

UNIVERSITY OF CAPE TOWN

FACULTY OF EDUCATION

**THE "EDUCATIONALLY DISADVANTAGED" STUDENT :
FACTORS IMPACTING UPON CONCEPTIONS OF
LEARNING AND PERCEPTIONS OF LEARNING CONTEXTS**

A dissertation presented in fulfilment
of the requirements for the degree of

Master of Education

by

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THE “EDUCATIONALLY DISADVANTAGED” STUDENT : FACTORS IMPACTING UPON CONCEPTIONS OF LEARNING AND PERCEPTIONS OF LEARNING CONTEXTS

ABSTRACT

Utilising an individual-difference model of student learning, this study set out to explore the manifestations of qualitative differences in study behaviour at the individual level, amongst a group of educationally disadvantaged students enrolled in the Academic Support Programme in Engineering at Cape Town (ASPECT).

The first aim of the study was to describe and conceptually categorise, within the concept of the study orchestration, the manifestation of these individual differences in study engagement, by means of a retrospective analysis of students' school-based study of Science. This process was undertaken when the students first arrived at the university. The quantitative process of classification, done independently of the author, was augmented by each student being individually interviewed by the author about his (retrospective) study behaviour.

The second aim was to investigate the study orchestrations of these students in the transition between school and university. Stability over time, in the absence of explicit intervention, of (in particular) students whose study orchestrations had been classified as “at risk” on entry to the university, confirmed the findings from previous studies (some of which had been conducted with groups of educationally disadvantaged students).

In previous studies, it had been shown that students in this conceptual category were likely to fail or achieve poorly in conventional university examinations.

An ongoing programme of intervention was then designed with the specific aim of enabling “at risk” students to ‘reorchestrate’ aspects of their study behaviour in qualitatively ‘deeper’ ways. Modelled in part on previous, more narrowly focused, intervention strategies, the intervention in this study set out to improve “at risk” students’ qualitative levels of perceptions of their learning contexts, but it also focused more broadly on the whole ASPECT group without losing sight of the manifestations of qualitative differences in learning conceptions, student epistemologies, and so on, amongst this group. This was achieved by engaging all students in ongoing discourse about crucial learning processes, such as the development of metacognitive awareness and the need to assume personal responsibility for learning.

The study confirmed the findings of other studies: that it is possible to alter “at risk” students’ contextualised perceptions in qualitatively ‘deeper’ ways. In addition, the study suggested lines for individual and subgroup intervention that (1) is possible within the context of everyday learning and teaching; (2) can be carried out by the average academic practitioner, and (3) is transferable to other contexts of academic support.

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Education in the Faculty of Education of the University of Cape Town. It has not been submitted before for any degree or examination in any other university.

Alan Frank Cliff

September 1992

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CHAPTER ONE : INTRODUCTION TO THIS STUDY

It is only comparatively recently that a body of research findings has emerged, which provides a way of understanding student approaches to learning in higher education, which stems from a research perspective which is somewhat different from conventional (psychological) understandings of this phenomenon (Entwistle, 1992b).

Research into student learning has generally "depended ... on the application of general principles of learning derived from mainstream psychology" (Entwistle, 1992b : 596). Over the past 15 years, however, a substantial body of research into student learning in higher education has focused on students' qualitatively different approaches to learning and perceptions of their learning contexts. This research has, in part, been influenced by phenomenographically-inspired studies, of which two of the most notable are the studies by Marton and Säljö (1976a; 1976b). As Marton (1986) observes, phenomenography essentially adopts a second-order perspective, describing not objective reality, but people's ideas about that reality. "Phenomenography investigates the qualitatively different ways in which people experience or think about various phenomena" (Marton, 1986 : 31). By extension, therefore, phenomenography might legitimately be used as a research "tool" to describe people's qualitatively different approaches to a phenomenon such as learning, for example.

Concepts and findings based on students' experiences of teaching and learning, and their applicability to learning at a university, are increasingly gaining acceptance as being

“valid descriptions of the everyday reality experienced by both staff and students in higher education” (Entwistle, 1992b : 596).

Studies of students' experiences of teaching and learning in naturalistic settings have been undertaken, using students' responses on inventories designed to operationalise variables in their learning environments. These qualitatively different perceptions have then been analysed and categorised by researchers after extensive interviews with these students. Qualitative research of this nature has, therefore, been augmented by quantitative research perspectives.

It is now clear that students in higher education manifest qualitatively different conceptions of learning (Marton and Säljö, 1984), different approaches to learning (Marton and Säljö, 1984 and Entwistle and Ramsden, 1983), and different forms of intellectual maturity (Perry, 1970 and Culver, 1987). In addition, students seem to adopt contrasting educational orientations towards and motivations for study in higher education (Entwistle and Ramsden, 1983 and Biggs, 1985), and they have different motivations (vocational, personal, academic) for taking particular courses (Taylor, 1983). Varying contextualised perceptions of and preferences for particular elements of the learning environment, such as the functions and purposes of lectures, tutorials, methods of assessment, reference books, syllabi and curricula (Meyer, 1988), are also associated with manifestations of qualitative differences amongst students.

These general conclusions form the background to a study of quality in student learning amongst educationally disadvantaged students who enter higher education at South African universities. The research reported in this thesis forms part of broader national and international research programmes into quality in student learning conducted across a wide range of tertiary education institutions and subject disciplines. In a South African context, for example, Meyer and Sass point out that research studies on student learning have "consistently pointed to the significance of recognising the existence of qualitative differences in the manner in which students engage learning tasks" (Meyer and Sass, 1991 : 4). An individual-difference model of student learning is, therefore, assumed to be fundamental to an understanding of the factors which impact upon conceptions of learning, and perceptions of learning contexts, amongst educationally disadvantaged students at an individual level.

The meaning of "intervention" in this study

Much debate has been engaged in as to the politically sensitive nature of academic support and intervention within the context of higher education in South Africa (see, for example, Tema, 1988; Mehl, 1988; Moll and Slonimsky, 1989; Craig, 1991). This debate presents enormous challenges in terms of what might be defined as "effective" intervention in Academic Support contexts.

The nature of intervention in this study was, by definition, likely to be of an individual nature, but any attempts to place this intervention within a particular paradigmatic framework must be resisted if that framework places limits, and imposes untested assumptions or presuppositions, on the nature of the intervention process itself.

The primary thrust of intervention in this study was towards enabling students to understand the processes which form part of, and contribute towards, their study orchestrations. An attempt was made to encourage the students, through their being given an explanation of how to interpret their study orchestration profiles, to engage their own study processes intellectually, with a view to determining the relative appropriateness of these processes. One of the reasons for this study was thus to assess the extent to which a student is willing and/or able to change his study behaviour if he is aware of its limitations.

Historical background to the intervention programme

Since the beginning of 1988, attempts have been made to analyse the qualitatively different approaches to learning which have characterised individual students who have been selected for the Academic Support Programme in Engineering at the University of Cape Town (ASPECT). This programme of research has sought, partly, as Meyer and Sass (1993, in press) point out, to create opportunities for ASPECT "from its inception to inform its own educational practice and test its own assumptions concerning educational 'disadvantage' against a complementary programme of appropriate educational research". To this end, the emerging body of concepts and findings from research into student learning, together with insights gained from the experiences of academic practitioners in ASPECT, have been influential in determining the kinds of academic and other support offered to these students. It must be emphasised that a commitment to this research aim has led to the nature of counselling and support offered to ASPECT students being markedly different, in conception and execution, to those offered in conventional ASPs. At least part of the explanation for this lies in the

relative absence of focus in conventional ASPs on some fifteen years of research on the application of learning theory in practical classroom settings, especially given that the research conclusions formulated have substantive implications for educational practice (Entwistle and Ramsden, 1983; Entwistle and Meyer, 1992; Kember and Gow, 1992).

Reasons for this investigation

The reasons for investigating the study behaviour of these specific (ASPECT) students could be summarised as follows:

- (1) These students all come from educationally disadvantaged backgrounds, which are traditionally assumed to have had a fundamental (and similar) influence on the quality of their learning experiences as a group. Moreover, it is often assumed that these backgrounds have been influential in encouraging these students to adopt learning approaches which might be regarded, for a variety of conceptual and practical reasons outlined in chapter three of this thesis, as maladaptive in the context of learning at a university.

These assumptions were the focus of the intervention programme. It was postulated that the group identity of these students would not sufficiently illuminate the existence of individual, qualitatively different, approaches to learning which might be contained within the group. Investigation would, therefore, attempt to describe and categorise manifestations of these qualitatively different approaches to learning (This is discussed in chapter four. Further

detailed description of this process of categorisation, as well as the conceptual profile of student's study behaviour developed, is to be found in Meyer, Parsons and Dunne, 1990a, and Meyer, 1991).

- (2) The second reason for the investigation was a practical need to go beyond the description of different approaches to learning, in an attempt to illuminate the associations between these approaches to learning, qualitatively different perceptions of the learning environment, and learning outcomes, for the students at an individual level.

It was regarded as potentially useful to analyse individual study orchestrations precisely because these orchestrations have been shown to have practical implications in terms of anticipating certain learning outcomes (particularly academic failure) for individual students. These orchestrations have practical value in, and of, themselves and are also potentially valuable in terms of understanding the study behaviour of individual students in a specific undergraduate degree subject, and being able to anticipate qualitative measures of change in learning and, possibly, in actual examination results, with a reasonable degree of confidence (Parsons and Meyer, 1990).

While this pattern of association has attractive possibilities (in terms of what could crudely be termed the "success rate" of ASPECT), there is, however, a far more important goal, namely, to analyse the extent to which the assessment

of individual study orchestrations can contribute meaningfully to constructive assistance for students who manifest learning difficulties in higher education.

- (3) This last paragraph indicates a third reason for this study, namely the extent to which intervention could be seen to be practicable, viable and ethically acceptable within the "normal" context of ASPECT. It might be argued that the description of individual students in terms of their study orchestrations is, essentially, an academic exercise. However, when this description is seen as providing a meaningful framework within which to provide more general academic support at the individual level, its value becomes obvious.

This thesis covers the design, administration and evaluation of an intervention programme for first-year students enrolled in the Academic Support Programme in Engineering at the University of Cape Town (ASPECT). It outlines the rationale for the study; the methodologies employed in collecting data from the students; the analysis of this data in terms of how it highlights qualitative differences in approaches to learning and perceptions of the learning environment amongst this group of disadvantaged students (at an individual and group level); the different ways in which the conceptual classifications drawn from the data can be interpreted and used; and the implications of qualitative differences in student learning for practices in Academic Support Programmes.

Analysis of data gathered from the intervention programme is interpreted by means of previously verified methodologies and instrumentation developed from research into

qualitative differences in student learning (Entwistle and Ramsden, 1983; Biggs, 1978; Meyer, 1988). The term "study orchestration" - a concept taken to mean the coalescence of approaches to learning and perceptions of the learning environment as manifested in a discipline-specific response by individual students - derived from the literature on qualitative differences in student learning (Meyer, 1991), is used to describe manifestations of study behaviour in specific undergraduate subjects for individual students within the ASPECT group. As such, these "study orchestrations" are amenable to conceptual classification within the model of student learning used to obtain them.

The administration of a composite inventory, "Experiences of Teaching and Learning" - adapted from previously developed inventories on teaching and learning (the Approaches to Studying Inventory, Entwistle and Ramsden, 1983, and the Qualitative Context Inventory, Meyer, 1988), is described. Empirically verified statistical analyses (fully described by Meyer and Muller, 1990a; 1990b) used to analyse the data obtained from the Inventory are discussed, and the results interpreted in terms of a profile which is developed of individual students' study behaviour for specific undergraduate degree subjects. (The conceptual basis of such profiles is reflected in Meyer, 1991). The classification of these profiles in conceptual terms is presented, and these conceptual terms discussed in relation to the implications of these categorisations for learning outcome for certain students.

Selected transcriptions of recorded material from individual interviews conducted with the (then) 53 students enrolled in the Academic Support Programme in Engineering at

the University of Cape Town (ASPECT) are used to illuminate the empirical manifestation of the qualitatively distinctive study behaviour of these students. The extent to which these interviews, as well as the profiles developed for each student, can be used as a means of intervention at an individual and group level, is assessed. Feedback from ASPECT students on the value to them of the interviews (in terms of the extent to which these interviews enable students to analyse the strengths and weaknesses of aspects of their own study behaviour) is also presented and discussed.

A number of forms of intervention (study skills workshops, and ongoing individual interviews, for example) undertaken within the parameters of this study are presented and evaluated. Improvements and amendments to the experimental design that was used are suggested. Findings from this intervention are discussed and are used to isolate important conceptual and other issues for future research.

Concluding chapters of this thesis address the following issues: (1) the association over time between qualitatively different approaches to learning and learning outcome in specific subjects; (2) the effects of intervention at an individual and a group level for this group of disadvantaged students; (3) the extent to which this kind of intervention is transferable to other academic support contexts; (4) the directions which this research study provides in terms of future interventions of this kind and others.

In summary then, the major working hypotheses around which the implementation of this intervention programme was designed, are:

- (1) Some educationally disadvantaged students (perhaps a majority) arrive at the university with relatively stable study orchestrations (Meyer, Parsons and Dunne, 1990b), evolved within an inferior school experience (Hartshorne, 1990), and these can be determined ("measured") and categorised on entry to the university (Meyer, Parsons and Dunne, 1990a; Meyer, Dunne and Sass, 1992).
- (2) Identification and description of these orchestrations at the individual level provides a framework for understanding these students on a deeper and broader level on entry to university study than is provided by assuming their apparent group identity. Furthermore, it provides grounds for intervention (in terms of diagnosis and interpretation at an individual level) in the case of specific subgroups of students, which might be seen as complementary to conventional academic support operating at the group level.
- (3) Students who manifest theoretically desirable approaches to studying in specific subjects, which imply that they actively search for meaning in their learning, are more likely to be successful in those subjects (Meyer, Parsons and Dunne, 1990a; 1990b).
- (4) Students whose study orchestrations are theoretically less desirable in specific subjects are likely to have academic problems which place them at risk of failing,

achieving poorly, or failing to understand the academic demands placed on them in higher education.

- (5) Engagement with students on an individual level, in the form of discussions with them on their study behaviour, the identification of areas of concern, and the development of strategies for change, is likely to be instrumental in improved understandings of the demands of study in higher education at a metacognitive level (Biggs, 1985; Vermunt and Van Rijswijk, 1988).

CHAPTER TWO: TOWARDS A STUDENT LEARNING MODEL FOR HIGHER EDUCATION

Research formulations about what constitutes learning have, as Entwistle (1992b) notes, had to rely, historically, on concepts and findings drawn from mainstream educational and cognitive psychology. It is apparent that educational practitioners in higher education have experienced difficulty in attempting to interpret these research formulations about learning and study behaviour in seeking to gain greater understanding of the particular experiences of learning for their own students in higher education.

In the past fifteen years, however, an alternative research approach has developed, which is substantially based on the learning experiences of students themselves, i.e. is rooted in the everyday reality of learning and teaching amongst staff and students in higher education, as perceived by students. The concepts and findings of this particular student centred research paradigm, confirmed across a wide variety of contrasting educational systems and subject disciplines, have gained wide acceptance as being valid descriptions of students' learning experiences within higher education.

The international impact of the studies from which these concepts and findings emanate, appears to carry great significance for an understanding of learning and study behaviour amongst South African students entering higher education who are currently being described as "educationally disadvantaged", by virtue of their exposure (typically) to

twelve years of inadequate secondary schooling. Of this phenomenon, more will be said in subsequent chapters.

Viewed as a whole, studies of student learning have "consistently pointed to the significance of recognising the existence of qualitative differences in the manner in which students engage learning tasks" (Meyer and Sass, 1991 : 4). Building on this notion, and from the perspective of a number of research paradigms, it is now possible to formulate analytic categories of description which depict hierarchies of qualitatively different conceptions of learning (Marton and Säljö, 1984), approaches to learning (Marton and Säljö, 1984; Entwistle and Ramsden, 1983), educational orientations and motives (Taylor, 1983; Entwistle and Ramsden, 1983; Biggs, 1985), levels of intellectual and ethical development (Perry, 1970), and qualitatively distinctive perceptions of learning contexts (Meyer, 1988), as referred to in the introduction to this thesis.

Quantitative studies of student learning, mainly using Inventory administration procedures, and qualitative studies, mainly using interviews with individual students, have confirmed the existence of a number of key behaviours associated with student learning, which have proved useful in illuminating qualitative differences in the ways in which students approach and engage learning tasks considered typical in higher education (Eley, 1992). The description and application of these concepts to students' study behaviour can allow for qualitative analysis of what students learn, and how they perceive that learning, rather than, or in addition to, a more traditional quantitative analysis of how much they learn.

Conventional educational assessment methods generally rely on interpreting assessment outcomes in terms of a number of right and wrong answers (Säljö, 1979). Interpreting assessment outcomes for individual students as being descriptive of qualitatively different approaches in the levels of processing of information set for the task (for example, see Biggs's SOLO Taxonomy - Biggs and Collis, 1982 - discussed further on), represents a relatively radical departure from more traditional forms of assessing outcomes, and does not feature prominently as an alternative to conventional forms of assessment.

The following discussion is concerned with outlining some of the important conceptual formulations, rooted historically in research into student learning, which have been identified and which have important links with the intervention programme described later. This discussion represents an attempt to select findings and conclusions from research on student learning, from sometimes widely differing paradigms. These selected findings and conclusions form an implicit part of a working model of student learning, outlined in the summary to this chapter, against which explicit intervention mechanisms for use with educationally disadvantaged students were designed.

The contribution of phenomenography

Pioneering work in the field of phenomenography, initiated by Marton and Säljö (1976a; 1976b), showed that individuals, when required to read an academic text, engaged in qualitatively different levels of processing of the text set, according to their own perceptions of what it was they might be required to do afterwards. It was clear that individuals "read" the text in very different ways depending upon whether they thought

they would subsequently be required to recall the detail of the text, or whether they would be asked to outline the author's meaning and argument. Those individuals who, by default, paid attention to the 'signs' in the text itself - an approach subsequently termed a 'surface approach' - appeared to place a premium on recalling specific facts in the text; those who paid attention to the author's argument or line of thought - an approach subsequently termed a 'deep approach' - appeared to be more concerned with grasping the underlying meaning of the text. Furthermore, this study showed that these qualitatively different levels of processing of textual information could be associated with qualitatively different individual learning outcomes.

A second, and related, study (Marton and Säljö, 1976b), revealed that it was possible to alter the level of processing, and, thereby, the level of assessment outcome, on an academic text read by individuals, by altering the types of questions posed to the readers about the text. From this second study, Marton and Säljö were also able to show that individuals who adopted a deep approach to processing information, not only paid attention to the underlying structure of the text argument, but were able to retain segments of textual information which, in terms of the experiment, would be expected to be retained more effectively by individuals adopting a surface approach.

From these and other studies, Marton and Säljö concluded that there appeared to be a finite range - the "outcome space" - of qualitatively different individual approaches to the processing of a particular text, and, by extension, of any external phenomenon (Marton, 1981). This finite range of individual approaches to processing appeared to

be related, at least in part, to individuals' context-based perceptions of task requirements and to what Säljö (1979), and Marton, Dall'Alba and Beaty (1992, in press), describe as qualitatively different conceptions of learning, specifically because these conceptions of learning represented what individuals brought with them to the experiments, and they appeared to be associated with qualitatively different approaches to learning (Marton, Hounsell and Entwistle, 1984). This latter association is supported by an empirical investigation by Van Rossum and Schenk (1984), and summarised in tabular form below:

TABLE 1 : Associations between conceptions of learning and approaches to learning (adapted from Van Rossum and Schenk, 1984, with acknowledgement to Entwistle, 1992b).

Conceptions of Learning	A: Increasing one's knowledge B: Memorising and reproducing C: Applying facts and procedures	Surface Approach
	D: Understanding E: Seeing something in a different way F: Changing as a person	Deep Approach

The Lancaster study of student learning

Undoubtedly, one of the most comprehensive, and widely cited, studies of student learning in higher education was undertaken by Entwistle and Ramsden (1983) at the University of Lancaster. In part, the work undertaken represented an attempt to corroborate the findings of Marton and Säljö (1976a; 1976b) - conducted in a naturalistic setting - by applying these findings to the learning activities of students engaged in the everyday experiences of learning and teaching at a university.

Two inventories, the Approaches to Studying Inventory (the ASI) - measuring students' perceived approaches to study - and the Course Perceptions Questionnaire (the CPQ) - measuring students' perceptions of the academic departmental context - developed within the context of the Lancaster study, were administered to students in a number of institutions of higher education in the United Kingdom. In quantitative analyses of students' responses to these inventories, and qualitative follow-up interviews with selected students, Entwistle and Ramsden were able to formulate four main study orientations typically adopted by students in relation to the demands of higher education. The first two study orientations ('meaning' and 'reproducing') have their conceptual origins in the work of Marton and Säljö (1976a) and Biggs (1978); the 'strategic' orientation describes a 'cue-conscious' focus on examination requirements, while the last one (the 'non-academic' orientation) is descriptive of particular individual students' responses to perceived academic demands within higher education.

Entwistle and Ramsden's concept of a "study orientation" could be seen as an attempt to describe students' study behaviour more holistically as being influenced by a coalescence of particular approaches (Marton and Säljö, 1976a), pervasive learning styles, strategies and pathologies (described by Pask, 1976) and contrasting forms of academic motivation (described by Biggs, 1978).

At this point, it is important to draw a distinction between the conceptual and empirical structures of these conceptually formulated study orientations. Whilst Entwistle and Ramsden's large-scale study had established strong support for both the conceptual

and empirical bases of the four main forms of study orientation, subsequent follow up studies by other researchers tended to ignore or lose the distinction between the conceptual and empirical composition of the study orientations (Meyer and Dunne, 1991). These later studies tended to assume that the study orientations were "stable features of the model of student learning and could thus be used to solicit the manifestations of qualitative differences between, or within, population samples" (Meyer and Dunne, 1991 : 498). Studies where the manifestations of qualitative differences were allowed to be determined empirically, on the other hand, contributed important insights into the manifestations of qualitatively different study orientations, because these studies did not lose sight of the fact that study approaches cannot be decontextualised. In these studies, the concept of a "study orientation" was used to describe the manifestation of qualitative individual and group differences within the same sample of students.

The study by Entwistle and Ramsden (1983), nevertheless, is of seminal importance in research on student learning. The Approaches to Studying Inventory, developed and refined in the Lancaster study, "... has been used in its original or in modified forms in a large number of studies into students' approaches to studying in both higher and secondary education" (Parsons, 1991 : 126). The influence of the study has been crucial in highlighting the importance of the following factors which contribute, in various ways and to different degrees, to an understanding of student learning:

- * the notion of qualitative difference in students' intentions for studying and preferences for particular approaches to the act of learning.
- * the influences of the features of particular academic discipline contexts on approaches to learning.
- * the fundamental importance of recognising individual differences in styles and strategies which students adopt towards learning.
- * the complex system of interrelationships between individual study approaches, academic departmental influences (such as forms of assessment), and student perceptions of what they are required to do, and the effects these interrelationships might have on designing and improving learning and teaching (Entwistle, 1984).

Perry's model of intellectual and ethical development

Based on a longitudinal study of college undergraduates, Perry (1970) investigated the effects of exposure to tertiary education on the development of increasingly complex intellectual processing amongst these students. The model he formulated makes a powerful contribution to the illumination of qualitative individual differences in intellectual development amongst a sample of college undergraduates, and, if the same kinds of differences can be identified amongst groups of South African undergraduate students, it would imply that ASP practices which assume all students to be at similar levels of intellectual development (in Perry's terms) might need to be reformulated. In addition,

the model implies that the process of improving the quality of learning and teaching would be impoverished if account were not taken of the (sometimes chasmic) manifestations of difference in intellectual and ethical development amongst college students on entry to higher education.

Perry's model postulates the existence of nine intellectual and ethical developmental "positions" through which students make sense of knowledge and the world in general (Perry, 1988). These positions might be seen to be hierarchical, in that the second intellectual state incorporates, and is more advanced than, the first, and so on through the stages. They are not necessarily age-related, but might be seen more as stage-related to a particular individual's cognitive approach in a given situation.

TABLE 2 : Adaptation of Perry's model of stages of intellectual and ethical development (taken from Entwistle, 1992b).

1. Dualistic position, expecting 'right' answers to be presented by the teacher and reproduced by the student.
2. Diversity of opinion perceived, but seen as part of an exercise to encourage students to find the 'right' answers.
3. Diversity and uncertainty recognised, but only as temporary. Grades seen as relating to 'good expression'.

4. Diversity reinterpreted as 'everyone has a right to their own opinion'. Relativistic reasoning recognised as 'what they want', but without understanding why.
5. Recognition that all knowledge and values are relativistic; begins to understand the interpretation of evidence.
6. Accepts the need to make some personal commitment, but based on a careful examination of the available evidence.

Evidence that student epistemologies can, in certain academic contexts, partly be influenced at a group level by the ways in which knowledge is structured and presented within particular departments, has recently been cited by Sheppard and Gilbert (1991). Perry argues that the "goal" of teaching in higher education might usefully be conceived as being related to designing learning opportunities which allow students, who are ready to do so, to make new kinds of sense in an appropriate context of academic and other support. And therein lies the paradox! Those individual students who are ready to make new kinds of sense often do so quite independently of any form of "intervention" on the part of educationists; and those who are not ready, often do not perceive that the learning opportunities designed to challenge their "world views" have that perceived purpose. What Perry's model does do, however, is provide a further sense of the complexities of students' approaches to, and conceptions and perceptions of, learning and the learning environment.

Biggs's contributions to concepts associated with student learning

In essence, the work of Biggs, based on a different model of student learning to the work of Entwistle and Ramsden (1983), has drawn attention to two key ideas associated with student learning, which make important contributions to the intervention programme described later in this thesis. The concept of the SOLO (Structure of the Observed Learning Outcome) Taxonomy (Biggs and Collis, 1982) is linked to the work of Marton and Säljö (1976a; 1976b) in that both focus, albeit from different perspectives, on qualitatively different levels of outcome (Van Rossum and Schenk, 1984). Although technically not related to the development and use of the SOLO Taxonomy, Biggs's concept of "metalearning capacity", and the associations between the development of such metalearning capacity and approaches to learning, are conceptually and practically relevant to the intervention programme that forms the basis of this thesis. Conceptually, the development of metalearning capacity appears to be related to a particular study approach, and a particular study approach to a qualitative level of learning outcome.

Biggs's SOLO Taxonomy (1982) focuses on the observation of qualitative differences in learning outcome. In the taxonomy, outlined in table 3 below, learning outcomes can be assessed in terms of the extent to which they show evidence of more complex capacities (the use of increasing amounts of working memory), abilities to relate operations (the ways in which the cue - the question - and the response interrelate), consistency and closure (the need to make consistent conclusions so that there is no contradiction between these conclusions and the data) and overall structure (the extent

to which the student makes use of irrelevant data in responding to a particular question, relevant supplied data, and/or relevant data which he draws from hypothesis and conjecture).

TABLE 3 : The SOLO Taxonomy (taken from Biggs and Collis, 1982, with acknowledgement to Entwistle and Entwistle, 1991).

Prestructural:	Tautological or irrelevant responses; point of question not understood
Unistructural:	One relevant piece of information; jumps to conclusions
Multistructural:	Presents relevant but isolated bits of information; lists unrelated facts
Relational:	Builds up an effective explanation from information presented by the lecturer
Extended abstract:	Uses additional material; argues effectively, with alternative interpretations

The SOLO Taxonomy presents attractive possibilities in terms of providing a framework within which to assess students' qualitatively different learning outcomes in relation to task requirements. Furthermore, it does not assume that students' ability to make extended abstract responses, for example, in a particular task is necessarily linked to an age-related developmental stage, but, rather, that the student's responses might be seen to represent a particular form of qualitative cognitive development on a specific task. This cognitive development might have links to important personal and situational factors associated with a particular model of student learning (Biggs, 1985). The application of the SOLO Taxonomy has implicit links with the concerns of Säljö (1979) and Biggs (1979) in focusing on what is learned rather than on how much.

A second important contribution of the work of Biggs to an understanding of student learning lies in his establishment of associations between what he terms "metalearning" (Biggs, 1985) and approaches to learning, specifically with regard to the perceived congruence between study motives and related strategies. In a series of studies on the development of metalearning in the learning and study processes of secondary and tertiary students, Biggs investigated metalearning as " a subprocess of metacognition that refers specifically to learning and study processes in institutional settings, and more particularly to students' awareness of their motives, and control over their strategy selection and deployment" (Biggs 1985 : 192).

Biggs's summary of his conclusions suggests that students' awareness of their motives for study, and their selection of appropriate strategies, seems to be available to many secondary school students, but that the availability of this awareness is complicated by factors such as academic ability (expressed as reasoning ability and memory) and locus of control. "Greater awareness of and increasing control over approaches to learning" (Biggs 1985 : 201) seems to be articulated by older secondary students in the context of institutional learning, but this articulation is also complicated by these students' academic ability, subject content background, internal locus of control and appropriate forms of motivation (such as intrinsic interest and achievement motivation).

In assessing the extent to which metalearning capability can be "taught", Biggs suggests the need to explore qualitatively different forms of intervention for students perceived to have high to medium metalearning capability (cognitive sophistication,

potential or actual strong motivation) versus low metalearning capability (external locus of control, poor motivation). Historically, there would appear to be a paucity of research on intervention strategies which assume different levels of “metacognitive readiness” (Biggs, 1985 : 209), and, indeed, of research which describes precisely what this readiness is and how it can be measured.

Perceived learning contexts and approaches to studying

As was discussed earlier, Marton and Säljö's (1976a; 1976b) work on student learning demonstrated the associations between approaches to studying and the context of learning in an experimental setting, and this connection was confirmed in the study in a naturalistic setting by Entwistle and Ramsden (1983). Stated differently, it might be argued that “the approach to learning should not be seen as a characteristic of the student, but as a response to a situation” (Entwistle and Ramsden, 1983 : 198). Clearly, the student's perception of what he is required to do, whether that be mediated by the nature of the task itself in higher education, the lecturer's approach, or the approach of a particular academic department, is of fundamental influence in determining a specific approach to the task.

Earlier work on student perceptions of elements of academic environments, such as good teaching, openness to students, freedom in learning, clear goals and standards, and appropriate workload, using the Course Perceptions Questionnaire (Ramsden and Entwistle, 1981), confirmed that, “... when academic departments were perceived to provide these characteristics, their students were more likely to learn effectively from courses run within them” (Ramsden, 1991 : 132). Three studies (using both quantitative

and qualitative research methods), one on associations between perceived academic environments, forms of academic motivation and approaches to studying amongst British and Hungarian adolescents (Entwistle and Kozeki, 1985; Entwistle, Kozeki and Tait, 1989a; 1989b), and the other two on perceived school environments and study approaches (as described in Biggs's Learning Processes Questionnaire - 1987) amongst Australian secondary school students (Ramsden, Martin and Bowden, 1989; Watkins and Hattie, 1990), confirmed that, at a group level, and based on these population samples, associations between pupil perceptions of teaching and approaches to learning could be empirically established.

The study by Entwistle, Kozeki and Tait (1989b : 347) "suggested that British schools were perceived as being more formal with pupils being more respectful to teachers, while the Hungarian pupils found explanations related more to real life experiences" and "skill in explaining and a light work load (sic) are associated with higher scores on deep approach, while surface approach are linked with heavy workload and formal teaching in both countries."

Ramsden, Martin and Bowden (1989 : 140) conclude, on the basis of both quantitative and qualitative evidence, that this evidence "gives strong support to the contention that approaches to learning are influenced by pupils' perceptions of sixth form environments". Their study also provides some evidence of associations between approaches to studying and school context at the individual level, notably for "deep approach with 'independence in learning', achieving (or strategic) approach with 'structure and

cohesiveness' and surface approach with 'emphasis on formal academic achievement'" (Entwistle, Kozeki and Tait, 1989b : 347).

A comparative study by Meyer and Parsons (1989), using a different population sample to that of the original study (at the Cape Technikon, a South African institution for higher education), on the association between perceived contextual factors and approaches to studying using the ASI and the CPQ (Entwistle and Ramsden, 1983), found evidence for the manifestation of two of the four study orientations described in the Lancaster study, namely meaning orientation and reproducing orientation. As Meyer and Parsons (1989) point out, their evidence supported the findings of other earlier studies by Watkins (1982; 1983); Watkins and Hattie (1985); Clarke (1986) and Meyer (1988). The results of this study, however, failed to support the presence of the additional two study orientations identified by Entwistle and Ramsden (1983). Meyer and Parsons (1989 : 151) comment that, as the population used for their study "shares many of the linguistic and cultural characteristics of these [other] populations, it is apparent that certain of the conceptual constructs ... are contextually defined and that these new associations can be conceptually defended".

With reference to the CPQ as a model for describing learning context, Meyer and Parsons (1989 : 151) comment that, in their study, "no empirical associations between the CPQ and the ASI could be established with the exception of the association between the subscale 'workload' and 'reproducing orientation'". Thus, their conclusion that "the constructs represented by the CPQ do not allow us to explore the associations between

contextual factors and approaches to studying at the individual level" (Meyer and Parsons, 1989 : 151).

The import of the somewhat detailed previous discussion cannot be over-estimated. A preliminary study conducted by Meyer (1988) on the association between different study orientations (measured by a modified version of the ASI) and perceptions of the learning context (measured by the Qualitative Context Inventory - an Inventory developed by Meyer) showed evidence of an association between qualitatively different study orientations and qualitatively different categories of perceptions of learning context. Using the conceptual framework provided by General Systems Theory and, primarily, the perceptions of lecturers to form the constructs associated with perceptions of the learning context, "it is possible to distinguish between qualitatively different perceptions of the same construct - a distinction which the CPQ is not sensitive to" (Meyer and Parsons, 1989 : 152).

It would seem, then, that the value of the Qualitative Context Inventory lies in the fact that it "demonstrates adequate conceptual coverage of the dimensions of individual learning context ... the associations demonstrated at the group level (Meyer, 1988) and at an individual level (Meyer and Muller, 1990b) are consistent with a theory that links qualitatively different levels of perception with qualitatively different approaches to studying" (Parsons, 1991 : 132).

The concept of study orchestration

The concept of “study orchestration”, which has important conceptual and other links with the intervention programme described later in this thesis, was first introduced into the research literature on student learning in a definitive sense in a study undertaken by Meyer, Parsons and Dunne (1990b) on the description of individual study orchestrations and their association with learning outcome. The authors of this study argue that “study orchestration” must be regarded as conceptually distinct from the term “study orientation” coined by Entwistle and Ramsden (1983), as “it indicates that the association of ASI constructs at an individual level is a context-specific response that is affected by the qualitative level of perception of certain elements of learning context” (Meyer, Parsons and Dunne, 1990a : 70). The concept of study orientation, by contrast, implies that the association of ASI constructs is relatively stable across different educational tasks. In subsequent studies, and also in terms of the definition assumed in the intervention programme, study orchestration has come to mean “the contextualised study approach adopted by individual students” (Meyer, 1991 : 297). A crucial conceptual shift in the meaning of the term has thus occurred. Whereas it once implied a qualitative study approach response to a qualitatively perceived learning context, it now implies, in addition, a study approach which is based on perceptions of discipline-specific content.

The recognition and conceptual classification of qualitative differences in perceptions of elements of the learning context and content, and their associations with approaches to study at an individual level is of fundamental significance to the implementation of the

intervention programme described later in this thesis. The central question thus addressed in this thesis was whether educationally disadvantaged students whose study orchestrations theoretically placed them at risk academically could be assisted to 'reorchestrate' aspects of their study behaviour in qualitatively 'deeper' ways. A further question addressed the extent to which, at an individual level, students with a meaning orchestration could be encouraged to maintain such an orchestration. Fundamental to this latter question is the realisation that some of the students in this latter category still fail academically or achieve poor marks.

Summary

Concepts which have emerged from the studies described above (and others) which have manifest links with the intervention programme described in this thesis, include: deep, surface, and achieving approaches to study; extrinsic, intrinsic and achievement forms of motivation; deep perceptions of elements of the learning context, and study orchestration, i.e. a concept used to describe discipline-specific and contextualised forms of study behaviour.

This chapter has outlined the important conceptual and paradigmatic framework for a study of student learning amongst a sample of South African university students. A significant subgroup of students who apply for registration in higher education within South Africa, are products of a secondary school system which, in practice, has been associated with poor Matriculation results (in terms of subject and aggregate symbols) and, subsequently, with underachievement or failure within higher education. This lack of achievement has, traditionally, been ascribed to factors within the secondary school

system from which these students graduate, such as poor facilities, underqualified teachers, lack of proficiency in written and spoken English, and so on. This subgroup of students has come to be described as "educationally disadvantaged", and substantial efforts, in the form of various kinds of academic support, have been undertaken to improve its chances of passing undergraduate degree courses and, ultimately, of qualifying with a degree.

The study which formed the basis of the intervention programme described in this thesis was based upon an expectation, grounded in conceptual and empirical theory, that the manifestation of qualitative individual differences in learning engagement amongst a particular group of educationally disadvantaged students would fit an eclectic model of student learning as outlined in the foregoing discussion. Manifestations of variability in study approach amongst students (coming from apparently similar learning contexts), further sharpened by different levels of intellectual sophistication, fluency in reflective thinking and metalearning capability, and qualitatively distinctive perceptions of learning context, formed a primary focus of the study outlined in this thesis.

The concepts and research findings outlined in this chapter, must be viewed as central to the development of an individual-difference model of student learning which is able to inform the kinds of academic support perceived to be needed in these support programmes, based on the experiences of the students themselves. Indeed, it is precisely because this model takes account of individual qualitative differences in the manner in which students engage learning tasks in higher education that it appears to

hold attractive possibilities for the design of learning environments and experiences which might broadly be regarded as constituting academic support practice.

The application in academic support in South African universities, of this individual-difference model of student learning, for which there is substantial empirical support (Meyer, Dunne and Sass, 1992), stands in contrast to approaches adopted by many practitioners in conventional Academic Support programmes. Before describing the application of the concepts and findings outlined in this chapter to specific contexts of academic support in higher education in South Africa, it is necessary first to offer a perspective on the historical and practical development of academic support in South African universities. This perspective forms the focus of chapter three of this thesis.

CHAPTER THREE : ACADEMIC SUPPORT PROGRAMMES FOR THE EDUCATIONALLY DISADVANTAGED

The rise in the number and nature of academic support programmes in the context of South African university education over the past 10 years has been substantial. This increase is not surprising, given that increasing numbers of (Black) students whose schooling has been inadequate or interrupted, are seeking, and gaining, admission to undergraduate degree programmes despite these students' having failed to achieve the necessary Matriculation "point score" for entry into certain university faculties. Part of the reason for one of the conventional admissions criteria being waived in certain cases, lies in the fact that many of these students seeking admission come from schools which have, historically and in terms of management and administration, fallen under the auspices of the DET (Department of Education and Training) or the DEC (Department of Education and Culture). A discussion of the political, economic, ideological, and other factors which have contributed to the deterioration of education in these schools, and attributional causes for their high Matriculation failure rates, have been extensively described elsewhere (for example, see Kalloway, 1984; Hartshorne, 1990), and do not form part of the focus of this thesis.

As a consequence of the effects of these factors, however, the variety of conventional academic support programmes at universities, both in terms of quantity and quality, has risen as a direct attempt to address a number of significant perceived student learning and other needs. These needs might best be viewed as related to broader issues in

higher education, such as equality of access; a paucity in the numbers of Black graduates, scientists and engineers, professionals, researchers and academics (Dunne, 1990); the perennial issues of educational standards and academic or cognitive potential; and to the assessment, and possible revision of, elements of the academic learning context, such as curricula and teaching methods.

Conventional academic support programme practices in South African universities

Lazarus (1988 : 5) argues that, historically, "english (sic) second language teaching has been the major area of engagement for ASP followed by approaches to teaching practice". In more recent deliberations, "... the area of cognition/learning theory and its relationship to teaching practice ..." and a "... fourth area of engagement for ASP - that of institutional development" have become more pertinent. Lazarus (1988 : 2) further notes that "Academic Support Programmes have been operative at the Universities of Cape Town, Natal, Rhodes and Witwatersrand since 1982".

In summarising the goals set for a workshop in June 1988, attended by ASP practitioners from the four universities mentioned in the last sentence, Lazarus (1989 : 153) makes the following points, relevant to the evolution of a number of important conceptual directions which have informed, and continue to inform, conventional ASP practice:

"Academic Support has for several years recognised research into learning problems as one of its major commitments ... under the pressure of daily demand for services, the need to examine [the] body of experience in the

framework of explanatory theory has not been adequately met. The workshop set this as one of its main goals ... a second ... goal was to provide academic support practitioner teachers with a point of access to, and a map of, the intellectual terrain ...the politics of change in the university ... set the third goal”.

By 1989, then, three primary focuses had emerged within ASP practice, namely the association between educational theory and ASP, and ASP and practice; the contributions of theories of cognition to such practice; and attempts to address the changing demography of South African university student populations, against the background of international research into the changing nature of educationally disadvantaged populations (see, for example, Pallas, Natriello and McDill, 1989).

In assessing the role played by Academic Support Programmes towards institutional development at the so-called “White liberal universities”, Mehl (1988) suggests four key issues for academic support to address: the ‘Africanisation’ of South African education; the need for a battery of cognitive and affective measures as an aid to deciding on access for students from educationally disadvantaged backgrounds; the need to understand the learner; and the creation of an optimum learning environment.

Stated differently, Mehl argues, firstly, that “it is no longer a matter of simply changing the student to fit into the university, but rather a matter of bringing the university more into contact with the stark reality which the colonised student represents”

(Mehl, 1988 : 18). Against this ideological background, he argues for changes to the conditions of access which assume that matriculation exemption is not necessarily a reliable predictor of university success for educationally disadvantaged students, a starting point which is currently accepted notionally and incorporated practically into student selection procedures across a wide range of subject departments and educational institutions.

Furthermore, his paper raises some very important issues in relation to developing an understanding of what he terms "the recipients of the learning process" (Mehl, 1988 : 18) in a South African context. Understanding the learner, he argues, might be usefully informed by burgeoning amounts of research into science education which is concerned with describing alternative conceptions of physical science phenomena. This contention makes a significant conceptual link with the phenomenographic research work of Marton and Säljö (1976a; 1976b) and Marton (1981; 1986) described earlier in this thesis.

Mehl contends that, in enhancing the accessibility of persons to university study, educators need, in addition, to determine "the cognitive profile of the learner ... the cognitive requirements of the particular content area ... the development of suitable materials which build the requisite thinking skills explicitly into the presentation of the particular content area" (Mehl, 1988 : 19). These issues are taken up at a later point in this discussion in the reference to the concepts of epistemic- and metacognition (Craig, 1991). Precisely how the "cognitive profile" of the learner is determined requires further

elaboration, and it was in an attempt to address this issue, that the study undertaken by this author sought to understand learning and cognition by investigating manifestations of these phenomena in the everyday experiences of the students themselves.

Some empirical evidence for the fact that cognitive structures are modifiable, even into late adolescence, and that it is possible to develop individuals' thinking skills in relation to the specific requirements of a subject-discipline, has been cited by international researchers working within this model, such as Nickerson, Perkins and Smith (1985); Perkins (1986), and Feuerstein, Rand, Hoffman and Miller (1980).

In Feuerstein's Instrumental Enrichment Programme, for example, Israeli adolescents from disadvantaged educational and other backgrounds, participated in an intervention programme designed to produce cognitive structural change. In the words of Feuerstein, Rand, Hoffman and Miller (1980 : 9), "structural changes ... refer ... to [changes in] the organism's manner of ... acting on and responding to, sources of information". Utilising the notion of a mediated learning experience - "the way in which stimuli emitted by the environment are transformed by a 'mediating' agent, usually a parent, sibling, or other caregiver" (Feuerstein, Rand, Hoffman and Miller, 1980 : 16) - the Instrumental Enrichment Programme sets out to act upon those cognitive functions diagnosed to be responsible for poor intellectual performance. In the case of the intervention programme, the teacher practitioner provides the mediated learning experience, through the implementation of materials designed to modify the cognitive structures of the individual student. Feuerstein, Rand, Hoffman and Miller (1980) provide some evidence

of improved performance, based upon the administration of a collection of aptitude, achievement and other non-intellectual tests of classroom participation and self-concept. The interpretation of evidence of improved intellectual functioning amongst participants on various implementations of the Instrumental Enrichment Programme, and the transferability of this improvement to academic contexts, however, is less clear (Nickerson, Perkins and Smith, 1985; Savell, Twohig and Rachford, 1986). In particular, the complexities of educational contexts, and students' perceptions of these, appear to be unaddressed in evaluations of Instrumental Enrichment.

Thinking skills approaches designed to develop context- and content-specific thinking skills, referred to by Nickerson, Perkins and Smith (1985) as "formal thinking approaches", also appear to have had mixed success. The majority of these programmes which Nickerson, Perkins and Smith (1985) review, appear to involve teaching content which is different from conventional course content for the subject-disciplines, and it is in this important respect that their value for ASPECT students (the focus of this thesis research) seems lessened. Although ASPECT students enrol for a reduced curriculum (Sass, 1988), they, nevertheless, follow conventional mainstream syllabi and assessment procedures.

Mehl (1988) suggests that the research directions he links with ASP developments are not solely manifested in those students regarded as educationally disadvantaged. He maintains, however, that the research directions he proposes remain an important focus for ASP practitioners, because of the extent to which students in ASPs appear to

manifest greater adjustment, learning and other problems in pursuing undergraduate degree programmes at universities than their mainstream counterparts.

Based on interviews, questionnaires and daily contact with B.Ed ASP students at Wits University, Moll and Slonimsky (1989) explain these students' learning difficulties as being the result of discrepancies between their demonstrated academic skills and the academic skills that B.Ed practitioners expect these students to be able to demonstrate. They create three descriptions of these discrepancies:

"1. Our B.Ed course assumes that academic activity consists in argument ... [o]ur ASP students do not perceive academic discourse to be a form of argument ... 2. We expect our students to be able to read a text for meaning ... [for] our ASP students, it is knowledge to be learnt as a totality ... 3. We expect our students to be able to exercise volitional attention in their study activities ... [c]ertain kinds of thinking (questioning, volitional attention, ... are deemed not to be part of [our students'] normal academic practice ..." (Moll and Slonimsky, 1989 : 161).

Their three descriptions contain clear conceptual links with the work of researchers in the field of student learning. Moll and Slonimsky's focus on the "argument" of academic discourse suggests a link with Perry's (1970) notion of student epistemology; the issue of "reading for meaning" suggests a link with Marton and Säljö's (1976a; 1976b) work

on study approaches; the question of "volitional attention" finds a conceptual parallel in Biggs's (1985) concept of metalearning capacity.

In assessing the extent to which "ASP theory" offers an adequate account of these discrepancies, Moll and Slonimsky (1989 : 162) argue, further, that "precisely what is entailed ... in the psychological condition of "disadvantage" remains radically unclear, and this means that ASP presents us with only a very general theoretical grasp of the problems we face in our courses". Additionally, they appeal for "a cognitive theory which will avoid the suggestion that all ASP students lack the cognitive structures on which university performance depends, but at the same time will explain how and why it is that they find it difficult to mobilise the appropriate contextual skills adequately in a university context".

Drawing on the cognitive/developmental theories of three primary cognitive psychologists (Piaget, Bruner and Vygotsky), and in the light of the (then) developed "ASP theory" for explaining the cognitive discrepancies noted above, Moll and Slonimsky (1989) propose three ways of understanding the learning difficulties of their B.Ed ASP students (each of which they associate with a proposed form of intervention): the learning problems of a small number of their students suggest that these students have not developed the abstract cognitive structures presupposed by the ground rules of the B.Ed curriculum; secondly, the learning problems of some students must be understood as being associated with the relation between language and cognition in second-language speakers, as these students' appear unable to think abstractly in a second-lan-

guage; thirdly, a large number of their students appear to possess the requisite cognitive operations, but they have never been required to use them in developing specific academic skills, such as attending to the structure of academic argument in a discipline-specific context, for example.

The form of intervention proposed for the first group is directed towards tutors developing in these students the cognitive structures and operations associated with higher forms of cognition; in the second group, a proposed linguistic intervention seems indicated; the focus of intervention in the third group would be on making students aware that different elements of the learning context may require different approaches to learning, and that they may need to mobilise different cognitive operations in dealing with these context-specific skills.

It would seem that attempts to develop cognitive structures and operations associated with higher education amongst educationally disadvantaged students might usefully focus on these students' epistemologies, or views of knowledge. The aims and assumptions embodied in the current version of the teach-test-teach (T-T-T) programme of the University of Natal, briefly described in Craig (1991), represent important attempts to, amongst other aims, describe the difference between student epistemology and conventional epistemologies subscribed to by university educationists, and, further, to assess the extent to which students accepted for the programme can be said to possess the "potential" to pursue university studies. Students who, on the basis of their responses to programme assessment, and the more generalised educational develop-

ment aims (such as the development of metacognitive ability) of the T-T-T programme, demonstrate that they have the potential for university study, may be admitted to a reduced curriculum or full first-year credit load. They also participate in foundation-type work aimed at "equipping them with the necessary meta- and epistemic cognitive operations for effective and autonomous engagement in university studies" (Craig, 1991 : 143). A fuller discussion of the terms "meta-cognition" and "epistemic cognition" as used here, is to be found in Strohm Kitchener (1983); the terms are referred to in the context of this discussion because they can be used to explain, at least in part, the discrepancy between educationally disadvantaged students' theories of knowledge and academics' theories of knowledge.

In her paper, Craig (1991) outlines what she terms "a commonsense theory of knowledge", and describes the apparent discrepancies between this theory of knowledge (as manifested in the responses to selected exercises amongst some educationally disadvantaged school-leavers who participate in the T-T-T programme) and conventional theories of knowledge embodied in the form and content of many university courses. The list of basic tenets she describes (examples of the manifestation of which are presented) are worth reflecting on in detail:

"(1). There is a "right" and "true" and "proper" because God (and the Bible or some other unquestionable authority) made it so, or because Nature constitutes it as such ... (2) The "I" of being or living has only one direct access to this "truth" ... through "on the spot" reporting or personal, immediate, first

person accounts of experience. (3) If the experience of "I" has any revelation about the "truth" ... that revelation has ... a linear (story) line where the events which are presented produce the last event as the obvious "truth". (4) The revealed "truth" begs no resolution of paradoxes or ... that this claim may beg evidence, or an appreciation of the logical, epistemic and moral consequences following on from it." (Craig, 1991 : 137).

Central to Craig's argument is the idea that, in order for discrepancies between an epistemological discourse, which she terms "africanism", and that more common to academic courses, which she calls "eurocentrism", to be addressed, these discrepancies would need to be made explicit to students, in order to assist them in bridging the gap between two learning histories. Broader political debates notwithstanding, Craig (1991) argues, as Mehl (1988) does, albeit it from a different perspective, that there would seem to be a pressing need for academics to address the conflict between what learners bring to the learning situation, and what it demands of them.

In delineating some of the assumptions underlying the concept of "academic support" and the implications of these assumptions, Tema (1988) offers a number of possible reasons for the lack of perceived relevance, historically, of ASP initiatives. She argues, firstly, that the typical ASP student's perception of the factors that contribute to success at a university appear to be different from the perceptions of these factors by academic practitioners. This argument appears to be based on the fact that, as Tema (1988) notes, a contradiction exists between the perceptions of the ASP student, on the one hand,

who prides himself on his grit and determination in succeeding at school, and thereby obtaining a university entrance pass, against many odds, and the academic practitioner, on the other, who regards this student's secondary educational background as poor and likely to lead to his academic failure at university.

Tema's (1988) second point is that courses which have historically been established for ASP students as separate courses (sometimes referred to as "foundation courses") to mainstream academic courses, run the risk of being perceived as discriminatory, especially if the majority of the students in these courses happen, in addition, to be Black students. A third reason for the perceived irrelevance of ASP which Tema (1988) cites, appears to lie, she argues, in a philosophical approach adopted by academic practitioners which assumes that Black students' poor performance in school subjects, especially science and mathematics, can be attributed to conceptual deficiencies which have their origins in the non-technological African cultural backgrounds of many of these students.

Much practical and research progress towards addressing some of the issues which Tema (1988) raises has, to date, already been achieved. For example, the successful completion of "foundation courses", in many cases, carries credits which go towards the student's undergraduate degree programme, thereby removing the stigma of these courses being seen as irrelevant; liaison between mainstream and ASP practitioners, in terms of making links in course content dealt with, assessment methods employed, discipline-specific language made explicit, and so on, has become the focus of certain

university academic departments. This liaison has meant a focus on mainstream and ASP courses as concurrent (sometimes integrated) activities rather than their being ideologically and practically separate.

ASP in the 1990's : Planning for 'Educational Development'

More recently, in a discussion document compiled by a number of staff members of ASP at the University of Cape Town (1991) a number of key research areas are identified, which suggest that ASP staff at this university are committed to ongoing research aimed at addressing some of the issues raised by writers such as Lazarus (1988), Mehl (1988) and others above.

Some of the research areas listed in the discussion document as pertinent focuses of concern for the 1990's include:

- (1) curriculum development (the integration of models of teaching and learning, and ASP practices, within mainstream curricula). This research direction indicates a commitment on the part of ASP to explore the applications of findings from the work of researchers such as Craig and Meyer, to mainstream teaching;
- (2) evaluation (of ASPs and other courses aimed at educational development). The intention here is to set up mechanisms for evaluating ASP courses in the light of appropriate research;

- (3) the development of teaching materials (aimed at improving student's spatial skills, and visual perception in particular);
- (4) conceptual clarification (of concepts such as "underprepared", "potential", "student autonomy", associated with educationally disadvantaged students specifically, and other students more generally);
- (5) analysis and measurement of learning approaches and thinking processes (and the design of interventions based on these analyses and measurements);
- (6) a focus on the specific area of mathematics (which would involve analysis of teaching and learning methods in the discipline, the status of Mathematics as a requirement for entry into undergraduate degree courses, and an examination of the nature and scope of "foundation courses" in Mathematics);
- (7) a focus on language (including teaching/learning methods, the status of the subject as a requirement for entry into specific courses, and "foundation courses");

Summary of major research and debate which have contributed to current ASP practice

The issues and implications raised in the research and position papers outlined above can be regarded as central to the current practice of conventional ASPs in this country. Some of the significant issues raised by the authors cited above have self-evident

conceptual links with the models of student learning discussed in the previous chapter, and with the design and implementation of the intervention programme described in this thesis:

- (1) The need to examine the practice of ASPs within the framework of explanatory theory, specifically theories and models which attempt to describe and account for, approaches to learning (Lazarus, 1988).
- (2) The contributions made, especially in the field of science, towards describing alternative conceptions of science phenomena amongst students in general (Mehl, 1988). This research focus was not explicitly addressed in the intervention programme described further on, but, in exploring by means of interviews, ASPECT students' study approaches adopted in respect of school Science, students frequently expressed their conceptions of some basic Science phenomena, such as Newton' Laws of Motion, for example.
- (3) Attempts made to understand, and describe, the "cognitive profile" (Mehl, 1988) of the ASP learner. The term "cognitive profile" is not, however, used in the description of the intervention programme outlined elsewhere in this thesis.
- (4) The notion that what is implied by the concept of "educational disadvantage" in relation to the study of specific university courses has not been adequately clarified through ASP practice (Moll and Slonimsky, 1989).

- (5) The idea that the cognitive skills that students are expected to mobilise in relation to academic tasks, are discipline-specific (Moll and Slonimsky, 1989).
- (6) The recognition that subgroups of ASP students may require different forms of intervention, in relation to the particular linguistic and/or learning problems which they might evince (Moll and Slonimsky, 1989).
- (7) The particular views of knowledge articulated by some students in ASPs, and the observation that these might be different from the views of knowledge held by academic practitioners (Craig, 1991) and/or the views of knowledge required by students in the fulfilment of everyday academic tasks (Craig, 1989).
- (8) The notion that educationally disadvantaged students applying for entrance to university studies may have different perceptions from those of academic practitioners about their abilities to be successful.

A model of student learning applied to ASP students

The intervention programme described more fully in the next two chapters of this thesis must be viewed as being based on a working model of student learning which is drawn from quantitative and qualitative studies of student learning within the framework of a number of different conceptual models. Although, notionally, this working model implies the incorporation of the ideas and concepts enumerated in the discussion immediately preceding this paragraph and in chapter two, it must be emphasised that the model

departs, conceptually and in its implementation, in important respects from the ideas listed above.

Firstly, the working model of student learning on which the intervention programme is based, is an individual-difference model which sets out explicitly to avoid any untested assumptions of presumed group identity amongst a particular group of educationally disadvantaged students. It attempts to describe and conceptually categorise the manifestations of qualitative differences (in student learning perceptions, conceptions, approaches and motivations) in the contextualised study approaches of individual students. Up to now, very little research focus has been directed in South Africa at this conceptual category of student. Crucial to this interpretation of students' study behaviour is the notion that this study behaviour is, at least in part, a response to the qualitative level of perception of key elements of a discipline-specific academic environment (Meyer, Parsons and Dunne, 1990a).

Secondly, the focus of this form of intervention is, by definition, directed at encouraging qualitative change, or awareness of, certain forms of study behaviour, i.e. it is conceived as an explicit form of intervention which stands out conspicuously against more conventional forms of academic support based on a presumed group learner identity. The description and conceptual categorisation of individual students' study behaviour, within the concept of the "study orchestration", in terms of which some students might be regarded as academically "at risk" of failing or underachieving, suggests that intervention might be aimed at assisting "at risk" students to reconceptualise aspects

of their study behaviour in qualitatively 'deeper' ways. But it also suggests that those students with theoretically desirable study orchestrations, who, nevertheless, still fail or underachieve, might require fundamentally different forms of intervention. "[T]hese are not two facets of the same intervention problem" (Meyer and Sass, 1991 : 2).

Thirdly, the model is based on testing assumptions, which might be regarded as implicit to it, against a body of appropriate educational research. Conventional ASP practices have been unable (for a variety of reasons) to adopt a rigorous approach to formulating and testing hypotheses. The intervention programme is also directed at illuminating and validating, by means of interviews with individual students, the conceptual classification of qualitative individual differences within the concept of the study orchestration.

Fourthly, the model seeks to interpret the learning problems of educationally disadvantaged students at a level of abstraction which cannot be addressed by adopting a 'study skills deficit' approach to these problems. Conventional approaches to what have been termed 'the real learning needs' of educationally disadvantaged students have tended to conceive these students as being 'deficient' in the use of certain academic skills (such as note-taking), in proficiency in written and spoken English, and/or in conceptual understanding - particularly in subjects such as Mathematics or Science. That the presence of these 'deficiencies' may be true, is not in question here; what is in question, is a popular assumption in conventional ASP practice that such deficiencies can be addressed through the introduction of generalised study skills programmes on how

students might tackle academic tasks such as taking notes, answering examination questions and managing time.

In two crucial respects (the content and context of academic tasks), these study skills programmes appear to be, at best, only partially adequate responses to the multiplicity of learning needs of educationally disadvantaged students, and, at worst, simply an inducement to those students who are captivated by the seductive lure of adopting 'recipe' type approaches, to perceive these programmes as handy answers to addressing their study problems. In terms of addressing the subject-specific content and context (both the objective academic environment and students' perceptions of this environment) of study, advocates of these generalised study skills packages appear to assume that there is a 'right' way to study which is applicable across a wide variety of educational tasks, and in relation to virtually any subject or academic environment. In the light of research evidence, particularly in terms of the qualitatively different ways students engage educational tasks, the value of this traditional form of study skills training is increasingly being called into question (Entwistle, 1992a).

Within the framework of the eclectic working model of student learning presented in chapter two, the intervention programme outlined in this study sought to explore concepts referred to in the present chapter. Attempts to describe the "cognitive profile" of the learner, for example, were made by exploring the behavioural manifestation of this "profile" in students' approaches to study; manifestations of student epistemology were identified in the context of individual interviews about study engagement; a focus

on qualitative differences in students' study engagement explicitly set out to suspend ideas that all these students necessarily lacked the cognitive structures for successful university study.

The forthcoming chapters of this thesis describe the intervention programme implemented against the background of the conceptual and theoretical model referred to above. It needs to be emphasised that this programme was specifically devised to provide ongoing academic and other support for a group of educationally disadvantaged students, and was particularly aimed at engaging these students with manifestations of their study behaviour in such a way that such resulting discourse was perceived by these students as integral and, indeed, desirable in the context of their everyday learning. The extent to which these aims were realised, forms part of the discussion of the next two chapters.

CHAPTER FOUR : THE DESIGN AND IMPLEMENTATION OF PHASE ONE OF THE PROGRAMME

This phase of the intervention programme was designed around four stages:

- (1) The administration of an Inventory to ASPECT students at the commencement of the academic year. Details of the conceptual basis, properties, and so on, of the Inventory used, appear in Appendix A. At their first official classroom meeting with faculty staff in orientation week, the ASPECT students were requested to complete the Inventory in respect of their (retrospective) learning of Science at Matriculation level. They were told that the completion of Inventories such as the one before them was a normal part of the university's ongoing commitment to assessing the quality of learning and teaching on the campus. Furthermore, they were informed that the statements which comprise the Inventory were examples of typical utterances of students, like themselves, about the ways they go about learning Science. Students were also advised that the task they were about to complete was not a test, that there were no 'right' or 'wrong' answers, and that they need not feel pressured into finishing quickly. They were requested to complete the Inventory in a way which they felt would give an accurate reflection of their own approaches to the study of Science at school. The administration of the Inventory was thus presented to the students in as non-threatening a manner as possible, and they were able to ask questions of the author about any language problems they might have

in reading the statements. As a result, all 49 students present completed the Inventory in a positive spirit, and without anxiety.

- (2) The conceptual classification of the study orchestrations of these students based on the Inventory responses. This classification process (carried out by Meyer), using previously verified methodologies, was done independently of the subsequent interviews carried out by the author.
- (3) The process of interviewing each ASPECT student, to illuminate and validate the independent classification of the orchestration profiles done earlier. This was done before the conceptual details of the orchestration classifications had been supplied to the author. The orchestration classifications were given to the author after the interviews and provisional impressions had been formulated, but before a subsequent and later reflection on the interview transcripts.
- (4) The soliciting of written feedback from the students as to the value or otherwise to them of the interview. An important point needs to be made here: in grouping students' feedback about their individual interviews under various conceptual orchestration categories, the orchestration classification used for each student was the one based on a second and subsequent administration of the Inventory. The second orchestration classification was used, because the students gave feedback on the interview just before the mid-year examinations, i.e. at a point when they had already been at the university for some five months, and their

study behaviour had already been “influenced” by their perceptions of a university learning context.

The data presented in the table below reflect:

- (1) a code number for each student, which is used in all further discussions of individual students;
- (2) an orchestration category for each student on the basis of the first Inventory administration;
- (3) the author’s impression of whether the individual interview confirmed or did not confirm the original independent Inventory response classification;
- (4) a student “rating” of whether the interview had been of value to him/her.

TABLE 4 : Associations between study orchestration classifications, and author’s and students’ impressions of interview (first Inventory administration).

<u>Student Code</u>	<u>Orch.Category</u>	<u>Author’s Impr</u>	<u>Students’ Impr</u>
b1	AVE-	+	+
b2	AVE-	+	+
b3	AVE +	+	
b4	AVE	+	
c1			+
c2	AVE-	+	
d1	AVE-	?-	
g1	AVE	+	+
g2	AVE +	+	?

i1	AVE	+	
j1	AR	+	
k1	AVE-	+	-
k2	AVE	+	+
l1	AVE	?+	+
l2	AVE	?+	+
m1	AVE	+	+
m2	AVE+	+	
m3	AVE-	+	
m4	AVE+	+	+
m5	AVE	?+	+
m6	AVE+	+	
m7	AVE	+	+
m8	AVE	+	
m9	AVE+	?-	
m0	AVE-	+	-
ma	AR	?+	+
mb	AVE	?-	-
mc	AVE-	+	
md			+
me			
n1	AVE+	?-	
n2	AVE	?-	-
n3	AVE	+	+
n4	AVE+	?-	+
n5	AA	+	+
o1	AVE	?+	-
p1	AVE	+	?
p2			-
r1			+
r2	AVE+	?-	?
s1	AVE	+	+
s2	AVE+	+	+
s3	AVE-	+	-
s4	AA	+	+
s5	AVE+	?+	+
s6	AVE+	+	
s7	AA	+	+
s8			
s9			

t1	AVE +	+	
t2	AVE +	+	+
t3	AVE-	+	+
t4	AVE	?-	
w1	AVE	?+	+
z1	AVE-	+	+
z2	AVE +	+	

Notes:

- (1) Column three is interpreted as follows: '+' : generally confirmed; '-' : generally rejected; '?+' : generally confirmed, but, on the basis of what the student said in the Interview, it seemed that the orchestration category might be a more "deep-oriented" one on a subsequent administration of the Inventory; '?-' : generally confirmed, but it seemed as if a subsequent administration of the Inventory might show a more "surface-oriented" orchestration.

- (2) Column four: '+' : the student regarded the interview as being of value in terms of its making him/her reflect on his/her study approaches; '-' the student regarded the interview as of no or minimal value to him/her; '?' : the student's comments could not be regarded as either positive or negative.

- (3) The "gaps" indicate that no data was available about this particular student (either because he did not complete the first administration of the Inventory, or because he did not give written feedback on the interview).

- (4) Students c1, md, p2 and r1 did not complete the first Inventory administration (they had not yet arrived at the university) They were, however, interviewed by the author, and could thus respond to the value of the interview to them.

Contrasting conceptual categories of study approach

A brief description of the five conceptual categories will now be presented, in order to relate these to the classifications of the study orchestrations of specific ASPECT students. A fuller description of these orchestration categories appears in Meyer (1991):

- (1) Study orchestrations classified as being "above average" are theoretically faultless. The student's study orchestration is not contaminated by any groupings of conceptual study approach variables which can be regarded as 'non-meaning' or 'non-academic' (likely to place the student at risk of failing, or achieving poorly, or failing to understand the academic demands in the studying of a specific undergraduate degree course). For example, the variables syllabus-boundness (sb), disorganised study methods (ds), and fragmented approach (fa), and the pathologies of globetrotting (gL) and improvidence (ip) - first described by Pask (1976) as extreme manifestations of the learning styles of comprehension learning and operation learning - do not feature prominently in the study orchestrations.

Instead, variables associated with a meaning orchestration, such as the adoption of a deep approach (DA), the use of reflection (RE), relating ideas (RI), the use of evidence to support an argument (UE), and the presence of intrinsic

motivation (IM) are characteristically grouped together and dominate these profiles. Coupled with these, are constructs associated with a rich, holistic perception of the learning context, such as deep perceptions of books (BD), human relationships (RD) and methods of assessment (AD).

Figure 1 : Example of "above average" orchestration

Observation o1
 CL RD RE
 BD AD
 UE
 cs
 DA
 LD
 St eM Ol RI
 ls
 rs
 IM Am
 ff
 ip
 sb
 ds
 ma fa
 wl gL

- (2) Study orchestrations classified as being "better than average" indicate the intrusion of certain variables which are regarded as non-pathological into the study orchestration manifested by a particular student. For example, the student's orchestration profile might indicate a minor contamination of an otherwise faultless orchestration. The crucial point about these contaminations is that they occur in relative isolation from other pathological variables, and are thus considered to have minimal contaminating impact. The overall cohesive-

ness of the study orchestration (in terms of which a meaning orchestration as outlined in the “above average” conceptual category is maintained) is still present.

Figure 2 : Example of “better than average” orchestration

Observation s5

St	Is	RD	
AD	BD		
UE	IM		
cs			
DA	OI	RE	
sb			
eM	LD	Am	Rl
CL			
ds			
ff			
gL	ip		
rs			
wl	ma		
fa			

- (3) Study orchestrations classified as “average” are those where meaning orchestrations become more contaminated, and start to lose their conceptual cohesiveness. Typically, students’ study orchestrations in this category reflect a mix of meaning orchestration and pathological variables. A sense of ‘meaning’ structure is still present, but it is contaminated by the presence of one or more variables associated with a more “at risk” orchestration, as outlined further on.

Figure 3 : Example of “average” orchestration

Observation n3

wl
ip RI
St Am
ma
IM
RD
OI DA ff
LD
BD
CL UE RE
cs sb
AD
ls eM gL
ds
rs
fa

- (4) The classification of students' study orchestrations as “worse than average” occurs in the presence of a significant number of constructs which can be regarded as pathological. Typically, these pathological variables are contaminations which break up much of the cohesiveness and meaning orchestration expected in an “above average” classification. Some variables associated with a meaning orchestration might still be present, but they are suppressed by the presence of other constructs, such as a fragmented approach or syllabus-boundness, or study pathologies.

Figure 4 : Example of "worse than average" orchestration

Observation b2

RI St
ma wl
ff CL RE
AD
sb cs
OI rs
RD ds
BD ip DA IM
UE Am
ls LD
gL
fa
eM

- (5) Study orchestrations classified as “at risk” seem to have little or no organising cohesiveness in terms of a meaning structure. Variables associated with meaning orchestrations and those associated with reproducing orchestrations occur with no apparent conceptual structure.

Figure 5 : Example of “at risk” orchestration

Observation I2

LD
eM
Is
fa
ip
BD
gL ff RE
AD
cs sb
St UE
RD
wl OI IM rs
ds
DA CL Am
ma
RI

The interview process

The emphasis in the rest of this discussion of phase one of the implementation of the intervention programme is on the process of interviewing individual students in order to corroborate and extend the findings of the profiles developed for each student. Conceptually, interviews with students are nothing new to the qualitative aspects of research studies of this kind (see, for example Marton, 1981; Lybeck, Marton,

Ströhmdahl and Tullberg, 1988; Entwistle and Ramsden, 1983; Ramsden, Martin and Bowden, 1989; Cliff, 1991). Clearly, the danger of confirming what the researcher wants to confirm anyway - the so-called "self-fulfilling prophecy" (Rosenthal and Jacobson, 1968) - is possible.

In this regard, it is important to take cognisance of the incisive critique by Fleming (1986) of the interview as a source of research data. Part of Fleming's argument is predicated on the fact that interviewees are likely to respond to the questions of the interviewer in ways which are a function of the interviewee's perception of what he thinks the interviewer wants to hear. This perception might be seen to be linked to the perceived status (in terms of role) of the interviewer.

Two responses seem pertinent here. Firstly, the interview process in this study represents an attempt to corroborate the depiction of students' approaches to study which are based on analytic categories of description (Entwistle, 1992b). No attempt, therefore, is made to suggest that these descriptions are created by the students themselves, or that they represent the students (rather than their ways of studying). Secondly, it would seem logical, if the students perceived it to be necessary to respond to the interview questions in ways which they deemed the interviewer to regard as theoretically desirable, that they would not describe ways of studying which, by their own admission, are theoretically undesirable.

The entire ASPECT I class of 53 students (4 students did not complete the Inventory, as they had not arrived at the university at the time it was administered; they were, however, interviewed later) was given the opportunity of an initial interview on the ways they had approached their learning of Science at school. These interviews were taped for the purposes of later analysis (one student was not taped at his request). The purpose of the interviews was not overtly designed to encourage change; it was primarily reflective in nature.

Cautions in interpreting interview findings

- (1) There is a danger that one might be tempted to “read” too much into the interview findings, or, subsequently, to interpret the student’s responses in terms of the (independently performed) orchestration classification. It is, indeed, manifestly clear that the interview is a reflection of a particular social reality, and that that reality is a mediated one. It remained abundantly clear, however, that there were (sometimes chasmic) qualitative differences in the ways these different students conceived of their learning. Thus, notwithstanding the fact that the interview might be regarded as artificial, there were many valuable perceptions that could be worked with in follow-up work.

- (2) There are ethical questions attached to attempting to categorise student behaviours in terms which connote potential danger for them. It must, therefore, be emphasised that, at no stage, was any student informed that he or she was considered to be manifesting an “at risk” study orchestration, for example. Allied to this is the author’s belief in the fundamental importance of the interview

subsequent to the inventory classification, whether that interview does or does not confirm the inventory responses. The interview represents a powerful point of departure for exploring aspects of the student's learning approaches which might be regarded as theoretically desirable, and holding these in front of the student as desirable goals for a more mature understanding.

(3) Conceptually flawless study orchestrations do not necessarily or automatically guarantee academic success (Meyer and Sass, 1993, in press; Meyer, 1991), and, while the converse is theoretically unlikely to occur, it has been observed to occur in some isolated cases which are the focus of further study. In any event, the study orchestration does not have a life of its own, and must be seen as representing a manifestation of study behaviour which can be discussed with the student - it is a self-reported model against which the student's actual future performance can be compared. It is the individual student's choice to decide whether he is concerned about his study approaches - just as it is his choice to be concerned about actual results or not.

(4) The classification of student's study orchestrations is an analytic process - the students did not classify or describe themselves in these terms. The resultant conceptualisations are, however, (accepted) research formulations which offer opportunities to engage the students in self-analysis. The essential focus of the interview process is to attempt to understand the range of conceptions which

students might have about components of the learning process, such as “understanding”, “study methods”, and so on.

- (5) The focus on individual students is not meant to suggest that there are not other variables in the teaching and learning interface worthy of research emphasis. What is being asserted is that the student is the critical mediator in terms of his qualitatively discrete approaches to variables in the learning process. An increasing body of research evidence within the field of student learning (synthesised by Entwistle, 1992a) points to the effects of elements of the learning context at a group level on the quality of learning which takes place (Ramsden, 1985), but, equally clearly, at the individual level, qualitatively distinctive perceptions of the same construct associated with perceptions of learning context have been identified (Meyer, 1988; Meyer, Parsons and Dunne, 1990a).
- (6) Individual study orchestration profiles, consisting as they do of a number of constructs associated with study behaviour, should not be interpreted by referring to single, or perhaps even groups of, variables in these profiles in an attempt to identify linear, cause-and-effect explanations for some students doing well or not. Classification of the student’s study orchestration as “average”, for example, is based on an interpretation of the associations and groupings of variables in the profile in an attempt to militate against reductionism in interpretation.

The interpretation of interview transcription material needs to be viewed in much the same way. The transcription material is not meant to suggest that, because a particular student adopts a memorising approach to the study of Science formulae, for example, he is necessarily manifesting a study orchestration which might be regarded as "at risk". The interview and the scoring of the inventory responses need to be interpreted as a totality or aggregate of relationships for a particular student, which might place the student's responses into a provisional "at risk" conceptual category.

"Different worlds in the same classroom" (with acknowledgement to Perry, 1988)

What follows, is a selection of student comments which reflect particular, or conceptually distinctive, aspects of their school-based study orchestrations. In the interview process, the posing of questions to the students generally followed a similar format, such that certain questions occurred in all the interviews. The questions and answers are grouped in such a way as to reflect something of the process of the interview, although the question-and-answer sets reported did not always follow immediately after one another. The underlining of selected comments is the author's emphasis. In many cases, the author's comments about the responses provide further elucidation of the individual student's study orchestrations, the conceptual details of which the author was unaware of at the time the interviews were conducted.

Two further points about the interview process are worth noting. Firstly, some of the students were interviewed at a point when the university lecture programme was already well under way; some of them were, therefore, already beginning to realise that certain of their study methods might be inappropriate. The second point is particularly interes-

ting, namely that students whose orchestrations had been classified as “above average”, seemed more fluent in being able to explain their study difficulties and what they needed to do about them, than others. Furthermore, they explained their problems, as will be seen, in ways which suggested their qualitatively ‘deeper’ perceptions of their learning contexts, a more sophisticated stage of intellectual development and greater metalearning capacity.

Student no. 13

(This student’s orchestration classification was “worse than average”, a classification confirmed, in the interview, by the author. This student rated the interview as being of value to her).

Q: Did you have problems with your textbooks?

A: I was misled by these textbooks that have answers at the back. You are actually tempted to get the answer before attempting the question...so you have an idea before attempting it...you are working to get to it, but you don’t understand how.....

Q: How did you know how questions were graded in your textbook?

A: Usually, they had asterisks ... if it had two, it was more difficult.....

This last remark seemed to suggest that this student’s understanding of the level of difficulty of a particular question was semiotic in nature - she sought ‘signs’ which served as cues to her approach to a problem.

Q: How did you obtain solutions to problem questions that worried you?

A: What worried me was to look at methods (for arriving at answers).....

Q: What did you do to study Science?

A: I answered past exam papers. My teacher said that examiners are lazy to set papers, so what they do, they collect past papers and set up questions from there...so I did question papers.....

Q: What branch of Engineering are you doing?

A: I had to change to Electrical Engineering.

Q: Did that worry you?

Q: It did, because at school I never did electricity ... the teacher would leave it (saying) this is easy; just read through it.....

This student's responses suggested an over-reliance on methods and procedures. She seemed able to say where she thought her difficulty lay, but her approaches to solving it seemed to be rooted in reproducing the structure of examples given, an approach consistent with this conception of learning (Säljö, 1979; Marton, Dall'Alba and Beaty, 1992, in press). Her unsolicited response about examiners suggested the instrumental nature of her doing past exam papers.

Her final comment was particularly disturbing in demonstrating the extent to which she was reliant on her teacher's perceptions of an aspect of her syllabus, as well as a disturbing absence of background knowledge on entering an Electrical Engineering degree programme. The interview with this student failed to provide any evidence of deep approaches to learning.

Student no. ma

(This student had an "at risk" orchestration classification, generally confirmed in the interview, which he rated as of value to him).

Q: Did you have difficulty with some of the work?

A: I couldn't write and listen at the same time. Afterwards, I sit down, try to remember everything the teacher said, and write it down...I cannot summarise
- I write most of the things...they are merely the same as in the book.....

Q: What did you do in problem situations in Science?

A: In some cases, the method was working; in some cases, it didn't work. I thought, maybe it's my approach to problem (sic). When I arrived here (university), I used the new method I received and compared it with the old one...I tried to look for a new method in reference books...I asked what's wrong with my method?...if their method works, I took their method. Sometimes, I didn't understand why their method works.....

Q: How did you study material?

A: I was not using a scribbler by my side...except in Maths, where I was doing examples,...when I got the answer, I just throw the papers away. It didn't work, because I could not find the method later.....

Q: How did you experience exams?

A: I expect to find what I've read in the exams. The paper might be tricky, but I'm waiting for both of them, whether it is a tricky one or an untricky one.....

Q: In what ways are Chemistry and Physics different?

A: If you understand the methods in Chemistry, there is no(t) any equation that you can fail to solve, but in Physics, there was an equation: I tried it from the beginning of the year to the end of the year...everytime during my leisure, but 'til the end of the year I couldn't solve that equation.

Q: Can you explain that? How come?

A: I don't know.....

These particular extracts were regarded by the author as being highly significant. Whilst they certainly demonstrated the student's fixation with a "method", as well as his apparently random approaches to problem-solving, a number of his comments also suggested attempts at deeper approaches to problem-solving. They suggested that focussing on this student's ability to "compare", and use "reference books", for example, might prove useful in his adopting deeper approaches to learning.

This student's over-reliance on detail, reproducing orientation towards examinations, and engagingly naive approaches to problem-solving (reported in the interview), seemed to confirm his orchestration classification.

Student no. d1

(This student had a "worse than average" orchestration classification, but the author's impression was that his orchestration was closer to an "at risk" orchestration. He did not give feedback on the value of the interview).

Q: Did you have any problems with Science?

A: The only problem I had was theory

Q: What specific part bothered you?

A: Chemistry...the structure of the atom...you couldn't see it; it was hard to conceptualise...if you can't see it, you can't relate to it. That means you have to swot it.

Q: What did you do to overcome this problem?

A: If it was a section of Chemistry I had to swot, I would read over it, try to understand it; if I couldn't, then I would swot it

Q: What do you mean by "swot"?

A: I'd read it, write it out,...try to remember it...

This student's reliance on "swotting" was clearly at the expense of deeper understanding: he expressed that distinction himself. It is worth noting here that the question of what precisely is meant by (subject-specific forms of) understanding is currently the focus of international research study. Already, it seems that associations between 'deep' forms of understanding and conventional forms of assessment can be shown, according to the experience of students preparing for final degree examinations (Entwistle and Entwistle, 1991) and in relation to a particular school subject - Chemistry (Burns, Clift and Duncan, 1991).

Q: In what ways were your teacher and tutor different? (this student made use of extra tutorial assistance outside his school).

A: The teacher does everything that's in the book; our tutor told us just what's in the syllabus.

Q: Was that helpful?

A: Very...it's not helpful for education purposes, but our education is exam-oriented...I'd rather get through the exams than to be taught Maths or Physics

Q: What's the difference?

A: If you want to get through the exams, you just do what is required for the exams, but if you want to know Maths, you do a bit extra...

Q: Which is your preference?

A: I'd rather be taught Maths, but I realise it's not going to get me through Matric or the university and I realise I have to be exam-orientated.....

This section of the interview served as a classic example of a strategic approach towards studying. This student sought cues (conceptually, and in practice, similar to 'cue-seeking' identified by Miller and Parlett, 1974) to the examination requirements to the exclusion of any deeper understanding; in fact, he actively shut out any deeper exploration. What was particularly disturbing here was that he seemed extrinsically, rather than achievement, motivated. His default behaviour of fulfilling the examination requirements seemed so strongly developed that there appeared to be little chance of his adopting deeper approaches towards learning.

Q: What is the 'formula' for having a good memory?

A: I don't know; I just concentrate on what I'm looking at. I just look at it, then I can look away and I'm able to write it down and say it aloud...three months later, I'm still able to remember it. But if I learn something, and, say, next year I don't have to know that anymore, then I find when I try to remember it, I can't.

It's almost like my mind organises what I have to know.....

The student's use of the word "organise" here was very interesting. It seemed to carry connotations of "excluding peripheral information", a learning activity which might be regarded as useful in some contexts. For this student, combined as it was with other features of what is clearly a surface approach to learning, it could become dysfunctional.

Student no. n5

(An orchestration classification of "above average", confirmed by the interview, which he rated as of value to him).

Q: How did you go about preparing for exams

A: I think I must change my way of studying

Q: What's made you decide?

A: The structure of work at 'varsity

Q: When did you realise your methods weren't appropriate?

A: My results were not that good...at university, here I'm on my own...there is not someone else who can help me.....

What is worth noting, here, is the interesting, apparently unrelated, response of the student to the question about preparing for exams. The question acted as a "trigger", and evoked a response which suggested that the student had been reflecting on his study methods.

Q: What did you do when you revised?

A: I read over and did a couple of equations, a couple of problems. People used to come to me with problems, and in helping them, I also used to learn something.

Q: When you had to teach other people, how did you go about it?

A: Basically, I tried to explain the concept and show them examples and that way they understand the work instead of memorising it or learning it.....

As with student d1 above, this student seemed to see understanding, in some ways, as reducing the need for memorisation, but his emphasis on understanding was very different: he saw it as being exclusive to memorisation. In terms of a hierarchy of conceptions of learning (developed by Säljö, 1979, extended by Van Rossum, Deikers and Hamer, 1985 and refined by Marton, Dall'Alba and Beaty, 1992, in press) this student appeared to view understanding as requiring the personal transformation of knowledge. The previous student viewed memorisation as an option which was used in the absence of understanding - a perception more consistent with a reproducing conception of knowledge.

Q: What is your concept of Science? What is Science?

A: A very wide field...it basically deals with humans, like, getting, er, ... human involvement in studying some natural element ... trying to explain ... synthesise

Q: With what aim?

A: To understand ... to solve human problems ... sometimes just searching for knowledge ... trying to know why ... sometimes for immediate purposes....

It might be argued that the kinds of questions asked of this student by the author were qualitatively different to those asked of other students whose study orchestrations had been classified as “worse than average” or “at risk”. The author would concur, but would qualify his agreement by noting that this student, and others like him, “led” the discussion in this direction by the deep approach which he took towards answering apparently straightforward questions. Perhaps the sense of this student viewing knowledge as being integrated with personal change is best illustrated in the following extract from the interview:

Q: Is there a reason you chose Mechanical Engineering?

A: I have a certain field of interest ... what I call transformational robotics. It starts with animation...that’s an idea; I would like to make it reality.....

This interview revealed a “classic” deep approach to learning. But the interview also raised many important questions: as a “disadvantaged student”, what factors contributed to his developing such deep perceptions? Would he ultimately succeed (pass) at university? How could his quality of learning be preserved and developed? To what extent is this kind of student catered for in a university degree programme (for the so-called “educationally disadvantaged”) in the presence of peers who appear to have fundamentally different conceptions of learning? Are his deep perceptions “rewarded” by, amongst other things, examination and assessment systems?

Student no. t1

(A "better than average" orchestration classification, confirmed by the interview. This student did not give feedback on the interview, as he had already been transferred to a mainstream Engineering degree programme, and thus did not complete ASPECT feedback questionnaires).

Q: Were there areas (of Science) that gave you problems?

A: I very rarely had problems, except where it came to the detailed analysis. You know, you had to be very careful with certain things ... organic chemistry ... the oxidation of alcohols

Q: What did you do about this?

A: I looked at another textbook, but, you see, [in] the oxidation of alcohols, two products can be formed, and the book only gave the method for one product, the aldehydes. I checked the equations, the products, and tried to find some sort of relationships ... I like working with problems like that ... I don't like being taught ... I analysed the problem.....

This response was typical of this particular interview. This student provided detailed analyses of a number of Science problems. What is also compelling here was the demonstration of detailed conceptual understanding and problem-solving. Phenomenographic studies of student learning have consistently focused on the description of qualitatively distinctive forms of conceptual understanding in relation to, for example,

physical science and chemistry phenomena (Marton, 1981; 1986; Johansson, Marton and Svensson, 1985; Lybeck, Marton, Ströhm Dahl and Tullberg, 1988), and have demonstrated associations between more sophisticated conceptions and 'deeper' forms of understanding. This student's use of a word like "analysed", for example, was qualitatively distinct from the use of the same word by student t3 (who had said "analysing the problem" had been a major difficulty for her in Science. The context of her remark suggested that she meant "finding the right answer").

Q: Did exams bother you?

A: When exams came, I really wanted to do my best ... sometimes I used to look forward to exams so I could really apply myself ... I'd keep on working, working so that when exams came, I was totally prepared.

Q: So what did you actually do?

A: I just tried to understand the work ... I never used to learn anything parrot-fashion ... I wanted to thoroughly understand ... I set a high standard for myself. I mean, there is memory work as far as definitions are concerned, but that's about it....

Q: Why do some people get stuck with applications to problems and others don't?

A: They don't put as much effort into it, I suppose. You shouldn't just limit yourself to a specific problem; you should work more or less around it ... question

yourself a lot. The moment a teacher explains something, then they follow him, then they say they understand it, but they never seem to do it on their own.....

This student articulated strong achievement and intrinsic motivation. His desire to understand deeply also seemed to be supported by detailed analysis of problems confronting him. His comment about other students' levels of understanding has profound implications for learning in higher education - it indicates his perception of what Entwistle and Entwistle (1991) have reported as the simplest form of understanding in preparing to meet perceived examination requirements, namely the reproduction of content from lecture notes without a clear sense of structure.

Q: What is understanding?

A: If you don't understand, whatever you do in the exam is just a mere regurgitating of what you read. To me, if you go to school or come to 'varsity, you're not there to go pass the exams; for me, it's a process of learning ... you should always question ... (it is) just the fact that your intellect is broadening.....

This student's study orchestration was classified as being "better than average", but in the independent categorisation of the orchestration, the comment was made by Meyer that it could easily become "above average". His learning style seemed to approximate the style of the "reasonable adventurer" (Pask, 1976) - he is a versatile strategist, capable of deep, holistic understanding and judicious use of evidence to support claims.

Student no. n3

(An “average” orchestration classification, confirmed by the interview, which he rated as of value to him).

Q: What difficulties did you have in Science?

A: I had a problem with certain chapters, like in titrations ... I think it was my understanding ... I would try to look at it another way ... this is wrong, and I would try to link what the teacher has said to what I think it is ... I used different textbooks; it didn't help me.

From this student's opening remarks, it seemed as if he was attempting to make use of study approaches which might be regarded as characteristic of a meaning orchestration (Meyer, Parsons and Dunne, 1990a). The question in the mind of the interviewer at this point was, therefore, how come “it didn't help?”

Q: When you prepared for the final exam., what did you do about that section of the work? [a section he had had trouble with]

A: I asked other teachers ... I seemed to have got what they said, but, ... when I tried to recall, I couldn't

Q: Did exams worry you?

A: What was in my mind was I'm not interested in Chemistry, so I have to give up on it ... now I see it was not good giving up Chemistry.

Q: When did you realise this?

A: This year in Geology; now we are dealing with some Chemistry ... crystals ...
hating it or not won't help me ...

It appeared from this series of remarks that the student had realised that Chemistry concepts had some value beyond having to remember them to pass an examination. It emerged later, however, that his motivation in studying Chemistry still appeared to be what Biggs (1985) describes as “instrumental” (working on the subject with a view to passing an undergraduate degree course).

Q: Did you have what you would call a “good” or “bad” teacher?

A: He was bad ... he would just read from the book and tell us what is in the book.

Q: What would you have preferred?

A: That he used many books, so that we can get different knowledges ... we didn't know how to use them [the textbooks].

Q: Did you have any problems with Science experiments?

A: I didn't know why we did them ... you just do it and then forget about it.

These remarks about textbooks and experiments appeared to be consistent with the conceptual constructs BD (deep approach to the use of textbooks) and AD (deep approach to methods of assessment) described by Meyer (1988). Yet the last remark

seemed to be demonstrating a sense of uncritical abandonment of potentially deep questioning processes about the use of textbooks and the reasons for experiments.

Q: Was that because of your teacher, or your own lack of understanding?

A: I think it was my lack of understanding.

Q: What is your lack of understanding with "titration"?

A: In fact it was the method; I didn't follow him [the teacher] ... I just couldn't

Q: Did you have problems with interpreting the colour changes in titration experiments?

A: Yeah, when the colour just changed ... the teacher would say, "Start afresh" ... the initial colour mustn't be purple ...

This last underlined comment seemed very much characteristic of the dualistic position described by Perry (1970). It seemed to be a verbatim reflection of the kind of statement which might be made by his teacher (built around a "teacher-right-good / pupil-wrong-bad" assumption).

Q: How did you learn these things for tests if you had problems?

A: I memorised those things I didn't understand.

Q: Were you worried about exams?

A: I didn't have confidence ... I worried that I might fail.

Q: Why did you worry?

A: I won't understand the question ... the way they put it ... I had difficulty understanding ... then I would sort of guess.

Q: What is your view of studying?

A: Trying to get the actual understanding ... to use it in the future ... trying to take something into your mind so that you won't forget it.

This student's responses in the interview situation appeared to reflect moments of insight into learning processes which might be said to be characteristic of a meaning orchestration; yet, it often seemed as if he could not utilise these insights to support his study methods. He reported tendencies to revert to what seemed uncritical or idiosyncratic study behaviour, especially in the absence of understanding.

In concluding this section, it needs to be observed that the foregoing discussion, while being organised under various conceptual categorisations does not do full justice to the manifest range of individual differences in study orchestrations which emerged clearly from the interviews. These individual differences might best be depicted by the comment of one student: when asked how he saw the idea of passing the Matriculation examination, he replied that it was "a challenge". In further elucidation, he commented

that the challenge for him was to show that “although it is difficult to pass Matric, it is not difficult for everyone.”

This kind of statement would seem to give the lie to the apparent group identity of ASPECT I students. In many respects, it might well be argued that they do have group identity, but the enormous contrasting qualitative differences between the ways one student engages the learning process as opposed to another, pose exciting challenges in the intervention process, and for academic support in general.

Feedback from the students on the individual interviews

Earlier, it was noted that the individual interview with the student was designed to be largely discursive in nature - its purpose was to corroborate and/or extend understandings and interpretations of the initial conceptual categorisations based on the students' study orchestrations. It was hypothesised then, however, that the interview might well prove instructive in terms of allowing students to reflect on, and assess the effectiveness of, their individual approaches to learning.

What follows is a range of responses which students subsequently made to the question:

“In what ways was the interview on Science Teaching and Learning useful or not?”

This feedback was obtained by asking the students to write their responses below the question; the question was one of a series of questions given to the students as part of an open-ended assessment of the teaching and learning which had taken place in ASPECT I during the first semester (before their mid-year examinations had been written).

Selected comments are again given, and are grouped according to the orchestration classifications of the students (as mentioned earlier, the orchestration categorisation used in this process of grouping was based on responses on the second Inventory administration).

It needs to be emphasised that this process of grouping goes far beyond being a hypothetical exercise. The manifestation of qualitatively different subgroups of student feedback is significant, and appears to support an earlier contention of this thesis that intervention might usefully focus on the identification of the different 'learning needs' of each subgroup of students. Not every feedback comment necessarily supports this contention outright (nor are all the students' comments given), but there is clear evidence of striking contrasts in the given subgroups of feedback (details of the nature of feedback comments given are reflected in Table four).

Students classified as "at risk" or "worse than average"

Student m0 : "It would seem as if the interview was actually meant to be useful for the interviewer"

Student s3 : "Not useful, since it did not benefit anything or rather it was never meant to benefit me"

Student k1 : "I didn't quite see the relevance"

Student b2 : "It help[ed] to analyse your study approach and improve it"

Student mb : "Here I am totally confused, because I personally feel that the interview was of no use to me"

Student t3 : "The interview was useful because I became more aware of my difficulties in understanding Science and I made an effort to improve some of my bad study habits"

Student c1 : "...I tried to change my approach to studying,...e.g. Usually, I only went there (to lectures) to get notes down and figure it out on my own at a later stage, which I found quite annoying. Lately, I listen and try to understand, while taking notes"

Student g1 : "It was useful in the sense that it gave me an idea of how Science learning takes place, and how I learn"

The responses of these students, while not all negative, did not generally verbalise any intention on the part of these students as needing to adopt a deep approach to learning. Those individuals who appeared to be indicating intentions to change, appeared to be

addressing the problem at a concrete (“study skills”) level, the potential dangers of which, especially in terms of students evincing reproducing study orchestrations (Meyer and Sass, 1993, in press), have already been referred to (Entwistle, 1992a).

Students classified as “better than average” or “above average”

Student n5 : “Discuss basic feeling about subjects and present direction and goals was refreshing”

Student w1 : “It made me analyse myself. I could identify my problem. I have yet to remedy it”

Student t2 : “During the interview itself it appeared as if (interviewer’s name) just want to elicit information from me because 99% of the time it was me who was talking, he would listen attentively with his tape recorder. But towards the end of the interview I realised that I know more about myself than before. I thought about the questions after the interview and I got to understand my shortcomings better and better. I also understood how my perceptions contributed to these to the problems that I had”

This last comment came from a student who seemed able to reflect deeply on his learning approaches during the interview, and this would seem to be confirmed by his feedback. His feedback is consistent with the approaches he articulated during the interview.

Students classified as “average”

Student s1 : “It is useful to identify or clarify as wether (sic) the method I use to study will enable me to cope with the university studies”

Student p2 : “[The interview was] not. We tell him our problems but he doesn’t help us solve them”

Student n4 : “I am not quite sure whether it was useful or not, because, first, he was questioning what I knew and what I had only to do was to give answers to his questions. Secondly I didn’t know or I don’t know what it had to achieve or not achieve so I cannot evaluate and sat here are its achievements so it has worked. Thirdly I think (the author) said that was the first part of his programme, so I can say that interview was the first step which will make other steps possible, so it was afterall (sic) worthwhile”

Student m2 : “Not useful so far because the feedback did not tell us what kinds of things to do but only told us how we are studying and how we are considering ourselves etc. That is the feedback did not address the questions on how to study at the ’varsity, how to manage time etc.”

The number of students whose study orchestrations were classified as “average” being relatively large, it would be ill-advised to attempt to generalise about what their responses are saying. What did appear to emerge, however, was a sense of this subgroup of students having perceptions about the interview providing functional,

tangible study skills advice. Their feedback might, therefore, prove useful in terms of intervention with this particular subgroup.

In general terms, the responses of the overall student body suggested that the associations between students' qualitatively different approaches to learning, their preferences for distinctive academic environments and their evaluations of teaching, need to be considered when their feedback is interpreted. Entwistle and Tait (1990) concluded, for example, that students give feedback on course evaluation forms which, in many ways, reflects their preferences for contrasting learning environments and particular approaches to study. Students who adopt a generally deep approach to learning tend to prefer learning environments which promote this approach; the converse can also be said to be true. Thus, Entwistle and Tait (1990) argue that students' feedback on course structure, methods of assessment, and so on, needs to be interpreted in the light of their particular preferences.

Viewed against these conclusions, these students' comments appeared to be conceptually consistent. For example, those students whose study orchestrations were classified as "at risk" or "worse than average" appeared to interpret the usefulness of their personal interview in qualitatively more 'surface' ways than those classified as "better than average" or "above average".

Conclusions based upon phase one

Based upon the findings of phase one of the programme, two specific questions suggested themselves as focal points for phase two:

- (1) To what extent, and to what effect, can students with theoretically undesirable study orchestrations be enabled to engage these orchestrations at a metacognitive level in ways which have positive effects on their academic outcomes?
- (2) How can a programme of intervention or academic development be so structured that it takes account of the manifest range of qualitative individual differences in study orchestration without risking the danger of becoming a self-fulfilling prophecy?

But further questions raised by the implementation of phase one of the intervention programme suggested themselves. These questions were not explicitly addressed within the context of the programme, but they are posed here, as they suggest lines for future research.

- (3) To what extent does this programme of intervention have transferability to students other than those involved in ASPECT?
- (4) What "baseline knowledge" do these students need to have as they enter ASPECT, and which might be regarded as optimum for academic development to be feasible?
- (5) How can individual understandings of crucial learning process variables be externalised and verbalised such that both students and teachers have some-

thing concrete and mutually understandable with which to work and about which to discourse openly in typical classroom contexts?

- (6) What changes are needed at the curriculum level which might augment the work done at individual level?

CHAPTER FIVE : THE DESIGN AND IMPLEMENTATION OF PHASE TWO OF THE INTERVENTION PROGRAMME

The design of this second phase of the programme was developed around the following stages:

- (1) A second administration of the Inventory. A similar procedure as had been adopted at the first administration of the Inventory, was followed here. This time, however, students were informed that they would be given individual feedback on their responses, once an orchestration profile had been determined for each student. The second administration of the Inventory was conducted during a timetabled drawing class.
- (2) An independent classification of the study orchestration profiles, to determine the study orchestrations of students in relation to an undergraduate university course that was cognate to studying Science at school.
- (3) A presentation to the ASPECT I class as a whole, giving each student feedback on his individual study orchestration. This was done so that students might make an informed individual choice as to whether they had reason to feel concerned about their orchestrations or not.

- (4) An offer to all students of participation in an ongoing programme of intervention, i.e. an involvement with the author in continual discussions, at workshop and individual level, on approaches to studying.
- (5) A targeting of those students whose responses, on the basis of the second administration of the Inventory, had been classified as "at risk" or "worse than average". These students were invited by letter to participate in the first intervention workshop discussed elsewhere in this thesis. An example of the letter which was sent to these students is included as Appendix B.
- (6) An investigation of the mid-year Applied Mathematics results, in order to examine the association between these students' study orchestrations and their learning outcomes. Special attention was devoted to the performance of the "at risk/worse than average", as well as the "above average/better than average" subgroups of students. A sample of students from these two subgroups would be targeted for interview, if their examination performance had been good and their orchestration had been theoretically undesirable, or their examination performance had been poor and their orchestration theoretically desirable.
- (7) Targeted interviewing, in the second semester, of selected students in order for them to discuss their reasons for successful or unsuccessful examination performance, with the author. These interviews, and the reasons for conducting

them, are discussed further on. Examples of the letters sent to these different categories of student appear as Appendix C and D.

- (8) The conducting of two further intervention workshops, one (during August) on study processes, and the other (just before the lecture programme ended, prior to end of year examinations) on preparing for final examinations. For these two workshops, all students who had opted for participation in an ongoing programme of intervention were invited to attend.
- (9) An investigation of the association between individual study orchestrations (based on a third administration of the Inventory immediately before students prepared for the end of year examinations) and final examination outcome in Applied Mathematics, particularly for the original targeted "at risk" or "worse than average" subgroup of students.
- (10) Obtaining written feedback from students on the value to them of the intervention programme as a whole.

Table five (below) reflects the following information:

- (1) the code number for each student;

- (2) an individual orchestration classification in respect of the second administration of the Inventory;
- (3) whether students opted to be part of an ongoing programme of intervention or not;
- (4) the numbers of students who were invited to participate in the first intervention workshop, plus the numbers of students who attended without specifically being invited;
- (5) the number and nature of the feedback responses given by the students to this first workshop;
- (6) the mid-year Applied Mathematics results of all students who sat the examination;
- (7) the number and nature of the feedback received about the second workshop;
- (8) the number and nature of the feedback about the third workshop.

Table 5 : Associations between study orchestrations, participation in and feedback from intervention programme workshops, and mid-year examination results (second inventory administration).

<u>Student Code</u>	<u>Orch Cat.</u>	<u>Particip</u>	<u>Invite</u>	<u>Fdb (1)</u>	<u>(2)</u>	<u>(3)</u>	<u>Exam (%)</u>
b1	AVE	+	G		+	+	
b2	AVE-	+	+	+	+	+	46
b3	AVE	+					
b4	AVE+	+	G				
c1	AVE-	+	+		+	+	21
c2	AR	+	+		+	+	68
d1	AR	+	+				
g1	AVE-	+	+	+	+	+	
g2	AVE+	+			+	+	
i1	AVE	+					
j1							
k1	AR	+	+	-	+		72
k2	AVE+	+			+	+	22
l1	AR	+	+		+	+	
l2	AR	+	+		+	+	
m1	AVE	+	++	+	+	+	61
m2	AVE	-					75
m3	AVE-	-	+		+		19
m4	AVE+	+			+	+	71
m5	AVE+	+			+	+	48
m6	AVE	+			+	+	55
m7	AVE	+			+	+	
m8	AVE+	+					49
m9	AVE	+	G				
m0	AR	+	+		+	+	60
ma	AVE+	+			+	+	50
mb	AR	+	+				
mc	AVE-	+	+				42
md	AVE+	+			+	+	68
me	AVE	+					
n1	AVE+	+					41
n2	AA	+					
n3	AVE	+	G		+	+	
n4	AVE	+			+	+	

n5	AVE+	+		+	+	43
o1	AA	+				71
p1	AVE	+			+	
p2	AVE	+		+	+	
r1	AA	+		+	+	73
r2	AVE	+				39
s1	AVE	+	G			
s2	AVE	+	G			
s3	AR	-	+			69
s4	AVE+	+	++	+	+	53
s5	AVE+	+		+	+	40
s6	AVE+	-				62
s7	AVE	-				
s8	AVE	+				
s9	AVE+	+				
t1						
t2	AA	+		+	+	52
t3	AR	+	+	+	+	47
t4	AVE	+				
w1	AVE+	+	++	+	+	
z1	AVE	+		+	+	47
z2	AVE+	+				36

Notes:

- (1) In column 3: '+' : opted for participation; '-' : chose not to participate.
- (2) In column 4: '+' : these students were invited to participate in the workshop; '++' : these students opted to attend, despite not being expressly invited. G : indicates that 6 other Geology students were invited to the workshop in order to enlarge the size of this group (which would otherwise have consisted of only one student, who may have felt "spotlighted").

- (3) In columns 5, 6, and 7 : '+' : each of these students rated the respective workshops as worthwhile experiences; '-' : these students rated the workshops as being of no value to them.
- (4) Of the 49 students who had completed the first Inventory, 1 (student j1) had been suspended from the university, and 1 (student t1) had been placed in a mainstream Engineering first-year course; the 4 students who had not completed the first Inventory (students c1, md, p2 and r1) were now included in the sample, as well as 3 more students (students me, s8 and s9), who were part of the sample, because they had been given dispensation to attend the ASPECT I Engineering Drawing class.

Discussion of the implementation of phase two

Phase two of the intervention programme started after the ASPECT I students had been at the university for three months. At this point, the students once again completed an Inventory, entitled "Experiences of Teaching and Learning". In design, the Inventory is precisely the same as the Inventory which they completed by responding to their school experiences of teaching and learning, the emphasis now being in terms of responding in respect of one of their first-year courses (Applied Mathematics). In order to allow each student to complete the Inventory, however, it was necessary for those who did not take Applied Mathematics to base their responses on one of their subjects: either Mathematics, Geology or Chemistry, in that order of choice.

Applied Mathematics was chosen as the focus course on which the responses were based, because Applied Mechanics is crucial in an Engineering undergraduate degree programme as it requires students to make use of conceptual knowledge, principles and formulae in an applied way. In conception, it is likely that students will need to engage approaches to learning which are characteristic of the deep approach as summarised by Marton, Hounsell and Entwistle (1984) and Ramsden (1988), in order to be successful in Applied Mathematics, and, in the long term, in graduating in Engineering.

Presentation of individual orchestration profiles

Once the orchestration classifications, based on students' responses on the second administration of the Inventory, had been completed, all ASPECT students were presented with these profiles, but not their categorisations. This last activity was done at a lecture room session on 6 May. Students were presented with their own individual orchestrations in which their particular preferences for certain learning approaches and learning contexts had been depicted in symbolic construct form. The appearance of these profiles was identical to the examples given earlier in chapter four.

The students were then presented with an "ideal" orchestration model of a student whose study orchestrations would be classified as "above average" (see Meyer, 1991 and also the model presented in chapter four of this thesis), and were asked to assess for themselves the extent to which their own profiles were similar to, or different from this ideal. At no stage were the students told that the categorisation of their orchestration was (for example) "at risk". They were, instead, presented with a general framework

within which to interpret their profile. This was done so that the ASPECT I group as a whole could make an informed assessment of the extent to which they themselves might have reason to be concerned about their individual study orchestrations.

Each student was then asked to opt for one of three further choices: (1) participation in an ongoing programme of intervention, (2) non-participation, or (3) a further interview with the author to discuss the individual orchestration profiles in more detail. Students who initially had opted for a further interview with the author, all subsequently chose to participate in the ongoing intervention programme. Details of students' choices for participation or non-participation are reflected in Table five above. Two of those students who chose option (2) - students m3 and s3 - had study orchestrations classified as "at risk" or "worse than average" on both the first and second inventory, and their academic progress was watched with particular interest as such apparent stability in these categories is conceptually, and empirically, associated with low achievement or failure amongst similar groups of educationally disadvantaged students (Meyer, Parsons and Dunne, 1990b).

First workshop intervention

An initial workshop seminar was conducted at which selected students and lecturers discussed their understandings and perceptions of certain key variables in the learning environment. Conceptually, this intervention workshop was modelled on the lines of a similar series of workshops, developed by Parsons, but conducted with a different sample of (Technikon) students (Parsons and Meyer, 1990; Parsons, 1993, in press).

Briefly summarised, the conceptual and theoretical base on which this first workshop was designed incorporated recent research studies on student learning, which have identified the important associations between individual perceptions of the learning context and approaches to study within the concept of the study orchestration (Meyer, Parsons and Dunne, 1990a; 1990b). Qualitatively different perceptions of factors associated with the learning context, have consistently been found to be associated with qualitatively different study approaches (Meyer, 1988; Meyer and Muller, 1990a; 1990b). The central question to be addressed within the context of this workshop was: to what extent can “at risk” students’ perceptions of the learning environment be altered in such a way that they are able to ‘reorchestrate’ their approaches to study in qualitatively ‘deeper’ ways and thereby improve their performance on conventional examinations?

Three different workshop groups were set up: a Geology group, an Applied Mathematics group, and a Mathematics group. The specific lecturers in Geology, Applied Mathematics and Mathematics who had worked with ASPECT I students as a group during the first semester, were asked to join the subject group of relevance to them.

Of the 20 students expressly invited to attend the workshop, 3 students (d1, m3 and s3) did not attend. Of these students, more will be said in discussion on orchestration classifications and end of year examination marks (in chapter six).

Discussion at the workshop centred around the following aspects of the learning environment at university: methods of assessment; the use of textbooks; student expectations of the lecturers and vice-versa; the physical arrangement of subject lecture and tutorial rooms. The rationale behind discussion around these issues was based upon the idea that students would be given the opportunity to examine the extent to which their perceptions of their learning environments were different from those of their lecturers. The goal of the workshop was to encourage students and lecturers to articulate their expectations about the use of textbooks, test feedback, etc. to one another. The aim was to facilitate the process of students more fruitfully utilising the feedback which they received about how to use their textbooks, lecturers and assessments on assignments/tests in future studying for that particular subject.

Students were requested to give comprehensive written feedback to the author about the usefulness or otherwise of this first workshop. Feedback was received from only 4 of the 20 students who had been at the workshop, but one "average" student (student m1) in particular recorded some powerful perceptions based upon his experience of the workshop:

The [Applied Mathematics] workshops are now helping us to pass instead of giving us education and not showing us how to use it ... I've realised that at the university, the lectures are test/exam focused and offer little (20%) education ... instead of being taught what, say, the centre of gravity is, you'll

be taught a little about it and a lot about how to find it. I don't understand why, but I don't like this."

These representative comments thus reflected a mixture of deep and surface approaches and perceptions consistent with the conceptual coherence of a typical "average" study orchestration.

But his comments are also far-reaching in terms of their articulating his need to pass before his need to be "educated" (there appeared to be an assumption that "education" was irrelevant for this student at this point). His comments also suggested a strong link between his study approaches and his anticipation of exam/test assessment demands, providing further evidence of the original thesis of Marton and Säljö (1976b). His study approaches also appeared to be related, to some extent, to the way in which the lecturers structured their focuses. Many research studies of student learning have already confirmed this association (see, for example, Entwistle and Ramsden, 1983). The final words indicated, too, his articulated dislike for a primary focus on methods as opposed to principles and concepts.

Workshops of this kind would also appear to have implications for teaching practices adopted by lecturing staff. This comment of the Geology lecturer present at the above workshop, made in response to a request to give the author a written comment on the usefulness of the workshop, suggested that he had benefited from hearing the responses of the students at the workshop to his teaching of the course:

“[The workshop] allowed integrated interaction and I was able to assess the pros/cons first-hand from the students themselves ... I will change certain aspects of my course because of these comments.”

Evidence of benefits of workshops of this kind to lecturers, in terms of which they are able to acquire a sense of the context-based study difficulties which students are experiencing, has also been reported by Parsons (1993, in press), working within a similar theoretical framework, but with a different sample of students.

Follow-up interviews based on mid-year examination results

Against the background of an investigation of the study orchestrations of an earlier group of ASPECT I students, in which individual orchestrations were conceptually classified and their stability over time demonstrated in some cases, Meyer, Parsons and Dunne (1990b) suggest that there appears to be an association between a deteriorating orchestration and a decline in academic achievement, assessed in terms of examination performance of these students in an undergraduate degree course in mid-year and end of year examinations. It also seems probable, as has been asserted previously, that a student with an “at risk” orchestration is likely to underachieve or fail in conventional academic examinations. Theoretically, this association seems logical, if a reproducing orchestration is taken, by definition, to preclude the attainment of understanding, and a qualitative component of learning outcome is assumed to be present in the assessment used. The assumption that quantitative measures of academic outcome (conventional written examinations) can also incorporate these more qualitative measures of understanding, appears also to be valid if the consistency of the associations in this

study and previous studies (Meyer, Parsons and Dunne, 1990a; Parsons, 1993, in press), within a similar theoretical paradigm, are taken into account.

Given the theoretical postulates of the previous paragraph, it seems important to investigate, by means of interview, the associations between study orchestrations and learning outcomes for students who might be regarded as atypical, i.e. students who, empirically, are categorised as having stable "at risk" orchestrations, but who still perform well in examinations, or students whose orchestrations are categorised as stable "above average", yet who fail or underachieve.

To this end, the author conducted a series of focused interviews with a number of ASPECT students, in an attempt to analyse the reasons for these students' successes or failures, whether anomalous or not, in the mid-year Applied Mathematics examination of that year. Previous quantitative studies of the associations between learning outcomes and study orchestrations had not been carried out on the basis of results in the mid-year examination results only, but on the mid-year and final results. This author felt, however, that a qualitative analysis of student's articulated reasons for success or failure would be useful at this mid-year juncture, in terms of providing study assistance to students during the rest of the year (as an ongoing part of the intervention programme). It was precisely to inform the provision of this kind of assistance that students were asked to speak to the author; interviewed students were told that comments made by them during the interview could be helpful in structuring further study assistance for all ASPECT I students.

Findings from these interviews are discussed in three sections:

- (1) Findings from the interviews with students who had passed the mid-year Applied Mathematics examination, and whose study orchestrations had been classified as “at risk” or “worse than average” after both administrations of the Inventory (on entry to the university and in April);
- (2) Findings from interviews with those students who had failed the mid-year Applied Mathematics examination, and whose study orchestrations had similarly been classified as “above average” or “better than average” on both administrations of the Inventory;
- (3) Findings from interviews with those students who had both passed the examination and whose study orchestrations had similarly been classified as “above average” or “better than average”.

All the students interviewed were asked to reflect on their approaches to the study of Applied Mathematics for the June examination, and on what they believed to be the reasons for their successes or failures.

(1) Stable “at risk” students who had passed the Applied Mathematics examination

Students in this interview category were interviewed for the following reasons: (1) Students c2 and k1 had attended the initial intervention programme workshop. These

two students will be discussed first. Interview data ought to show evidence of shifts in qualitative levels of perception of elements of the academic context, as a function of these students' attendance at the workshop; (2) Although invited to attend the initial workshop, student s3 had not been present. In his case, interview data ought to be without evidence of 'deep' perceptions of the learning context; (3) In the case of all three students, the author would seek to find some qualitative evidence to explain their examination successes, if these could not be ascribed to positive shifts in contextual perceptions.

Student c2

The first student from this interview set disagreed with the interviewer when the latter suggested that he had achieved a good pass in the Applied Mathematics examination; he felt that he had underachieved. He seemed to identify underachievement at least in terms of his expressed belief that he could have done better marks-wise.

On being asked what he could do to improve his marks, however, this student said:

"I need to learn more ... I need to work harder ... I must do more examples and concentrate more in my study time so that I can do really well."

Further exploration on the part of the interviewer about what the student meant by these remarks seemed to suggest a primarily product orientation in this student's study approaches. Achievement motivation seemed to be linked to study approaches which focused on the amount of work done to reach a quantifiable goal, namely the reaching

of an answer to a particular question. This student's stated intentions in preparing for an examination did not appear to include focusing on the kinds of work done as opposed to the amounts. This student's articulated desire to achieve top marks, combined with a strategic approach to study (expressed in terms of this student saying that he had worked through past examination papers and tutorial sheets) seemed to have been contributory factors in this student's passing the examination in Applied Mathematics reasonably well (he had achieved 68%). From what was said in the interview, this student's theoretically undesirable orchestration did not appear to have become qualitatively 'deeper'; instead, the comment made above would seem to be characteristic of his having adjusted his approach in the light of perceived task demands - a process referred to in the research literature on study approaches as 'technification' (Marton and Säljö, 1984).

Despite this student's attendance at the workshop on perceptions of the academic context, the interview did not reveal any 'deepening' of perception on his part, or any evidence of his entry-level study orchestration having altered. On the basis of the interview data, a number of conclusions about this student's study approach leading to examination success in Applied Mathematics are possible: (1) the author failed, in terms of the questions asked, to elicit any responses from this student which would be indicative of a 'deeper' perception. This conclusion is unlikely, given the wide-ranging nature of the questions asked and the extensive time (one hour) and 'space' given for the student to respond; (2) the nature of the questions asked in the mid-year examination was such that this student's examination preparation, although suggestive of his

having a reproducing orchestration, was not 'challenged'. This conclusion is difficult to sustain in the light of the earlier assertion about Applied Mathematics being a course which requires deep-level processing; (3) Perhaps the most plausible explanation for his successful examination performance, in terms of what he said in the interview, lies in the fact that he had revised questions in so many previous examination and test papers that he was able to recognise and reproduce 'stylised' answers on the basis of his familiarity with the forms of questions.

Student k1

From what this student reported at this interview, it would appear that his study behaviour had changed in qualitatively significant ways, and he now seemed to be reporting study approaches and perceptions of his learning environment which were more characteristic of a meaning orchestration than had been apparent from the scoring of previous Inventory responses and his responses at an initial interview on entry to the university (an interview which, as discussed earlier, had been conducted with all ASPECT students individually).

When asked to say what it was in his study "methods" that was contributing to his academic success in Applied Mathematics, he stated:

"I go through past examination papers and tut sheets ... I do extra reading in the library ... I refer to other textbooks, so that I am quite sure of the way one textbook explains it from another ... I try to relate one section of the work to another ... I read ahead what we are going to do the next day

... I used to memorise formulas, but if you understand them, you don't have to [memorise] ..."

From these and other comments this student made, it would seem that he was beginning to appreciate that understanding is an important first principle in studying, and he seemed to be saying that understanding, as a necessary condition for a deep study approach (Ramsden, 1985), appeared qualitatively superior to memorising.

After the initial intervention programme workshop, this student commented on a written, open-ended feedback sheet that the (intervention) workshop with his Applied Mathematics lecturer (outlined earlier in this chapter) had not been of any use to him. From what he was saying in the context of the present interview, however, it appeared that he had developed some approaches to and perceptions of learning which were fundamentally different from his approaches and perceptions on entry to the university.

It is possible that there had been an "incubation period" before the effects of the workshop intervention began to be reflected in study behaviour comments more consistent with students with meaning orchestrations. It is also possible that evidence of a conceptual shift would have been shown anyway, but this would not seem plausible if the results of a previous study of this kind (Meyer, Parsons and Dunne, 1990b) are considered. Meyer, Parsons and Dunne (1990b) produced results which showed that "at risk" orchestrations remained remarkably stable, even amongst students who had been accepted on a programme designed to assist them to adapt to the requirements

of university study assumed to be absent from their study behaviour as a result of an inferior school experience. After this interview, the author was left with a conviction that this student's study orchestration would show evidence of a shift towards a meaning orchestration when his responses to the third administration of the Inventory had been conceptually categorised. This shift (discussed further on) was, in fact, reflected in this subsequent Inventory response classification.

Student s3

Although this student had been invited to discuss his academic successes (his passing the Applied Mathematics examination) with the interviewer, his unsolicited opening remarks at the interview were disturbing:

"I don't know what has happened to me ... since I have come back from the mid-year vacation, I cannot concentrate on my work anymore ... I can't spend more than ten minutes on my work ... it is mounting up ... if I don't start soon, it will be too late."

During discussion, this student stated that his problem seemed to be both personal ("I am influenced by a group of friends not to study") and academic ("I failed (Engineering) Drawing, and now I am worried that I will not pass it at the end of the year ... I don't know why I failed Drawing ... I thought I had passed it").

This student's academic successes up to the end of the first semester could be attributed to the fact that his study methods had been unquestioned until they were perceived as inadequate to allow him to explain or interpret a specific test outcome.

When he was asked what he thought had contributed to his failing the Drawing examination, this student stated that he felt that he was being expected to use first semester knowledge in an applied way in the examination. He felt that this change in the use of course knowledge might also be a contributory factor towards his present study difficulties (in the second semester), yet he could offer no suggestion as to how he thought he might resolve his problems other than to construct, with the help of the author, a study timetable. It seems that, in the case of this student, a "tangible" intervention strategy represented the best strategy possible, given his apparent inability to reflect on the reasons for his reported failure.

His inability to explain his failure in Drawing, coupled with the fact that his study orchestration was classified stable "at risk", would seem to be related to a conclusion in a study by Entwistle, Meyer and Tait (1991) in which it is suggested that students with disintegrated study orchestrations (such as this student) appear to be unable to extract from their learning environments the feedback which helps them to explain their failures in particular examinations or tests. Two pieces of interview data seem to support such a conclusion being reached about this student: his stated sense of helplessness about what aspects of his study behaviour he needed to change in relation to Drawing; his study behavioural "immobility" on entry to the second semester, coupled with increasing anxiety about the amounts of work he was deferring.

This student did not attend the initial intervention programme workshop, so, in terms of the rationale for the workshop, it is not surprising that his qualitative level of perception

of the academic context had not altered. But his absence from the workshop cannot explain how or why he passed the mid-year Applied Mathematics examination so well. As with student c2 above, the most plausible explanation of his examination performance would seem to lie in his thorough revision of past papers.

All three of these students passed the Applied Mathematics examination at the end of the year, too. The study orchestrations of students c2 and k1, in addition, showed evidence of a positive conceptual shift after a third administration of the Inventory; the orchestration of student s3, on the other hand, showed a deterioration after the third Inventory administration. These observations are discussed further on in this chapter, in the section on the associations between study orchestrations and end of year learning outcomes.

(2) Stable “above average” students who had failed the Applied Mathematics examination

In this subsection, exhaustive analysis of all students interviewed is unnecessary, as the comments of the two students presented here are conceptually and thematically representative of the subgroup (of ten) as a whole. The two students' responses are presented and discussed in order to illustrate that, unlike students c2 and s3 presented in section (1) above, these students could clearly and easily pinpoint the reasons for their poor academic performance. In addition, they seemed, even before the interview with the author, to have identified what they could do to improve their examination performance without, necessarily, abandoning their meaning orchestrations.

Student n5

This student said that he thought his difficulties now were related to the fact that he had never had to work hard at school, and that he was relatively unused to expending much effort on study:

“I have never really had to work hard ... at school, I never worked; I could pass without working.”

What was particularly interesting about this comment, was that it was made with such conviction by this student. From other comments which he made, it was apparent that he was still attempting to understand Applied Mathematics in a meaningful way, making links between aspects of the conceptual subject material, and so on, yet he was saying that this was not sufficient to allow him to pass.

“I am going to make sure that I do all the tut sheets thoroughly from now on, that I do past examination papers...”

It would appear that this student had decided to strategise his study approach, and had assessed quite clearly what was needed of him to pass the examinations. What was qualitatively different between his response and the response of student c2 in subsection (1) above, who also spoke of doing past examination papers, was that this latter student seemed able to understand that his decision to strategise was a conscious act

of the will. His reported achievement motivation also seemed to be stronger now than it had been at the time of the first exploratory interview he had had.

From the interview discussion, it seemed possible to conclude that (1) this student's meaning orchestration is a necessary condition for him to reach conceptual understanding in Applied Mathematics, but it is not sufficient for him to pass examinations if it is not paired with forms of examination preparation, such as going over past examination papers, which he seemed to have skipped; (2) the presence of metacognitive awareness about his need to adopt differential strategies for improving his academic performance enabled this student to retain a meaning orchestration, while simultaneously being able to exercise control over his study options.

Student s5

This student also seemed able to articulate quite easily what he thought his study problems with Applied Mathematics were:

"I need to put more effort into my examination preparation ... I am not working thoroughly enough."

What seemed particularly noteworthy about the study approach of this student was the extent to which he seemed to welcome the opportunity to reflect on his study approaches and perceptions with the author. He spent much time in thinking through questions posed to him, and, from the responses which he gave, seemed to be aware of different study processes which he employed for different tasks:

"I need to complete worksheets which we get ... I don't work through enough examples ... sometimes, I'm lazy - then I don't try to understand."

As with student n5 in this orchestration category, this student did not report having study problems of a potentially problematic nature, such as adopting a fragmented approach, or memorising in the absence of meaningful understanding - he seemed to be clear about where his problems lay, and, what was particularly significant, appeared to know what he had to do to solve them in ways which demonstrated characteristics of a meaning orchestration.

As will be seen from the data in Table six, student n5 just passed the end of year Applied Mathematics examination (with 50%), and student s5 failed (he later passed a supplementary examination with 65%). This disturbing phenomenon, where students with theoretically desirable orchestrations still fail or underachieve in terms of examination performance, is the subject of ongoing research work at the University of Cape Town. Attempts to offer causal attributions for this problem will, therefore, not be a focus of this thesis.

(3) Stable "above average" students who had passed the Applied Mathematics examination

As was stated earlier, students from this category were interviewed primarily with a view to noting aspects of their study behaviour which they felt had contributed to their passing Applied Mathematics. The aim was to see whether they were adopting study ap-

proaches which were different from the students in group (2) above, and which might be said to have contributed to their passing.

In particular, three characteristic features seemed to emerge from the responses of these students, which, when viewed in conjunction with their conceptually meaningful study orchestrations, seemed to suggest themselves as contributory factors to their academic success in Applied Mathematics. These factors had not been reported by students in category (2) above, suggesting that their presence is likely to increase the chances of these students performing well: (1) fluency in subject knowledge and application (these students seemed able to discuss Applied Mathematics concepts and applications fluently, and in ways which demonstrated deep understanding of these; and (2) personal commitment to studying Applied Mathematics, and (3) to pursuing an undergraduate degree programme at this university. One student, when asked whether he thought having background knowledge such as Matric Physical Science was important to his being able to do well in Applied Mathematics, replied:

“No, not for me; it is more important for me to work hard, and understand the concepts in Applied Mathematics”.

Clearly, this student was not denying the need to have pre-university subject knowledge background, but his remark poses a challenge to the assumption that having background subject knowledge per se is necessary, or that all students entering ASPECT

have similar perceptions of and approaches to the concept of background subject knowledge.

Intervention workshops two and three

A second workshop, entitled “Becoming Aware of my Learning Processes”, was offered to all students in ASPECT I. Students were divided into groups of 6, and were asked to discuss, with one another, a set of questions designed to focus their attention on how they were engaging their coursework in different contexts, what their views of knowledge were in a particular discipline, what they meant when they said “I understand”, and so on. The sheet of questions which each student was given, is to be found in Appendix E. During group discussion, the author acted as facilitator, by assisting groups who had questions about the task set, or by challenging groups to think reflectively about the questions on the worksheet. Groups were also requested to summarise their findings on sheets of newsprint, which they then attached to the pinboards in the lecture room. After 30 minutes’ discussion, groups were asked to appoint a spokesperson, who could report findings back to the group as a whole. The author then elaborated on points, made by the students, which he considered tied in significantly with the aims of the workshop (these aims were not given to the students).

The primary purpose of the workshop was to encourage these students to reflect on, and become aware of, study strategies, approaches and perceptions which they were adopting in their study of undergraduate degree subjects such as Applied Mathematics. This workshop was designed on the assumption that the development of metacognitive awareness in context could lead students to develop strategies for learning of the kind

described by Vermunt and Van Rijswijk (1988) as leading to “self-regulated learning”, and by Novak (1985) as “learning how to learn”.

According to Vermunt and Van Rijswijk (1988), self-regulated learning can be conceived of as involving two kinds of discrete learning activities: the processing of elements of content, such as facts, concepts, theories, and so on, and the regulation of these typical processing activities. As these writers argue:

“Regulation activities are directed at the processing activities; students actively employ them to orchestrate, coordinate, regulate and check there (sic) own processing activities and so to exert control over their own learning” (Vermunt and Van Rijswijk, 1988 : 649).

Their description of these two distinctive learning activities highlights some crucial theoretical issues around which the workshop was designed, namely, firstly, that the development of self-regulated learning occurs in relation to particular course content; secondly, that this regulation is an active, individual process; and, thirdly, that it culminates in the student being able to exert executive control over his own learning. But crucially, Vermunt and Van Rijswijk (1988) argue that self-regulated learning development is also associated with students’ learning conceptions (Säljö, 1979; Marton, Dall’Alba and Beaty, 1992, in press), their conceptions of what constitutes good teaching (Van Rossum, Deijkers and Hamer, 1985), their views on working cooperatively with fellow students (McKinley, 1983), and their study orientations - a concept referred to

earlier, and taken to mean a coalescence of motivations and intentions for, and values about, studying (Biggs, 1985; Entwistle and Ramsden, 1983).

Zimmerman (1986) argues that theorists in the field of self-regulated learning usefully conceive of a tripartite model which depicts self-regulated students as:

“... metacognitively, motivationally and behaviourally active participants in their own learning processes. Metacognitively, self-regulated learners are persons who plan, organise, self-instruct, self-monitor, and self-evaluate at various stages during the learning process. Motivationally, self-regulated learners perceive themselves as competent, self-efficacious, and autonomous. Behaviourally, self-regulated learners select, structure and create environments that optimize learning” (Zimmerman, 1986 : 308).

Key issues raised by Zimmerman (1986) which can be said to form part of the theoretical background of the workshop under discussion suggest that self-regulated learning requires both reflection and action, probably in an ongoing, sometimes idiosyncratic, manner (Harri-Augstein and Thomas, 1991). Thus stated, it seems that it is not enough merely to raise students' metacognitive awareness of how they are consciously engaging their studies (Biggs, 1985), but simultaneously, to focus on the role played by a student's perceived self-system - more fully described elsewhere as a combination of self-concept, self-image, self-esteem, self-worth, self-efficacy and self-control (McCombs, 1986).

Within the conceptual framework of an information processing model of student learning, Biggs (1985) argues that students' approaches to study are associated with particular study motives and strategies. A recognition (by the student) of what motive goes with what strategy, Biggs sees as an important first step in the development of what he terms "metalearning" capacity. A second important step involves students' being able to exercise control over their perceived strategic options in relation to studying. The workshop under discussion set out to address stage one in the development of metalearning capacity, as being an important factor in students' assuming greater responsibility for the regulation of their own learning.

Two subsidiary influences were anticipated, namely, (1) that students would benefit from this kind of self-conscious reflection about specific undergraduate courses in terms of becoming aware of, and being able to exercise more control over, their own learning processes, i.e. exercise a kind of metacognitive awareness of the kind discussed by Biggs (1985); (2) that students with 'deep' approaches and perceptions might positively "influence" students with 'surface' approaches and perceptions to adopt these deeper ones.

As can be seen from Table five, those students who gave written feedback on this workshop all responded positively to it. The following comments, in particular, suggest that, for some of the students, the author's goals for the workshop (of which the students were not aware) had been achieved:

Student m1 : "It changes my whole study approach from answer-seeking to knowledge-seeking"

Student m0 : "This workshop helped me understand what it is that I am doing, and how"

Student l1 : "I'm now concentrating on understanding rather than to memorize"

Student g2 : "It helped me to actually think of how I studied"

In theoretical terms, these students were articulating changes in their levels of awareness about some of their study processes. In the cases of the first three students, these stated changes in their levels of awareness also appeared to have had benefits for them in terms of passing end of year examinations in Applied Mathematics (students m1 and m0) and Chemistry (student l1). Student g2, however, performed very poorly in all three end of year examinations she wrote. But to attempt to interpret individual student's successes or failures on the basis of attendance at a single workshop would be contrary to an underlying approach of this intervention programme, which was to engage students in an ongoing programme of intervention that could include individual and group interventions. The feedback which these students gave about this workshop must, accordingly, be viewed as, at the very least, testimony to the value of such a workshop in a context of continuing intervention. Of these issues, more will be said in the concluding chapter of this thesis.

Many students still appeared to be seeking more tangible 'study-skills' type advice from workshops such as the one under discussion. Comments such as the one given below were, therefore, not surprising:

Student b1 : "I didn't get what I thought was going to be given. 'Study methods'"

At the third workshop, a panel of five more senior ASPECT students discussed the coping strategies they had used in previous examinations and which they thought had enabled them to pass their examinations in previous years. In setting the senior students the task of discussing their examination coping strategies, the danger of their reflecting narrow, calculating strategies for 'passing at all costs' would need to be avoided, as this would be cutting across the purpose of the workshop. To this end, these senior students were expressly asked, in talking about their coping strategies, to comment on the extent to which they could attribute their success to factors which could be regarded as being within their control, such as thorough preparation and judicious use of time in the examinations. It was anticipated that first-year ASPECT students would perceive these senior students, who had themselves been first-year students, as having been able to attribute their examination success to controllable factors. It was, therefore, postulated that ASPECT I students, who were concerned that academic failure was inevitable and uncontrollable for them, might perceive that the causes for their failure were modifiable, and therefore, able to be changed before the final examinations.

The theoretical framework for this workshop was based on two studies, one by Van Overwalle, Segebarth and Goldchstein (1989) on improving first-year students' academic performance through the attributional testimonies of fellow students and another by Van Overwalle and De Metsenaere (1990) on the effects of attribution-based intervention and study strategy training on academic performance of first-year students. Both studies are predicated on the idea that students who ascribe their academic failures to relatively enduring and uncontrollable factors, such as lack of ability, are likely to be less able to make active attempts to overcome their learning difficulties. They perceive the causes for their failure to be ascribed to factors beyond their control. On the other hand, students whose causal attributions for failure are generally unstable and controllable, for example, insufficient effort on task, are more likely to attempt to overcome their learning difficulties, as they perceive these difficulties to be transitory. Central to the implementation of these attribution-based intervention programmes was the idea that senior students related the fact that they had had learning difficulties, but, in addition, that they also related more details about the temporary causes of their examination failure and how they had managed to cope with them.

A study by Perry and Penner (1990), on the associations between causal attributions, locus of control, quality of lecturer instruction and academic achievement amongst students enrolled on an introductory psychology course found that attributional retraining enabled external-locus students to benefit more from a lecture and make better use of study materials than before, as well as improving their performance on learning from a lecture and on completing homework assignments one week after the lecture;

however, it offered no perceived benefits for internal-locus students. It appeared (1) that internal-locus students were already using causal attribution options (of ability and effort) presented in the retraining programme, and (2) that, of the attribution options presented, external-locus students most easily incorporated the programme option related to personal effort. External-locus students thus perceived that they could control positive achievement through greater work-related effort. Furthermore, these students also benefited, in terms of improved academic achievement, enhanced self-confidence and belief in their own efforts, if they received instruction from an expressive instructor ("high quality" instruction).

Internal-locus students who attributed their academic achievement to personal ability and who received instruction from an expressive instructor, actually performed less adequately on the homework assignment (a task which the authors of the study argue requires self-initiated activity rather than passive reception of information such as is the case in conventional lectures), seemingly because they perceived their ability attribution to be sufficient to 'get them through' the task, without the need for effort. Furthermore, internal-locus students faced with high expressive lecturers might actually be less actively engaged in learning from lectures, precisely because they perceive the lecturer to be doing all the 'spadework'. These students' ability attributions might mean that they then do no further work themselves.

The implications of this study are interesting in terms of suggesting that attributional retraining by high expressive lecturers is viable, particularly for external-locus students,

and that it can be an integrated part of everyday teaching and learning. In the case of internal-locus students, however, this study seems to suggest that students who attribute their academic achievement to ability, might actually become less motivated by such explicit attributional intervention. In terms of the workshop conducted with the ASPECT I students, the implications of a focus on attributional retraining with students with meaning orchestrations might also have unexpected negative consequences for achievement. It is this author's intuition (based on qualitative interview data) that, as a group meaning orchestration students are also internal-locus students who make ability attributions. Whether the workshop actually lowered such students' motivation to expend effort on examination performance, such as was argued in the study by Perry and Penner (1990), would need to be explored. In any event, the study once more points to the need to deal with subgroups of students in qualitatively different ways.

As was the case with the second workshop, ASPECT students were not given any information about the theoretical framework, or the author's goals, for the workshop. They were told, rather, that the purpose of the workshop was to enable them to hear from senior students about their (the seniors) examination preparation approaches. Students gave written feedback about this workshop which suggested that the comments which the senior students gave were particularly helpful, because the first year students could identify with the seniors. The seniors served as credible role models, as they had been through similar learning experiences and problems as the junior students:

Student z1 : "Some of their problems were related to mine"

Student l2 : "...the senior students expressed their problems which they had, most of which are applicable in our situation"

Student s4 : "It was encourages (sic) to see that people who were in the same state as you were, manage to pass"

Student p1 : "This helped me alot (sic), especially because they were black D.E.T. students"

But a number of students also raised an important issue which would need attention in future workshops of this kind: senior students who are perceived by the juniors to be exceptional students (the juniors attribute the success of such seniors to innate ability rather than effort), hold less credibility for the juniors than do the "struggling" seniors. One such exceptional student was a member of the discussion team. This perception of the junior students appears to be entirely consistent with an aspect of attribution theory which states that students who can make, for example, effort causal attributions are more likely to attribute their poor performances to unstable and temporary factors.

Student m5 : "I suggest that in future you bring the successful students who went through difficulties like failing most of the tests, thinking of leaving university, ... etc."

Student m1 : "It would have been better if you did not invite the 'geniuses' only because I want to hear someone whose failed four or more tests and how he would cope"

One student also made a valuable comment about the timing of the workshop being at the end of the year. The adoption of her suggestion could be helpful in reducing perceptions of the workshop being 'strategic' by being offered so near the end of the year:

Student m6 : "[The workshop] was a great idea but if it was done in the beggining (sic) of the year it would have been more effective than it is now".

Associations between study orchestrations and end of year learning outcomes

Table six below gives:

- (1) a code number for each ASPECT student;
- (2) an orchestration classification for the third administration of the Inventory;
- (3) the final mark, expressed as a percentage for each student doing Applied Mathematics.

Table 6 : Associations between study orchestrations and end of year Applied Mathematics mark (third Inventory administration).

<u>Student Code</u>	<u>Orch. Category</u>	<u>Examination (%)</u>
b1	AVE	
b2	AVE-	36
b3	AA	
b4	AVE	
c1	AVE	DPR
c2	AVE	76
d1	AR	
g1	AVE	
g2	AVE	

i1	AVE	
j1		
k1	AA	86
k2	AVE+	48
l1	AVE-	
l2	AVE	
m1	AVE	66
m2	AVE+	62
m3		40
m4	AVE	74
m5	AVE+	55
m6	AVE+	60
m7	AVE	
m8		38
m9	AVE	
m0	AVE	57
ma	AVE+	64
mb	AR	
mc	AVE	55
md	AVE	73
me		
n1	AA	34
n2		
n3	AVE	
n4	AVE	
n5	AA	50
o1	AVE	52
p1		
p2	AA	
r1	AVE+	80
r2	AA	50
s1	AVE+	
s2	AVE	
s3	AR	67
s4	AA	65
s5		65
s6		77
s7	AVE+	
s8		
s9		

t1		
t2	AVE +	75
t3	AVE	40
t4		
w1	AVE	
z1	AVE	61
z2	AVE +	58

The reason for a focus on Applied Mathematics as the undergraduate course in which to assess academic performance was stated earlier, as were the reasons for targeting a particular subgroup of students for (specifically) the first intervention workshop. Detailed discussion in this section will, therefore, be concentrated on those nine students who fall into both these above categories, i.e. they were "at risk" or "worse than average" students on the basis of the second administration of the Inventory, and they were Applied Mathematics students. More general discussion of patterns in the data for the other ASPECT students will form part of the discussion in the final chapter of this thesis.

For students c2, k1, m0, and mc, the intervention programme would seem to have had expected benefits, both in terms of their having passed the end of year Applied Mathematics examination and their having "deepened" their orchestration category. An investigation of these students' decisions to participate in an ongoing programme of intervention and attendance at workshops, shows these students to have had a consistent pattern of continuing involvement with discourses about learning which,

when this involvement is assessed as an aggregate of experiences, presents striking evidence of their having, to some extent, 'reorchestrated' their study approaches in accordance with changes in their qualitative levels of perceptions of their learning contexts.

For students c1 and t3, the intervention programme had some benefits in terms of their having 'deepened' their orchestration category, but this 'deepening' of orchestration category was evidently insufficient for them to have passed the end of year Applied Mathematics examination. In the case of these students, there is evidence to suggest that their orchestrations showed qualitative improvement during the year in the context of the ongoing intervention programme, but that this qualitative improvement did not translate into improved examination performance.

The association between learning outcome and study orchestration for student s3, however, is inconsistent with previous research findings about samples of educationally disadvantaged "at risk" students performing poorly in examinations (Meyer, Parsons and Dunne, 1990b). This student's study orchestration deteriorated over the course of three administrations of the Inventory, yet he still passed the end of year Applied Mathematics examination reasonably well. In terms of his examination performance, it would be reasonable to assume, in the light of what he had said at the interview (referred to earlier) he had had with the author after the mid-year examinations, that this student performed well on the basis of thorough revision of past papers (as was stated previously) such that he was able to 'recognise' the format of examination questions.

Given that he did not participate in the ongoing intervention programme, his deteriorating orchestration provides compelling evidence of the fact that, even though he is otherwise in an Academic Support Programme context designed to offer academic and other support, he is still without the kind of support which seems to be required for his developing deep approaches to study.

Of the remaining two students, m3 did not complete the third administration of the Inventory (he was ill) and the orchestration of b2 remained stable. A possible explanation for this stability in student b2's orchestration is offered in the concluding chapter of this thesis.

Feedback from students on aspects of the intervention programme

Based on the perceptions of the students involved in the present study, it seems reasonable to conclude that ongoing intervention programmes of this kind have enormous potential for engaging students with aspects of their study behaviour in a naturalistic setting and in a manner which is perceived by the students themselves as being both supportive and beneficial. This kind of ongoing intervention allows the academic support practitioner to establish a credible relationship, with the students, based on perceived trust and actively providing academic support which takes cognisance of the qualitatively different manifestations of study behaviour identified by both students and practitioner.

The development of access to individual study counselling is perceived by the students to be important. One student commented as follows in a written, end-of-year evaluation (before the examination session) of this intervention programme:

Student z1 : "I suggest that ... you try to see students (individually) almost every month because some of them can have problems and be afraid to talk them out until they are individually approached."

Feedback by the author on the conceptual interpretation of study orchestration profiles would also seem to be more appropriate if handled at an individual level. On his written evaluation form, one student remarked:

Student m5 : "I suggest that during the feedback session you go, if possible, through specific difficulties that individual students experienced, this to be one-to-one communication."

Comments from the students about the various workshops run during the year provide striking evidence of the effectiveness of these workshops in raising students' awareness of how learning tasks are being consciously engaged and of the critical need for them to take responsibility for their own learning:

Student m4 : "I wish this [workshop with the senior students] could be done in future in broader terms, i.e. not just studying for exams but learning other things in general"

Student c2 : "... my study approach can not be corrected by anyone else but myself"

The influence of a particular context on learning approaches was also mentioned as an important mediating factor by a number of students:

Student m7 : "I [became] aware of how different type of inst[it]ution with different ways can change your learning capability and your coping with stress"

Student n3 : "[The workshop on becoming aware of my own study processes] was useful ... although some of the strategies did not work for a particular subject

Implications of the findings from this intervention programme

The findings recorded in this (and the previous) chapter of the thesis have powerful implications for the theory and practice of academic support programmes, especially in terms of a number of commonly-held assumptions, at a group and at an individual student level, about the learning needs of educationally disadvantaged students.

Furthermore, these findings point to the implementation of forms of intervention, at both group and individual level, which stand out as conspicuously different from certain conventional forms of academic support, in that they suggest that a reconceptualisation of the concepts and consequences associated with "educational disadvantage" is needed. The implications of this intervention programme for learning and teaching in both academic support programmes and the university as a whole should also not go unnoticed. Precisely what these implications are, as well as the directions which this

intervention programme provides for future educational research in this area, is the focus of the following chapter.

CHAPTER SIX : CONCLUSIONS AND IMPLICATIONS FOR ASP PRACTICE

Findings of the intervention programme described within the context of this thesis suggest that approaches to the enhancement of tertiary teaching and the promotion of excellence in student learning, cannot ignore three important recent developments in educational research, incorporated in the implementation of this intervention. These, Biggs (1989) neatly summarises as being focused, although drawn from very different conceptual models, on three key shifts: (1) a shift in approach, from the study of educational contexts in theory, to a focus on the study of learning in its naturalistic setting; (2) a shift in perspective, from a study of learning from the view of the researcher or teacher, to that of the student; and (3) a shift in focus, from the study of the student as an apparently passive information storage system to that of the student as an active regulator of learning, with the capacity for constructing conceptions of content, being aware of and exercising control over cognitive processes, and adopting differential, context-based study approaches from task to task.

Conclusions drawn from the intervention programme

(1) Study orchestration classifications

The stability over time of “at risk” or “worse than average” study orchestrations for individual students, in the absence of explicit forms of intervention designed to alter these orchestrations, is entirely consistent with the findings of other studies conducted with similar groups of educationally disadvantaged students (see, for example, Meyer, Parsons and Dunne, 1990b). On the basis of the quantitative analysis of these ASPECT

students' responses in the first and second administrations of the Inventory, it can be concluded that those students whose orchestration classifications are "at risk" or "worse than average" on entry to the university, continue to orchestrate their study approaches within a university context in ways which lead to their entry level study approaches being classified as "at risk" or "worse than average". Given that this phenomenon has now been reported in a number of separate studies, an inescapable conclusion might be reached: in a context of academic and other forms of support, educationally disadvantaged students who are not explicitly engaged with manifestations of their own "at risk" study behaviour appear unlikely to alter this study behaviour in qualitatively 'deeper' ways.

Given that "at risk" study orchestrations have been associated (in other research studies) theoretically and empirically, with poor academic performance, or failure, it seems reasonable to conclude that "at risk" students in the group of ASPECT students under discussion in the present study might also fail or perform poorly. It was precisely this association which the intervention programme set out to 'break' in seeking to alter "at risk" students' orchestrations, by enabling them to alter their qualitative level of perception of their academic contexts.

Based on the study orchestration classifications for the targeted group of students on the third administration of the Inventory and after participation in the intervention programme (see Table six earlier), the orchestrations of the eight Applied Mathematics students (one of the original nine students did not complete the Inventory a third time)

fall into three groups: (1) in the case of six of them, their orchestration category 'deepened'; (2) one of the students had an orchestration which deteriorated over time; (3) for one student, his orchestrations remained stable. Each of these three groups is discussed in turn.

The six Applied Mathematics students who had 'deepened' their orchestration categories, had all participated in the ongoing programme of intervention and were thus in a position to derive expected benefits from their participation. It seems reasonable to assume that this improvement can be ascribed to their participation in the intervention programme, given the postulates of the previous paragraphs in this section, and the fact that this finding of the present study confirms those of other similar studies (Parsons and Meyer, 1990; Parsons, 1993, in press) carried out with different groups of students, but within a more narrowly focused theoretical paradigm.

In the case of the student whose orchestration classification had deteriorated (student s3), he had not participated in the ongoing programme of intervention, and his orchestration deterioration is thus consistent with previous research findings and expectations referred to earlier.

The quantitative evidence of stability of orchestration in the case of student b2 (despite his participation in the ongoing programme of intervention), can be linked to qualitative feedback received from this student at the end of year evaluation of the programme. In

responding to the value of workshop two (on awareness of study processes), this student remarked:

“I should have taken it more seriously”.

His self-reported lack of engagement with the content and intention of this workshop at the time it was offered, suggests that he only realised, at the end of the year, that workshops of this kind contained perceived benefits for him. It is thus possible that, although physically present at the workshops, he was motivationally “absent”, which could explain the stability of his orchestration.

No attempt will be made, within the bounds of this thesis, to draw conclusions about changes to orchestration classifications amongst subgroups of students in other orchestration categories, as these subgroups did not form part of the targeted group. Conclusions about students in these subgroups concerning other aspects of the intervention programme will be discussed as these conclusions impact upon facets of the programme.

(2) Initial individual interviews with students

Exhaustive analysis of the findings from the process of individual interviewing, as well as the feedback from individual students, has already been completed in chapter four.

Based on the interview data and the student feedback on the interviews, a number of conclusions suggest themselves. Firstly, in terms of the overall conceptual categorisa-

tion of study orchestration, the interviews provided illumination and expansion of the categorisations which were, in every case, a validation of the original independent classification. Certainly, in the case of some students (in particular, students m5, ma, o1, r1 and w1), the interview discussion provided evidence of these students having begun to adopt 'deeper' approaches to university study than what the orchestration classification had suggested about their school Science approaches, but no students' orchestrations seemed to have been "misplaced". The quantitative classification of their orchestrations on entry to the university thus appeared to be verified by the independent qualitative, interview-generated data.

Secondly, qualitative evidence of the manifest range of individual differences in study approach, as set out in chapter four, confirms the conceptual and empirical robustness of the model underpinning the classification of individual orchestrations for this group of ASPECT students. The model, against which qualitative individual differences in study approach and contextual perceptions can be categorised, appears valid for this sample of students, and, by inference, for other similar groups of students, for example, in Science and Medicine.

Thirdly, the evidence from the interviews strongly supports a contention of this thesis that individual (and possibly subgroups of) students report fundamentally different forms of study behaviour in accordance with their widely differing conceptions of, approaches to and perceptions of the contextualised study process of engaging school Science. If there is evidence that these different forms of study behaviour are also engaged in

relation to undergraduate degree subjects (and the quantitative evidence of stability of orchestration classification in the transition between school and university - Meyer, Dunne and Sass, 1992 - seems to support this contention), then it must be concluded that academic support practitioners need to take account of these qualitative differences *in their teaching and in the design of learning experiences.*

Fourthly, a detailed analysis of interview transcriptions would seem to be useful in terms of suggesting lines of study intervention at an individual level. The “cues” about study approach and perceptions which individual students articulate can contribute to meaningful intervention, should individual students require it, precisely because these cues are articulated in relation to contextualised study behaviour. They provide a framework within which to engage individual students in ongoing intervention.

Fifthly, from the feedback which the students gave about the value to them of the initial individual interviews, it would seem that this kind of interview has “metacognitive” benefits in terms of which students are able to reflect on their study behaviour, and, in some cases, make decisions to change aspects of it which they perceive to be dysfunctional, as a result of the “space” allowed in which they could reflect, and in the absence of the interviewer having suggested possible changes. Clearly, some students were seeking study behaviour advice, but the fact that many of them welcomed the opportunity to discuss their study behaviour in an exploratory fashion indicates that engaging students in discourse about learning is a powerful interventionist tool per se.

The grouping of students' responses to the initial interview, in terms of which many (then) "at risk" or "worse than average" students rated the interview as less than useful, suggests a sixth conclusion about the interviews. This seems to be that "at risk" or "worse than average" students apparently do not see the value of such exploratory interviews, in fact, may even resent them, in the absence of explicit connections about the relevance of these interviews being made for them by the interviewer. A related conclusion seems to be reasonable here, namely that those "at risk" or "worse than average" students who did see merit in the interview, were not able to reconceptualise their study behaviour at a level of abstraction which went 'deeper' than that of a study skills level.

(3) Presentation of individual student orchestration profiles

The author's presentation of individual orchestration profiles to ASPECT students, as outlined earlier, was designed to enable these students to assess, in the light of an interpretive framework provided by the author, the extent to which their perceptions of their academic contexts might be said to be contributing to their (discipline-specific) study approaches. The evidence, from what the students said, is that this exercise provided them with an opportunity to identify specific learning difficulties and relate them to a conceptual model of learning which is sensitive to individual differences in study engagement.

The presentation of orchestration profiles provided the students with a readily interpretable set of constructs which, at the level of the individual, reflected their personal preferences for unique study approaches and perceptions. Clearly, the feedback from

the students suggests that this kind of study approach engagement is meaningful, provided that attention is paid, by the author, to the unique associations of constructs for individual students.

(4) The intervention workshops

The first workshop

On the basis of feedback (albeit limited) which the students gave after their attendance at this workshop, it could be concluded that the workshop presented the opportunity to both students and practitioners for engagement on study issues which are part of the everyday experiences of higher education for both. For these educationally disadvantaged students, in particular, the workshop presented a unique opportunity for them to engage, first-hand, with members of the academic community who had previously seemed inaccessible to them.

The comprehensive written feedback provided by one student (referred to earlier) suggests that workshops of this kind could provide powerful indications of the effects of particular teaching approaches on certain students. The commitment of one lecturer to change aspects of his course, as a result of the comments of students, is consistent with a conclusion by Parsons (1993, in press) (using intervention workshops of a similar kind with different samples of students) when he suggests that academic practitioners need to take up the challenges presented by this kind of workshop in effecting desirable changes to classroom practice.

The second workshop

Student feedback on the second conducted workshop seems to indicate that a number of the goals of the workshop were achieved. Students reported greater awareness of their study processes (which is hardly surprising given that the word "aware" was included in the title of the workshop), but they also reported an awareness of the role of the academic context. This observation by some students, made independently of any explicit 'prompting' by the author, testifies to the power of this workshop: in putting together students studying a variety of different undergraduate subjects, the interaction with one another about aspects of their discipline-specific study engagement seems to have contributed to their awareness of the role played by different academic contexts.

The fact that some students reported being able to exercise greater control over their study processes, as a result of their enhanced awareness, is also significant evidence of a goal of the workshop having been achieved. Other (unanticipated but not unexpected) changes, such as students' reporting changes to their epistemologies, provide important evidence that workshops of this kind, in being focused on the interaction of students with one another, with minimal author intervention, can produce significant beneficial effects for students' study approaches.

The third workshop

Evidence from what students said about the value of this workshop, suggests that a significant number of ASPECT students felt more confident of passing end of year examinations as a direct result of hearing the attributional testimonies of students who were credible role models for them. There was clear evidence, from student feedback,

that they perceived examination success as possible for them, as a result of senior students suggesting that success was due more to their own efforts than to innate ability.

Comments from some students about the timing of the workshop seem to suggest that the 'lessons' learned by these students, and the impact these insights had on their subsequent examination performances, could have been even more effective had the workshop been offered earlier in the year. In the light of the fact that the workshop did, in fact, produce evidence of these students' being able to rely on their own efforts, it seems possible that their confidence in their own efforts could have been enhanced earlier, with concomitant positive effects on test and examination performance.

(5) End of year examination results

For the targeted group of nine Applied Mathematics students, whose orchestrations had been classified as "at risk" or "worse than average" on the basis of the second administration of the Inventory, their end of year examination results show that five out of nine passed (see Table six in chapter five). Two of these students, c2 and k1, in fact achieved overall results in their three undergraduate subjects which placed them on the Dean's merit list for examination achievement. From table six, it can be seen that four of these five students (including c2 and k1) also showed study orchestration improvements on the basis of the third administration of the Inventory. For these four students, the associations between their learning outcomes and study orchestrations are consistent with an hypothesis of this study, namely that it is possible to attempt to raise students' levels of metacognitive awareness and focus their attributional causality, with

an expectation that such intervention can, and will, lead to an alteration that is ultimately reflected in improved examination performance.

Of the other four students targeted for intervention (who did not pass the end of year Applied Mathematics examination), two students showed orchestration improvement (students c1 and t3). Student c1 has already been referred to - he stated in his written feedback at the end of the year that he had realised, by the end of the year, that he should have been more actively involved with the intervention programme than he had been: he had been psychologically "absent". For student t3, it is possible that her lack of background knowledge in certain sections of the Matriculation Science course (to which she referred in her initial interview with the author, discussed in chapter four) could have affected her performance in Applied Mathematics. Bridging this 'information gap' in one year may not have been possible for this student.

Student m3 (referred to in chapter five) did not participate in the ongoing intervention programme.

Notwithstanding the fact that, at the individual level, there are a number of factors associated with eventual examination success, the evidence presented above gives grounds for cautious optimism that individual students who enter higher education with "at risk" study orchestrations, and who participate in an ongoing programme of intervention which leads to improvement in their study orchestration, pass end of year examinations, and perform significantly better than those who do not participate in such

an intervention programme. This finding is consistent with a similar conclusion reached by Parsons (1993, in press).

Implications of the conclusions of the intervention programme

Perspectives on the perceived learning problems of educationally disadvantaged students on entry to university study might usefully be summarised by reference to three contemporary writers in this field. Agar (1990) describes the learning problems of educationally disadvantaged students as being the results of an assumed similar set of deleterious secondary school experiences. Agar (1990) interviewed a group of "non-traditional" African, English second-language speaking students in ASP at a South African university about the problems they were experiencing in adjusting to the transition between school and university study. He suggested that the academic adjustment problems these students experience at university can be ascribed partly to factors which all these students experience, such as the gap between school and university in terms of academic skills required, as well as the lack of school-based experience (usually attributed to the school context being a rote-learning one) which these students report in needing to think critically, to manage time and workload, to read and express themselves competently and confidently in a second language, and so on.

Tredoux (1992), on the other hand, argues that, to regard the academic approaches, and difficulties, of all educationally disadvantaged students as being attributable to homogeneous sets of school learning experiences, could lead to some dangerous oversimplifications in determining forms of academic support required. In her position

paper on the development of ASP practice in the Science Faculty at the University of Cape Town, Tredoux (1992) asserts that qualitative individual differences in the study behaviour of educationally disadvantaged students in the transition between school and university should be explored, (within the concept of the "study orchestration") as a background to determining forms of academic support needed at an individual level. But her paper also suggests that exploring the study orchestrations of 'traditional' students might also be useful in terms of establishing whether such students with similar manifestations of entry-level study behaviour as their educationally disadvantaged counterparts, require similar (or different) forms of academic support.

Important research work on the manifestation of "at risk" study orchestrations is currently under way amongst the 1992 first-year class of Engineering undergraduates at the University of Cape Town. The findings from this and other similar studies might well prove insightful in suggesting that traditional students might also require forms of academic support if their study orchestrations suggest that they are academically "at risk". If, however, it appears that the forms of academic support indicated for mainstream students who are "at risk" ought to be differently conceived than those for disadvantaged students, the practice of academic support may ultimately need to be relocated as a fully integrated mainstream endeavour.

Dunne (1990), in a position paper circulated as a contribution to debate about addressing educational disadvantage, entitled "Impressions of disadvantage", argues cogently for a more holistic approach to educational development programmes set up for

disadvantaged students. This approach, he argues must address institutional staff approaches to orientation week, student perceptions of residence ethos, residence tutorial and computer support systems and networks, the 'hidden' messages about helplessness which might be perceived by students 'labelled' as disadvantaged, and so on. The crux of his paper suggests that "any faculty intervention which does not address the whole person in academic disadvantage may well fail for reasons unconnected with conscious decisions that structured and motivated intervention" (Dunne, 1990 : 5). His paper implies that the perceptions of educationally disadvantaged students about the purpose and structure of academic support, as well as their perceptions about the institution of which these programmes (and the students themselves) are a part, need to be considered when assessment of these programmes is undertaken.

Against this contemporary background, the conclusions of the intervention programme discussed in this thesis would seem to have a number of important implications for ASP practice at various levels:

Implications at the individual student level

At an individual student level, the intervention programme has validated a most important assumption around which its activities were based, namely that it is possible to engage students themselves with aspects of their study behaviour in the context of their everyday learning experiences in a manner that is perceived by them to be both supportive and useful.

This observation, made against the background of student feedback in relation to a variety of intervention programme activities, has profound significance, specifically for academic support amongst educationally disadvantaged students, in that it suggests a number of important implications:

- (1) The construction of “learning conversations” (a term coined by Harri-Augstein and Thomas, 1991) can and should be a legitimate focus for academic support practitioners. What Harri-Augstein and Thomas (1991) argue is that a primary goal for any learner is the development of the capacity for Self-Organised Learning (S-O-L). They suggest, furthermore, that the development of the capacity for S-O-L is crucially dependent upon an individual learner’s “increasing awareness of the personal processes of learning [achieved through] reflectively reviewing ... direct personal experience [so that] Self-Organised Learners can better regulate the direction, quality and content of what they choose to learn” (Harri-Augstein and Thomas, 1991 : 3).

In essence, what is being asserted here is that the goal of developing Self-Organised Learners (a goal which is unlikely to be disputed in terms of its being desirable in the context of higher education in general, and academic support programmes in particular) needs to be based upon an ongoing and integrated engagement with learners at an individual level about aspects of their everyday learning behaviour.

The issue of this engagement being ongoing would appear to be crucial, as it implies that learning is a constantly fluctuating process of personal reconceptualisation and reformulation which, given an appropriate context of academic and other forms of support, can be structured to lead to the development of a basic lifelong ability which, as ASPECT student m1 (quoted earlier) asserted, leads "from answer-seeking to knowledge-seeking". More mature conceptions of learning itself, as well as the acquisition of deep forms of conceptual understanding, must surely be an important goal of any academic support endeavour. This form of ongoing conceptual and practical engagement, as an integral ASP practice such as finds expression in this intervention programme, stands out as conspicuously different from such practices as 'added-on' forms of decontextualised study skills support at a group level.

The fact that this engagement needs to be rooted in the everyday reality of learning and teaching is also of fundamental import since it implies that any meaningful conversation about learning at an individual level needs to be contextualised, in the case of ASPECT students, within a particular grouping of undergraduate subjects in an Engineering degree programme. The role of the learning context on approaches to learning which are undertaken has already been extensively documented elsewhere (see, for example, Ramsden, 1988). Reports emanating from the experiences of the students themselves on the value to them of individual discussion with the author about aspects of their study behaviour imply that these discussions were meaningful insofar as they

were rooted in particular engagement with specific undergraduate degree courses, forms of assessment, lecturers' approaches, and so on. In addition, the students reported that author-led group discussions directed at enabling students to interpret their self-reported study behaviour (presented to them as a product of their inventory responses) may not always be useful, unless these discussions take account of the uniquely individual association of study approach and contextual perceptions represented in terms of the study orchestration profile developed.

- (2) The manifestations of sometimes vast qualitative differences in the manner in which students engage typical university tasks poses a serious challenge to any untested assumptions regarding "anecdotal stereotypes" (with acknowledgement to Kember and Gow, 1991) which currently abound concerning the learning 'needs' of educationally disadvantaged students.

From the quantitative and qualitative analysis data obtained on the intervention programme conducted within the framework of a particular model of student learning, the present study indicates clearly that the recognition of qualitative individual differences in the study behaviour of (educationally disadvantaged) students is an important starting point for the establishment of meaningful individual intervention in ASPs.

Implications for groups of students

The workshops conducted within the context of the intervention programme generated a number of implications for academic support and/or intervention at subgroup level.

The notion of a 'subgroup' in the context of an individual-difference model of student learning cannot be over-emphasised, given the consistent focus of this thesis on students' qualitatively different contextualised study approaches.

"At risk" students who reported (at the initial exploratory interview on their approaches to learning school Science) a desire to alter aspects of their study behaviour to meet the demands of tertiary study, tended to respond in terms of wanting to make 'quantifiable' changes. They would spend more time on study; work harder; do more tutorial examples; and so on. Students with "above average" orchestrations tended to reflect more on the fact that tertiary study would require qualitatively 'deeper' levels of understanding and conceptual fluency, for example. Clearly, a great deal more stringent research is indicated in terms of determining the distinctive learning 'needs' of these differential forms of student engagement with undergraduate study, particularly in cases for students in the latter group who still fail.

In the case of "at risk" students, observations from the workshop on altering these students' qualitative levels of learning context perceptions would appear to imply that this form of explicit intervention is practicable, and seen by the students themselves as helpful rather than discriminatory. Based upon the end-of-year results of the subgroup targeted for this workshop intervention, as well as the scoring of their responses to the

third administration of the Inventory, qualitative improvement in perception occurred in six of the nine targeted students. Whatever other factors may be associated with the examination success of these students, their exposure to the workshop would seem to imply that the form of discourse between student and lecturer set up at this workshop could become an explicit part of everyday academic practice, especially for these subgroups of students in ASPs. Whilst it might be argued by ASP practitioners that apparently similar forms of support are offered in ASPs anyway, the explicit nature of this workshop intervention, coupled with an ongoing awareness on the part of the practitioner of differential forms of study behaviour, as well as qualitatively different student perceptions of the same learning environment constructs in different academic contexts (Meyer, Parsons and Dunne, 1990a), would seem to be unique contributions of this form of workshop.

The implications of the workshop designed to encourage students' increased metacognitive awareness of their contextualised study behaviour are less easy to document, as the workshop included other students in addition to the targeted group of "at risk" students. What it does imply, however, is that this process of raising metacognitive awareness is viable, and that it contributes to students' perceptions of control over their learning. Qualitatively different feedback from the students as to the value of this workshop implies, again, that assessment of such activities cannot ignore students' individual contextual perceptions. But the conduct of the workshop also implies that it is possible to group students with disparate learning conceptions, approaches and perceptions in such a way that articulations of some students can 'influence' the

perceptions of others. When these articulations have to do with matters of fundamental importance to students, such as study processes, this process of mutual influence implies that students with theoretically desirable approaches and perceptions can act as role models for other students.

The implications of the third workshop conducted as part of the ongoing intervention programme seemed to be conceptually and practically linked, in at least one important respect, with those of the second workshop, namely in their common focus on the notion of attribution retraining: if attempts to raise students' metacognitive awareness of their study processes, and simultaneously to produce motivational and behavioural change (Zimmerman, 1986), imply attributional retraining in some instances, then conducting workshops on appropriate examination preparation also implies assisting students to perceive, upon listening to other students with similar academic backgrounds discussing their examination preparation, that the causal attributions for their examination successes or failures might be temporary (unstable) and modifiable (controllable), i.e. that they might be a function of factors which the student can change, such as inadequate preparation or inappropriate study strategies (Van Overwalle, 1989; Van Overwalle, Segebarth and Goldchstein, 1989; Van Overwalle and De Metsenaere, 1990).

From qualitative feedback received from students who attended the workshop, it seemed that first-year ASPECT students, after listening to senior students discussing temporary study difficulties and how they overcame them, were indeed able to perceive

their academic preparation and achievement to be controllable. But the complexities of individual level feedback and perceptions could not be rigorously analysed within the scope of this thesis research.

The workshop with ASPECT students implied that ASPECT I students can benefit from listening to more senior ASPECT students, precisely because the latter are credible role models for the first-years. From feedback given by the students who attended the workshop, however, it would seem that one senior student's examination preparation 'tips' were less credible, because, over the three years of his engagement with university study, he had had an outstanding academic record, and first-year students perceive his study approaches to be atypical to theirs. This would seem that these first-year students benefited more from hearing study advice from more senior students who were perceived to have 'struggled' as much as they had.

Implications of the intervention programme for academic staff

Detailed discussion of the implications for academic staff of the conduct of the intervention programme is considered to be outside the bounds of this thesis. These implications will, nevertheless, be discussed briefly, because of the strong associations which exist between learning and teaching, and staff and student. Furthermore, the implications for academic practitioners highlight important areas for future research in student learning which impact significantly on ASPs and on mainstream academic development.

Members of the academic staff of ASPECT, by virtue of being in almost daily contact with the author, were exposed to a number of powerful concepts and findings related to student learning at an individual and group level. These concepts and findings became de facto part of the ongoing discourse between these practitioners and the author. It thus seems possible for the average practitioner within academic support to be made aware of these concepts and findings, an awareness which can be useful in terms of the practitioner being sensitive to the differential forms of study behaviour manifested in a group of students. Furthermore, the conceptual framework provided by an individual-difference model of student learning can be used by academic practitioners to introduce meaningful changes in teaching approach in order to assist students who might otherwise be at risk of failing academically, a notion already referred to by Parsons and Meyer (1990) and Parsons (1993, in press) in separate studies.

One link between assessing and developing the quality of student learning, on the one hand, and improving the quality of teaching, on the other, lies in a focus on the lecturer in tertiary education becoming action researcher in his own teaching practice. Kember and Gow (1992) express surprise that such limited reference has been made to the use of action research in the context of higher education. They argue a case for the use of action research in higher education, in addition to its use in secondary education, predicated upon three premises: (1) as research is a valued concept in higher education, lecturers are more likely to possess the skills, inclination and time to carry it out; (2) the improvement of teaching itself is an activity which might become the focus of research (leading to publication), thereby allowing practitioners to fulfil both teaching

and research roles concurrently; (3) the fact that control over the curriculum usually rests within the hands of a specific tertiary institution, makes staff development through action research more feasible and more easily implemented.

Discussion of concepts and findings of the intervention with the academic practitioners in ASPECT seems to suggest that action research might be usefully engaged, if only at the relatively low-key level of practical action research, where academic practitioners reflect critically with peers and students (perhaps by means of interviews or questionnaires) on the impact of teaching methodologies, curriculum revision, assessment procedures, and so on. Forms of feedback which constitute the substance of these processes of critical reflection could be used by practitioners to analyse student conceptions of, approaches towards and intentions for learning.

Discussion

There is overwhelming qualitative evidence of the value of an intervention programme of this nature in the context of higher education for this group of students. Research into student learning has focused international attention on students' qualitatively different conceptions, perceptions, approaches, epistemologies, motivations, and so on. This intervention programme has provided abundant confirmation, in a South African academic support context, of the manifestations of individual differences in the ways in which students engage learning. Based on the experiences of the students themselves, it has also suggested lines for intervention at an individual and at a subgroup level. It is clearly possible to assist "at risk" students to 'reorchestrate' aspects of their study behaviour in qualitatively deeper ways. Although the sample of students

targeted for this kind of intervention was a small one (work with larger samples of “at risk” students is currently underway at the University of Cape Town), the evidence of individual ‘reorchestration’ is especially compelling when this evidence is viewed against the findings of previous research about the stability of “at risk” orchestrations in the absence of explicit intervention.

In terms of raising students’ levels of context-based metacognitive awareness, and thereby enabling them to assume greater control in the regulation of their study activities, the intervention programme has provided substantial qualitative evidence of the viability of such focuses. In putting the learner in conversation with himself about the uniquely individual processes of learning (Harri-Augstein and Thomas, 1991), the intervention suggests that learning engagement is a complex individual process of developing this metacognitive awareness. The fact that such “conversation” is viable with groups of educationally disadvantaged students might well assist learners and practitioners to develop a sophisticated level of ongoing, abstract discourse about learning, which is aimed at the development of mature conceptions of, and commitment to, lifelong learning. Such is the nature of the challenges posed by this study.

Appendix A : Conceptual Base of the “Inventory of Teaching and Learning” used in this study

The Inventory consists of a series of statements typically made by students about the ways in which they engage learning, and their perceptions of the contexts in which learning takes place. Students respond to each statement in terms of a 5-point scale:

1	=	definitely agree
2	=	agree, but with reservations
3	=	not sure or it doesn't apply
4	=	tend to disagree
5	=	definitely disagree

The variables of the Inventory fall into two categories: contextual perception variables, and discrete study approach variables. The discussion below (with acknowledgement to Meyer and Watson, 1991) gives a code for each variable, a description of the meaning of the variable, and a sample item.

1. Contextual perception variables

BD DEEP PERCEPTIONS OF BOOKS

An awareness of the organisational attributes of books. Books are selected on this basis and used in relation to the value of the information they contain.

Sample item: “When selecting books for study purposes, I often examine their ‘search apparatus’ (such as the index, list of contents, chapter headings, cross references)”.

AD DEEP PERCEPTIONS OF METHODS OF ASSESSMENT

An awareness of the content, purpose, types and benefits of tests and exams, as well as the value of written feedback from teachers.

Sample item: "I usually think very carefully about the comments the lecturer makes about my answers to test or exam questions".

LD DEEP PERCEPTION OF LEARNING SPACE

An appreciation of the importance of the relational, rather than the functional, uses of chalkboards and the equipment in classrooms or laboratories as well as an awareness of where one sits in a classroom.

Sample item: "I usually notice the different uses of teaching aids (such as the blackboard, overhead projector, television and so on)".

RD DEEP PERCEPTIONS OF HUMAN RELATIONSHIPS

An appreciation that one can be helped and guided by others and that human interaction is affected by one's own attitudes.

Sample item: "I enjoy some learning experiences, such as those involving learning things from other people, more than others".

cs SURFACE PERCEPTIONS OF COURSE CONTENT

Attention specifically on the detail of the content in terms of its volume, structure and perceived relevance.

Sample item: "I prefer learning activities to be clearly structured and highly organised".

Is SURFACE PERCEPTIONS OF LEARNING SPACE

A concentration on those aspects of the learning environment (noise, legibility, equipment) which affect the ease and accuracy of information transfer.

Sample item: "I usually notice the legibility of what is written on the blackboard or on an overhead transparency".

rs SURFACE PERCEPTIONS OF HUMAN RELATIONSHIPS

An uncritical reliance on the words of the teacher or textbook while ignoring other aspects of the teaching/learning relationship.

Sample item: "In class I usually write down what the lecturer says or writes on the board".

wl WORKLOAD

A feeling that too much work is covered and expected, reflected in too many topics and too much written work, giving rise to a feeling of pressure.

Sample item: "The continual pressure of work - assignments, deadlines and competition - often makes me tense and depressed".

2. Discrete study approach variables

DA DEEP APPROACH

A conscious intention to understand new material even if this requires considerable effort.

Sample item: "I usually set out to understand thoroughly the meaning of what I am required to learn".

IM INTRINSIC MOTIVATION

A strong interest in, and even excitement about the subject being studied that extends beyond the demands made in class.

Sample item: "My main reason for being here is so that I can learn more about the subjects which really interest me".

RI RELATING IDEAS

Relating ideas between, as well as within, subjects, as well as a conscious attempt to relate material to real life situations and integrate it within a personal framework.

Sample item: "I try to relate ideas in this course to ideas in other subjects whenever possible".

UE USE OF EVIDENCE

The critical use of evidence in order to draw conclusions and an examination of evidence where this is used to support an argument.

Sample item: "I am usually cautious in drawing conclusions unless they are well supported by evidence".

CL COMPREHENSION LEARNING

Divergent thinking or 'mapping out' a subject as part of the comprehension of new ideas.

Sample item: "In trying to understand a puzzling idea, I let my imagination wander freely to begin with, even if I don't seem to be much nearer a solution".

RE REFLECTION

The process of reflecting on past learning experiences or real life experiences and deriving fresh insights from them.

Sample item: "I sometimes think about things I have previously learned and change my mind about their meaning".

St STRATEGIC APPROACH

A strategic manipulation of resources to meet perceived academic requirements.

Sample item: "I look out for hints about what is likely to come up in tests and exams".

OI OPERATION LEARNING

An engagement of problem solving that is reliant on factual detail and logical analysis.

Sample item: Puzzles or problems fascinate me, particularly where I have to work through the material to reach a logical conclusion".

Am ACHIEVEMENT MOTIVATION

A motivation to succeed, especially in competition with others.

Sample item: "I enjoy competition: I find it exciting".

ma MEMORISING APPROACH

A rote learning approach to studying in which important information to be "learned" (such as facts and definitions) is committed to memory by way of repeated rehearsal.

Sample item: "When I am learning I try to memorise important facts".

fa FRAGMENTED APPROACH

An inability to see the relationships between ideas or concepts. The "learning" of material that is perceived to be fragmented and poorly understood.

Sample item: "Much of what I am studying seems to consist of unrelated bits and pieces".

sb SYLLABUS-BOUNDNESS

A narrow focus on the requirements of the task and a preference for clear guidelines and structure.

Sample item: "I prefer learning activities to be clearly structured and highly organised".

ff FEAR OF FAILURE

A general concern with failing, but linked to exam tension, speaking in class, and pressure of work.

Sample item: "I am scared that I might fail this course this year".

ip IMPROVIDENCE

A failure to integrate detail into an overall picture and an over cautious reliance on detail and procedure.

Sample item: "Although I generally remember facts and details, I find it difficult to fit them together into an overall picture".

ds DISORGANISED STUDY METHODS

A general disorganisation reflected in poor time management (including putting off work), distractions and a backlog of important work.

Sample item: "Distractions, e.g. talking to friends or watching television, make it difficult for me to do much effective work in my study time".

gL GLOBETROTTING

An inability to back up a general picture with the necessary detail, leading to unsubstantiated conclusions and the use of irrelevant material.

Sample item: "Although I have a fairly good general idea of things, my knowledge of the details is fairly weak".

eM EXTRINSIC MOTIVATION

Studying and subject choice is seen as specifically career-related and as a means to obtaining a good job.

Sample item: "I chose my present course of study mainly to give me a chance of a really good job afterwards".

Note:

1. All of the contextual perception subscales except workload (wl), owe their conceptual origins to the work of Meyer (1988). The workload (wl) subscale

derives from the Course Perception Questionnaire used in the study by Entwistle and Ramsden (1983).

2. The study approach subscales are substantively those of the Approaches to Studying Inventory (ASI) used by Entwistle and Ramsden (1983). The original surface approach subscale (sa) of the ASI is split into two variables in the present study (ma and fa) based on a study by Meyer and Watson (1991), while the inclusion of the reflection subscale (RE), owes its conceptual origin to the work of Boud, Keogh and Walker (1985).
3. Interpretation of individual responses to the Inventory items is related to the association of variables at the individual level of response, and not to any linear interpretation of a response to a single variable or subgroup of variables.
4. Sample items are precisely that. These statements are given because they capture the essence of the description of the variables.
5. The convention of using uppercase letters for constructs which denote elements of a meaning orchestration and deep perceptions of learning context; lowercase letters for those constructs denoting reproducing orchestrations or surface perceptions; upper case followed by lower case letters for those constructs which are less well established empirically; and lower case followed

by upper case for the more usually reported empirical association (Meyer, Parsons and Dunne, 1990a).

Appendix B : Letter sent to students targeted for first intervention workshop

Dear

You are invited to attend an informal discussion group/workshop on **Monday 27 May** at **10h00** in **Lecture Theatre 11** (next door to ASPECT office). The subject of the workshop will be: "What I can expect from my lecturers; what they can expect from me."

The workshop will last for approximately 40 minutes and will take the form of discussion between yourselves and your Applied Mathematics, Maths or Geology lecturer. I shall be present to facilitate discussion.

You have been invited, because part of what you indicated on the Inventory which you completed, suggests that you could derive benefit from discussion and reflection on the topic mentioned above. You are therefore urged not to miss this valuable opportunity.

Yours sincerely

Appendix C : Example of letter sent to students who had passed the mid-year Applied Mathematics examination

Dear

Your results in the June test for Applied Mathematics show that you did particularly well in that subject.

I believe it would be valuable, both for you and for your fellow students, for us to discuss the study methods which you are currently adopting in your studying of Applied Maths. Your methods have been successful in your obtaining a good result, and your fellow students could benefit from hearing about them.

To this end, would you be prepared to talk informally with me at some time in the next couple of weeks? If so, please make an appointment through the ASPECT office ...

Thank you very much.

Appendix D : Example of letter sent to students who had failed the mid-year Applied Mathematics examination

Dear

Your results in the June test for Applied Mathematics might be causing you concern at this point.

I believe it might be valuable, both for you and for your fellow students, for us to discuss the study methods you are currently adopting in your studying of Applied Maths. By discussing your study methods with me, you might have the opportunity to assess, and possibly change, those methods which you feel might currently not be useful to you. This might also be helpful to your fellow students in terms of their avoiding similar problems.

To this end, would you be prepared to talk informally with me at some time in the next couple of weeks? If so, please make an appointment through the ASPECT office ...

Thank you very much.

Appendix E : Copy of worksheet given to students for use during intervention workshop two

LEARNING PROCESSES WORKSHOP - MONDAY 19 AUGUST

1. What are my main reasons for being at university?

(Some of the reasons for being at university which students give are :

to obtain a qualification

to enjoy new learning experiences

to obtain the highest marks possible)

2. Can you think of ways which your particular reasons for being here might influence your particular approach to your studies? (difficult question - think hard!).

3. Which of my particular learning approaches this year seemed to be the most helpful:

seeking to understand principles, concepts, formulae

memorising concepts, principles, formulae

making sure that I listen carefully in lectures and tutorials to what the lecturers say is important for examinations, etc.

any other methods and approaches?

4. In what ways can I/do I get the most out of lectures and tutorials? What kinds of lecturers and tutors do I most prefer? Why?

5. What study methods are working for me at the moment? How can I change those which aren't?

6. What have I noticed about examinations and tests? Do I think they test my understanding? Or my ability to recall detail? How can I prepare for them in different ways that make it possible for me to do really well?

7. How has the feedback I have received on tests and assignments helped me to adapt my study methods?

8. What aspects of the textbooks do I find most useful for my study methods? Why?

9. Do I feel in control of my studying at present? In what ways have I taken control of my own learning?

10. In what ways have I changed my views/increased my understanding of studying and learning this year:

in relation to Engineering

in relation to knowledge?

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