rules we learned from the method have made the process of summarising easier and clearer, because one knows what to do to produce a good summary.
I tend to make my summary as close as possible to the text trying to make the ideas in my summary in the order the ideas of the original text were arranged.
- 2- I read the text with concentration and a lot of attention. I read on and when I was not sure I understood I reread.
When I understand an idea from the text, I refer back to the text to make sure. Another way that I learned is to link the idea to what I know in my experience or to the ideas I usually have in my mind about the topic. This I think is new to me, I think I learned it from the new method because it was doing it a lot and I realised that it makes one understand better.
I tend to summarise the text by extracting the main ideas of paragraphs then I link them together in my own way to make my summary reflect the meaning of the text. I do not necessarily stick to the order of ideas in the text. I make sure my summary reflects the ideas of the text. However, I consider a summary as my own understanding of the text, that is, I rewrite the text, in short form, in my own words. I may give examples from my own experience that are related to the text.
- 3- I usually read normally, however when I feel I do not understand I reread. I read with concentration of course. The thing which is new to me, may be I learned it from the new

Appendix XIIIA con.

method that my teacher was using with us, is that when read I relate the ideas in the the text to reality. this helps me concentrate and understand better. I really read the text as if I live it. When I read a sentence or an idea I think about it and discuss it, then I move on to another one then I connect them together if possible I reduce them to one. I tend to give examples representing the ideas so that the flow of ideas is not disrupted in my mind. Because I relate the meaning to what I know, I always check whether there is proof in the text or in my experience about what I understood.

I summarise by extracting the idea of the text. I make sure that those ideas are not repetitive and that they do represent the text and also represent what I know in my reality. I tend to make my summary as close to the text as possible although not using the same words and examples in the text. So the summary is my understanding of the text.

- 4- I read the text one paragraph at a time. Then I was able to summarise it. I read and extract the important words and ideas to keep in my mind so that I can concentrate. While I read I ask myself questions to make sure that I concentrate on the text and that I understand it. This also away for me to check my understanding.

I tend to summarise and shorten the ideas of the text to help me not to lose track of ideas in the text.

I refer back to the text all the time to make sure that my ideas are connected. Relating those ideas to reality is another way which helps me concentrate and understand better. It also helps check my comprehension.

In summarising the text, I organise the ideas in my summary as the ideas are organised in the text. Sometimes, however, I think, it is more appropriate to do the summary the way is appropriate to what one knows.

- 5- I read the text with concentration. After every few sentences, I extract the ideas expressed in them. When the paragraph is read I review in mind what the main idea is and put it to my memory.

I refer constantly to the text because it is always possible that two paragraphs may be talking about one single idea in two different ways. To help understand I try and give different interpretations to the text and go back to check which is more relevant and also draw on my experience to check which is the right interpretation. This helps my understanding very well.

I summarise the text according to the way we were taught by the teacher. I tend to try and represent the ideas as they are represented in the text.

- 6- I read the first paragraph then I try to understand it. Then I extract an idea from it.

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To my sure that I understood, I reread the paragraph. When I move on to a new paragraph, I revise in my mind the idea of the previous one so that I make connection between them. To help concentrate and understand one has to link ideas together. When I read a text, as I learned from the new method our teacher was using with us in many texts, I learned to relate ideas. This helps my comprehension.

I summarise the ideas of the text as I learned from the new method by getting the main ideas and connecting them together.

- 7- I read the text, then I look for what is difficult to try and understand it. I also read and think about the ideas I read, especially the important ideas. When I read I connect ideas to reach the general idea in the text. When I read and feel I do not understand, I reread what is before to help me.

When I read I try to make mental pictures in my mind because this helps in comprehension especially when the text is difficult. So when the text is difficult I imagine a picture in my mind. Well I only learned this recently from the new method. I think I will use always, it helps a lot. Then, of course, I refer back to the text to check my understanding against it.

I summarise the text ideas and organise them in manner similar to their organisation in the text.

- 8- I read then reread. I read in view to understanding. This helps me concentrate. I sometimes set myself questions to help me for answers to those questions. This makes me concentrate more and understand better. I got this from the new method. When we required to ask questions I found that this helped in comprehension.

I read the text looking for important ideas. Relating what I read to reality helped me considerably.

My way of summarising the text is to extract the most important ideas then include them in the summary. Then rewrite the summary in my own way without necessarily organising the ideas as in the text.

- 10- I read slowly and with concentration. I read a paragraph if I do not understand I reread. When I read a paragraph I summarise it. Then I read the following paragraph, I quickly skim again through the previous one to make the link between their ideas. Then, when I finish reading I try and construct the ideas in whole text (summary) independent of the way the ideas in the text are organised. Also, when I read I make imaginal pictures in mind to illustrate to my mind. This helps me to comprehend better.

Appendix XIV

SAMPLES OF ARABIC TEXTS AND QUESTIONS

An example of the application
of the Multifaceted Method

"طريقة التدريس المتعددة الأوجه"
تعريف وتطبيق

تعريف:

تمثل الطريقة المتعددة الأوجه تطبيقاً لبعض النظريات الحديثة في علم النفس التربوي. وتهدف هذه الطريقة إلى مساعدة التلميذ على الفهم الجيد لما يقرأ. تركز هذه الطريقة على ثلاث نظريات هي:
١- طريقة الإثراء: وهي طريقة تعتمد على التساؤل وضرب الأمثلة وإجراء المقارنات. وينضوي تحتها ما يلي:

- إعطاء أهداف
- قياس الفكرة على ما يشابهها
- ضرب الأمثلة
- إعادة صياغة الجمل والعبارات
- طرح الأسئلة
- التصور الذهني وأعمال الخيال
- ٢- المراجعة الذهنية أو الفكرية: وتتمثل في
 - طرح الأسئلة
 - محاولة التوقع
 - محاولة التوضيح
 - المراجعة الذهنية الخ... مما يتعلق بشعور المتعلم بعملياته الذهنية.

- ٣- التلخيص: ويتمثل في
 - شطب وطرح غير المهم
 - تصنيف الأنواع أو الأفعال تحت صنف واحد
 - انتقاء جملة من الفقرة تكون ممثلة لمعنى العام للفقرة
 - في حالة عدم توفر هذه الجملة في الفقرة يصبح ضرورياً استنباط الفكرة الممثلة للفقرة

مثال تطبيقي للطريقة المتعددة الأوجه :

- النص هو "الحيوانات المنقرضة والحفريات"
- يقرأ النص فقرة فقرة باهتمام وتركيز على الفهم .
 - تناقش الفقرة (الاستاذ مع التلاميذ)
 - يتأكد الاستاذ من مدى فهم التلاميذ لما قريء
 - يسأل الاستاذ التلاميذ عن كيفية فهمهم وكيف توصلوا اليه ولماذا اختاروا شرحا معينا ويسألون عما فعلوه حتى توصلوا للفهم
 - تراجع الفقرة وتناقش طرق فهم الموضوع باستعمال الطريقة الجديدة
 - يسأل التلاميذ أن يعطوا صورا ذهنية وأمثلة من واقعهم المعاش على شرط أن ما يقدمونه يقرب الصورة الممثلة للنص المدروس
 - مثال لتصوير الفكرة : ان الأجزاء الرخوة تمثل ... مثلا ، لو عثرنا على جثة حيوان مات من مدة نجد أن لحمه بدأ ينحل ولم تبقى منه الا العظام وفوق العظام قد نجد آثارا تدل على وجود لحم وعضلات.
 - يطلب من التلاميذ اعطاء أمثلة عن الأجزاء الرخوة في الحيوان
 - يطلب منهم اعطاء أمثلة عن الأجزاء الرخوة التي تترك آثارا دالة على سابق وجودها
 - الجملة الأخيرة " يمكن معرفة الكثير عن المخ المبتدثر...تحتويه" يمكن أن يشابه ... اعط أمثلة تصور هذه الصورة ، وهذا لأن....

* يطلب من التلاميذ مراجعة الفقرة مرة أخرى

ثم يسألون عن :

- فهمهم
- عن أفكار الفقرة
- ماذا تذكرهم الفكرة

* يسأل التلاميذ عن التآويلات الممكنة استنتاجها من الفقرة وذلك بـ

- استخلاص نتائج معينة
- طرح افتراضات
- طرح الأسئلة

مثال ذلك في الجملة الأولى يمكن الافتراض أن الكاتب يريد أن ينبهنا الى أنه من النادر جدا ان لم يكن من المستحيل بقاء الأجزاء الرخوة أو العثور عليها.

- المعيار هو أن الأجزاء الرخوة تختفي وتندثر
- الأجزاء الرخوة أسهل تفككا واندثارا من الأجزاء الصلبة

- تبقى الأجزاء الصلبة كعلامة ودليل على وجود الحيوان المندثر وهذه الفقرة تبين أيضا أن هذه الأجزاء الصلبة لم تكن قد وجدت هكذا وإنما كانت: - محاطة أو ملفوف حولها <
- أو محتوية < الأجزاء الرخوة
- أو عالقة أو ملتصقة بها <

* يطلب من التلاميذ قراءة الفقرة مرة أخرى ويسألون عن

- فكرتها العامة
- ما إذا كان هناك ما هو غامض ويحتاج توضيحا
- طرح أسئلة حول الموضوع ويشترط أن يكون الجاب عن هذه الأسئلة معبرا عن معنى أو معاني الفقرة . وهذا يفعل للتأكد من فهم التلاميذ واستيعابهم للموضوع.

* يطلب من التلاميذ تلخيص الفقرة باستعمال طريقة التلخيص .

* يطلب من التلاميذ محاولة توقع ما يمكن أن يلي الفقرة التي قرؤوها .

* يطلب من التلاميذ أن يحاولوا تفهيم ما قرأوه لزملائهم ويسألون عن

- كيفية تدريسهم لها
- وأهم الأفكار الواردة في الفقرة ولماذا

* وتناقش الفقرات الباقية من النص على هذا المنوال .

* بعد الانتهاء من الفقرات يقرأ النص جملة واحدة ويطلب ما يلي:

- وأنت تقرأ حاول أن تراجع في ذهنك ما نوقش داخل القسم حول معاني الجمل والفقرات. وحاول أن تسترجع الأمثلة التي ضربت ، وحاول أيضا أن تضع أسئلة وكأنك تريد اختبار أحد زملائك في فهمه للنص . وحاول أن تلخص الأفكار وتربطها ببعضها .
- اذن لا بد من تحقيق مايلي:
- معرفة ما تناول النص من أفكار
- أفضل طريقة لتلخيصها .
- ربط ما تناوله النص بالمعرفة الشخصية السابقة
- معرفة مدى تأثير المعرفة السابقة في فهم ما نوقش
- مدى اثراء المعرفة السابقة

- ماذا استفيد من الطريقة الجديدة
- سهولة أو صعوبة الطريقة ولماذا
- الفائدة أو الفوائد المقتتطفة من الطريقة
- الرغبة في استعمال الطريقة في مواضيع أخرى ومن طرف أساتذه آخرين.
- هل ترى من المفيد استعمال هذه الطريقة في دراستك ولماذا؟
- هل تعتقد أن هذه الطريقة يمكن أن تساعدك في الفهم في دراستك في المستقبل ولماذا؟

Appendix XIV cont.

Text: Towns in Elisabethan Times

نص المدن في العصور الوسطى

كانت أغلبية المدن في العصور الوسطى في بريطانيا أصغر من القرى الحديثة وكانت كل مدينة مبنية حول سوقها الأسبوعية حيث يؤتى بالمنتجات المحلية للبيع. ويبيع أهل المدينة صناعاتهم لأهالي الريف ويوفرون لهم ما يحتاجونه من شراب وأكل خلال اليوم. كانت التجارة مقتصرة عمليا على ذلك اليوم الواحد. وهذا ينطبق حتى على مدينة يتجاوز عدد سكانها الألف ساكن. وفي أيام السوق يعرض الحرفيون سلعهم في الهواء الطلق. وخلال يوم أو يومين في الأسبوع يجمع الحرفي أو التاجر سلعته ويغدو باكرا للتجارة في سوق مدينة مجاورة إلا أن هذا يكلفه ضريبة ثقيلة مقابل حصوله على مكان لعرض سلعته في ذلك السوق. وغالبا ما يكون المكان الممنوح للتاجر الزائر أقل أهمية من المكان الموفر لتجار وحرفيي تلك المدينة. وللحرفي فرصة أخرى لعرض سلعته ، وهو اليوم الذي يجتمع فيه الناس يوم الأحد صباحا لأداء عبادتهم الأسبوعية في الكنيسة . ورغم أنه لا يسمح بأي معاملات تجارية خلال فترة العبادة ، فإنه بعد انقضاء التجمع التعبدية ، تحدث هناك بعض التبادلات التجارية أمام أبواب الكنيسة مع أهل البادية الذين يغادرون المدينة بعد العبادة .

كانت التجارة منصبة كليا على تبادل المحاصيل القادمة من الريف المحيط بالمدينة ، والمنتجات المصنوعة من طرف حرفي المدينة ، وهذا مما يحرم مكانا في التجارة للبائع بالتقسيط. وقد كان البيع بالتقسيط في المنتجات المباعة في السوق ، وخاصة الزراعية منها ، أمرا يثير عدم الثقة ويعتبر نوعا من الاستغلال. وحتى لو وجدت هناك فسحة أو فرصة للتجارة تتيح فرصة لأحدهم ربح خبزه ، وذلك يشرائه للسلع بالجملة وبيعها بالتقسيط ، فرغم ذلك فإن سلطات المدينة كانت تتردد في السماح لهذا النوع من التجارة .

ورغم ذلك كان احتكار السوق أمرا يغري كثيرا من الناس. فكانوا يشترون المنتجات من خارج السوق ثم يعيدون بيعها في السوق بسعر أغلى. وتحفظ وثائق المدن الكبيرة قوانين واجراءات متكررة وعقوبات مترددة ضد هذه الممارسات ، وهذا يثبت أن هناك من دهاة الناس من كان يمارس هذه الأمور.

ونشهد في عصرنا هذا تحديد ساعات التجارة لفائدة تجار التقسيما وليس ذلك بسبب نقص المنتجات، غير أنه في العموم الواسع كان الأمر مختلفا إذ أن تحديد ساعات السوق كان لصالح المستهلك وهذا حتى تتاح الفرصة لكل مشتر أن يبتاع قسما عادلا من كل ما هو معروف وسبب آخر يتثل في أن ذلك التحديد يساعد السلطات على الاشراف على المعاملات التجارية ، وبذلك يمكن لها أن تتأكد أنه ليس هناك أي مستغل يندس بأي طريقة ويستغل الفرصة ليرفع الأسعار.

كانت كل مدينة تصدر قوانينها الخاصة بسوقها . واذ كانت كبيرة فان نقابات الحرفيين تنشأ فيها . وتكون مهمة هذه النقابات تنظيم شؤون أعضائها وتحاول فرض احتكار كلي لتجارتها . وفي الوقت الذي كان فيه زعماء النقابات كالحرفيين يتبعون بشدة سياسة حماية المنتجات المحلية ، إلا أنه في نفس الوقت من حيث هم زعماء للمدينة ، يريدون تحقيق سوق كبيرة مكنتة تأتي بمردود مادي معتبر وهذا من خلال الضرائب والمكوس . وادى تضارب المصالح الى أن تكون الاجراءات القانونية متكررة ومتغيرة ومتناقضة وغالبا ما يطغى عليها طابع التعسف . فقد مر وقت في القرن الرابع عشر لم يكن يسمح لتجار السمك في لندن التجارة فيه الا بعد أن يمر عليه ثلاثة أيام من عرضه للبيع من طرف الصياد الذي اصطاده .

وفي حمية (غذاء) تقل فيه الفواكه والخضر فان السمك يمثل تغييرا مقبولا . فقد كان الشعب في بريطانيا لا يأكل اللحم أيام الجمعة ويصومون عنه أياما طويلة خلال فترة الصوم الدينية . وكان السمك المطازج عزيزا جدا لغلائه وحتى السمك المملح والمجفف فال جدا رغبانه النوع الذي يؤكل بكثرة وكان سمك القرش الأرخس والأكثر وفرة هو المالح المشهور . وتجد أن الذين تتوفر لديهم أماكن يشترون سمك القرش المملح ويحفظونه في براميل ، أثناء فترة الخريف ليبقى محفوظا لفترة الشتاء وفترة الصوم الدينية .

Appendix XIV cont. Text Fossils

نص الحفريات

ان الأجزاء الرخوة للحفريات تختفي وتندثر في أغلب الحالات الا أنها كانت في الأصل ملتصقة بالأجزاء الملحية أو حولها أو محتواة داخلها. وكان الكثير منها مرتبطا بالأجزاء الملحية. وغالبا ما تترك هذه الارتباطات والالتصاقات آثارا يمكن أن ترى على شكل أماكن مداسة (مضغوطة) أو نتوءات أو أخاديد أو قمع صغيرة رخوة أو صلبة تبقى ملتصقة بالأجزاء الملحية. ان العضلات الضرورية لنشاط الحيوان و الواضحة في شكله الظاهري ترتبط وتلتصق بالأجزاء الملحية للحيوان ، ويمكن إعادة تركيبها من خلال هذه الارتباطات. ويمكن معرفة الكثير عن المخ المتدثر من خلال الجزء الداخلي للجمجمة التي كانت تحتويه .

ان إعادة تركيب المظهر الخارجي لحيوان منقرض لا يمثل أي قيمة علمية ، فهذا التركيب لا يساعد حتى على استنباط نشاطات الحيوان أثناء حياته ، أو ما مدى سرعة جريه أو نوع أكله ، أو أي نتائج أخرى ذات أهمية لتاريخ تطور الحياة. فغير أن ما يريد عامة الناس معرفته عن الحيوانات المنقرضة هو مظهر هذه الحيوانات عندما كانت حية. وحتى علماء الحفريات يريدون أن يعرفوا أيضا. ولا تمثل حفريات الأصداف مشكلا كبيرا كقاعدة ، لأن الأجزاء الملحية فيها تمثل المظهر الخارجي عندما كان الحيوان حيا ، وبقي المظهر الخارجي محفوظا في الحفرية ، وغالبا ما يكون اللون عملية تخمين رغم أن خطوط الألوان ونماذجها تبقى محفوظة حتى في الحفريات القديمة جدا.

يواجه الاختصاصيون مشاكل كثيرة في إعادة تركيب الحيوانات المنقرضة التي هيكلها العظمي داخليا. ويعترف المصادقون منهم أنهم يلجؤون - غالبا - الى التخمين. يمكن تركيب المظهر العام للجسم وما يكسوه من خلال شكل الهيكل العظمي والعمليات الملتصقة به. من النادر جدا - بأي احتمال واقعي من الدقة - استعادة السمات أو المميزات الظاهرية التي تعطي للحيوان مظهره المميز. والحاضر يساعد في تفسير الماضي. ولذلك يفترض أن الحيوان المنقرض يكون غالبا مشابهها - لتطائره من الأحياء انما ما كان له أي تطائر. وغالبا ما يمثل هذا التباسا. فغالبا ما يعاد تركيب الحصان

المنقرض بشكل يشبه الحصان الذي نعرفه في زمننا ، وحشيا كان أو أليفًا. من المحتمل أن جلد الحصان المنقرض كان مخططًا كالحمار الوحشي المخطط. وكان من الممكن أن تكون للحصان المنقرض مميزات غير موجودة في أي من أنواع الأحصنة الموجودة الآن. ولوافترضنا أن الأسد والنمر كانا قد انقرضا ، لكان من الممكن أن يكون إعادة تركيبهما جد متشابه. من المعروف أنه ليس للفيل الموجود الآن شعر كثيف. والمموث الذي يعتبر فيلًا منقرضًا كان من الممكن أن يعاد تركيبه بدون شعر لو لم يسبق معرفة وجود وبر كثيف عليه. ونعرف ذلك لأن هذا النوع من الفيلة انقرض قريبًا ، وقد ترك لنا انسان ما قبل التاريخ صورًا لهذا الحيوان ، وقد عثر على بعض الجلد والشعر في بعض العينات. وليس لنا مثل هذه المعلومات عن الحيوانات الأقدم انقرضا. ان طول الشعر وطول وشكل الأذنين واللون وتمادجه ووجود أو غياب السنمة (في الجمل) كلها استنتاجات غير أكيدة على أحسن تقدير ، وهي محض تخمينات. وهذا ينطبق على إعادة تركيب جل الحفريات ، وخاصة ما يتعلق منها بالثدييات.

من الممكن معرفة الكثير عن نشاطات حيوانات العصور القديمة وذلك من خلال أجزائها الصلبة من صدفات وتركيبات عظمية خارجية أخرى أو من خلال الهيكل العظمي الداخلي المعاد تركيبه وهذا دون الحاجة الى تركيب كامل. والحقيقة أنه من الممكن التوصل الى استنتاجات مقبولة ومفيدة عن حياة الحيوانات المنقرضة من خلال سن واحدة أو مجموعة أسنان أو من خلال هياكل عظمية غير كاملة. يمكن معرفة عادات الطعام عند الحيوانات الثديية بطريقة عامة وفي حالات أخرى بطريقة دقيقة ، وهذا عن طريق الأسنان. مثال ذلك أن أغلب الحيوانات الثديية المزودة بأنياب متطورة النمو بالإضافة الى وجود أسنان خلفية حادة وقاطعة كانت حيوانت آكلة للحوم. اما اذا كانت مزودة بأنياب حادة وكبيرة وفك متوسط القوة وكانت رشيقة الجري فغالبا ما تكون حيوانات مفترسة. أما الحيوانات التي كانت مزودة بأسنان ثقيلة غير حادة وكانت بطيئة الحركة الحركة تكون في الغالب حيوانات آكلة للنبات.

Appendix XIV cont.

Text Motoring offences

نص انتهاك قوانين المرور

هناك فرضية أساسية مؤداها أن انتهاكات قوانين السياقة مستنتجة من حوادث المرور فقط وأنه ليس هناك أي خلل في شخصية المنتهك أو خلفيته مما يمكن أن يجعله نزاعاً لانتهاك القانون. فإذا سلمنا أن الحادث عرض يحدث فجأة وبسرعة ولا يكون للفرد قدرة على تفاديه ، فإن الفرضية تصبح مضحوة ، فقد وجدت دراسة جديدة على ٦٥٢ انتهاكا أن ١٤% فقط من هذه الانتهاكات كان نتيجة حوادث غير مقصودة . وحتى مثل هذا التقييم يعتبر ساذجا . ان الانتهاكات كانت في أغلبها راجعة الى المنتهكين أنفسهم . وتوحي أوضح التفسيرات أن هذا كان نتيجة للمغامرة في حالة عدم اضطرار. ففي الـ ٦٥٢ حالة التي درست وجد أن ١١% من المنتهكين (٢١% من ٤٣ الذين سئلوا) بدت فيهم علامات الأنانية وحتى القسوة والمنفعة الذاتية. غير أنه ليس من الممكن استخلاص أي نتائج تدل على أي اضطراب في شخصيات المنتهكين ورغم ذلك يعتبر أي استنتاج متعلق بالسمات الشخصية ضربا من المغالاة في التقدير في تأويل المعطيات النوعية والكيفة ، كما يمكن اعتبارها نقصا في التقدير لأن هناك القليل جدا مما سجل عن المنتهكين أنفسهم. فنقص المعطيات يعتبر نتيجة لقلة الاهتمام بالسائقين المنتهكين للقانون كأشخاص .

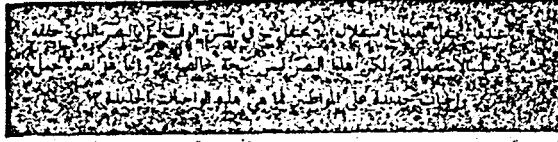
وفي حالة غياب أي دليل يثبت العكس فإنه من البديهي الافتراض أن أغلب المرتكبين للانتهاكات الخطيرة المدروسة في الاستفتاء هم أناس عاديون استسلموا للاغراء عندما كانت الفرص مواتية وكان من الممكن المغامرة ، ولذلك يمكن أن يكون هناك شيء ما في الشخصية العادية يجعل السائق ميالا لانتهاك القانون. ومهما كان هذا الشيء فإن وجوده في الذكور أكثر بروزا على ما هو لدى الإناث بنسبة ١٨ الى ١ و ٢٢ الى ١ ، والتقييم الحقيقي لهذه النسبة يعتبر صعبا لأن نسبة كل جنس من المعرضين للخطر غير معروفة . ومن خلال دراسة لعينة من حاملي سندات التأمين استخلص باحث نسبة ٦ الى ١ ، وهذا يعتبر في الحقيقة خطأ في التقدير طالما أن هناك كثير من الإناث - وربما هذا أكثر من الرجال - يستعملن أو يسقن

سيارات يكون تأمينها على غير اسمهن . ولذلك يمكن اعتبار نسبة ٢ الى ١ أقرب الى الحقيقة . وبلغت الإناث نسبة معتبرة - مقارنة بالرجال - في انتهاك القانون في حالة واحدة : وهي الهروب بعد وقوع حادث . ان الفرق بين الجنسين في ميلهما لانتهاك قوانين المرور يعتبر مهما لأنه يبين أن منتهكي قوانين المرور لديهم سمات مشتركة مع منتهكي القانون في مبادئ النشاط الاجرامي حيث أن عدد الذكور يفوق عدد الإناث بدرجة واضحة . لقد أعلن أحد مالكي شركات التأمين على السيارات عن نيته بمنح تخفيضات في أقساط التأمين عندما يكون حامل التأمين أو السائق المذكور في وثيقة التأمين امرأة .

وتدحض الفرضية الأساسية أيضا بكثرة حدوث عدم التأمين ضد الأخطار الممكن حدوثها للطرف الثالث. ورغم ذلك فان الحوادث لم تبرز للضوء الا نسبة قليلة من هذا النوع من الانتهاكات . وأكثر من هذا لا يمكن القول بأن هذا النوع الذي يعتبر من الانتهاكات الخطيرة الأكثر شيوعا ، كان قد ابرز بطريقة المدفئة . بل بالعكس يمكن اعتبار مثل هذا النوع من الانتهاكات على أنه جريمة اقتصادية ، وهذا رغم كونها أحيانا ترتكب عن غير قصد . الا أنها في غالب أحيائها ترتكب عن قصد وبحساب .

Appendix XIV cont. Text: Responsibilities of independence
Given in the first training in MFM

أعباء الإستقلال



1 - صدق رسول الله إذ يقول عقب عروة غزاهما : رجعتنا من الجهاد الأصغر إلى الجهاد الأكبر . يعني بالجهاد الأصغر جهاد العدو ، وبالجهاد الأكبر جهاد النفس وغزاهما .

جميل أن تقدم الأفرح . والنبالي الملاح . لبس الإستقلال . فانه أمل تحقير . وجهاد توج بالنصر . وتمن لدماه غزيرة منيكت . ونفوس شرذبت . وأموال صودرت . وذنبا خربت . ومصالح غطت . ولكن ماذا بعد ؟

2 - أعباء يقال بنوه بها أهل القوة ، لقد خلف الإحتلال الأجنبي ذبونا نقيال الظهور ، وقيدا تغرق الحركة : فلا بد من همم جبارة ضد الدين ، وغناء مضن يمهّد للراحة . وأعمال جبارة تكسر القيود . وقف الإحتلال في سبيل تعليمنا الصحيح .. فحبلنا ، وعث في مواردنا الاقتصادية .. فافتقرنا ، وفي تكوير أخلاقنا .. فانحللتنا ، وفي حسن إرادتنا .. فتواكلنا ، وقرب بعضنا . وأبعد بعضنا .. فاختصنا ، ورزى في سياسته إلى نفع قومه قداسنا ، وإلى استغلالنا فاستترف دماءنا ، وامتنع أرواحنا .

3 - واليوم نلتفت - بعد الإستقلال - فرى عقل الأمة يجب أن يعلم ، ومال الأمة يجب أن يخلق ، وأخلاق الأمة يجب أن تبنى ، وإدارة الأمة يجب أن تنقى ، وخصومتنا يجب أن تتلغ من جذورها ، وألفتنا يجب أن تؤسس من جديد ، وعزتنا يجب أن تسترجع ودماءنا يجب أن تجري في عروقنا حارة طاهرة ، وليس ذلك باليسير . سوء تعليمنا جعل نوابغنا قليلي العدد ، وتشويه أخلاقنا جعل هؤلاء النوابغ الأكفأ يتحاربون ولا يتعاونون ، فلا يبقى للأمة بعد هذه الحرب إلا قوة ضئيلة لا تكفي لتسيير السفينة فهل لنا من عصا سحرية تقلب العداة ألفة ، والكراهة حبا ، والخصومة تعاونا ؟

4 - قديما قالوا إن للشرق أدواء¹⁰ مزمينة هي : داء المخسوبيّة¹⁰ ، وداء الأنانيّة¹¹ ، وداء التضحية بالمنفعة العامة للمنفعة الشخصية . وهي حقا أدواء مفرعة ، ولكن هل هي حقيقة أدواء نبتت من طبيعة الشرق ، أو هي أدواء خلقت العزب ، وبذرها في الشرق ؟

إليس هو الذي اختار أسوأ الناس ومكتم في أحسن الناس ، فكرة بعضهم بعضا ، وقسدت الذمم¹² ، وانتشر الغضب ؟

5 - قد كنا فيما مضى نحتمي بالإختلال نحمله كل عبونا ، ونعلق به كل وجوه نقصنا ، فنسب إليه جهلنا وفقرنا وانحلالنا ، ونذعي أن الأجنبي أس الفساد . فاليوم زال الإحتلال ... وتم الفصل الأول من الرواية وبدأ الفصل الثاني ، وفي بيدينا أن نكتبه جملا يوجب الناظرين ، أو زدينا بسوء الفارين ولم تنته الرواية بعد ، في إمكاننا أن تكون سائرة . أو أن تكون محرقة .. فهيا إلى المسرح ، ومثلوا الأدوار .

Appendix XIV Text: Man as a social animal

Given in the second training of MFM

الإنسان حيوان اجتماعي

أغلق الباب بالمفتاح ، على طفل صغير ، في الرابعة من عمره ، ثم اتسع المفتاح من الفحل وضعه أمام الطفل .
 ماذا تتوقع أن يفعل ؟ لاشك أنه سيأخذ المفتاح ويدبره في الباب ليخرج . ولكنك لو فعلت ذلك مع حيران آخر : قط أو كلب مثلا ؟ لن يفعل .
 نترك من هذا أن الإنسان حيران ذكي ، وأنه يتعلم سلوكه من المجتمع .

1 - ما هي الثروة التي تكمن وراء تصرف الإنسان حتى يمتلك هذا الكوكب ؟ إنهما قوتان اثنتان : الذكاء والحس الاجتماعي .
 لقد حرم الإنسان الوسائل البدنية الطبيعية : فليست له أنياب ولا مخالب ولا أسلحة طبيعية . وهو ضعيف البنية معرض للأخطار . ولكنه متفوق على كل رفاقه في الحياة بفضل قوة دماغه . هذا من جهة . ومن جهة أخرى فإنه يميل كثيرا إلى أشباهه ويتوق إلى الاجتماع مع الأفراد الآخرين من بني جنسه . وهذه الزعة الإجتماعية هي التي أمدت الإنسان بقوة ، ضاعفت قوته الأصلية وقادته إلى النتائج المائلة . في ميدان المعرفة ، وفي مجال السلطة .

2 - فنذ العصور العريقة في التمدن أي منذ أن ظهر الإنسان إلى الوجود . ما قننى ، يُطوّر علاقته مع العالم الخارجي ، وما قننى - في نفس الوقت - يُنظم حياته في نطاق جماعات تتوسع وتتعدّد أكثر فأكثر . فالإنسان ، وهو يتعلم كيف يتمكّن من القوى المادية ، ويُسيطر على غرائزه ، قد استعمل عقله ، فابتكر الصناعات والتقنيات والعلوم والفنون والفلسفات والتواوين والأخلاق ، وما انفكّ بذلك يتعمّد ، أكثر فأكثر ، عن أصوله المنحطّة .

3 - وكل ما أضافه الإنسان الألاحق ، بهذه الطريقة ، إلى الإنسان السابق ، عبر العصور ، يُسمى الحضارة . وهذه الإضافات تبلغ حدّا كبيرا من الأهمية ، بحيث كلّمنا وقتنا - في كهوف ما قبل التاريخ - على عظام شبيهة بعظامنا ، نتحتم علينا أن نبدّل جهدا كبيرا من التخيل ، حتى نجد لنا شيئا مع هؤلاء الرجال الذين احتفظوا كثيرا بالطبع الحيواني . إن الطريقة التي ساعدت - أساسا - على هذا التطور هي التبليغ ، تبليغ ثمار التجربة الخاصة من جيل إلى جيل آخر .

وهكذا فإن المبادرات السعيدة والاكتشافات والاختراعات قد انتقلت من البعض إلى البعض الآخر عن طريق الإشارة ثم الكلام ثم الكتابة ثم الطباعة . إنها - دوماً - ظاهرة التقليد والوراثة الإجتماعية ، وهي ظاهرة غير معروفة في عالم الحيوان ، فالكلب المهذب لا يهدب كلبا آخر كما يقول إيمرسون .

عن [جان روسان]

Appendix XIV cont. Text: Precision of work

Given in the third training of MFM

إِتْقَانُ الْعَمَلِ

يَكْتَسِبُ التَّلِيدَ ذَرْسًا فَلَا يُعْنَى بِظَالَةِ الْكُرْسِيِّ ، وَلَا بِتَطْيِيرِ الْغَنَائِمِ أَوْ الْكَلِمَاتِ
الْمَاهِيَةِ . وَيَضَعُ النِّجَارُ نَامًا أَوْ نَائِدَةً فَيُظْهِرُ النُّورَ مِنْ شِقْرِ لِيَهْمَا عِنْدَ الْإِنْعِلَاقِ إِلَى الْعَمَلِ
وَيُصَلِّحُ الْمَكَانِيكِي سِيَارَةً فَلَا يَلْهَى بِهَا صَاحِبَهَا بَعِيدًا حَتَّى تَرْتَفِعَ وَتُجْرَنَ ، وَيَعْمَلُ
رَبُّهُ أَلَيْسَ الْأَوَّلِيُّ أَوْ الْبَائِتُ لِلَا تَرْبِيلُ كُلِّ الْأَوْسَاحِ الْعَالِيَةِ تَابًا . تَلْكَ كَلِمَاتُ الْعَمَلِ
عَبْرٌ مُنْقَلَةٌ لَا تَنْفَعُ صَاحِبَهَا وَلَا تَفِيدُ غَيْرَهُ مِمَّنْ يَتَعَامَلُونَ مَعَهُ . لَكِنْ مَا هِيَ لِمَنْ
الْعَمَلُ الْمُتَمَرِّضُ ؟

1 - فَكَرَّرْتُ فِي النَّاسِ يَرْوَحُونَ وَيَعْدُونَ ، وَيَعْمَلُونَ وَيَجْتَهِدُونَ ، وَفَكَرَّرْتُ
فِي أَعْمَالِهِمْ أَيْنَ يَبْلُغُ بِهَا الْمَدَى ؟ وَأَيْنَ تَقَعُ مِنَ الْعَايَةِ ؟ فَاسْتَبَانَ لِي أَنَّ الْفَرْقَ
مَا بَيْنَنَا وَبَيْنَ الْأَمْرِ الْمُتَقَدِّمَةِ فِي مِتَابِرِينَ الْحَيَاةِ هُوَ مَا يُجَسِّدُهُ الْحَدِيثُ الشَّرِيفُ
الْقَائِلُ : « إِنَّ اللَّهَ تَعَالَى يُجِيبُ إِذَا عَمِلَ أَحَدُكُمْ عَمَلًا أَنْ يُنْفِثَهُ » .

2 - الْعَمَلُ لَا يُحَقِّقُ غَايَتَهُ إِنْ لَمْ يَبْلُغْ بِهِ صَاحِبُهُ مَدَاهُ ، وَإِنْ لَمْ يُحَقِّقْ لَهُ
أُبْعَادَهُ كُلَّهَا مِنَ الْإِتْقَانِ وَالتَّجْوِيدِ ، إِنْ رُوحَ الْعَمَلِ لَا تَكْمُنُ فِي الْجُهْدِ
الْأَوَّلِيِّ الَّذِي يُبْذَلُ فِيهِ ، قَدَّرَ مَا تَمَكَّنُ فِي فتراتِ الْعَمَلِ الْأَخِيرَةِ ، فَتَلَأَلُ
الْفَرْحَةَ فِي وَجْهِ الْعَامِلِ حِينَ يُنْجِزُهُ مُخَكِّمًا . لَهُ ... إِنْ صَقَلَهُ خَيْرَةٌ بِمُرِّ
بِهَا رَسَامٌ عَلَى لَوْحَةٍ ، أَوْ ضَرْبَةٌ فَرْشَاءَ لَطِيفَةٍ مِنْ يَدِ ذَهَانٍ عَلَى خَائِطٍ ،
أَوْ بَسْمَةُ الطَّيِّبِ فِي خِتَامٍ فَخَصِيهِ لِلْمَرِيضِ ... ذَلِكَ هُوَ الَّذِي يُعْطِي لِلْعَمَلِ
غَايَةَ أُبْعَادِهِ .

3 - وَالْعَمَلُ يَكْتَسِبُ طَعْمَهُ فِي إِتْقَانِهِ . هُنَاكَ أَعْمَالٌ كَثِيرَةٌ تَرَاهَا ، أَوْ تَقْرَأُ
بِهَا ، أَوْ تُقَدِّمُ إِلَيْهَا ، وَلَكِنَّا لَا نُحِسُّهَا طَعْمًا ، فَيُحِي أَعْدَادُ أَوْ كَمِّيَّاتُ ،
لَكِنِ الْعَمَلُ الْمُتَقَنَّ هُوَ الَّذِي يَبْرُكُ مَذَاقُهُ عَلَى السِّتِنَا ، وَاللَّهُ عَلَى وَجْهِهَا ،
وَأَثَرُهُ فِي نَفْسِنَا ، فَتَتَغَاطَفُ مَعَهُ ، وَنَمِيلُ إِلَيْهِ وَنُحِسُّ بِحَبِّهِ .

4 - إِنْ إِتْقَانُ الْعَمَلِ هُوَ وَحْدَهُ الَّذِي يُمَكِّنُ لِصَاحِبِهِ أَنْ يَسْتَفِيدَ مِنْهُ وَيُمَكِّنُ
لِمَنْ حَوْلَهُ أَنْ يَتَغَاطَفُوا مَعَهُ وَيُمَكِّنُ لِلَّذِينَ يَأْتُونَ مِنْ بَعْدِهِ أَنْ يَقْسُوا عَلَيْهِ وَأَنْ
يُفِيدُوا مِنْهُ . وَمِنْ الْمُمَكِّنِ أَنْ تَنْسَاهُ : مَا مَصِيرُ الْإِنْسَانِيَّةِ لَوْ أَنَّهَا لَمْ
تَمَارَسْ عَمَلَهَا عَلَى أُسَاسٍ مِنْ هَذَا الْإِتْقَانِ وَالتَّجْوِيدِ ؟ !

لهـ عن (ابن الحكيم)

(مجلة الثقافة . عدد 6 .)

Appendix XIV CONT. Text: The year of drought
Given in the second test

عَامُ الرَّمَادَةِ

إذا وقع الناس في الضيق، ودعت أموالهم وممتلكاتهم، وأصابهم المرض والفتنة، ماذا يجب أن يفعلوا حتى يتخلوا أنفسهم؟

1 - لم يكن عُمر بن الخطاب - رحمه الله - يُقدِّر ، حين صلَّنا بالمسلمين من الحج ، سنة ثمانٍ عشرة ، أنه يستقبل بالمسلمين ، من أهل بلاد العرب ، عاما أسودا قائما ، يُمتَحِنُون به في أنفسهم وأموالهم وأخلاقهم ، فيما أتبع لهم من الصبر على الشدائد والنبات للمكروه .. ولكن العام الجديد يُقبل ، وإذا السماء تبخل بمائها حتى تحترق الأرض ظلما إلى هذا الماء ، وحتى نَسَدَ كأنها الرَّمادُ ، وعجزت الأرض عن أن تُخرج للناس ما يأكلون وتأكل الأنعام . وينظر عُمر بعد أن استقر في المدينة وإذا أهل البادية قد أُجذبوا ، فلم يفكروا إلا في أن يهرعوا إلى خليفتهم ، يلتبسوا عنده ما يطعمهم من جوع ، ويستقيم من ظمأ ، ويكسبهم من غري . وما لهم لا يهرعون إليه وهم كانوا يشفرون بحبه لهم وعطفه عليهم وبره بهم ، ينتمى إلى أفضأهم كما ينتمى إلى أذلهم ، لا يُقصر في السعي إليهم ساعة من ليل أو ساعة من نهار .

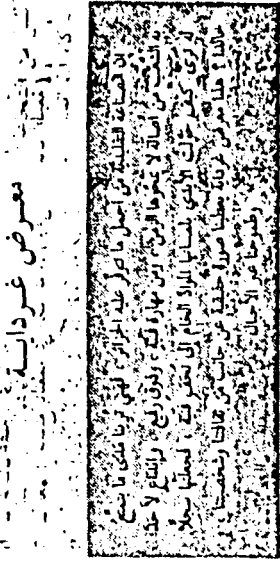
2 - وقد بدأ عمر بنفسه في مقاومة هذا الخطب فأتى إلا أن يكون رجلا من المسلمين ، يشقى كما يشقون ، و (يجوع) كما يجوعون ويطمأ كما يطمأون ، رأى المسلمين لا يجدون السمن إلا في مشقة وجهد ، فحرم على نفسه السمن حتى تجده عاتمة الناس ، وفرض على نفسه الزيت والخبز الجاف ، ثم جعل يطعم الناس على الموائد العاتمة ، ويجلس معهم إلى هذه الموائد يأكل ما يأكلون ، وكان يشرف بنفسه على إعداد الطعام ، ورُبما علم الطبائخين كيف يطبخون .

3 - ولكن الأزمة تشتد ، وأهل البادية يهرعون إلى المدينة ، وكثير منهم لا يستطيعون أن يتقبلوا من أملاكهم . قد هلك الرزق ، وجف الصرع ، ونفقت الماشية ، وأصبح من الحق على الخليفة أن يشرك هؤلاء الناس في مواطنهم ، ويحيل إليهم أرزاقهم ، ماداموا عاجزين عن السعي إلى هذه الأرزاق .

هنا ، يكتب عمر إلى عماله في الأقاليم ، ويأمرهم بأن يرسلوا إليه الإمدادات ، ثم أرسل رسله ليتلقوا هذه الإمدادات ويميلوا بها إلى أهل البادية في أملاكهم وأحيائهم فيكسبهم ويسقونهم .

4 - وأشد من هذا زواعة ، وأعظم من هذا إثارة للغيرة أن عُمر قد فتح بيت المال على مضراغته وأزمع أن يوزق الناس منه ، حتى إذا لم يجد فيه شيئا كلف كل أسرة غيبة أن تطعم مثل عددها من الفقراء ، يأخذهم بذلك سلطان القانون والدين حتى يأتي الله بالفرج .

Appendix XIV cont. Text: The Ghardaia Festival
Given in the third test



2- من ثقل كان يُنظَّم معرضٌ جهويٌّ بزيادةٍ في موسم الربيع تحت عنوان : « عيد الزريبة » . أما الآن فقد أصبح يُنظَّم معرض وطني للصناعة التقليدية ، على بُعد كيلو مترين من وسط المدينة تقريباً . إن فصل الربيع هو الموسم المناسب لتدبُّح في الجيوب نظرًا لاغتيال قفصيه ، ولذا تُعرف هذه المنطقة إجمالاً كبيراً من السراج ، في هذا الفصل ، وقد يندفث ثياب مدينة غرداية كلها كسوقٍ كبيرةٍ ، فالسراج مزدهجة ، والدكاكين مملأةٌ فانضةً بالصناعة التقليدية الممتلئة لكل أنحاء الوطن ، فانت تجد زراعي تلسانٍ وتطريز قسطية ، وخزف تورتال ، ومجوهرات نجيبي ، فهي مرآة لكل الصناعات التقليدية .

3- إن المعرض لا يمكن أن يتلَّع مَداهةً في ظرف سنة أو سنتين ، وليس هناك أي داعٍ للسرع ، فإن كل شيء مخطَّط على المدى البعيد ، وتُصنِّع نظيره ليست معاصرة ، وإنما هو عمل يُحقَّق الفائدة بدون شك ، ذلك أن الجزائر تحتلُّ الصدارة في الصناعة التقليدية من حيث النوع والأصالة ، ابتداءً من الزربية إلى الحياك والبزوس والتشايبة والنفس على الخشب والنحاس وصناعة الخلفاء والشمع والمجوهرات والتطريز وصناعة الملبود والقحار وغير ذلك . هناك ما يزيدُ عن عشرين نوعاً من الزرابي ، وكل نوع له طابئة الخاص من حيث الألوان ، والرُخوة والأشكال ، ومثا جعل الزربية الجزائرية تمتنع بَشيرةٍ عاليةٍ ، وتعرف رواحا كبيرا في أوروبا .

4- والرُخع العائدي في الصناعة التقليدية ليس هو كل شيء ، بل يجب النظر إليها من الزاوية التَّيْبِيَّة ، فهذا الجانب له أهمية ، لأنه يمثل حُرَّة من ثقافتنا ، وشخصياتنا ، وبمعكس مُعْرَوفاً ، وأماننا ، وآلامنا ، تتبر الأجيال . لقد سَمَّيتُ سائما أحبباً مُعْرَوفاً بالصناعة التقليدية الجزائرية يُعبّر عن إعجابهِ ويقول حين زار غرداية للمرة الثانية : « إن هذه الواحة الساحرة لا تُقْفِي بأسرارها في ظُرف أسبوعٍ كلِّ قد لا تُقْفِي بِسرها الكفين أبداً وتُركك تُحْكُم داما وتُشَمِّي العودة إليها ... فالصناعة التقليدية

هي أجمل شيء رأيتُه في الجزائر ، لأنها تُربحي تَدَى ما يتبع به هذا الشعب من مهارة فنية ودقِّق رفيع ، « ولبداح » لا حدَّ له ، وأصالة ، لا يتجزأ الرمن ... تُرى كيف حولت الأيدي يَمَسَّانها هذه المواقف العام إلى تُحْكَم فنية ، وجعلتها سحلا خالداً ؟ ! .

عن [العائد الأسبوعي]

1- إنطلقت بنا السيارة ، وتركنا ورامنا العاصمة بفسيحها وازدهارها ، فكانت المناظر الخلابة تُنتد على طول الطريق إلى مدينة الأغواط .

وفي الصباح كُنا في غرداية ، في الواحة الخضراء التي تُحيط بها الجبال المتخصرة الجرداء ، في المدينة العتيقة والمصرية التي تضم بدون تآمر تقديم والجديد ، العربات التي تُجرُّها الأحصنة ، إلى جانب السيارات الفخمة والناحيات الكبيرة ، الأكوخ المراثية على سفح الجبال تُنتد أرقعةً مصريةً ضيقةً إلى جانب المحلات التجارية الكبيرة ، والواجهات المصرية في الشوارع الواسعة أما الأزياء في التباس مُحدَث لا تخرج ، لقد إختصت في الشوارع أزياء كلِّ المصور والأجناس ، من الشراويل التقليدية العربية إلى البُجَّة ، إلى أنواع العتائات ، إلى البرانس والتشايبات ، إلى التلات المصرية الفتوة ، إلى القفصان والسرراويل القسفة ، إلى الحياك المصرية ، والحمرية البيضاء والزرقاء ، إلى الصابن (والشوة القصيرة) ... ألوان وأشكال من البشر ، مضاف إليها ألوان المنازل ، وخضرة التخليل ، وزرقة السماء ، وأنيقة الشمس الذهبية ، وزخارف الصناعة التقليدية التي تُحْكَمها المدينة .

Appendix XIV cont.

Question on text: Towns in Elisabethan time

أسئلة حول نص المدن في العصور الوسطى

- ١- ان المدن في القرون الوسطى كانت مميزة
 - ا- يصغر حجمها
 - ب- بأسواقها الدورية
 - ج- بمبانيها المركزية التخطيط
 - د- بمنتجاتها المحلية
 - هـ- بالتجار القادمين من مدن أخرى
- ٢- يقوم سكان المدن في الماضي بشراء حاجاتهم من السوق
 - ا- نصف شهريا
 - ب- اسبوعيا
 - ج- شهريا
 - د- يوميا
 - هـ- أي وقت
- ٣- يفضل التجار العمل في مدنهم لأنهم يستطيعون
 - ا- ايجاد مرطبات بسهولة
 - ب- بيع أي منتجات يشاءون
 - ج- العمل في الهواء الطلق
 - د- مباشرة العمل مبكرا
 - هـ- الحصول على أفضل مكان
- ٤- اذا باع التجار بضائعهم في مدينة غير مدينتهم فانهم
 - ا- يكسبون الارباح ببطء
 - ب- يدفعون ضرائب خاصة
 - ج- يبدأون العمل باكرا
 - د- يجدون المنافسة شديدة
 - هـ- يسIRON مسافات طويلة
- ٥- يسمح للتاجر بيع بضائعه
 - ا- في أيام محددة
 - ب- في أيام الاسواق
 - ج- في الحفلات العامة
 - د- في أيام مختلفة
 - هـ- بعد اقضاء العبادة
- ٦- هل يجب السماح بالمتاجرة أثناء فترة العبادة

- ا- لا ، لأن المكان صغير جدا
 - ب- نعم ، لأنه من فائدة المتعبدین
 - ج- نعم ، لأنه يجلب أرباحا كثيرة
 - د- لا ، لأنه يشوش على عبادة الناس
 - هـ لا ، لأنه غير صحيح تجاريا
- ٧- يتمثل الاتهام الموجه الى تجار التقسيط في
- ا- تدخلهم في تجارة السوق
 - ب- الحد من ربح الحرفيين .
 - ج- فرضهم أسعارا غالية
 - د- غشهم في معاملاتهم
 - هـ عرقلة التجارة المحلية
- ٨- يسمح لتجار التقسيط ممارسة مهنتهم عندما
- ا- تكون التجارة بسيطة و السوق فارغة
 - ب- يتأكد أن يكون ربحهم بسيما
 - ج- يكون حظهم في العمل ضئيلا
 - د- تمنح لهم رخص رسمية بذلك
 - هـ يغامر تجار الجملة بمنافستهم
- ٩- يكون فرض القيود على تجار التقسيط أمر غير معقول اذا
- ا- توفرت السلع في السوق
 - ب- ارتفعت أسعار السلع
 - ج- فقد المستهلك ثقته فيهم
 - د- لم يتوفر الشغل في المدينة
 - هـ احضرت البضاعة من بعيد
- ١٠- كانت التجارة بالتقسيط محدودة لأن
- ا- العملات النقدية لم تكن مستعملة
 - ب- المنتج يبيع للمستهلك مباشرة
 - ج- المحلات التجارية كانت متقلبة

Appendix XIV cont.

Questions on text :Fossils

أسئلة حول نص الحفريات

- ١- الحفريات هي:
- بقايا عظام أي حيوان ميت
 - بقايا الحيوانات القديمة التي عمر عليها الأثاريون
 - الطريقة العلمية لإعادة تركيب الحيوانات الحفرية
 - صور الحيوانات التي صورها علماء الآثار
 - الصخور التي تحمل آثار أشكال الحيوانات الميتة
- ٢- ان الأجزاء الرخوة للحيوانات الحفرية
- يمكن دائما تمييزها بدقة
 - تندثر دائما دون أن تترك آثارا
 - يمكن دائما إعادة تركيبها
 - تترك عادة بعض الآثار
 - لا يمكن أبدا إعادة تركيبها
- ٣- ان الأجزاء المضغوطة أو الناتئة أو الظاهرة على شكل أخاديد أو قطع رخوة أو صلبة على الأجزاء الصلبة تساعد على إعادة تركيب:
- الأجزاء الرخوة
 - طول الشعر
 - نموذج اللون
 - المظهر العام
 - عادات الأكل
- ٤- يمكن أحيانا إعادة تركيب عضلات الحيوانات الحفرية لأنها
- تبقى محفوظة مع الأجزاء الباقية من الحيوان
 - تعتبر جزءا من الهيكل العظمي للحيوان
 - جزء من الأجزاء الصلبة للحيوان
 - متعلقة أو لاصقة بالهيكل العظمي للحيوان
 - ضرورية لنشاطات الحيوان
- ٥- يمكن لشكل وحجم جمجمة الحيوانات الحفرية أن تعبر عن درجة تطور أو ذكاء الحيوان لأن:
- المخ يبقى محفوظا داخل الجمجمة
 - المخ كان مستقرا في الجمجمة وترك آثارا عليها