

Dyslexia in Higher Education:

**An exploratory study of learning support, screening
and diagnostic assessment.**

Dorota Zdzienski, November 1998

Abstract

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Dorota Zdzienski

There has been a notable lack of research, reported teaching experience and standardisation of assessment procedures for dyslexic learners in Higher Education. This is endorsed by the findings of a National Survey on Dyslexia In Higher Education (Singleton, in press). This study investigates the nature of learning support, screening and diagnostic assessment procedures for dyslexic students at Higher Education level.

This study necessitated the review of successive definitions of dyslexia, together with dispelling some of the myths that surround it and documenting the moves to make provision for special educational support at government level. A literature review of major publications in the field from 1895 to 1998, predominantly from the UK investigates information on the causes and features of dyslexia.

A series of six individual case studies were drawn upon to examine students' learning experiences and explore the effectiveness of a variety of study support methods, some of which have been developed by the researcher.

In total, the research studies and experimental work on design and trialling of screening and diagnostic tests involved 2000 students across many subject disciplines, from the Universities of Kingston and Surrey, of whom 200 were dyslexic.

Data was collected on student performance in cognitive and attainment tasks and analysed quantitatively to establish mean performance levels. Qualitative analysis was also employed to identify study skills difficulties and areas where dyslexic students showed differences in their responses to tasks compared to those of their non-dyslexic peers. The resultant wider approach to diagnosis is based on profiling areas of relative strength and weakness in study skills, and includes reporting on learning style preferences, in addition to the assessment of dyslexia.

The final stage of the research was the development and production of a computerised screener, 'QuickScan', and additionally a computerised diagnostic assessment battery, 'StudyScan'.

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and diagnostic assessment

**Abstract
(Section 1)**

INTRODUCTION

Rationale for the Study.
Issues proposed for investigation, context, and methodology
Main Review of Literature

BACKGROUND (Section 1)

A brief historical review of the problems surrounding the definition of dyslexia:
Set in the context of adult literacy provision, educational funding and legal issues.

EXPLORATORY STUDY 1993 - 1996 (Sections 2, 3 and 4)

Review of Learning Support

A Further Exploration of Learning
Support through a series of Case
Studies

Survey of existing Screening
Procedures.

Study of specific components
of screening through action
research.

Development of an
exploratory Quick Screener.

Review of diagnostic
Assessment Procedures

Exploration of diagnostic
assessment through an action
research project.

MAIN STUDY 1996 - 1998 (Sections 5.1, 5.2 and 5.3)

Analysis of the most effective
elements of learning support drawn
from the Case Studies and other
research in the dyslexia field.

Development of a computer-
based screening procedure:
A learning styles, study skills
and dyslexia questionnaire. It is
developed for computer
administration into a programme
called 'QuickScan'

Presentation of a framework for
computer-based diagnostic
assessment: A battery of
cognitive and attainment tests
and the development of a
computerised programme
'StudyScan.

Conclusions, implications and discussion.

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1.1. Rationale

1.1.1. Introduction

In social, political and educational debates the view is often expressed that the true civilisation of a country is evident in the way that its less fortunate members are treated. In an uncaring environment those who, through no fault of their own, experience difficulties can become damaged and overwhelmed. In an enlightened setting, however, the same people are more likely to find that they can learn from these experiences and become stronger individuals.

During the last fifty years, the gradual recognition and provision for people who are dyslexic has followed a slow, tortuous and at times painful path. The very existence of dyslexia took a long time to find acceptance, and is still challenged today. Various attempts by people from a wide range of disciplines to define 'dyslexia' have often added to the confusion and frustration of dyslexics, their relatives and those working in the field.

The main purpose of this study is to explore the nature of learning support, screening and diagnostic assessment of dyslexia in Higher Education.

This study is divided into 6 sections. Section 1 provides the rationale for the study, methods of research and a literature review of the causes and features of dyslexia. The second part of the section presents the relevant background to the history, popular misconceptions, legislation and definitions of dyslexia. Sections 2,3,& 4 present a series of exploratory studies into Learning Support, screening and diagnostic assessment. Section 5 presents the main study which constitutes a selection of teaching methods which were found to be helpful to the students, and are presented for consideration in Learning Support provision, and then leads to a programme (The StudyScan Suite) aimed at helping Study Support Tutors to facilitate the needs of dyslexic students through the use of computer-based screening and assessment.

StudyScan aims to shift the emphasis, from control resting with the examiner to the student. The intention is for the student to explore his/her own learning style and study habits, and through a series of test activities gain an understanding of his/her scholastic strengths and weaknesses, and then discuss appropriate support requirements with the tutor.

1.1.2. Preliminary investigation into the question, What is dyslexia?

To put the study into its appropriate context, however, the researcher considers it necessary to provide a background that briefly explores the problems of definition, some of the popular beliefs that surround dyslexia and successive moves at government level to assure provision.

Section 1.3.2., 'Dyslexia - the problems of definition' presents a historical overview and explores some of the underlying reasons for the continuing controversy over a dyslexia definition, and section 1.3.4 examines some of the myths surrounding the subject.

Whilst the historical, legal and educational background may not be of direct relevance to the main study, it contributes to a general understanding of dyslexia which is a multi-faceted, individually varying and subtle human condition, and helps to 'set the scene' for the study as a whole. This background section also explains some of the reasons for adopting particular perspectives relating to the study which have their roots set in the history of parents' and professionals' fight for acknowledgement of the existence of dyslexia.

Government legislation, which finally acknowledged dyslexia as a Special Educational Need (1981, & 1988 Education Acts followed by the Code of Practice) was very gradually and unevenly implemented at local level. In a recent National Survey carried out by the British Dyslexia Association (1997), it was found that even in the present time it is only the more severe cases of dyslexia that are identified and result in Statements of Educational Need (see section 1.3.8.). Consequently parents have had to watch their children growing up in a largely unsympathetic educational system, and whilst some dyslexics have coped quite well, many were and continue to

be left with a legacy of academic underachievement, and social and personal problems.

The issues of responsibility are explored, a brief review is provided of the introduction to Statements of Need and the role of the British Dyslexia Association (BDA) is examined.

1.1.3. Chronology of events surrounding the study

At the time of undertaking this study there was no overall policy regarding provision for students with SpLD/dyslexia in Higher Education. At the early stages of the study (1993) the Higher Education Funding Council for England (HEFCE) set up a series of initiatives, one of which was awarded to Kingston University based on preliminary work on memory strategies for dyslexic students (Zdzienski, 1993) that had already been carried out by the researcher, who subsequently took on the management of the project in its second year.

During the research phase of the study, carried out under the auspices of an HEFCE funded project to examine various aspects of dyslexia in further and Higher Education, the researcher participated in regional meetings which were attended by representatives of other project member Universities and Colleges, and recorded their comments and findings. Some of this material has been introduced into the present study to illustrate the fact that this was not simply an isolated project, but that the findings made by the researcher could be seen in the context of a national move towards establishing greater awareness of dyslexia and appropriate provision at HE level.

During the later part of the study the researcher became a member of the National Working Party on Dyslexia in Higher Education and she has therefore also been able to draw together many common threads between the findings of her own study and experience on a national scale.

During the last five years (1993 - 1998) there has been an increase in the levels of awareness and interest in dyslexia at Higher Education level. The National Survey on Dyslexia In Higher Education (Singleton, in press) reports that approximately 45% of Higher Education Institutions now have a dyslexia-trained tutor or run staff development courses on dyslexia. It is acknowledged, however, that there is still much more to do.

While a national study would have been beyond the scope of the resources available to the researcher, it is highly relevant to note that similar findings to her own with regard to standards of provision and the growth of recognition were being revealed across the country through the many projects in progress during the HEFCE funded initiative which started in 1993 and followed up by further project in 1994-5 which looked at the many issues arising.

In 1995, the Disability Discrimination Act (DDA) was passed requiring all Higher Education Institutions to set out their policy statements regarding provision for disabled students. Although it was not itself an Act exclusively relating to education, it had the effect of reinforcing the provisions of the 1992 Further and Higher Education Act which had set up the national funding councils which are required to *"have regard to the needs of students with disabilities"* in their activities. The DDA included a policy statement with regard to Specific Learning Difficulties (SpLD) / dyslexia), and this has caused key members of staff not only to have to acknowledge the existence of dyslexia among students but also to recognise the fact that dyslexic students have rights to equal educational provision, including appropriate levels of individual support.

By 1998, the educational environment for dyslexic students in Higher Education has benefited from a combination of legal stipulations, increased awareness among staff as a result of the HEFCE special initiatives, and the establishment of the obligation to ensure Learning Support provision.

1.1.4. A Summary of the Issues proposed for investigation and the methods of research

Data collection and archiving

As the main thrust of this study, to explore learning support, screening and diagnostic assessment of dyslexia at HE level, was extremely wide ranging in the scope of what it could encompass, it was considered, in the initial stages, to be most important to keep an open mind to the widest possible range of what might be discovered, rather than first developing a framework for research which might later prove too constricting.

One of the primary facets of such an investigative initial approach was the need for recording as many aspects as were feasible of each student participant and their work as related to the study. The significance of the collected data often became clear only in the light of the collection of further results. At worst a less flexible approach might otherwise have resulted in failure to record data which did not seem relevant within a narrow context.

Accordingly one of the principle considerations was the need for thorough result and action recording to be put in place, as well as establishing thorough archiving of all work carried out during the research phase of the study.

Approaches to the research

The approaches adopted in this study have taken into account the relevance of personal accounts of dyslexia, individual case histories, and an analysis of dyslexic students' performance in a range of cognitive and attainment tests. Dyslexia is a '*complex neurological condition*' (Singleton, in press), often manifesting an '*unusual balance of skills*' (Miles, 1993) in the individual, and therefore it is more likely that a balance of perspectives might yield some useful insights into the condition.

The last two decades have been something of '*a professional battlefield*' (Swann, 1985) in the search for agreement regarding the existence of, and need for appropriate provision for, individuals diagnosed as dyslexic.

A greater understanding and consensus regarding the general traits of dyslexia as well as the existence itself of such a condition may have been achieved earlier, according to Asher Tropp (1974) if the research had '*utilised both sampling and the detailed study of individual cases*'.

This view presented by Asher Tropp in 1974 in many ways inspired the researcher's approach to this study. When dealing with such a complex subject and attempting to gain a better understanding of it, it was also considered by the researcher to be important that the methods used should not constrain the direction of the enquiry but should rather be utilised as research tools to be selected according to how appropriately they suited the research stage concerned. The various methods used throughout this study and the reasons for their selection are considered in this section.

One of the initial aims of this study was to explore and systematically record some of the learning experiences of dyslexic students in Higher Education, with a view to presenting some of the successful learning strategies as well as discussing some of the problems that dyslexic students have encountered whilst studying.

The methods implemented include a series of 6 individual case studies which examine dyslexic students' learning experiences, from their identification of a problem, through the diagnostic assessment process, and onwards to learning support. Working with these students in a one-to-one situation provided an insight into the nature of their difficulties and required a selection of effective methods of intervention. The effectiveness of a variety of study support methods, including Neuro-Linguistic Programming, memory strategy development and study skills techniques is explored and the outcomes presented. Inconsistencies in existing provision have had significant implications for students' individual human rights and these issues are discussed.

The selected format for recording information about the students is outlined below:

Case Studies - Relevant Background Information

- Name and age
- Title of course and year
- Referral information
- Motivation and goals
- Summary of the assessment report
- Student's description of past difficulties and strengths
- Student's current learning difficulties and strengths
- Language attainment scores
- Other relevant information
- Summary of the student's current situation

Case Studies - Learning Support

- Summary of agreed course of action and direction of learning support
- Report on the work carried out, illustrated with examples
- Evaluation of progress made
- Determining the relative merits of particular strategies used during the sessions, and selection for wider use with groups of students
- Summary table to include future recommendations.

As a follow-up to the case studies, a presentation is made of the most relevant aspects of learning support. This is intended for the purposes of Study Support Tutors working on individual training programmes with dyslexic students, and may confirm some existing methods, whilst bringing forward others for consideration, discussion and possible implementation.

Individual support of dyslexic students is based on the findings of an educational assessment, preceded by some means of initial identification of a problem, therefore all these processes are closely linked and whilst working with students all three areas i.e. learning support, screening and diagnostic assessment have been investigated, to varying degrees, within the scope of this study.

Figures from the recent National Survey on Dyslexia in Higher Education suggest that between 1 and 1.5% of students following Higher Education courses are

dyslexic. The survey highlights the fact that while more students are now being identified during their years at school (attributed to increased awareness and provision resulting from the improved Local Education Authorities' Statementing Procedures, as well as the contributions from the voluntary educational charities in training teachers and providing tuition and assessments), of those students being identified or diagnosed as dyslexic, there are currently still some 43% who are only identified 'for the first time' while attending university.

A second aim of this study, since screening is not at present accessible to large numbers of students, is to carry out a survey of existing screening procedures, analyse selected components of screening and, as part of the main study, (see sections 3 and 5) to develop a screening programme for use with all students.

The National Survey reports that whilst a great deal has been researched and written about dyslexia among children, there is an acknowledged lack of research, reported teaching experience and standardisation of assessment procedures for adults, particularly those in Higher Education. Furthermore there is a lack of consistency in the assessment procedures suitable for the adult Higher Education population, a shortage of Educational Psychologists to carry them out promptly and limited resources to apply to individual assessments (Singleton, in press).

The Report further remarks that the quality of assessment reports varies greatly, which causes problems for the Local Education Authorities, and possibly results in unsuccessful claims by dyslexic students for Disabled Students Allowances. It was recently estimated that a substantial portion of the special allowances allocated under the category of students with disabilities (70%) were to dyslexic students. (See appendix 1A for details of DSAs and amounts allocated (Matty 1995)).

The third aim of this study is to research assessment procedures for the diagnosis of dyslexia in students who are studying at Higher Education level.

The assessment of dyslexic adults in Higher Education (where there is a well documented history and previous assessment reports) is a fairly routine procedure, whereby even in the absence of any of the generally accepted traits of dyslexia - such as an 'ACID' profile (Thomson, 1990), a discrepancy between verbal and non-verbal IQ (Turner, 1997), or '*an unusual balance of skills*' (Miles 1993), the

educational psychologist often has no qualms in up-dating a confirmation of dyslexia. The same is not true of a number of students who are being assessed for the first time in Higher Education - where they have a high level of ability and are well compensated in many areas, and where a full personal background is not available. Dyslexia can vary in severity from one individual to another (Turner, 1997) and can be compensated to varying levels (McLoughlin et al 1994).

The investigation into assessment procedures includes some of the objectives of the HEFCE project (Kingston University 1994-5) which are summarised below:

- *‘to identify tests that can be used by adult learners based on research data analysis and comparative literature,*
- *Through diagnostic assessment to identify the student’s learning difficulties; whether they are specific in nature or due to other factors; and to measure the extent to which they need additional support, by identifying the student’s strengths and weaknesses.’*

The exploratory work carried out is presented in section 4. It includes an analysis of students’ current performance levels and a basis for diagnostic dyslexia assessment in Higher Education which draws on both the findings of the investigation, as well as an interpretation of other work carried out in the dyslexia field.

This exploration of assessment leads on to an investigation of ways in which all students who have a need can be effectively assessed, and raises the question:

‘Can dyslexic students be positively identified and assessed through the use of computer-based questionnaires and tests?’

Little or no research had been carried out on computer-based diagnosis of dyslexic adults. Feasibility studies carried out in recent years (Nicolson, Fawcett, & Miles 1992) suggest that computer-based testing can be reliable and objective. Furthermore, in the case of specific memory tests, the multimedia version, carried out in identical fashion to the traditional method, was not only valid, but also significantly easier to administer (Nicolson, 1991).

This technological breakthrough has provided researchers with the opportunity to construct a new generation of psychometric tests that would enable larger scale, and lower cost screening and assessment.

The final aim of this study, which is the researcher's response to this challenge, was to put forward an outline for a computer-based dyslexia screener and diagnostic assessment programme.

This involved the production of a new screening tool and full battery of tests for diagnostic assessment to be piloted and submitted to a computer company for programming. The development work was carried out during 1996 and was followed by the piloting of test materials with groups of dyslexic and non-dyslexic students at Leicester and Ulster Universities. The computer company then carried out the programming and eventual release of the screener and test battery under the title of 'The StudyScan Suite' (1997-98) (on the basis of a shared responsibility for continuing research, statistical analysis, and regular up-grading).

There were some early apprehensions, but what could not have been easily predicted at the start of this study, was the rate of technological development which has now meant that the speed, power and availability of personal computers and the development of the Internet have revolutionised approaches and attitudes to Information Technology in education.

At that time though, when considering the use of computers for such sensitive functions as the identification and analysis of dyslexia, there were concerns among dyslexia specialists which needed to be addressed, such as the need to ensure a continuation of human contact as part of the process.

There was also a fear of the potential for the whole issue of assessment to be relegated to the status of an automated process. It was also thought that some students might find this medium discouraging and would prefer to be tested by a Tutor or Educational Psychologist. Furthermore, there were inherent aspects in a computer programme that are not as flexible as might be desired and which can on occasion be irritating due to the limitations of programming. There also needed to be continuing research carried out to ensure reliability and validity of diagnosis.

There were, however, also a number of advantages to be considered. Some students might find computer-based testing to be more user friendly, and consequently adopt a more positive attitude towards carrying out tests. For dyslexic students, whose common trait is inconsistency of performance often coupled with feelings of anxiety and lack of confidence, it is important for them to feel reasonably relaxed in an assessment situation in order for the examiner to get a true record of their strengths and difficulties. For some this may best be achieved working on a computer where anonymity is secured, and any feeling of embarrassment or inadequacy avoided as they would not be faced by an examiner asking, for example, a series of general knowledge questions, some of which the student may not be able answer.

The test development included the documentation, monitoring and analysis of screening and diagnostic assessment procedures. Some of these processes involved the researcher directly in the interactive events. Other areas of this study are descriptive and reflective accounts used to compare and contrast the results of other research with the findings of the study.

'The StudyScan Suite', the outcome of this study, is a two-part programme. Part One, named QuickScan (see section 5.2) is partly based on the BDA Adult Dyslexia Checklist, but it also extends to general study skills and individual learning styles. Pilot testing of QuickScan was carried out in 6th Form Colleges, and several universities with groups of confirmed dyslexic and non-dyslexic students.

The exploration activity for part two of the Suite, named StudyScan, is an adult cognitive and attainment test battery which required piloting in three stages.

The first stage (see section 4) involved the administration of the SATA (Scholastic Abilities Test for Adults - Bryant, Patton & Dunn, 1991) to UK students. The SATA, having been standardised on over 1000 examinees residing in 19 US States (the sample is claimed to be representative of the US population). It had not been used in the UK and needed to be trialled with UK students.

This test battery is to be adapted as a result of the exploratory study (section 4), and in parts further developed, for use with UK students (2000 students mainly from two universities and from approximately 60 different subject areas).

The second stage was the piloting and testing of the new test battery (presented in section 5.3) for reliability against the SATA. An item calibration for the new form of the test was carried out using Rasch analysis. This allowed for a calculation of internal consistency together with the difficulty level of each item, standard error, and discriminating power of the items. The Rasch model provided the information needed for revisions to the programme. All suggestions for changes that arose from this analysis required implementation.

Data was collected on student performance in a range of cognitive and attainment tasks across many subject disciplines. The methods of analysis employed were for the most part quantitative and aimed at establishing mean performance levels. Qualitative analysis was also required to locate areas where dyslexic students showed differences in their responses compared to their non-dyslexic peers, with a view to identifying factors which would discriminate them from their peers.

The research was intended to contribute to the ongoing process of identification and evaluation of the most effective discriminators of study problems for dyslexic students at Higher Education level.

At the third stage (see section 5.3), other specific tests considered essential for a dyslexia assessment but not part of the SATA, such as speed of information processing, visual and auditory sequential memory and coding were trialled and included. Those Phonological Skills Tests that became available in the later part of the study (e.g. non-word reading, Snowling, Strothard & McLean, 1996 (see section 3.2.5)) were administered to some students, but did not appear to present them with any difficulties, except in the cases of those individuals with severe dyslexia, or those who were not very familiar with English.

A future development programme is to be set in place for a much larger statistical analysis to be carried out with a number of institutions, so that further minor

amendments can be made allowing for increasing levels of reliability, for a series of validity studies to be conducted, and changes to the presentation of the programme to be considered in response to feed-back from users.

This work is presented in the light of the fact that *“We do not have alternative tests nor well-developed research procedures that have been thoroughly researched and validated”* (Singleton, in press), and is intended to a) present a constructive contribution to the dyslexia field in terms of research data on a range of aspects of the dyslexia condition among students in Higher Education, b) produce a tangible outcome for the work that was carried out under the auspices of the HEFCE project at Kingston University, (but not disseminated to other universities), and c) provide all students with a means of identification of specific learning difficulties/dyslexia and analysis of their cognitive and attainment profile, irrespective of their previous educational and financial background.

1.2 Review of published research on the causes and features of dyslexia

1.2.1. Introduction

The scientific diversity of researchers doing work related to dyslexia has broadened during the last few years, generating information from a wide spectrum of research areas. Research reports on dyslexia are now being published from fields such as linguistics, education, genetics. Furthermore, there is new information from the areas of neuroanatomy (Nicolson & Fawcett 1996), and visual (Heeger, Chase & Birch 1996) and auditory processing (Tallal et al, Merzenich et al 1998). We are now learning more about phonological processing in dyslexics (Stothard et al, Vellutino, 1998), the aetiology and genetic basis of dyslexia (Pauls 1996, Pennington 1998), differences in multiple neural systems involved in information processing (Hynd et al, Filipek, 1998), as well as further refining the definition of developmental dyslexia (Shaywitz et al, Shaw et al, 1998).

There are a number of 'generally' observed symptoms which have been well documented over the years (see section on checklists) and have acted as indicators of dyslexia, such as poor hand-eye co-ordination, weaknesses in auditory/visual working memory, sequencing skills, and coding processes.

The occurrence of uncertain or mixed laterality and the incidence of dyslexia within family groups have also been considered of relevance.

What has been a generally accepted feature of dyslexia i.e. that it effects more boys than girls with a 3:1 ratio (Chasty & Friel 1993, Frith, 1993), has been the subject of recent research. These figures have usually been based on responses from the voluntary educational charities working with dyslexic children, and need therefore to be seen as being limited to the children derived from this particular client group. Kolata (1990), has disputed this notion but further studies show a greater incidence of learning difficulties in males, non right handers and those with a left eye preference (Steenhuis et al 1993). Whilst girls may have generally more developed language skills and manual dexterity than boys, by adolescence they start to be overtaken in the area of spatial skills. However even taking into consideration some of bias in the test procedures there appear to be fewer girls with dyslexia than boys (Turner, 1997).

A wide range of factors can be associated with dyslexia and these factors work differently in different individuals (Harrie and Weller, 1984).

General intellectual ability appears to have little to do with the causes or symptoms of dyslexia except that IQ tests have been a useful tool over the years to point out the clear anomaly of an otherwise reasonably intelligent person not being able, in spite of effort, to master some of the fairly basic literacy tasks such as spelling, handwriting and sustained reading.

Turner (1993) suggests that the discrepancy between expected and actual achievement remains the basis for the identification of dyslexia. The two most consistent research findings, he claims, are that dyslexics have lower verbal than non-verbal abilities, (although in the case of dyspraxia the reverse of this is usually the case [Shapiro,B 1994]), and that other family members are often similarly affected.

1.2.2. Controversies over laterality and hemispheric specialisation

The possible causes of dyslexia have been pursued from Orton's early observations, who regarded dyslexia as a failure of the brain to '*establish unilateral cerebral dominance and perceptual consistency*' (Valett 1980), In the 1970s the issue of uncertain lateralisation or mixed handedness was considered by many to be an indication of a lack of hemispheric integration (Naidoo 1972,Vernon 1975).

Those children showing spatial confusion and disorientation (Benton & Kemble 1960) were seen as exhibiting a sub-type of dyslexia. Left - right confusion was observed in students with writing and reading difficulties (Galifret -Granjon, 1959) who did not at the same time show any signs of oral language nor of visual perceptual difficulties.

The focus moved away from cerebral dominance as research into this area was not yet sufficiently advanced, and theories could only be put forward that were inferred from behavioural data (Beaumont & Rugg 1978).

However, work was also carried out that suggested that the analytical left hemispherical functions were dominated by and interfered with by spatial, holistic functions of the right (Witelson 1977). In Holland, Dirk Bakker (1972) investigated the impaired temporal order of visual and auditory stimuli in children with reading difficulties.

Dr. Tomatis, whose work is now implemented throughout the world (in 250 centres), contended that since the left hemisphere of the brain is the main centre for processing language, then the right ear must take a dominant role in listening. Dyslexics who have not achieved right ear dominance are likely to jumble the order of speech sounds. (Sound Therapy has been claimed to help establish right ear dominance). This view was also supported by others including Gaillard (1990) whose research confirmed that generally right-handed school children have a right ear dominance for processing verbal material, such as a series of digits. This supported the notion that people use an effective left hemisphere lateralisation for linguistic functions. But students with Specific Learning Difficulties very often, through dichotic listening tests, were found to be using their left ears for reading and arithmetical tasks, which suggested that some degree of hemispheric compensation was in play.

Using the dichotic listening techniques as described by Kimura (1961), it is possible to calculate the superior ear which indicates the hemisphere processing language (Chasty 1979). This research went on to demonstrate that language impaired children are strongly using the right cerebral hemisphere to process language, leading to the definition *'a dyslexic is a person with a different and less efficient form of neurological organisation for language'*.

Whilst no correlations have been found between handed-ness and reading ability among the general population (Rutter & Tizard 1970, Satz & Fletcher 1987), when groups have been selected primarily because of their poor reading the results have been more positive, especially among the extreme tail of the distribution (Naidoo 1972, Annett & Turner 1974). However, these were small-scale studies. There still needs to be more convincing evidence regarding handedness and reading failure among this small sub-set of the left-handed population. Further evidence has emerged in the work of Annett's right-shift theory (1981) suggesting a genetic link between handedness and cerebral lateralization.

In tests it was found that many dyslexics are right handed and right eyed, and there are plenty of people who are cross-lateral without being dyslexic, so a shift was made to examining what turned out to be a far more profitable and rewarding path by looking at the dyslexic's inability to retain a complex load of information over time (Miles, & Wheeler 1974), i.e. Memory difficulties.

Farnham-Diggory, & Gregg (1975) showed that dyslexics exhibit a very marked 'fatigue' effect which makes them extremely inefficient at information processing as time goes on, and this was later to be found to be related to auditory memory, not visual.

The effect of an inefficient working memory on the acquisition of literacy skills has been researched (Gathercole & Baddeley 1990) and has led to the fact that an underlying difficulty of dyslexics is with phonological processing, which is dependent for its success, on an efficient working memory (Papagno, Valentine, & Baddeley 1991).

Nevertheless, laterality, and left/right confusion have been associated with dyslexia from its earliest observations. They used to form a part of the GP's assessment of dyslexia (and indeed the educational psychologists) and very often a left-sided cortical dominance was not proven in dyslexics - 'a significant finding' (Harvey 1970).

'Whilst all speculation should be treated with caution, the development of cerebral asymmetry of function ...is an important area for fundamental research and should not be written off hastily..' (Chasty,H 1978).

Studies found evidence that some children with reading problems also suffered a confusion of left and right. According to Corballis and Beale (1976) this was especially true of those who might be described as truly dyslexic and compose the lowest 2 or 3% in reading ability. In their research, left/right confusion emerged as a significant factor in reading disability only in large scale studies or in the studies of severe cases.

The link between directional confusion and lack of cerebral dominance was suggested in a study of left-handedness and laterality in pilots, where an inability to act accurately and without hesitation upon verbal instruction concerned with direction was vital to survival (Evrard et al 1976), and a small percentage of people seem to retain this inability throughout life.

Whereas, right-sided people seem to have an immediate awareness of direction, those who are ambidextrous, left-handed, or ambivalent as to eye dominance are sometimes more vulnerable to directional confusion and this may cause problems in the acquisition of literacy and numeracy skills (Street 1976).

In a number of recently published Guides for Staff on the subject of Dyslexia in Higher Education, there are references to cross-laterality and left/right confusion. *'We have not found left handedness to be particularly common among dyslexic students , although most students show some degree of ambidexterity'* (Loughborough University 1993). (see section 5.2.)

These observations made by a practitioner in 1976 are endorsed by university-based research (Garner & Rippon 1997) which concluded that weaker readers and spellers were characterised by poor phonological processing skills and reduced dextrality (small left/right hand skill differences), whereas good readers but poor spellers showed less phonological difficulty and more evidence of stronger lateralization.

However, investigations of the role of dominance in handedness, eyedness and mixed laterality have produced no consistent conclusions (Harrie and Weller, 1984) There is still no definite explanation for impaired lateralization (including mixed handedness and left/right confusion) and with the introduction of functional imaging (which will allow researchers to examine pictures of the brains of dyslexic and non-dyslexics whilst they are involved in specific tasks), answers may well be forthcoming in the near future.

The whole issue of laterality is somewhat briefly and summarily dealt with by Turner (1997) in a section of a book on the Psychological Assessment of Dyslexia entitled *'What are *not* signs of dyslexia?'* as a condition that may or may not coexist with dyslexia, but is likely to compound and confuse the symptoms of dyslexia.

He concludes that laterality is probably not linked with any of the causes of dyslexia and that such common developmental aberrations that are included in checklists for dyslexia will result in a situation whereby '*numerous children will be wrongly recruited as victims*' The consequence of such a statement has been that numerous assessments carried out under the auspices of the Dyslexia Institute have ceased to comment on the child's lateral functions and left/right awareness, since they were given a brief stating that laterality tests among other outmoded tests would no longer be 'mandatory' (Turner, M 1994).

Poorly established dominance has been found in developmental dysphasia, autism, and schizophrenia. '*It is notable, that all these conditions involve disordered language acquisition and tend to run in the same families*', (Stein 1996). He suggests that abnormal hemispheric lateralization may be the cause of a spectrum of conditions running from dyslexia to schizophrenia. (Recent studies have furthermore linked schizophrenia and dyslexia in association with a skewed sense of time, (Ahuja 1998) in this case caused by levels of a brain chemical, dopamine).

1.2.3 Genetic and birth factors

Speculations into the causes of dyslexia suggested that it could be acquired before birth or during the first two years of life, when children were either not forming the necessary connections between cells or failing to make effective interaction between brain cells (Gordon 1977). This theory was presented by the consultant neurologist speaking at a one day conference on the 'Medical Aspects of Dyslexia' in 1977.

After some twenty years these hunches are now more fully endorsed. The range of symptoms and the neuropathology of developmental dyslexia strongly suggest that it is a congenital neurological syndrome due to impaired development of the normal architecture of the brain (Stein 1996).

In researching the sub-types of dyslexia it has been found that there appears to be higher incidence of birth difficulties of various types, and a higher incidence of family history of similar difficulties (Fleming & Singleton 1997).

There is now beginning to emerge more established evidence for the existence of sub-types of dyslexia, with differing but sometimes complex aetiologies involving interaction of genetic and birth factors.

Theories put forward suggesting that the problems of dyslexics are more likely due to external factors, such as poor parent-child relationships (Young & Tyre 1983) whilst at times overlapping with the dyslexic's situation, do not really hold up in the light of all the evidence that is now accumulating about the causes of dyslexia.

Over the past decade the research of Professor Galaburda has found through dissection of brains, distinct differences in the clusters of large cells in the areas of the brain which process visual and auditory information. Dyslexics showed clusters roughly 30% smaller than non-dyslexics of similar IQ, suggesting that processing detailed information quickly would be a problem (Turner 1993).

Galaburda's theory has been explored and reaffirmed by research presented at the BDA York Conference showing that the volume of the left temporal lobe is significantly smaller in dyslexics (Coloni, Cavalheiro, Castro & Cerri 1997).

1.2.4 Neurological bases

Research carried out by Uta Frith at the Medical Research Council's Cognitive Development Unit in London University is reported under the apt heading 'Dyslexia's broken bridge' and states that '*Dyslexia is caused by a faulty connection between two areas of the brain which process language*' (Carter 1996). Using brain scans the team found that in non-dyslexics the insula (crucial bridge) and both language areas (Wernicke and Broca) lit up together during linguistic tests. However, in the dyslexics' scans, the insula did not light up, and each language area was activated in isolation. Since each language area deals with a specific aspect of word processing (Wernicke - recognition of whole words, and Broca - segmentation and imaging of the sound), most people when they see a written word can also automatically 'hear' it at the same time, whereas in dyslexics the areas are disconnected. Consequently, instead of knowing instinctively what a written word sounds like, they have to think about each word they see and consciously translate it from one form into another.

This research is presented in more detail in a paper entitled 'Is Developmental Dyslexia a disconnection syndrome?' (Paulesu, Frith, Snowling et al 1996).

Many dyslexics compensate reasonably well by using other pathways in the brain, and their difficulties only really show up when they find themselves under stress. The educational implications, therefore are that dyslexics have to put much more mental effort than their peers into work which involves using languages and this extra effort is not always reflected in their written examination results.

In her keynote lecture at the BDA International Conference at York (1997) Uta Frith stated that *'There is some evidence for a genetic basis, and some evidence for a brain basis although in both fields the work is only just beginning.'* She believes that there is an underlying cognitive deficit and that this may provide a unifying theory of dyslexia. She goes on to describe it as a *'most intriguing and subtle disorder'*.

1.2.5 Neuroanatomic bases

It has long been recognised that there appeared to be a link between dyslexia and gross/fine motor skills difficulties. As part of the neurological examination, carried out by GPs there included testing for evidence of the integration of the nervous system i.e. Looking for signs of a lack of motor power, muscle tone, sensory loss, lack of appreciation of form, and space and body image ('Draw-a-man'). Checks were carried out to confirm the presence of reflexes, and evidence of a good cortical control (Harvey 1970).

Visuo-spatial-motor factors of dyslexia affect approximately 5% of dyslexics (Robinson and Schwartz, 1973), and result in difficulties with sequential organisation, scanning and the perception of temporal and spatial cues.

Research at the University of Sheffield (Young 1994) carried out by Nicolson and Fawcett now show a high correlation between dyslexia in children and impairments in the cerebellum (an area of the brain usually associated with motor control). They suggest that cerebellar impairment might be an underlying cause of dyslexia.

More recent work suggests that there is a growing probability that the route towards phonological deficits may involve early difficulties in motor aspects of speech (Nicolson, Fawcett & Dean, P 1997).

1.2.6 Impaired phonological processes

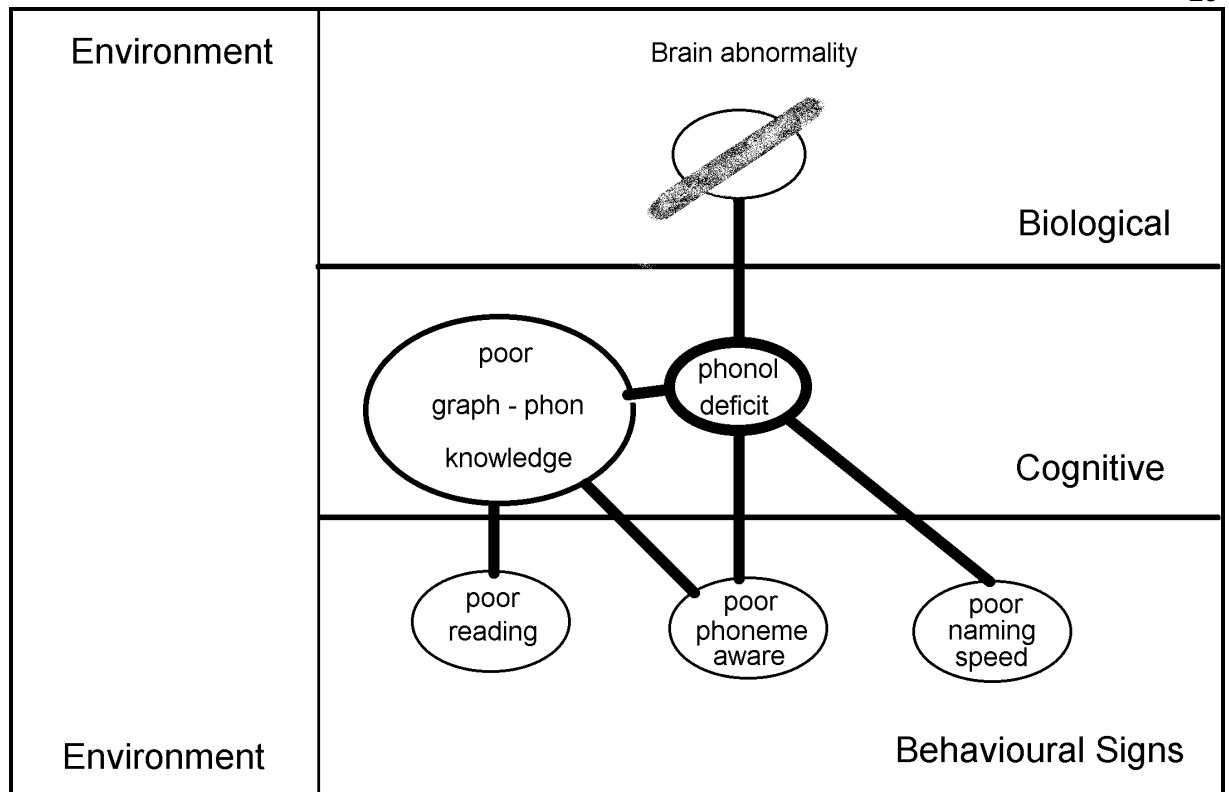
The primary contributing factor to dyslexia has increasingly been seen to be an auditory language deficit, i.e. a disorder within the language centre of the brain which causes interference with a person's ability to isolate and manipulate sounds. Mattis (1978) identified 86% of dyslexics as having difficulties in linking the spoken form of a word with its written equivalent. Vellutino's book (1979) was an important landmark showing that dyslexics' difficulties were mostly to be found in verbal and not non-verbal tasks. Groups at Oxford and University College, London were amongst the first to refine this position further, showing that dyslexics' difficulties were most consistently found in tasks requiring phonological (word-sound) processing (Rack 1996).

Phonological dyslexia is a form of reading disorder in which the ability to read unfamiliar words, or pronounceable non-words, is selectively deficient. It occurs both as a developmental dyslexia and as an acquired dyslexia and has implications for our understanding of how children learn to read and of the architecture of the reading system used for normal skilled reading (Coltheart 1996)

Over the past decade there has been growing support for a causal relationship between phonological awareness and reading acquisition (see illustration 1a.).

Research of more than two decades has affirmed the importance of phonological awareness and its relationship to reading acquisition. Recent reviews of the literature (Hurford, Darrow, Edwards, Howarton, Mote, Schauf and Coffey, 1993; Mann 1993) indicated the presence of phonological awareness in good readers and its absence in poor readers.

Illustration 1a: Causal model of dyslexia with phonological deficit (Frith, 1995)



There is now strong research evidence that phonological awareness is part of a larger construct in coding and retrieving verbal information known as phonological processing (Hurford et al., 1993, Wagner and Torgesen, 1987 Vellutino and Scanlon 1987).

Phonological processing consists of two components, awareness and coding, each having many dimensions that are relevant to the acquisition of reading. Explanations for differences between normally achieving and diverse learners in the ability to code, remember, and retrieve verbal information suggested a causal chain (Liberman and Shankweiler, 1985; Mann and Brady, 1988, Torgesen, 1985).

Research has shown that many aspects of phonological awareness can be validly and reliably measured through a variety of tasks (Wagner 1986, Yopp, 1988). However, it is important to note that only a small number of phonological awareness studies have been carried out with older students (Vellutino and Scanlon, 1987, 1987a). However, recent reviews of the causes of reading disabilities generally refer to research across ages (Rack, Snowling, Olson, 1992 ; Snowling , 1991).

Individuals who are clinically diagnosable as dyslexic (using, for instance, a discrepancy criterion where reading and spelling achievement are compared to the child's IQ and educational opportunities) generally have the following signs:

- Delayed speech acquisition and problems in early speech production (e.g. Scarborough, 1990).
- Difficulties with object naming / word sound retrieval (e.g. Wolf, 1991).
- Poor verbal short term memory (e.g. Shankweiler & Crain, 1986).
- Difficulties in segmenting phonemes (e.g. Kamhi & Catts, 1986)
- Poor non-word repetition (e.g. Snowling, 1987).

Frith, (1995)

1.2.7 Impaired visual processes

Exploring the visual processes underpinning the development of literacy was undertaken by Stein, Fowler, Seymour and Wilkins. However, in comparison with the numerous studies focused on the nature and educational importance of phonological and verbal processes, the work in the visual field is less well known to teachers (Pumfrey, P 1996).

While there have been several reliable studies over the years to suggest that dyslexics have no greater incidence of eye problems than individuals with normal reading ability (Helveston, 1969, Blika, 1982, Keys, 1982, Hiatt, 1984) there is now increasing evidence that dyslexics demonstrate specific visual deficits.

Research has identified several visual factors as correlates of dyslexia, including poor ocular accommodation, binocular instability, a deficit in the transient visual sub-system and the Meares-Irlen syndrome. Evans, (1996) concluded that although phonological factors were probably the main causes of dyslexia, optometric anomalies could well be a contributory factor.

Research studies now reveal (Demb, Heeger et al 1997) that the level of brain activity in the visual cortex (portion of the brain devoted to processing visual signals), appears to predict the speed at which dyslexics can read. *There is a visual deficit*

associated with Dyslexia, but at this time we don't know for certain if the deficit causes dyslexia or is just a marker for it. Using functional MRI (magnetic resonance imaging) the researchers took pictures of the brains of dyslexics and non-dyslexics whilst they were involved in specific thinking tasks. It has already been established (Livingstone, Galaburda et al 1991) that in dyslexics the cells found in the M (magnocellular) pathway are smaller compared with non-dyslexics. This gave rise to the theory that a deficiency in the M cells could cause dyslexia; whereby it becomes more difficult to recognise rapidly scanned print or carry out the fine motor control of the eyes required for reading without experiencing interference.

Supporting evidence comes from other studies in which a particular abnormality has been found in the fast processing stream of the visual system, and differences have been located in the regional organisation of the cortical visual system (Den, Van Meter, Rumsey, Maisog, Woods, & Zeffiro 1997). Research has also shown early evidence of a connection between impaired processing in the M (magnocellular) visual stream and four kinds of perceptual errors in reading, namely: 1) letter omission 2) letter substitutions 3) letter translations and 4) letter additions (Cornelissen, Evangelinou, Hansen & Stein 1997).

Either auditory/phonological or visual processing may be impaired in developmental dyslexia. *'But currently most psychologists believe only phonological skills are affected'* Many dyslexics have both types of problem and research is now showing that both are likely to be impaired, though often to different extents. This would lead to the theory that the development of the child's whole nervous system is abnormal (Stein 1996).

Little evidence is available to indicate the extent to which dyslexics experience a simultaneous visual and language processing dysfunction. Results of recent studies (Slaghuis, et al 1993), suggest the concurrence of both visual and language deficits.

Gaillard (1993) describes dyslexia as an instrumental deficit located *'at the cross-roads'* between language and visual perception.

1.2.8 Positive aspects of dyslexia

Certain learning strengths are also attributed to dyslexics, such as an ability to think more holistically and therefore display greater levels of creativity, understanding, and awareness (these being a little more difficult to test using standard assessment procedures). Some of the most brilliant and forward-thinking individuals in our culture have had trouble with words. It is now becoming increasingly clear, claims West (1995), that often people with great visual - spatial or other non-verbal talents have '*extraordinary brains*'. - brains that seem to be optimised to do tasks other than those which are normally called for in conventional word-dominated education systems. Tom West argues that the efforts that have been put into teaching (reading, writing, counting and memorising) will, with computer technology soon become '*the outmoded skills of a mediaeval clerk...*' and that *dyslexic people with their 'high level thinking, mental modelling and visualisation skills - sometimes hidden beneath a variety of verbal and academic weaknesses - may turn out to be superlatively well suited to the emerging 21st century.*' His book 'In the Mind's Eye (1991) has been seen by many as a landmark in positively influencing attitudes about dyslexia. For the first time dyslexics were being presented in a very positive light, as visual, multi-dimensional thinkers, intuitive, at times highly creative and excelling at hands-on learning. Where at one time dyslexia was regarded as an 'affliction', recent literature presents dyslexia more as a 'gift' (Davis & Braun, 1994).

When looking for statistically based support for claims, as substantial as this seems to imply, there are only relatively oblique references which suggest that there may be spatial strengths among certain dyslexics which would be found in only 25% of the general population. (Turner 1997)

Visual-spatial abilities appear more regularly in tests to be male dominated attributes. In a few otherwise normal individuals these skills are found to be stronger than might be expected, and even in the cases of certain retarded individuals unusual spatial skills can be found (Gardner, 1983). Many individuals with unusually developed spatial intelligence have, perhaps not surprisingly, excelled in the professional spheres of science, engineering, architecture, computer graphics, painting and sculpture.

The following is an example of a young dyslexic artist's work, (the researcher's learning support student) whose handskills for writing were exceptionally poor, who was generally underachieving academically yet was able to produce this drawing with relative ease and speed.

Illustration 1b: An example of a dyslexic artists work



1.2.8 Summary

The picture that emerges of dyslexia is that of a 'discreet' brain disorder, a variable condition affecting different individuals in different ways and to varying levels of severity.

It might be expected, therefore that students who are dyslexic, and following courses at higher education level, may show some of the following characteristics:-

- an inefficiency in the short-term or working memory system which may cause them to lose track of ideas, or in conversations, and to find learning for examinations difficult.
- inadequate phonological processing abilities, so that longer words are sometimes difficult to pronounce and unfamiliar words are frequently mis-read.
- a difficulty in automising skills, making it difficult to listen and take accurate notes simultaneously, or concentrating on a flow of ideas and having a regard for correct spelling and punctuation at the same time.
- difficulties with rapid visual processing, whereby it becomes difficult to deal efficiently with sustained reading activities.

As one student put it:-

'Dyslexia is like a finger-print, it is unique to each person'

1.3. Background to Dyslexia

'Dr John Hunter, the famous surgeon of the Eighteenth Century could not read until he was 17, and occasioned great distress in his family by his backwardness'
(Harvey, K.E 1970).

1.3.1 Early Observations

It was as a result of a similar observation to that the General Practitioner, Dr. Pringle Morgan submitted comments to the British Medical Journal (1895). He stated that there was a boy of 14 at one of his schools in Seaford who could not master the art of reading and yet was of superior intelligence. The schoolmaster had said that if the teaching had been oral, this boy would have been top of the school. As it was, he was struggling along at the bottom of his class. *'Could it be'*, wrote Morgan, *'that there exists a condition which one might call 'congenital word-blindness?'*
(Critchley, 1974).

The identity of that boy and his progress remain obscure. Critchley's research identifies three schools where Dr. Morgan practised and concludes that the most likely one was Seaford College. However, during the war, Seaford College was evacuated to Graffham, near Petworth, where it remained. All the early records of the College had been destroyed. Whilst unfortunately any qualitative or diagnostic evidence was no longer available, public interest had been inspired and the quest into dyslexia had begun.

1.3.2 The Problems of Definition - a brief historical perspective

The notion of 'word-blindness' caused so much controversy in the fields of Education and Psychology that in the 40's 50's and early 60's the concept of intrinsic developmental neurological difficulty was rejected (Newton 1974). In England, the existence of dyslexia began to be publicly acknowledged by 1962 at a word blindness conference sponsored by the ICAA (Invalid Children's Aid Association),

which led to the foundation of the Word-Blind Centre and the registering of dyslexia as a disability under the provisions of the 1970 Chronically Sick and Disabled Persons Act. Since that time, although there have been numerous attempts to redefine dyslexia, thus casting doubt on the original definition, it is interesting to note that in the 1991 edition of the Chambers Dictionary, dyslexia is still described as 'word-blindness'.

In spite of holding a conference in Nottingham in 1961 entitled 'Dyslexia and Remedial Education', the BPS (British Psychological Society) wrote to the Tizard Committee in 1972 stating that they '*seriously questioned the use of the term 'dyslexia' as a clinical entity,*' (Meredith 1972) The name was subsequently changed to '*special reading difficulties*' and '*specific reading retardation*' thus shifting the main focus of the problem to that of reading. This created some confusion because dyslexia is not always primarily a reading difficulty, and many dyslexic students can read quite well but have greater difficulties in the area of spelling, organisation and memory.

The difficulty in arriving at a satisfactory definition of dyslexia since its first identification a hundred years ago has lain in encapsulating so many varied symptoms and manifestations of the problem in a definition constituting one succinct statement. Because it was so difficult to define, it became an easy target for those who were reluctant to recognise its existence or who did not wish to assume the responsibilities that came with it. The fact that dyslexia has touched such a wide range of disciplines including the medical, psychological, clinical, neurological, paediatric, occupational therapy, speech therapy, and teaching professions has had both beneficial and adverse effects. Consequently there has been a wealth of enriching professional perspectives on the subject, which have all added credibility to the existence of dyslexia. The adverse effect, however, has been that as a result of a lack of communication and tolerance between the various professions a common consensus has become even more difficult to achieve.

Dr. Curtis Jenkins (1976), a medical practitioner, who identified a number of children at his clinic as dyslexic described the '*hornets' nest*' he had stirred up, and went on to write (Dyslexia Review 1976): '*If I told the parents, the schools would accuse me of interfering. The school medical officer had already made some very forceful remarks*

about my meddling in things that did not concern me, when the trickle of schoolchildren began to come with their parents to seek help. In addition I had already learnt to my cost that the local Child Guidance Service was incensed at my direct referral to them of children with learning problems. Six, seven or even eight month waits for assessment were common. The parents were often intimidated by suggestions that it was their fault and psychotherapy was on a few occasions suggested to apparently treat the anxious mothers.' (Curtis-Jenkins 1976). He made these statements ten years after he had first observed dyslexia as a clinical entity.

Asher Tropp, a professor of sociology at The University of Surrey commented in a paper entitled 'The Dyslexia Controversy' (1974): *'The problem over 'dyslexia' is often based on a more subtle but significant conflict between professional psychologists and the medical profession'*. He argued that psychologists were unduly influenced by continua, normal distributions, averages and random samples and that they had been affected by the heredity/environment conflict to the extent that Intelligence Quotient (IQ) testing had been superseded by environmental considerations. While this may have been appropriate when considering reading standards in general it was not particularly helpful in the dyslexia debate where there was now evidence (Vogler et al 1985, Olson et al, 1989, 1990) of a hereditary link and in which I.Q. has been a key factor in making positive diagnoses. Prof. Tropp also felt that psychologists were insufficiently aware of recent research and thinking on human biology. In contrast to the psychologists' approach, he said, *'the medical profession tends to see isolated cases which when repeated they tend to group as 'syndromes'*. For him, the 'correct' approach to research was *'one which utilised both sampling and the detailed study of individual cases'*. Such a balance of perspectives from a range of disciplines would have done much to produce a more fully rounded and better informed definition of dyslexia than the individual pursuit of any specific discipline has been able to achieve.

One of the main reasons why early definitions of dyslexia have come into question is because they focused on discrepancies between a person's potential, as measured by an intelligence test, and their performance in reading, writing and spelling as measured by standardised attainment tests. Discrepancy between ability and performance was the primary component of earlier definitions of dyslexia: *'There are*

two conditions which need to be satisfied if a person is to be counted as being 'dyslexic'. The first is that of discrepancy. By this I mean that the person's performance at spelling, and usually at reading also needs to be discrepant with his intellectual level. The second is that he needs to display special difficulties in arranging things in spatial and temporal order. There may, of course, be people who may be discrepant without having these orientation and sequencing difficulties. In that case they are not dyslexic.' (Miles 1974).

The discrepancy theory, however, 'a foundation concept for the very idea of dyslexia' has in recent years been contested (Stanovich, 1991).

Under the title of 'The Uses of Discrepancy' Martin Turner states: *'the contrast principle is the cornerstone of the individual cognitive assessment. There are many possible discrepancies to be evaluated - discrepancy with I.Q. is but one kind - and all are descriptive rather than definitional'*. For example even a very recent working definition of dyslexia given by Professor Tim Miles (printed below) which is used by universities in their documentation on dyslexia, has itself, a tendency towards being descriptive:

'The key feature in Dyslexia is an unusual balance of skills. The typical dyslexic may be very gifted in some areas, yet have totally incongruous difficulty in others...Dyslexics may have all sorts of creative ideas yet find it very hard to put them down on paper'. (Miles 1993).

Whilst In the last 30 years, a measure of ability has been the 'cornerstone' of dyslexia assessments, more generally in the education field there was a distinct swing away from intelligence tests. In a social climate of equal educational opportunities, there would often be a general feeling of discomfort among educationalists at addressing the possibility of innate cognitive inequality, cultural differences, and student selection on the basis of ability. Additionally IQ tests have come to be regarded with a certain degree of suspicion and seen by many as instruments of the policy of selective education (Miller 1997, Fischer et al 1996, Gould 1981,). *'The idea that all of a person's multiple abilities can be reduced to a single number, and the entire population ranked upon such a scale would strike most people as absurd'* (Rose 1996). More recently, however, with the introduction of

league tables for student performance, intelligence tests, such as the CAT (Cognitive Abilities Test 1997) have been adopted for use in many schools, in the attempt to predict examination outcomes (categorisation of students likely to pass at least 5 GCSEs at A-C grade, and those at A-E grade) and in the attempt to be more accountable, a base-line assessment provides the tools with which to quantify individual scholastic development. Teachers are not usually given access to the test results, since it is recognised that this information can influence their expectations and therefore the performance of their students.

Extensive research has been carried out in the area of IQ testing: *'such tests tap the most important general way in which people differ psychologically.....I.Q. has undoubtedly been more fully checked out for possible bias than any other variable in psychology.'* (Brand 1996). Even though practitioners in education have objected to the concept of IQ testing, mainly on ideological grounds, The fact remains that even if the IQ tests are biased in favour of the articulate 'middle class', *'much of the examinations and curriculum expectations in schools continue to favour this group'* (Walker 1993).

In relation to dyslexia assessments, IQ/intelligence has been defined by educational psychologists who carry out the tests (Walker 1993), as *'the ability to learn from experience and it is measured by retention of information and the use of conceptual skills in visual or verbal processes'*. Whilst this is clearly a narrow view of intelligence, and it omits any regard for levels of creativity, motivation, problem solving and personality factors which can have positive or negative effects on the application of intelligence, Educational Psychologists (working for the dyslexia charities) have never assumed that IQ was the whole of intelligence, nor that it was either a sufficient or even necessary condition for success in professional life.

Personality itself, can be influenced by early emotional experiences, but recent genetic research has shown that it is largely *'sculpted by heredity'* (Eysenck 1996).

However, without the edge that psychometric testing gave to the assessment of dyslexia, it is doubtful that such definitions as are now being put forward (Miles 1993, BDA 1998, Reid 1996) could ever have been sustained during the preceding twenty years.

In the early 70s dyslexia research was, in fact, mostly conducted among children of average or above average intelligence, so as to avoid the complexities that would enter interpretation of the results (Franklin 1972). Similar concerns regarding the ethics of such a selective assessment were also voiced by Prof. Zangwill (1974). The role of IQ, therefore has been closely linked with dyslexia over the years, and the public awareness of dyslexia has been influenced to the extent that dyslexia is often associated with above average ability.'

Currently, evidence (in addition to the discrepancy between ability and performance) is also sought of processing deficit in order to identify dyslexia (Seigel 1988, 1989). However, in spite of the contention since the early seventies surrounding the use of psychometric testing among researchers and educationalists in the field of dyslexia, Educational Psychologists' report has remained up to the present time, a requirement in order to access LEA financial support or examination concessions. At the time of writing, negotiations had been taking place to establish the assessment reports of RSA trained special needs tutors as being equivalent to the traditional Educational Psychologist's report for the purposes of allocating examination concessions at GCSE level, and this will no doubt eventually work up towards the higher age and ability level. However the content of these reports is still expected to be based on a similar framework i.e. the administration of a range of tests to show whether there is evidence of phonological processing difficulty and any significant discrepancy between intellectual ability and literacy performance, without an apparent physical, emotional or cultural cause. This proposal has now been ratified (1997).

One of the most widely used definitions was compiled by the World Federation of Neurology in 1968:

'A disorder manifested by difficulty in learning to read, despite conventional instruction, adequate intelligence, and socio-cultural opportunity. It depends on fundamental cognitive disabilities which are frequently of a constitutional origin'.
(Critchley 1970)

However, the Tizard Committee was sceptical about the notion of an innate dyslexia and preferred to set it within the context of poor readers in general. Consequently, dyslexia became submerged and dyslexic children were '*re-christened*' as children with '*special reading difficulties*' (Stewart 1972).

Research attempts to bring a predictive element into the definition, created too great an emphasis on reading difficulties. These, presumably, could be more easily measured than the cluster of other inconsistencies in performance which were too elusive and unpredictable, varying from one person to another, that would not easily lend themselves specific research studies or lead to such a clear cut definition.

The following definition, entitled '*Specific Reading Retardation*':-

'An attainment in either reading accuracy or reading comprehension which was 28 months or more below the level predicted on the basis of each child's age and Short WISC I.Q.' (Rutter et al 1970), whilst being adopted as a working definition, with far reaching implications, was known to be inadequate to many in the field, '*it does not describe the same children as those called 'specific dyslexics' although many of these would be included*' (Franklin 1972).

For some years to come, the term 'dyslexia' became equated with '*reading disability*' and as a result the other problems of the dyslexic child were ignored. Waddon, (1975) suspected that dyslexic children with a marginal reading problem and a much more severe spelling difficulty were being mis-diagnosed.

In the same way as the original concept of word-blindness became firmly established, so did the notion of dyslexia being primarily a reading difficulty. A 1997 article in

'The Independent' refers to the British Medical Association's definition of dyslexia as being: '*A specific 'reading disability', characterised by difficulty in coping with written symbols.*'

The term '*Specific Reading Difficulties*' was adopted by the D.E.S. (Department for Education and Science) in their 1972 definition as was the notion that the means by which these difficulties could be identified (reading ages taken from standardised tests compared to chronological age), depended on reading age being '*significantly*' below standard for the age group.

There was also a shift in emphasis, which developed into the early eighties, from considering laterality and directional confusion were important factors in the identification of dyslexia, towards memory difficulties, defined as an '*inability to retain complex information over time*' (Miles 1974) and therefore suggesting that the underlying problem of the dyslexic was, in fact, a short-term memory problem.

The BDA Cardiff Conference of 1978 held a Dyslexia Symposium which was the first of its kind in the UK, on Memory and Dyslexia. Dyslexia then began to be seen as a problem in information processing and deficits in short-term memory storage were central to this interpretation.

The notion of 'disability' was in itself only partially acceptable (particularly to dyslexic adults) since it carried the connotation of 'slow learner' and could suggest a limitation on the individual's intellectual capacity. The idea of dyslexia being a '*limited disability*' was put forward by a psychologist (Gauntlett 1978) who was himself dyslexic. However, such subtleties were never really accommodated within the concept of '*disability*' and '*handicap*' and the issue still remains unanswered today. This is particularly relevant to dyslexic students in higher education for whom a '*difference in learning*' is perhaps a more appropriate trait than a '*learning disability*' which, in their case, misleadingly suggests an incapacity to learn. Recent research (Kolata, 1992) suggests that dyslexia is not always the '*unalterable disability*' that psychologists, educators and parents have assumed it to be. This finding would imply that an early diagnosis of dyslexia does not necessarily indicate a continuing struggle with literacy skills into adulthood. Other recent studies also suggest that with appropriate coaching dyslexic children can learn to overcome their difficulties and accomplish a great deal (Bower 1992, Fackelmann 1992).

Most recently McGuinness (1998) the co-author of a 'new' teaching method, 'phono-graphix', has controversially suggested that dyslexia does not exist at all.

By 1981 '*Specific*' and '*Reading*' had been dropped from the then D.E.S.'s definition and dyslexia came under the more general umbrella of '*Learning Difficulties*':-
'to include not only physical and mental disabilities but any kind of learning difficulty experienced by a child provided that it is significantly greater than that the majority of children of the same age'. (D.E.S. 1981)

It was this rather loosely worded acknowledgement of dyslexia which prompted the writing of a publication that initially was to be entitled 'Caught in the Act' (referring to the 1981 Education Act and eventually published under the main title 'Children With Special Needs') (Chasty & Friel, 1993). The book sought to give parents an insight into how best to use the provisions of the Act when trying to get action for dyslexic children. The word '*significant*' remained as ill defined as '*specific*' had been in the earlier D.E.S definition. It is clear that many dyslexic students of above average ability would fail to be identified under this definition because for them to be significantly under achieving (by up to two years below their potential, as measured by I.Q. scores,) could well be at a standard commensurate with their chronological age and thus be overlooked. Within the classroom the focus tended to be on those who were generally under achieving by up to four years against their chronological age, and this has been recently endorsed by the findings of the BDA Survey of Local Education Authorities (LEA) Special Educational Needs (SEN) provision (1997). As a result, the dyslexic student was often seen to be the least of any educational establishment's problems in the context of a growing failure in basic literacy skills, which has now been acknowledged by the Department for Education and Employment (DfEE), and is in the process of being addressed. In 1997 experimental tests in 270 schools showed that 75% of seven-year-olds are achieving the expected standard (Charter 1998). Therefore the DfEEs target for 80% literacy by the year 2000 is seen by many to be a political masking of the real problems, since an 80% literacy rate for 11 year olds by the year 2000 is not only quite achievable but the least to be expected, and it will still result in a significant percentage of children, many of whom may well be dyslexic, failing to achieve an acceptable standard of literacy.

Dyslexia / Specific Learning Difficulty, was defined by Chasty, (1984) as: *'An organising difficulty which affects laterality, perception and short-term memory, so causing significant interference in the ordered development of language (talk, reading, spelling, writing, number, essay writing) (sic) in the person.'*

This proved to be a very good working definition which was, in fact, largely adopted by the BDA. It had the advantage of avoiding reference to ability and placed the emphasis on a different way of learning as opposed to regarding dyslexia purely as a handicap. Ten years later the BDA definition was as follows:-

'Organising or learning difficulties affecting fine co-ordination skills and working memory skills. It is independent of overall ability and conventional teaching. When untreated, there are significant limitations in the development of specific aspects of speech, reading, spelling, writing, and sometimes numeracy - which may lead to secondary behavioural problems - although other areas of ability are unaffected.'
(1994)

The revision of this definition in 1998 continues to keep the focus away from ability and is much more concise: *'A surprising, serious and persisting difficulty with reading, spelling, handwriting and/or, numeracy'*. (1998). However, is the word *'surprising'* not in fact suggestive of *'discrepant'*? How can a *'surprising'* difficulty be quantified and guide those who are carrying out assessments?

What came to be seen by many practitioners as the shortest definition of dyslexia in recent years was one which explained dyslexia on the basis of: *'inefficient working memory'* (McLoughlin 1994). Indeed, some psychologists make a positive diagnosis of dyslexia, chiefly on the confirmation of poor short term and working memory, on the basis of just one or two short subtests.

However, the realisation of the central role of memory in dyslexia, and that short-term memory was phonologically coded (Baddeley 1986) led to research into the inefficiency of phonological skills. The likely cause for dyslexic's difficulty in this area was suspected to be a disorder within the brain's language centres. This would cause interference with the individual's ability to isolate and sequentially manipulate sound.

The more recent definition of dyslexia comes under the title of '*Developmental Phonological Dyslexia*' and is defined as:

'The principle difficulty in registering, maintaining and accessing phonological information. This difficulty links together a number of characteristic difficulties in verbal expression, short-term memory and literacy skills.' (Rack 1996).

These difficulties are 'subtle' and may go unnoticed, until some demanding or stressful situations cause them to become manifested. Nevertheless, other abilities can enable the dyslexic to compensate to varying degrees.

There is now a new source of 'potential confusion' as some people are using the term dyslexia only to describe the phonological pattern. The new term is appearing in which reference is made to a '*narrowly*' defined dyslexia (otherwise also called '*Classic developmental dyslexia*') which is synonymous with '*developmental phonological dyslexia*'. The term '*broadly*' defined dyslexia will currently mean '*specific learning difficulties*'.

In recent years, Specific Learning Difficulties had become the recognised term for dyslexia although for several years the public and even teachers themselves were unclear about whether the two titles were synonymous or stood for different things. By the time Specific Learning Difficulties had become established as the new name for dyslexia, a further semantic shift has occurred which leaves dyslexia as one single disability among many, under what had now become an umbrella term of SpLD and that incorporates other concepts.

There is a concern that the concept of dyslexia will continue to be the centre of confusion and misinterpretation where 'no two groups of people who use the label use it in precisely the same way' (Yule 1975). The National Working Party on Dyslexia in Higher Education (1996) spent one full day in lively discussion on the question, '*What is Dyslexia?*' and had to bring the discussion to an end because of time restrictions, rather than because the question had been answered to the satisfaction of the group as a whole.

A current definition (Reid 1996), given at a Leicester Conference for Specific Learning Difficulties (SpLD) is to view it as a collective term:

'A distinctive pattern of difficulties relating to the processing of information within a continuum from very mild to extremely severe, which results in restrictions in literacy development and discrepancies in performance within the curriculum.' (Reid 1996).

This could be effectively used as a collective definition for SpLD of which dyslexia is a subset.

The Code of Practice (DfEE 1994) has contributed to the development of this notion, by highlighting dyslexia as one example of a pattern of specific learning difficulties. Other disorders would include dyspraxia, dyscalculia, AD(H)D (Attention Deficit Hyperactivity Disorders) which are now separately defined. Originally the problem of definition was not surprising, given such a varied cluster of opposing yet sometimes overlapping symptoms.

Dyscalculia (not in a standard dictionary) otherwise known as *'Developmental Arithmetic Disorder'* affecting 1% of the population, has been defined as:

'An innate inability to deal with mathematics: whilst showing normal intelligence, these children demonstrate inability to handle and manipulate numbers' (IDA International Dyslexia Association 1998)

Dyslexia, otherwise known as *'Developmental Reading Disorder'* is said to affect nearly 4% of the population some of whom have a combination of both dyslexia and dyscalculia.

Dyspraxia is defined as: *'a specific language disorder, the symptoms of which include poor motor control affecting hand/eye skills (for handwriting and copying), sequencing and memory. Like dyslexic children it affects more boys than girls (4:1) but unlike dyslexia it is less researched as a disorder, and there is no evidence of improvement with maturation.'* (The Dyspraxia Trust.1994)

There are several sub-categories of dyspraxia:

- 1) Constitutional Dyspraxia (difficulty in relating elements of a motor task to a complete structure - shows up on the Block Design sub test of WISC).
- 2) Postural Dyspraxia, otherwise known as 'clumsy child syndrome' or 'motor skills disorders' (motor clumsiness - continuum from gross motor problems through to fine motor skills difficulties - shows up in copying shapes tests, handwriting, and coding sub-test of the WISC).
- 3) Verbal Dyspraxia, otherwise known as 'developmental speech and language disorders', 'developmental articulation disorder', 'developmental expressive/receptive language disorder', or pragmatic semantic disorder'(in which speech is not automatic)

Dyspraxia was recognised over 60 years ago (Wolff 1934) by a specialist teacher working with children at the Maudsley Hospital. One of the children in her care was a 12 year old, left handed, intelligent boy named Jack, who wanted to be a scientist. However, nobody could read his school essays, since he wrote using 'bizarre' spelling and had illegible handwriting.

Attention Deficit (Hyperactivity) Disorder is defined in the following way:

'These children seem to experience specific difficulties with the control of attention, organisation, planning and other behaviour-regulation or control processes. Underachievement at school is usually associated with this pattern; especially when it is accompanied by hyperactivity'. (Rack 1996).

AD(H)D is a neurological disorder (various parts of the brain are affected) characterised by impulsive, distractible or hyperactive behaviour or any combination of these. It may affect 5% of schoolchildren to some degree, and is more common in boys than in girls in the ratio of 3:1. Many sufferers appear to grow out of the condition during adolescence. The causes of AD(H)D appear to be in the structural differences to the normal brain with some evidence of chemical deficiencies. There may also be hereditary factors.

AD(H)D has been associated with low self-esteem (Battle & Shea, 1989), as have learning difficulties of a more general nature (Shaw, 1960).

There is even a *'specific developmental disorder not otherwise specified'* which includes delays in acquiring language, academic and motor skills that affect the ability to learn, but do not meet the criteria for 'specific learning disability' (NIH National Institute of Health 1993).

The notion of dyslexia being a multi-faceted syndrome was suspected many years ago, and the acceptance of this much broader concept would have allowed all the different disciplines to co-operate in their research and should really have been acknowledged as special educational needs on the basis of the evidence presented in each individual case, rather than being used as an economic, ideological and educational shuttlecock.

It may, therefore, be appropriate to summarise with one definition for the dyslexia syndrome proposed over 20 years ago which covers most of the sub-categories described above:

'There are several types of 'dyslexia' arising out of dysfunction in auditory processing, visual processing, haptic processing, multiple stimulus integration, disorders of short-term memory, and dysfunctions in symbolic operations (auditory language, de-coding written language, encoding written language) (Tropp 1974).

To provide one example of qualified teachers' responses about the nature of dyslexia the question *'What do you understand dyslexia to be?'* was put to a group of teachers on the 'Certificate of Professional Practice' course at the Roehampton Institute in January of 1998.

Their answers to this question were generally:

- *'It's when they reverse their letters'*
 - *'It's when there is a mismatch between verbal ability and what they write down.'*
- And also included further observations:
- *'It runs in families'*
 - *'They confuse their lefts and rights. It's problems with laterality'*
 - *'It's called Specific Learning Difficulties'*

It is interesting to note that the mismatch between verbal and written ability was identified as early as 1895, that family incidence was discovered by an English Eye Specialist, C.J. Thomas, in 1905 and that the characteristic reversal of letters was discovered by Dr. Samuel T. Orton in 1925. At the time, it was described as *strephosymbolia*, meaning 'twisted symbols' - a name suggested by a Greek professor (Karnes, 1996)), (Critchley 1974). Dyslexia as a syndrome of serious directional confusion had been investigated by Mac Meekan in 1939. (Miles 1974).

The teachers' responses are an indication that perhaps some of the earliest identified characteristics of dyslexia are still as relevant today as they were fifty to a hundred years ago. Within what has become a highly sophisticated area of research, some of these early discoveries remain among the most well known.

One current and more specialised definition of dyslexia, *namely 'Developmental Phonological Dyslexia'* (Rack 1996) was not mentioned by any of the teachers in that sample. Although it is acknowledged (Frith 1997) as one of the first analyses of the condition that can be substantiated by research evidence, it does not embrace all of the well recognised characteristics of dyslexia and has perhaps not yet permeated into general teacher awareness. The teachers' comments represent aspects of similar and at times overlapping characteristics which are typically identified by parents, teachers and other professions who have had contact with dyslexics over the last 30 years.

1.3.3 The Myths surrounding dyslexia

'It seems as if the human being naturally creates causal links between two concomitant facts. This tendency is probably more innate than dyslexia. It is a kind of fantasy that is particularly difficult to destroy.'(Gaillard 1993).

The tendency to draw causal links between two factors, which in practice were not directly related, was at the heart of some of the myths that surrounded dyslexia and persist today. One of the most common has been to relegate dyslexia to the status of a *'middle-class syndrome'*. A brief historical exploration of the *'parent pressure groups'* and dyslexia charities provides an insight into how this situation has arisen. (A chronology of the dyslexia movement compiled by the researcher has been archived).

The strongest pressure group was that of *'Dyslexia Parent Power'* which sprung up in different parts of Britain in the mid-to late 1960s. Parents of dyslexics set up local interest groups and called on experts, researchers and remedial teachers to get involved. These events are recorded in greater detail in the Dyslexia Diary of 1972.

In Scotland, for example, an association was formed by a mother, Mrs. Gill Thomson, whose son was diagnosed as dyslexic when *'diagnosis was available but the subsequent educational tuition virtually impossible to find.'* Indeed, after a year of specialist support he gained admission to the school of her choice, later passed seven 'O' Levels and hoped to go to University.

Similarly, in Bath, Mrs. Marion Welschman, whose child was assigned by the LEA to go to a school for backward children, set up the Bath Association for the Study of Dyslexia in 1966, contacted the Orton Society in America, and went on to become a pioneer for the dyslexia cause, *'It was her reaction to that fact that led, by logical and persistent steps to success, not only for her son, but also for many children and adults in this country who have dyslexia.'*

The local groups co-ordinated their efforts to form a national network (which evolved into the present day British Dyslexia Association) and collected charitable donations to found dyslexia centres that would offer assessment, specialised tuition and teacher training. The North Surrey Dyslexia Association helped raise funds and in 1972 set up the Dyslexia Institute, which has grown in strength over the years to become a leading national organisation. At around the same time the Cheshire and North Wales Dyslexia Association, with Professor Miles acting as their President, started to negotiate for special allowances to be made by examining bodies, to support dyslexic adults and seek provision for tuition via the LEA.

In spite of all the pioneering work for dyslexia which was carried out by these parent bodies, one element which has been particularly damaging to the cause, and which still resounds in discussions and written articles today, was the unhelpful connotation that became associated with it from the early days of the movement, that dyslexia was simply a '*middle-class syndrome*'.

A psychologist, who, for 'good professional reasons' preferred to remain anonymous, wrote in an article in the Dyslexia Review (A dyslexia journal established to follow on from the original Dyslexia Diary 1972) '*This now despised word [dyslexia] has fallen into such disrepute - largely due to the over-zealousness of middle-class parents who are suspected of preferring to label their 'dull' children dyslexic than backward - that efforts have been made to re-name it 'specific reading difficulties' or just call it 'inability to read'.*

It was a difficult myth to dispel, partly because the parent movement was led largely by middle-class people, and the services which they set up as a consequence of charitable funds all had to continue, after a first year induction period, to fund themselves and they therefore started charging for their services at 'private education' rates, whilst maintaining a small bursary fund to endorse their charitable status. Such fees could only be afforded by quite affluent families, or by those who gave their child's education high priority in the family budget. It therefore excluded all those people who believed that education (like health) should be provided for by the state, towards which they paid their taxes, and in relation to which they therefore adopted a more passive approach that had confidence in the '*experts*'.

There developed what was, in many ways, a two tier approach to dyslexia, whereby those who could afford it and were prepared to bring pressure to bear on their Local Education Authorities (LEAs) would succeed in gaining appropriate provision for their dyslexic children, while those who could not afford private fees, or who were associated with schools and LEAs that did not accept dyslexia went without. An apt illustration is to be found in reports from the first meeting of the Leicester Dyslexia Association *'Parents from the County have had their children diagnosed and are being given help, but the City children are not diagnosed as 'dyslexic' but told they have 'reversal problems'*'(Dyslexia Diary 1972).

Such a two-tier approach to dyslexia has at times, called into question issues of professional practice and integrity. The conflict that could have arisen, on occasion, would be when an LEA Educational Psychologist assessed a child and found him/her not to be dyslexic whilst engaged in their normal duties for the LEA, but later made a positive dyslexia assessment for the same child when under the auspices of a Dyslexia Centre. Such errors were indeed very rare, because precautions were taken at dyslexia centres to enquire about the family's Local Education Authority before assigning a psychologist to the case. At centres such as the Dyslexia Institute, (which depended heavily on part-time LEA psychologists to carry out their assessments) this facilitated the wearing of two different hats by educational psychologists. Dyslexia centres were not always able to mask the situation, and parents who had been unsuccessful in getting a dyslexia diagnosis from their LEA Educational Psychologist could, to their dismay find the same person carrying out dyslexia assessments for children from a different area.

This two tier system was further compounded by the recommendations of the Goodman Committee Report (1976) which concluded that there was no need to make any major changes to the way in which charities were run; since, based on the Statute of 1601, it was still accepted that *'all charitable work emanates largely from humanitarian impulses felt by those who undertake it'*. So the committee concluded that the fact that an educational charity charged for its services should not be a bar to charitable status'. It meant that dyslexia centres would be able to continue gaining tax privileges (rate relief and favourable income tax treatment of donations) and be exempt from the new value added tax. It also permitted them to keep accounts without the need for an annual audit, and allowed them to operate quite freely given

that the Charity Commission's powers to intervene had been significantly curtailed by the Charities Act (1960). "*Three cheers for Goodman*" wrote Corrie, (1977) who clearly saw this as a positive way forward for the dyslexic students who would benefit from these services. Perhaps, ironically, this somewhat open definition of 'charity' allowed the concept of the 'middle-class syndrome' to be perpetuated to the present day, because it effectively meant that unless dyslexic children were in high income families, they would be unlikely to gain access to the provisions made by the 'charitable' organisations who were charging private education market rates. It also relegated dyslexia, largely, to the role of a good charitable cause to be involved with - thus promoting the '*bettering of one's life and that of one's fellows....the distinguishing marks of a free society..*' (Beverage 1948) as well as reinforcing the already strong notion of dyslexia as a middle class phenomenon. This shifted some of the focus away from the education system where dyslexia belonged and within which every dyslexic child should have had an equal right to appropriate educational support.

The Government White paper (1989), further restricted the powers of the Charity Commissions and encouraged '*innovation and enterprise*', so the Dyslexia Centres in recent years have had the freedom to run associated businesses, to organise themselves as corporations rather than trusts and to use modern fund raising techniques such as television advertising.

The Dyslexia Centres availed themselves of the services of part-time, or retired LEA educational psychologists and very often employed mothers of dyslexics or mothers returning to employment, who on completion of their diploma courses (e.g. the original Dyslexia Institute Diploma, the BDA Diploma, the Hornsby Centre Diploma) would start to provide specialist tuition. The Hornsby Centre has a long-standing tradition (over twenty years) of accepting people onto its courses who do not necessarily have any teaching qualifications or relevant experience, and subsequently approving them on successful completion of a course, as practising '*dyslexia therapists*'. Without doubt many of these participants have made valuable contributions to the field. Equally, the original Dyslexia Institute courses that focused their teaching methods exclusively on the Kathleen Hickey (1977) system of teaching will have occasioned criticism from the teaching and other professions for what was seen by many to be a thorough but somewhat blinkered approach to teaching that

did not accommodate existing classroom practice (e.g. the cursive handwriting taught at the Institute was based on the Gillingham-Stillman (1969) method which was more widely practised in America but quite different to the cursive writing taught in UK. Schools, and the dyslexic children were taught this writing style without any regard for the fact that they were often expected to adopt a different style for their written work at school) There was often no communication between the child's school and the dyslexia centres and therefore no integrated approach to the teaching that the child received.

Furthermore, problems have arisen when a dyslexia tutor, trained in a private dyslexia centre, (perhaps a mother of a dyslexic, with at times a disproportionate zeal to change attitudes of teachers in schools to a more favourable and sympathetic approach towards dyslexia), would attempt to advise mainstream teachers on how to deal with dyslexic children in their classrooms, but in effect only reinforced the negative perceptions of the staff regarding '*dyslexia*'.

'The Dyslexia Institute does benefit many children, however, there are serious educational and moral problems raised by the growth of the [dyslexia] movement' (Swann et al 1985). Some of the problems created by the dyslexia movement were for example, its contributing to a decrease in equality of educational opportunities, and its creating a division between so called deserving and undeserving slow learners.

Referrals to the Dyslexia Institute could certainly not be seen as a random process, and all research based solely on their clientele would need to be seen in that light (see section 4.4.13).

'The process of identification tends to give children from financially secure, stable backgrounds more chance of being dyslexic than those from poorer, less stable backgrounds' (Swann et al 1985).

A survey of Dyslexia Institute teachers (Gilbey, J 1994), found that they were predominantly female, about two thirds of the group financed their own training, about one-third was employed in independent schools, or self-employed, and their qualification was more likely to lead to employment in the maintained sector in an advisory or co-ordinating capacity rather than in direct provision of teaching.

'One of the reasons children are referred for help to specific psychologists or clinics is the parents' or teachers' knowledge about the clinic's beliefs' (Swann 1985).

Another dyslexia myth that arose, mainly as a consequence of vigorous disagreement between professionals on the subject, was the relegation of dyslexia to the status of some kind of an esoteric and at times paradoxical phenomenon about which

(due to a lack of scientific evidence) one could at best choose to either '*believe*' or '*disbelieve*' in. Thus, strongly held, often emotionally-based expressions in favour of the existence of dyslexia or against it abounded. Some of the '*non-believers*' held positions of power in schools and on LEA committees, and a few of these people still maintain their '*disbelief*' today, in spite of the mounting research evidence in support of the condition that is now available.

An illustration of this is taken from the early 1970s when the Merton Dyslexia Association was formed and reported that '*anyone claiming to have a dyslexic child is likely to get short shrift from their LEA*'. Although this particular LEA does now make some provision for Dyslexic students (the 1998 Merton and South London Dyslexia Association newsletter (Evans 1998) reports a 90% success rate in meeting the DfEE Code of Practice time schedules in the borough's schools), there is, still today, a view held among some local teachers, (based predominantly on the past) that '*Merton doesn't believe in dyslexia*' (expressed in the discussion at Roehampton Institute, 1998). As a long-standing committee member, and now, ordinary member of the Merton and South London Dyslexia Association, the researcher recalls some 10 years of parental enquiry, meetings, letters, and pressure being effectively blocked by one key individual in the LEA, with responsibility for education matters, who quite openly '*disbelieved*' in the concept of dyslexia (and as predicted by members of the Association committee it was after the eventual vacation of that particular post due to retirement, that changes began to occur for the better).

This '*belief*' structure would have made it difficult to make appropriate provision. The situation further compounding the delays through the bureaucratic process of passing relevant documents from one administrator to another in the course of authorisation.

1.3.4 Dyslexia in the context of adult literacy and higher education

'Language is the most frequently used and most highly developed form of communication we possess' (Crystal 1971)

General literacy is a fairly recent development in this country. In 1814 the general rate of literacy was so low that 33% of men and 49% of women made a mark on the marriage register instead of writing their signature.

The introduction of state education would have made it possible for any person to have determined for *themselves* *'whether to follow uncritically the track he found himself in, without considering his aptness for it, or to consider and re-shape his course accordingly'*. (Thomas Hardy - *Jude the Obscure* 1896).

University education which had been provided for with scholarships and exhibitions set up by various trusts for selected individuals became universally accessible in the UK with the implementation of the 1944 Education Act. However, a century after compulsory education had been introduced in England, it became gradually apparent that a need was not being met for literacy support among adults. This was commented on in the Tizard Report of 1972, and steps were taken to recommend remedial opportunities for school leavers. *'There could be more Evening Institute classes for illiterate and semi-literate adults'* (Tizard, 1972).

It was gradually being recognised that perhaps literacy was not something that we naturally acquire but that it had to be *'taught'* (Bullock Report, 1975) and further more that there was an optimum sequence to the teaching/learning process. However this may not have been generally implemented as the methods had become polarised by the 'phonics versus real books' debate over the last twenty years.

In 1973, REHAB (British Council for Rehabilitation of the Disabled) set up a working party to investigate the needs of the adult with dyslexia, and this led to the opening of the Dyslexia Centre in London.

There were, twenty five years ago, few examples of special provision having been made for dyslexics and the following example reported in the Dyslexia Diary of 1972

(journal of the North Surrey Dyslexia Association) was a success story worthy of note. The son of a member of the Hampshire Dyslexia Aid Association was being '*encouraged*' to leave school and seek employment on the grounds that '*no further teaching would be beneficial to him*'. However, his parents raised an objection and the LEA agreed to pay for one year's tuition at the Helen Arkell Dyslexia Centre on the basis of it being a '*special case*' (Dyslexia Diary, 1972).

Since the earliest stages of concerted action on dyslexia in the mid 60's led by the alliance of interest groups and professions, there has been a multi-disciplinary forum on the subject. Typical of the kinds of meeting held, for example, was the first open meeting of the Norfolk and Norwich Association for the Study of Dyslexia in 1971 which was led by a neurologist, a general practitioner, a lecturer in psychology and remedial teachers.

City of Bath Technical College, which has now long-standing associations with the BDA, introduced specialist tuition for their 17 and 18 year olds who were seriously underachieving (Dyslexia Review, 1972). At around the same time, Hampshire Dyslexia Association managed to get a dyslexic young man registered as a '*disabled person*' after a diagnosis of '*specific developmental dyslexia*' had been made. West Surrey Dyslexia Aid Association set up some adult classes for dyslexics, and the North London Association were planning to get support from the ILEA, whilst also drawing interest from the Adult Literacy Scheme (Dyslexia Diary, 1972).

During the early 70s the local branches of the BDA were setting up conferences for adults. One such conference was produced by the North Surrey Dyslexia Society, and was entitled 'Specific Reading and Writing Disabilities in Young People and Adults' - it included among its speakers, a staff development officer, an area senior psychologist, a tutor organiser for the disadvantaged adult, and a successful dyslexic adult (1974)

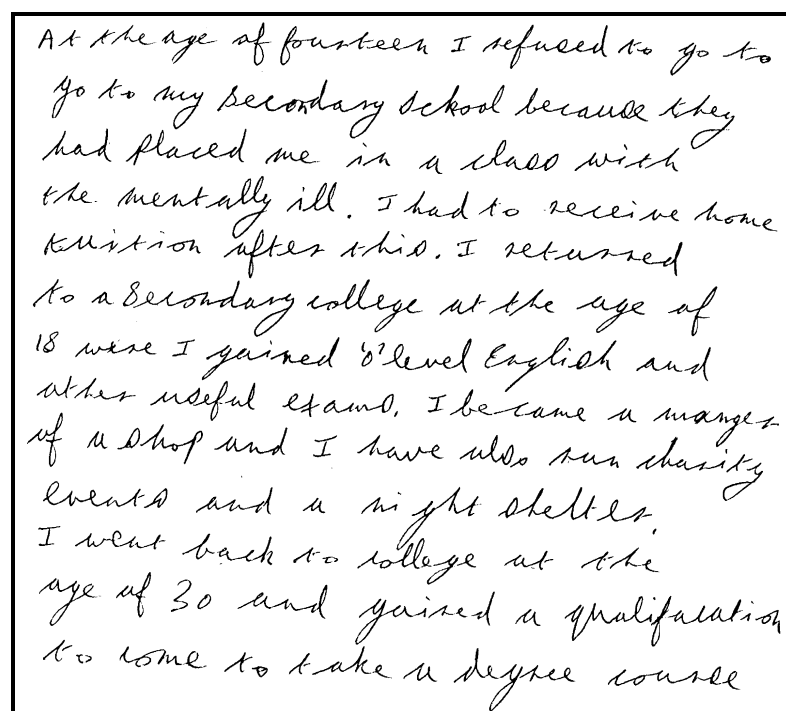
The Department of Employment offered to help dyslexics by enabling them to take City and Guilds and other examinations with special allowances for their handicap (1974, BDA Conference in Cambridge).

At the conference in Cambridge a talk was given by the Director of the Inner London Education Authority (ILEA) Literacy Scheme who mentioned some 27,000 adults with literacy problems in Inner London alone, but was unable to say what percentage of this number were dyslexic since *'she was forced largely to ignore [them because of a] lack of specialised teachers'*.

During my own work (tuition and counselling of dyslexic adults), there were repeated cases of people who had been mis-diagnosed when they were young and placed in the wrong type of learning environment, creating a lasting detrimental effect upon their self-esteem, career and personal lives. Many, like David (see illustration 1b.), have eventually managed to find their way back into the academic paths they could originally have followed, but it will often have taken them a long time and affected their career prospects. David describes his painful early experiences before going onto an access course as a mature student.

Extract from David's hand written description: (currently studying at King Alfred's College in Winchester)

Illustration 1c: David's handwriting



At the age of fourteen I refused to go to
go to my secondary school because they
had placed me in a class with
the mentally ill. I had to receive home
tuition after this. I returned
to a secondary college at the age of
18 where I gained O'level English and
other useful exams. I became a manager
of a shop and I have also run charity
events and a night shelter.
I went back to college at the
age of 30 and gained a qualification
to come to take a degree course

The whole issue of negative early experiences for otherwise bright dyslexic children often leading them to crime and delinquency has long been suspected and in recent years is being more fully researched and monitored.

From the researcher's personal involvement in running adult classes for dyslexics over a number of years, it appeared that the dyslexic adults often experienced similar problems in general adult literacy classes as they did when younger, at school i.e. that the teaching methods were not specifically geared to their needs.

When addressing a conference for Adult Literacy Tutors in Middlesex (1990) the researcher found a definite resistance among the tutors to some of the teaching suggestions made. These had been taken from evaluations given by the dyslexic adults themselves of some of the most valuable aspects of the specialised tuition they were receiving at the Dyslexia Institute.

The following were among those placed at the top of their list:

- Vocabulary extension exercises. These were aimed at bridging the gaps in the students' expressive vocabulary that most probably resulted from a greatly reduced contact with reading, essay writing, and higher level subject specialism. The Literacy Tutors, on the other hand found it difficult to believe that a) the adults actually wanted this and b) that they would be able to cope with it.

This is not surprising in the light of the fact that general 'remedial' education did not traditionally cater for verbally able students such as dyslexics often proved themselves to be.

- Memory and Sequencing training. This was another controversial area. It focuses on the characteristic weaknesses among dyslexics, but again may not be of particular relevance to the basic teaching of literacy to non-dyslexics.
- Structured, multi-sensory and cumulative teaching methods. These have been advocated within the dyslexia field as the main teaching method, but would not be seen to be of relevance in the basic adult literacy field, although the literature

claims that it would be of great benefit to all adults wishing to improve their spelling and written language skills (Hornsby, 1984).

All of the above methods have been used to varying degrees with dyslexic adults in further and higher education by tutors who have been trained to specialise in dyslexia.

The experiences of dyslexic adults in general adult evening classes is much more positive when the tutor has some knowledge and understanding of dyslexia. There are now opportunities for adults to link up with their regional RSA (Royal Society of Arts) Diploma Courses whereby they can be offered a series of one to one lessons, preceded by a diagnostic test, carried out by a teacher who is learning to specialise in Specific Learning Difficulties provision.

The Adult Dyslexia Organisation (ADO) founded in 1991 offers discussion and support groups which are set up locally by dyslexic adults, and gives them the much needed opportunity to share their experiences.

Charter (1998) reports that in the late 1970s, about 12% of the population went on to Higher Education. In the late 1980s that figure increased to about 15%. However, in the present day it has dramatically increased to 30%.

The incidence of dyslexia in Higher Education has increased from 120 recorded cases in 1981 to 2000 in 1991 (Gilroy,D 1993). Incidence of Dyslexia in Higher Education is presented in the National Survey (Singleton, in press) as over 1% (under 1% in the traditional universities and over 1.5% in colleges).

In the late 1970s, it was recorded that a dyslexic young adult (with 6 'O' levels and 2 'A' levels) who disclosed his dyslexia, failed to gain admission to college on the grounds that his spelling was not of a '*suitable*' standard. Yet, it goes on to tell of his success in ultimately being accepted to train as a teacher (Dyslexia Review,1977). It is interesting to note that today the reverse would most probably be the case for this young man. His declaration of dyslexia on a UCAS form would not impede his entry into Higher Education, nor indeed would his poor spelling. However, both of these difficulties may well bar his entrance onto a teacher training course.

Within the dyslexia field, much of the emphasis in education has been on learning support for children, and on providing GCSE and 'A' Level concessions.

A question was raised in the House of Lords by Lord Addington, himself a dyslexic, on *'Dyslexia in the workplace'*, stating that dyslexia is not just a childhood disability but that it goes on to cause difficulties and problems for the dyslexic throughout adulthood (Hansard, May 1994).

Support has in recent years increased greatly for dyslexic students in Further Education, due largely to a national development project funded by the Adult Literacy and Basic Skills Unit (ALBSU).

With a recent government grant to universities (HEFCE Scheme on Widening Participation for Students with Special Needs 1994/95) this provision is now extending to HE. E.g. 90% of HE Institutions offer additional time for dyslexic students to complete their written examinations (Gilroy 1991, Singleton, in press).

The issues surrounding support and concessions to dyslexics in HE are discussed in greater detail in the Report of the National Working Party.

One particular concern is expressed by the Principals of these institutions regarding the validity of the degree itself (after concessions have been made) and regarding the standards of ancillary skills (reading, writing, spelling, numeracy) among graduates. Employers also share some of these concerns.

'Simple words are misspelt, sentences are incoherent and punctuation is poor'.

These were the comments about the standard of students' work which worried academics conveyed to a newspaper survey (Sunday Times 1996). Among the findings was the fact that at least 5 institutions were willing to offer places on four year degree courses to school leavers who had failed all their 'A' levels, despite a Government inquiry into the practice.

The sort of problems noted were for example experienced by engineering students having to complete a psychology module that was difficult for them to grasp and for

which they had to answer questions in an essay format which they were not used to. An example given;- *'Psychology could be said to be the way that we as a race react, persevere and think about a situation'*, is not surprising in the context of the main subject. (Section 3.6.10. reports on spelling standards across a wide range of disciplines).

Whilst the Dearing Committee (1997) calls for increased access for students with disabilities (including dyslexia), - at present only some medically related courses and some programmes of teacher training actually deny access to students with dyslexia - there exists a tension among educationalists between the concerns of quality and of access with regard to taking on students with poor literacy skills (see section 2.5).

The Graduate Standards Programme instigated by the CVCP (Committee of Vice Chancellors and Principals) conclude in their paper on the concept of 'graduateness' (1996):

'There seem to be irresistible arguments that no one should graduate who lacks such ancillary skills'

These skills would include the ability to write grammatically acceptable and correctly spelt English (or Welsh), a certain level of numeracy, a range of general knowledge, a basic familiarity with IT etc.

Among tutors and lecturers from different disciplines, and in different institutions, however, there appears to be a lack of consistency in their expectations regarding this matter. Equally, among different subject areas, and different institutions there appear to be different standards among the students (see section 3.3).

'Institutions that take on students whose intelligence is insufficient to cope with Higher Level Courses are both misleading students and wasting public money' wrote (SKILL, 1995), in the defence of dyslexic students being accused of abusing the DSA (Disabled Students Allowance).

1.3.5 Educational funding and legal issues.

'Dyslexia is a professional battlefield' (Swann 1985)

In recent months, the 'Independent', a daily newspaper, published an article entitled *'Woman wins £45,000 for dyslexia that was missed.'* (Dutter 1997). Pamela Phelps sued her LEA (Hillingdon) for failing to diagnose her dyslexia when she was at school, and consequently not making adequate provision in the form of specialised tuition. *'This was the first damages award of its kind in the English Courts'* (Dyer 1997). If successful, it would set a precedent for hundreds of other dyslexic adults in a similar situation. Pamela left school *'semi-literate'*, and although she was *'seriously under performing'* (at 11 years of age, she had a reading age of 6.9) the educational psychologist had found no specific weaknesses on a WISC test and concluded that her problems were 'emotional' and that she basically lacked confidence. Pamela was privately assessed at sixteen and was diagnosed as dyslexic (Orton 1997). However in 1998 the Local Authority won their appeal on the basis of insufficient evidence for the loss of potential earnings. The BDA's Press release on 4th November stated: *'The Phelps case highlights how the education system has failed dyslexic people'*.

Over the last thirty years the question of who pays has been a controversial issue. (A chronology of the relevant state and legal aspects of dyslexia as compiled by the researcher has been archived). In many cases parents have spent substantial amounts of money to privately fund specialist tuition for their dyslexic offspring. In the 1970s and up to the 1981 Education Act, local authorities were seen as very much avoiding responsibility.

Under the 1944 Act the LEAs had been protected from having to provide the necessary support for dyslexic children, and in arguing for an independent appeals system, Mr. William Shelton M.P. (Streatham, Conservatives) stated *'education is very important for a child and a decision made by an LEA can mould his whole life.'* (Stewart 1975).

'Many of the parents of older children and adults wrote saying they had been through all the procedures: they had seen the educational psychologists, had been told 'not to worry' and had spent bitter years watching their intelligent six year olds turn into backward, semi-literate school leavers.' (Dale 1976)

In the state sector during the 70s and 80s there is ample evidence of financial cuts to remedial education. The 1981 Her Majesty's Inspectors' Report stated '*Remedial teaching, courses for academically less able pupils and additional work with the very able are less easy to justify and provide when provision for the majority is under pressure*' (DES 1982), with the consequence that it became '*difficult at best, impossible at worst, to provide remedial teaching or to respond to pupils with a range of special learning needs*'.

Today, in spite of the 1981 and 1988 Education Acts and the 1994 Code of Practice, provision still varies greatly from one area to another and has been found to focus only on the more severe cases.

Gradually, through the system of appeals, increased public awareness, and specialist teacher training programmes, more dyslexic students have in recent times had statements of Special Educational Needs, and many of these have gone on to university degrees.

The interpretation of the Education Act 1981 and the Education Reform Bill 1988 by the then DES and Local Education Authorities, in relation to the National Curriculum, had to take into account a more child centred approach that, instead of regarding learning as an innate skill that could not be altered, recognised that each failing child in fact required individual provision which met their learning and curriculum needs. This immediately raised major issues of funding and the DES's failure to fund this important educational advance '*sent signals to local authorities which conflicted with the intention of the provision made in the Act, and must be regretted by all concerned in education*' (Chasty & Friel, 1993).

Even in 1998 Local Authorities still appear to be seeking any opportunity to cut resources for dyslexic students. A recent example of this is expressed in the Education Secretary's own words, that: '*Some councils are deliberately "misinterpreting" a government consultation paper by using it as an excuse to refuse funding for dyslexic children to attend specialist schools.*' The paper had suggested that dealing with dyslexia at an early age, would allow more dyslexic children to be to be integrated into mainstream schools.

The arrangements for provision were developed slowly but compared to the '*very dark and gloomy educational outlook*' which existed for dyslexics before the publication of the Warnock Report in 1978, the new Act soon came to be seen as a challenging legislation which radically changed the established expectations of the time for children with dyslexia.

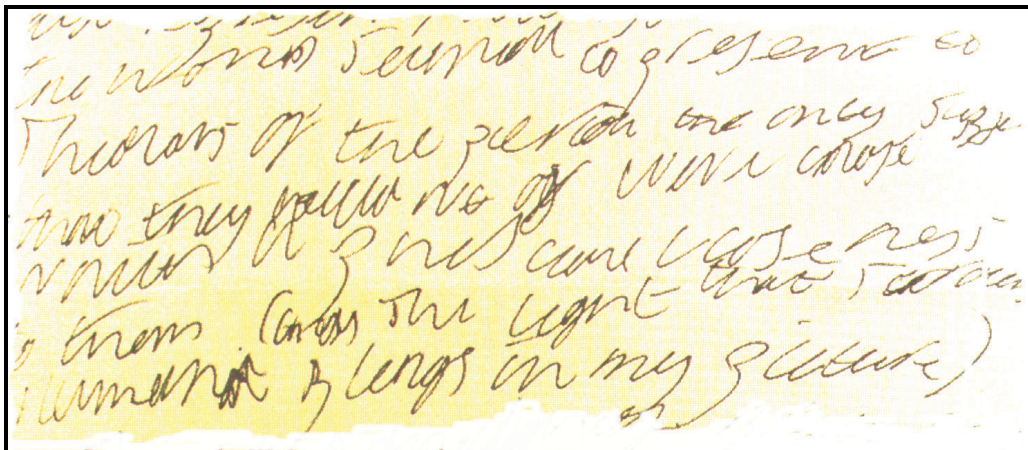
The 1993 Education Act brought in the Code of Practice which is effectively a good practice guide for local education authorities in relation to how they exercise their duties of identification of and provision for children with special needs. The Statement of special educational need is a method by which the individual needs of the child are identified and the provision to be made is protected by the statement. Failure to comply with the terms of the Statement could lead to the LEA being subject to action in the high court. (Love, 1995)

Strict guidelines were laid down in the regulations as to the time periods during which the various stages of the statementing process had to be completed. However a recent survey (see section 1.3.6) indicates that many LEAs are not achieving these deadlines.

1.3.6 The role of the BDA

An extreme case will always be easily identified by those connected with it and draw the maximum publicity. The 'Times' newspaper recently published a feature article entitled '*Dyslexic boy at 14 wins a place at Cambridge*' (Charter, 1998). The boy's parents had observed that from the age of five he had been able to recite stories verbatim after listening to them on tape, and to make '*moving and impressive*' responses to them because '*his dyslexic brain makes connections a normal brain would not*'. At the same time he was extremely clumsy and unable to write. It is now acknowledged (Howard, 1998) that he is also dyspraxic (See section 1.3.2) At the age of nine he passed English Language GCSE (B grade) and at 11 he passed English Literature A level (another B grade) by speaking his answers onto tape. An illustration of his handwriting, written at an average two words per minute, shows how '*really illegible*' (Alexander's own words) it is. In his primary school he ranked 20th out of 22.

Illustration 1d: Sample of Alexander's handwriting.



This case has been used by the British Dyslexia Association to highlight the general plight of students with specific learning difficulties within the British Education System.

Joanne Rule, the Chief Executive of the BDA issued a press release (25 August 1998) entitled '*BDA Comments on the Faludy Case*' in which she states

'It is sad and frustrating that "the system" cannot cope with difference. There are many bright dyslexic youngsters, perhaps not so unusual as Alexander, but whose life is unfulfilled, stuck in lower stream groups, regardless of ability, often afraid of being bullied.' And continues to point out that *'The Government must signal its determination that schools have higher expectations of pupils with special educational needs, enabling them to reach their full potential, by setting ambitious targets for their performance.'*

A 1997 BDA Survey of LEA SEN provision (reported in TES 1997, Hornsby Centre Newsletter 1998) found that teachers in 102 LEAs are not having children statemented until the child's reading age is at least 4 years behind their chronological age.

A child of 10 - 11 in year 6, about to move to secondary school, is unlikely to get a statement of Special Educational Needs (according to LEA policies) unless his reading age is 6 years 5 months or lower.

Perhaps that is how Pamela Phelps failed to be positively diagnosed (Dutter 1997), and how dyslexic children continue to turn into '*backward, semi-literate school leavers*' (Dale 1976).

Since the 1970 Act of Parliament for the Chronically Sick and Disabled, which registered '*acute dyslexics*', but protected LEAs from having to do anything about dyslexia in general, we have travelled a controversial, and at times highly emotive path, through denial of dyslexia, into a series of debates and changing definitions regarding '*specific reading difficulties*', to an acknowledgement of dyslexia as a '*handicap*', a series of individual battles with LEAs over '*scarce resources*', and into the schools and parents in partnership according to the Code of Practice 1994, resulting in the BDA Survey's findings. Twenty seven years later, it is still only the narrow band of '*severe cases*' that is being officially recognised. Provision has become more accessible for the '*middle-class*' families, who were prepared to pay for private assessments, for specialist tuition, for private dyslexia boarding schools with good academic reputations, for special dyslexia summer schools, and examination revision courses. With an additional fee concessions certificates for GCSE and 'A' Level Examinations have been routinely issued, and carried into University.

Provision has also improved for those dyslexics, who, as a result of the increased awareness, statementing procedures, and individual LEAs spending preferences, got relevant support, sympathetic staff at school, encouraging parents, and/or who have had the sheer personal determination to achieve their goals.

Lack of appropriate provision is a continuing problem for those who are not being identified, (because their problems are not sufficiently severe, or who are quite bright and therefore not underachieving significantly compared to their chronological age, who are in an LEA where dyslexia is low down on the list of priorities, or whose behaviour is seen to be the main problem) whose dyslexia triggers them into difficult behaviours and negative attitudes, and who fail to achieve their potential. Often, with lowered self esteem, these dyslexics accept a life of unfulfilling jobs and personal interactions or worse still, end up in prison. In a recent survey of 5 London Boroughs 52% of offenders of average intellectual ability showed indications of dyslexia (Morgan 1997). Similar trends have been observed in America (Antonoff 1997).

All of these issues are explored in greater detail (Osmond 1993), in both book and video presentation in which *'the pain and suffering so vividly portrayed cannot be ignored'* (Pumfrey 1995).

'From the evidence shown, it would be logical to state that all dyslexics can expect to suffer from inadequate help and neglect, undergo humiliation and be teased or persecuted within the present school system. As a direct result of this they lack confidence, doubt their intellectual ability and develop behaviour problems. In a minority of cases...the stress and trauma built up by the whole experience of being dyslexic in school led to the extreme reaction of clinical psychosomatic illness.' (Edward 1994).

Section 2: The development of teaching methods through a series of case studies.

2.1 Introduction

Awareness regarding Dyslexia support in Higher Education was more widely spread as a result of the HEFCE (Higher Education Funding Council for England) initiatives leading to grants made in 1994 and 1995 for a number of projects relating to dyslexia. (National Project entitled 'Improving Access to Higher Education for Students With Special Needs', see appendix 4A for information on HEFCE Projects on Dyslexia including project outlines from participating institutions).

The longer term benefits of this increased awareness need to be monitored, since in a number of institutions the end of the funding equated with a reduction to some of the services. The Further and Higher Education Act (1992) put measures in place to establish National Funding Councils to *'have regard to the needs of students with disabilities'*, and The Disability Discrimination Act (1995) required all Higher Education Institutions to publish Disability Statements setting out their policy and provision for all students with a disability (Singleton, in press). This constituted a step forward for the students, but may not necessarily have meant that all of the required support would automatically be delivered.

Responsibility for monitoring the delivery of support in accordance with these Disability Statements was vested in the Funding Councils. In theory the funding councils could even impose financial penalties on institutions that do not make adequate provision for students with disabilities. However since the Council's key role is to encourage HEIs to improve disability provision it seems unlikely that such enforcement action will be feasible in the short term. The hope is that the various projects will provide models of good practice on disability that other HEIs will be able to emulate.

These funding council projects were originally instigated as a three year programme of special funding for disability projects. While establishments that fail to provide appropriately for students with disabilities (including dyslexia) are, in the longer term likely to be penalised for their negligence, it remains to be seen exactly how institutions will be able to effectively continue to fund provision, when the project funding which may have initially facilitated it as part of shorter term research projects is exhausted.

One possible ray of hope in this respect is the following comment from the Report of The Dearing Committee of Enquiry into Higher Education, '*Higher Education in the Learning Society*' (Dearing Report Executive Summary, Point 26, 1997):

'...We believe that the best progress will be made if funding of expansion is targeted on institutions which can demonstrate a commitment to widening participation in the recent past, and have a robust strategy for doing so in the future.'

The Students Charter (DfEE 1993)(see appendix 2A for selected pages) recommended that students should have a more direct involvement with and access to information about their learning. This did influence some institutions regarding the manner in which aspects of special needs support were dealt with. For example, in 1992 when the researcher was working as a consultant to Kingston University, the University procedure was that dyslexic students should neither be shown nor given copies of their assessment reports which were automatically sent to the relevant internal authorities. However in the following year, following a the successful bid for an HEFCE funded project this practice was reconsidered and students were asked whether they wanted to register their dyslexia. If they did, their reports would be sent to the Academic Registry, and to

their Year Tutor, and they would be given opportunities to see and discuss their reports with the study support staff. The main areas of difficulty experienced by dyslexics in Higher Education have recently been addressed in the Report of the National Working Party (Singleton, in press).

During the three years (1992-1995) the researcher acted as dyslexia tutor for students at Kingston University, and was personally involved with the assessment of over two hundred dyslexic students. This provided a privileged viewpoint from which to observe, learn about, and further contribute to these students' wide range of personal approaches to study.

In a recent study at the University of Northumbria it was found that dyslexic adults perceived themselves as more anxious than their peers, and considered their written work to be an underestimate of their true ability (Riddick, Sterling, Farmer, Morgan & Cooper 1997).(see section 5.2).

These students' perceptions are borne out by the fact that in the Kingston/Surrey University study group comprising over 1500 non-dyslexic and over 100 dyslexic students, the distribution of GCSE and A level passes showed that dyslexic students do appear to under-achieve in comparison to their peers (see Section 5.3.1).

Adult dyslexics, however intelligent they may be, will use up a lot of their mental energies in various strategies for coping with everyday life and studies. Because of this they are less likely to achieve at the level commensurate with their real potential. As a result, their performance can fluctuate from day to day, and produce an inconsistency of output, which they, and those around them, need to accommodate.

2.2 A case for appropriate counselling and learning support

Counselling

Whilst there is a need for counselling dyslexic students, the provision has focused on specialist tuition, and it is members of the teaching profession that have mainly dealt with dyslexic students and not members of the counselling profession. For example, in Kingston University, dyslexic students would seek help either through the Health and Counselling Department, or through the Educational Development Unit (which was running the dyslexia project), and whilst the Health and Counselling staff could appropriately deal with the personal anxieties related to student life, any more specific help regarding dyslexia would be referred by them to the unit. Because it is such a specialist area, a thorough knowledge and understanding of dyslexia is required.

Personal counselling is very helpful for students, who apart from the normal stresses of university life, have also to contend with the whole spectrum of emotions that comes with being dyslexic. This experience is particularly stressful for students who discover their dyslexia during the course of their studies, or worse still, shortly before taking important examinations (see case study 2, 2.4.2). Gilroy, (1994) points out in particular that *'deep-rooted scars may re-open in reaction to a bad mark, or an inadvertent comment by a tutor, and at such times the dyslexic student needs to turn to someone who understands the problems'*.

In counselling dyslexic students an understanding of the types of difficulty i.e. whether they are primary or secondary in nature has also been very valuable. The way in which students then seek to resolve their difficulties are categorised in the following way:

1. The level of awareness individuals have regarding their weaknesses.
2. The level of consciousness individuals have in relation to their compensatory behaviour' (McLoughlin, Fitzgibbon, & Young 1994).

On the basis of this awareness, individual support programmes can be implemented.

Learning Support

Learning support for dyslexics which implements McLoughlin's (1994) three Ms (manageable, multisensory and make use of memory aids) provides a framework for the basic principles involved, and is used in the support and analysis of progress in the following case studies.

The main difficulties of dyslexic students have been investigated and are reported (Miles & Gilroy 1986), but they can be summarised as follows:

- *The volume of study*
- *Reading speed and comprehension*
- *Handwriting presentation (legibility), grammar and spelling*
- *Organisation*
- *Planning and structuring of essays and dissertations*
- *Maths*
- *Presentations at student seminars*
- *Dealing with anxiety and a sense of failure*
- *Performance under examination pressure*
- *Examination revision*
- *Remembering of lecture content*

- *Memorisation for written content.*

Many universities now have pamphlets and guides for staff about Dyslexia and how to support students (for an example from Kingston University see appendix 2B) and the National Bureau for Students with Disabilities (SKILL 1994) has issued its own guide for all staff in Higher Education (appendix 2C).

Much work has been carried out in the area of learning support based on a tutor's informal testing procedure which concentrates on literacy and numeracy attainment (Klein 1991). The underlying principles for the suggested methods are fundamental to dyslexia support in general. They serve as a basis for the study support carried out at Kingston University and are summarised below:

'There are 3 essential criteria for establishing a successful learning programme.

- 1 *It must be completely relevant to students' individual needs and goals*
- 2 *It should give them immediate (or almost immediate) experience of success*
- 3 *It should enable them to participate in and eventually take charge of their own learning.'*

Harrie & Weller had noted earlier in 1984 that *'There is no simple formula for diagnosing and treating a dyslexic. Each one requires his or her own individual programme'.*

2.3 Summary of a regional Higher Education Group discussion

As a member of one of the HEFCE Project Teams the researcher had the privilege of being both a participant and an observer at a regional meeting which was attended by most of the representatives of HEFCE projects from other universities (see section 4.4.1), in addition to representatives from such key dyslexia centres as the Adult Dyslexia Organisation (ADO) and the Dyslexia Unit at Bangor University.

This extract has been selected from notes taken by the researcher at the above regional meeting held on 28th October 1993. The meeting was arranged in response to Tutors' shared concerns about the welfare of dyslexic students in Higher Education and was of relevance to Higher Education institutions as a whole. The notes which have been summarised from the meeting by the researcher serves to illustrate some of the issues dealt with in this section. A brief outline of some of the main points follows, under the sub-headings of guidance and counselling, examination provision and staff issues:

Guidance and counselling

- A concern was expressed that In Bangor the group of dyslexic students is increasingly being used as a research group by other departments in the university, and that this could have a demoralising effect on students.
- A representative from the ADO stated that students may not realise what strategies they subconsciously use, because they are not really sure what dyslexia is. Explaining what dyslexia is to new students is very important. It also helps with counselling as it shows students how to avoid defining themselves by their dyslexia and its limitations. It is also important for people to know the implications of their dyslexia and how they can best deal with it. Especially important (e.g. for job interviews) to be able to put across their own dyslexia in a positive way.
- The ADO is trying to set up a 'buddy service' for students to support others on the same course.
- At North London Newsletters are written by and for students.

Examination Provision.

- "Concessions" may be an unhelpful term as it may demean the qualification
- Students must ask for arrangements early, but there is a need for someone to tell students this as there needs to be plenty of time for negotiation.
- Some universities require an Educational Psychologist's report.
- Special rooms are required for candidates needing extra time.
- The use of a word processor needs to be considered (In some universities this is considered to be an extreme measure).
- University of Central Lancashire can make any reasonable arrangement, including viva, special room, reading the answer book, word processor. These are individually negotiated with each student and apply in all departments.
- There is an examinations policy with guidelines for markers (Written with help of Oxford Brookes.) The marking policy has not yet been monitored as it is still too new.
- Redrafting examination papers into double spacing can help many students.
- If students do all their assessments orally should this be identified by references?
- Students and examiners need training in oral examinations.
- GCSE have an agreed policy for arrangements for dyslexia.
- One of biggest problems is resourcing arrangements, including room space.
- Perhaps students could write their examination papers and take a copy home to transcribe onto a word processor and submit a typed copy in addition to the original.
- Leicester's project team is considering some acceptable examinations arrangements.

Inconsistencies in provision were highlighted and these can have far reaching implications for individual students, see discussion (section 2.5).

Staff issues

- The use of educational psychologists' reports by staff can be problematic.
Educationally based reports are more accessible to staff
- There is a need for staff to be trained to detect dyslexia (& other needs) so that they can refer or adapt as necessary. This needs to be done in the first 6 weeks. Screening on entry would be a good idea. Sometimes dyslexia is not identified until the 3rd year. Mature students bring problems with them anyway and are therefore unlikely to do well in the first year.
- As part of the dyslexia project at Kingston University, the team is exploring the possibility of matching the learning profile of a dyslexic student to the profile of competencies required in a particular subject, and later in a particular career. In that way the resulting Statement of Need will be directly relevant, and will provide a constructive basis upon which provisions of technological equipment can be usefully made, individual support during course time, examinations to be appropriately marked, and support where required to be compiled and delivered.
- In conclusion it was proposed that a student charter may be one way of tightening up on what can be expected of staff with regard to dyslexia provision.

The awareness of tutors of these problems facing dyslexic students in Higher Education is what prompted, two years later the need for some national guidelines to be drawn up, so that institutions could be given some guidance and offer a more consistent and fair service to dyslexics.

2.4 Case Studies - Introduction

Teaching methods used during the case studies

The researcher was herself directly involved in teaching and was able to draw on fifteen years of experience, ranging from teaching of primary age dyslexic children through to adult dyslexia support, and including both teacher training on existing BDA and RSA courses, as well as establishing new courses and training staff to teach on them.

Many of the teaching methods used by the researcher with students featured in the case studies in this thesis had been developed and refined over this period. Through her teacher training experience the researcher has been able to see similar results to her own being achieved by other teachers applying methods she had passed on to them. She was thus, from the outset, in a position to be reasonably confident that it was the methods more than the influence of her own personality which were the effective element. The methods were therefore considered worthy of being recorded and reported as they should be capable of being applied by any other similarly competent tutor with a comparable degree of success.

The case studies presented in this section follow the format in illustration 2a. They are selected from work carried out in 1993 leading up to the HEFCE project in Kingston University, and from the duration of the project 1994-1995.

Students were self-referred or sent by their course tutors. This naturally meant that there was a strong bias in the sample towards likely dyslexic subjects, but as no quantitative evaluation was to be carried out such as comparing percentages of students in the sample to those in the wider population at university, this bias was not of direct relevance in the study. Students were offered initial interviews, followed up by assessments and further learning support where possible and where it was required.

The methods used for offering learning support and counselling are as outlined in section 2.1, and additional techniques and approaches were used by the researcher as a follow-up to her own initial pilot studies (Zdzienski, 1993 and 1994) on the use of memory training (see section 5.1.10) with dyslexic students and the application of Neuro-Linguistic Programming (NLP) techniques in helping dyslexic students to overcome specific problems (see sections 5.14, 5.15, 5.16 and 5.18).

Illustration 2a: Outline for the Case Study presentations

1. Name and age
2. Title of course and year
3. Referral information
4. Motivation and goals
5. Summary of the assessment report
6. Student's description of past difficulties and strengths
7. Student's current learning difficulties and strengths
8. Language attainment scores
9. Other relevant information
10. Summary of the student's current situation

The 6 students selected for case study presentation were taken from a total of over 70 who received support at the unit. The criteria for selection were a) chronological - to show the gradual development of the assessment service, b) to produce examples from a range of age, gender and subject areas, although these are not intended to be representative of the age or gender distribution in the sample as a whole (for the statistics on the distribution of first year and mature dyslexic students, and for the distribution of dyslexics across faculties (see section 5.3.1) and for the distribution of dyslexics by gender across the general population see section 1.2.1) and c) to show a representative range of the types of intervention implemented.

While it may have been preferable from a pure research point of view to have achieved a fully representative sample for presentation in these case studies, the researcher was limited to a smaller available selection of original materials, documentation and extracts from the students' work which had been photocopied and archived by the researcher herself. However the main objective in these case studies - to explore the learning strengths and weaknesses of dyslexic students in Higher Education in a qualitative manner - was able to be achieved with the selected sample and serves to increase awareness of the nature and variety of the problems encountered by these students.

The aims of the support offered to dyslexic students can be summarised as follows:

- To arrive at an agreed course of action, based on an evaluation of the student's needs and on a discussion of desired outcomes
- To report on the work carried out
- To evaluate progress
- To determine the relative merits of particular strategies used during the sessions, and select them for wider use with groups of students and the

Content of the sessions followed this general format:

- Summary of the agreed content and direction of learning support
- Outline of work carried out, illustrated with examples
- Monitoring progress
- Future recommendations
- Summary

The assessment report format that was used with students attending the unit is presented in illustration 2b. below:

2b. Outline of a standard assessment report

PERSONAL & CONFIDENTIAL

Student Details Details

Re Specific Learning Difficulties/Dyslexia

I assessed this candidate and can confirm that the student is of ----- intellectual ability:

Application for allowance in future University Examinations

2. Cognitive test profile

Ravens Progressive Matrices Test IQ equivalent

Wechsler Diagnostic Profile (ACID)

Arithmetic

Coding/Symbol Where a scaled score of 10

Information equals an average ranking for

Digit Span age level

3. On the educational attainment tests used the student obtained the following scores:

i) WRAT Graded Word Reading Test (R2) (RQ) (PR....)

ii) WRAT Graded Spelling Test (R2) (SQ....) (PR....)

iii) WRAT Graded Arithmetic Test (R2) (AQ....) (PR....)

iv) Vernon Warden Reading Scale (PR....)

(RQ = Reading Quotient, SQ = Spelling Quotient, AQ = Arithmetic Quotient
CQ = Comprehension Quotient)

Minimum standards: GCSE - 13+ years, A levels 16+ years)

Speed of Reading WPM

Speed of Writing WPM

Speed of Copying WPM

adult reading Average level = 250wpm Average adult writing level = 20wpm

The student has good conversational skills and is able to discuss ideas effectively, however, finds it difficult to transfer these skills into writing, particularly under timed conditions. In handwriting, sentence construction and syntax he/she does not show the ability reflected in verbal communication.

The student has a specific learning difficulty of a dyslexic nature and should be granted special concessions when sitting for formal examinations.

Recommendations:

1) additional time to complete written examinations additional time to complete written examinations at the rate of 10 minutes each hour per paper.

2) allowance should be made for the students weaknesses in handwriting and spelling.

3) a programme of specialist tuition in study skills techniques is required.

J W Chartered Psychologist (Clinical and Educational) cc: - Academic Registry

2.4.1 Case Study 1

1. Name: John B. Age: 28

2. Title of Course and Year

Degree in Electronics with Software and Business. John is a mature student in his second year.

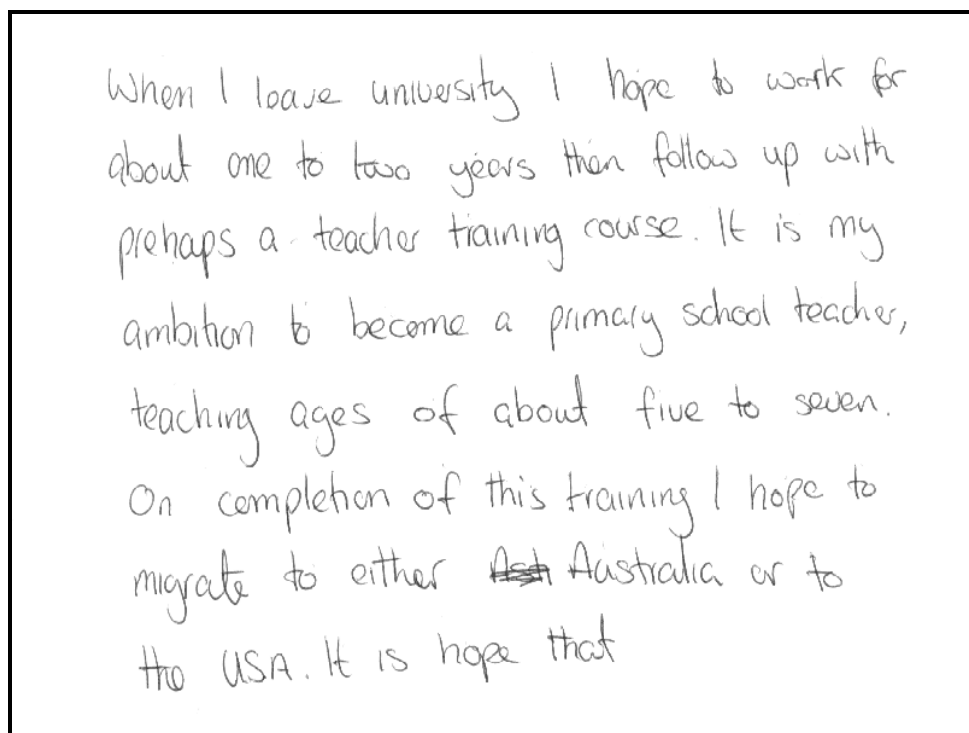
3. Referral Information

John was referred by his tutor to have an assessment in July 1992 at the end of his first year, but due to the unavailability of an educational psychologist at that time he was advised to return to the Unit in his second year and was eventually assessed in the following January.

4 Motivation and Goals

His stated ambition was to become a primary school teacher and work abroad.

Illustration 2c: Sample of John's handwriting



When I leave university I hope to work for about one to two years then follow up with perhaps a teacher training course. It is my ambition to become a primary school teacher, teaching ages of about five to seven. On completion of this training I hope to migrate to either ~~Asi~~ Australia or to the USA. It is hope that

5. Summary of Screening and Assessment.

The result from the Adult Dyslexia Checklist showed nine affirmative responses of which four were 'positive indicators'. This would suggest that he is likely to have learning difficulties that are of a dyslexic nature.

He was diagnosed in January 1993 by the educational psychologist who was a member of the HEFCE Project Team. John is of above average ability, but is dyslexic. His scores on the Coding (Digit Symbol) and Digit-span sub-tests of the Wechsler Adult Intelligence Scale - Revised, (WAIS-R) were below average (Coding - at scaled score of 6) Recommendations were made for him to have additional time in written examinations, allowances for his weak spellings and extra tutorial support.

6. Student's Description of Past Strengths and Weaknesses

Although John was never diagnosed at school, it was known to the staff that he had difficulties, and he was placed in a small group situation for some of his lessons.

John recalls that from about the age of nine he had difficulties at school with spelling, maths, writing, reading, essay writing and revision. However, he was good at sports and art.

7. Student's Current Strengths and Weaknesses

Now, in his second year at university, John still dislikes reading aloud, and he generally takes a long time to read in order to gain a reasonable understanding of a particular text. Equally, he dislikes writing and finds spelling difficult.

When asked to list some of his main difficulties, John produced the following:

"Revision, spelling, Grama, Report Writting."

Furthermore, he spoke of his problems remembering verbal information, numbers and sequences.

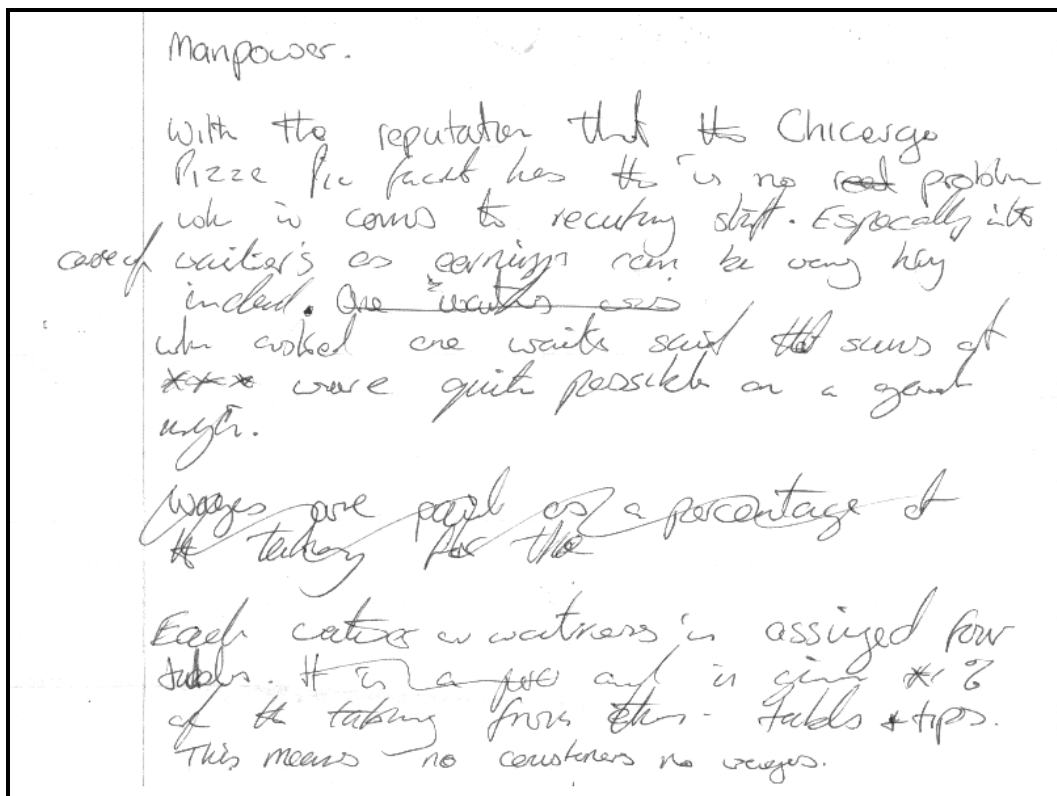
John's main difficulties are in the following areas:

Report Writing

Although he generally obtains good marks for his written work (e.g. current assignment on Software Design - Stock Control - 80%), John spends far longer preparing for it than his peers and usually works through a greater number of drafts (see illustrations 2d and 2e.).

From the first rather illegible version, which contains at least fourteen spelling errors (e.g. 'starff', 'espeasaly' and 'assinged'), John took another three attempts on the word processor before achieving the results shown below (see illustration 3). The transfer from writing to word processing reduced his errors by about 50%, and by the second attempt (with the aid of a spell checker) he had further reduced the errors to two. The spell checker was, however, defeated by more subtle errors of punctuation and by spelling errors that in fact are valid words e.g. 'form' for 'from'.

Illustration 2d: Extract from John's handwritten draft assignment



When reading the final version, apart from the lack of commas, and incorrect apostrophe (e.g: *table's*) it would only be apparent to the observant tutor (familiar with the types of spelling errors made by dyslexics) that John has written 'instead' as two separate words 'in' 'stead' (a typically dyslexic error, in which the content and sound of the words takes priority, and the incorrect choice of spelling and segmentation of sounds go unnoticed).

It is easy to see how dyslexic students go unnoticed, sometimes for a whole year, when most of their work is handed in already typed and checked for spelling.

Illustration 2e: Extract from John's typed draft assignment

MANPOWER

With the reputation that the Chicago Pizza Pie Factory has there is no problem when it comes to recruiting staff. Especially in the case of waitresses, as earnings can be quite high indeed. When asked one waitress said that the sum of seventy-five pounds was possible on a good night. Each waitress is assigned approximately thirteen tables during the day time and five in the evenings. Four percent of the assigned table's revenue plus any tips is paid to the waitresses in stead of an hourly rate. This means though; no customers no money (very good for the restaurant).

Spelling

John's spelling is very weak and he makes much use of the spell-check on his computer before handing in any written assignments. When writing by hand in lectures, or during the first draft for his reports, every line contains one or two errors. He stated in one of his sessions that he cannot make visual images of words. When he tried he was, indeed, unable to call out the spelling of a word that was quite familiar to him. He explained that this was because he does not see letters with any clarity in his mind's eye.

John would quite frequently spell the same word in a number of different ways on the same page, and not notice this inconsistency when checking over his work e.g. 'A **compiler** reads the whole program and converts it into an OBJ file and then the **compilear** will also check for errors'..

John's greatest set-back, in his own opinion, is the slowness of his reading, comprehension and writing. His poor memory can also be a hindrance to him. He is mindful of the further disadvantage that his poor spelling and grammar cause him. However, since most of his work is submitted in the form of typed reports, his difficulties are not so evident to his tutors.

He is keen to benefit from learning support, not so much because of any immediate concern for improving his marks at university, but in face of his longer-term aspiration to become a teacher. He is strongly motivated to improve his literacy skills in order to secure the profession of his choice when he leaves university. It was therefore decided that his sessions would provide the way for him to improve his spelling, written expression, and speed of reading and writing.

8. Language Attainment Scores

John's language attainment scores at the time of his assessment were as follows:

Test Title	Percentile Ranking	Status	Standard Score
WRAT Word Reading R2	23	Low Average	8
WRAT Spelling R2	8	Below Average	6
NFER Comprehension(154/2)	75	High Average	12

Speed of reading is below average at 90wpm

Speed of writing is below average at 8 wpm

Speed of copying is below average at 15wpm

* Based on a 15 year conceptual level

9. Other Relevant Information

He expressed a specific wish not to be registered as dyslexic and not to be granted concessions. (Unfortunately because of an administrative oversight his report was automatically sent to his Head of Year, who wrote back to the Unit a letter of complaint, but added that the student's request for confidentiality would be honoured).

10. Learning Support - Content and outcome after five sessions

To include agreed content, outline of work carried out illustrated with examples and progress made by student.

Spelling

A diagnostic analysis of John's written work showed that he makes the following types of errors:

1. Errors in word endings, showing a lack of familiarity with the rules of suffixing, e.g.

'scrapping' for scraping

'unforgettable' for unforgettable

'relativly' for relatively

2. Numerous minor spelling errors. These, however, do not present the reader with any major difficulties in deciphering his work, being for the most part, regular phonic alternatives. He shows a reasonably good grasp of the basics of sound to letter correspondence, but a lack of familiarity with more advanced vocabulary, e.g.

'matirial' for material 'musium' for museum 'neseserty' for necessity.

The programme for spelling included ways of tackling these two main areas of difficulty. The short time available for this work meant that the improvement needed to be a) immediate and significant to John, b) a tool for dealing with spelling difficulties by himself in the future.

This was dealt with in a fairly straight forward and systematic way, i.e. there are specific rules of suffixing, they can be prioritised in terms of frequency and relevance and worksheets can be devised to offer practice with particular lists of words. These were carried out with gradually increased levels of success

Some exploratory exercises confirmed that John is primarily a kinaesthetic and visual learner. One of these will serve as an example and is taken from NLP procedures.

John was asked to study and memorise the following sequence for 1 minute and was then tested on his recall - ' D J W 1 8 E D L 4 2 1 S '

His results were only partially successful. When asked to comment on the strategies he used, his only response was to keep repeating the sequence to himself until he had run out of time.

Through some discussion and analysis, John investigated different approaches to similar tasks and discovered that he in fact can make visual images and use tracing to reinforce them. His next results were greatly improved and in addition were carried out with a greater degree of ease.

During a spelling exercise he was encouraged to try and visualise certain words. Whereas at first he had felt he could only make fairly vague images that were not of any use, now, he became aware that he could actually identify individual letters in a sequence, and from the first trial '*world*' which he remembered as a shape of a church with a steeple starting with '*w*' and ending with '*d*' with little clarity of the letters in between, he progressed to taking words from his assignments which he had mis-spelt and learning them correctly through the use of visualisation. So he could take words like '*flexible*', '*function*' and '*soldered*' and recall them in further re-test situations perfectly. This, he later stated, gave him a great deal of confidence in an area where he felt very vulnerable.

His comment which the researcher recorded at the time was '*I feel I can now get on top of this (spelling) and sort it out.*'

Using a metacognitive approach to this situation, the end result of this exploratory work was that John was now able to mediate this piece of learning to other aspects of his study. His use of visualisation, he suggested, could apply to his electronics and recall of particular formulae and diagrams. He showed what he meant with this example:

'How to calculate the voltage at a given point on a circuit where resistance values and supply voltage are known' would be produced like this on a small card, traced and visualised using colour, texture and depth.

$$V = V_{cc} \frac{R_2}{R_2 + R_1}$$

With the increased confidence in his own spelling abilities, John was shown the proof reading technique for checking his own work. Using small samples of his writing he looked at words individually and out of their normal context by working from right to left. This, he felt, made the task easier for him.

Several short spelling tests based on vocabulary he required for his work, were carried out with very successful results and this gave him an added boost of confidence.

To work on general recall and improvement of listening skills (for lectures and note-taking) John carried out several exercises in active listening (see Section 5.1.10).

He found that once he learnt to focus his attention in short bursts, and used a multisensory reception, it was possible for him to recall the content with greater detail and accuracy.

The above listening and recording exercises, together with selected Ann Arbor exercises in tracking helped John's concentration, prediction and accuracy in reading and recall. These short exercises are carried out under timed conditions, and John's first attempt took him about one and a half minutes, but by the fifth session he was completing them in under 30 seconds. This met with the expected time-scales for speed of processing written data that would be achieved by his peers.

Speed of Reading, when John focused his mind on it, was now increased, and from the original speed of 90 wpm at his assessment, he was recorded as having read at 156 wpm on his final session. His own comment was that he felt he was taking in the information better as well. Comprehension was not formally re-tested within this time-scale, and it can only be taken as reported by John that he felt more capable of coping with the reading component of his studies as a result of the sessions he had attended and that he would build on this positive approach in his own time.

Speed of Writing, on the final session was re-tested and had increased from 10 to 17 wpm. However, this is only marginally faster than his original speed of copying (15 wpm). John was able to increase his speed of writing very slightly, and if he tried to do any more his writing would become fairly illegible and his anxiety would return and with it the spiralling loss of confidence. In order to deal with this he decided to use his word processor for earlier drafts of work, rather than grapple with hand written notes that were messy in appearance.

His final comments regarding his learning difficulties were that he was now better able to detach himself from his difficulties, examine them in a more dispassionate way and then apply measures to deal with them. If his hope is to become a teacher and he was embarrassed about his weak spelling, and afraid of failure, then the sessions have given more courage and the confidence of having learnt to see and feel words and be able to spell them correctly when he needs to.

Illustration 2f: Extract from John's assignment on software design

*Each software project will require **it's** own special set of tools for solving the many problems that will be confronted during **it's** production. This report has only underlined a few basic considerations and design techniques available to the software engineer **to day**. Some details not covered in this report are the documentation of the program being written, the testing and the writing of a users manual, The subject of software specification and design is truly a vast subject. There are approximately 150 books on the subject of software design in the library at present. **On thing dose be come clear** from the reading of this report and that is that a great deal of experience and understanding of the whole design process is needed **be for** you can be considered a good software engineer.'*

To end this section an extract is copied above which is the summary of John's assignment on Software Design for the School of Science and Electronic Systems for which he was awarded 80%. This was the result of four drafts (1 by hand and 3 on the word processor) and whilst perfectly readable and technically satisfactory, the few words presented here in bold print might, once again, have alerted his tutor to the possibility of a specific problem.(See illustration 2f.)

Summary

John, whilst never having been assessed, struggled at school and later went on to follow a degree course. He did not want to be formally assessed or labelled, nor to have any concessions. When he first came for sessions it was clear that he was a student who had ability but needed to build up his self confidence. He was encouraged to address problem areas from a position of greater strength and control in order to clear the way to achieving his longer term objectives. Had he been assessed and appropriately supported at school age it is more

likely that he would have reached this stage younger in life. He clearly saw the label of dyslexia, whilst being a positive confirmation of his problem at a personal level, as definitely not being a desirable label to show to anyone else. He expressed his concern that it could have an adverse effect on his attempts to get into teacher training.

Because he had chosen a subject which did not require much essay writing he had a reasonable chance of successfully completing his course. It may not have been the subject of his choice, but it was one which was less likely to expose his weaknesses. However, the next stage of his career will need a high level of confidence and will itself bring many challenges. The additional confidence he is going to derive from having a degree will help considerably.

With his dyslexia and weak spelling (currently at 8th percentile) the ambition of taking teacher training is certainly a tough choice. Keeping his confidence in the face of making basic spelling errors within a primary school environment will not be easy and his current insistence on keeping his dyslexia to himself may not be possible to sustain.

Table 2.ii: Summary Table for Case Study 1

Summary Table for Case Study 1 subheadings - learning strengths & weaknesses	
Progress	Future implications
Spelling Rules	
Improvements noted through informal tests	This course could be completed after his degree work.
Minor Spelling Errors	
Techniques for learning individual words were taught, which gave him more confidence.	These techniques could continue to be used and developed in the future.
Visual Strengths	
He has discovered that learning is not a purely verbal activity and was not even aware of his visual strengths.	Visual structure can be applied to learning situations in the future and he can plan to extend his visual learning.
Poor Concentration	
Exercises in focusing of attention applied to listening and reading comprehension activities with improved results.	To develop his ability to consciously focus on spoken and written information.
Speed of Reading	
Improved from 90 to 156 WPM through listening reading and tracking work.	Can be further developed using the same techniques.
Handwriting	
Recognition of abilities and limitations and learning to work realistically within this framework	Selective application of handwriting - more work to be done on word processor.
Confidence	
As a result of addressing strengths and weaknesses and analysing them and detaching himself from them his confidence is much improved.	This form of confidence building is a constructive tool for future situations which can be developed indefinitely.

2.4.2. Case Study 2

1. Name: Anna Age: 22

2. Title of Course and Year

Degree in English. Anna is a third year student.

3. Referral Information

Anna was referred by her tutor in September 1992 to have an assessment and to receive some study skills assistance as a matter of priority. She had, in her own words, '*scraped through*' the course so far, and her tutor was concerned that she may not cope with the finals which were less than six months away.

4. Motivation and Goals

Her goal was to continue with her studies, which started with Philosophy, (but this course was subsequently closed down and only made available as a subsidiary) so she switched her main study to English Literature which she enjoys but finds difficult. She hopes to complete her degree and, at a later date, go on to do an M.A. Her career choice is to train to become a nurse, and in addition to '*help make homeopathy and aromatherapy more mainstream*'.

5. Summary of Screening and Assessment.

The result from the five minute writing exercise completed by Anna showed five affirmative responses of which four were 'positive indicators'. Although a comparison cannot be made with the checklist in this case, her writing did include some of the classic signs of dyslexia which can be taken as a strong indicator of Specific Learning Difficulties.

Anna was assessed in November 1992 by the Educational Psychologist (member of the HEFCE Team), and was found to be a student of average ability, but with below average scores in the Arithmetic, Coding (Digit Symbol) and Digit Span subtests of the WAIS - R. However she gained above average results on the other verbal subtests. It was confirmed that she is dyslexic, requiring special concessions of 10 minutes per hour extra time in written examinations, and a programme of specialist tuition.

6. Student's Description of Past Strengths and Weaknesses.

Anna's own summary of her problems at this stage are as follows:

Anna explained that she had always had difficulties with learning at school. Although her parents are involved in Education, and her father is a professor, her problems were never dealt with (at home or at school) until now. She has an older sister, who having always been academically successful, made Anna feel somewhat inadequate. It would seem that her parents presumed her to be less able or conscientious, rather than considering the possibility of her being dyslexic. Anna describes herself as very slow at reading, poor at maths, '*bored with not being able to spell*' and not even knowing the alphabet. She cannot sight read and finds it difficult to concentrate.

Anna stated that she always knew within herself that she had a problem, but in the absence of anyone with whom she could discuss this, she had found her own ways of coping e.g. writing difficult spellings on large sheets of paper and sticking them up on her wall.

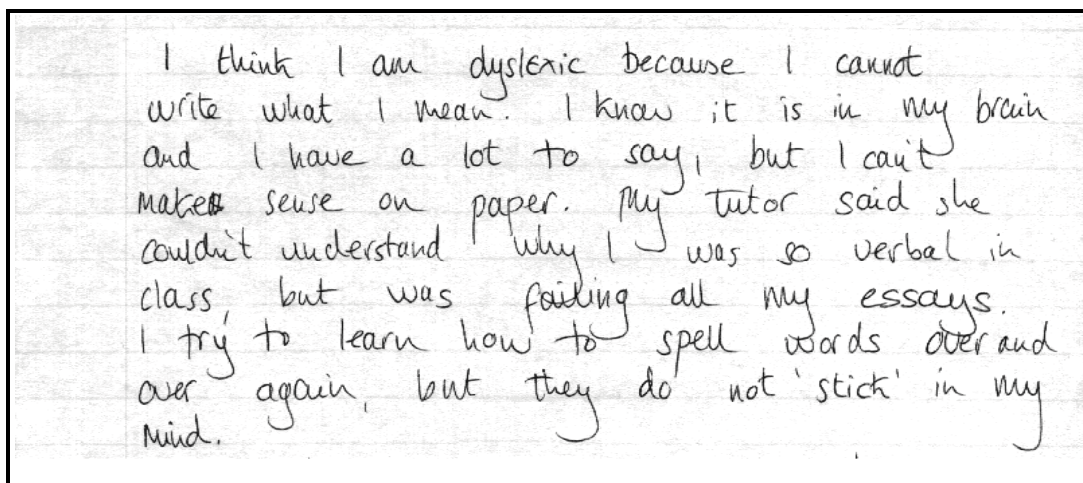
She always enjoyed reading and was brought up in a literary atmosphere at home, so she grew up having acquired a certain ability with words and an enthusiasm and flair for literature.

7. Student's Current Strengths and Weaknesses

Anna has found her degree course interesting, but has always achieved just around borderline results. She *'loves doing literature but there is too much to cover'*. She has become somewhat overwhelmed by the volume of reading and the fear of not passing her final examinations. With regard to reading, she explained *'I don't read fast enough, don't recognise words I should know and I guess a lot. I ignore the ends of lines and sentences and rush through the text. I have poor concentration. I frequently read without taking in the meaning'*.

Her 5 minute writing exercise (see illustration 2g.) in which she describes her difficulties contains many of the classic elements of dyslexia, i.e. good verbal ability coupled with poor written expression, poor memory and concentration, difficulty in focusing on text, directional confusion and reversal of numbers.

Illustration 2g: Sample of Anna's handwriting



8. Language Attainment Scores

Anna's language attainment scores at the time of the assessment were as follows:

WRAT word reading R2 percentile 30

not able to recognise words like 'rancid' and 'vehemence', and misread deteriorate as 'deteriate' and emaciated as 'emanciated'.

WRAT word spelling R2 percentile 75

errors included 'eligible' for eligible, 'precautious' for precocious and 'aligence' for allegiance.

WRAT arithmetic R2 percentile 16

Vernon Warden Reading Scale percentile 75 (ref. Turner, M 1997)

Speed of reading is below average 110wpm

Speed of writing is below average 17 wpm

* Based on a 15 year conceptual level.

9. Other Relevant Information

When looking more closely at Anna's responses to the Vernon Warden Reading Scale, several types of error were to be found which often occur in the work of dyslexic students such as, for example an over literal response as in items 12, 20, 23, 25.

The following are examples of Anna's responses to various test items:

20. 'The art student worked hard and scrupulously at his task. Yet he failed to produce a masterpiece for the obvious reason that he had no (paints, *duty*, *need*, *support*, *talent*).

e.g. giving almost the opposite response to the correct answer, probably because of rushing through the text, and to a conclusion, without paying attention to the extra clause within the sentence, as in 17, 27, 33,

17.'The level of the water was at its highest; after some weeks it began to fall, at first slowly but afterwards quickly. By the end of the month the river was quite (high, *wet*, *wide*, *low*, *swift*).

10. Learning Support - Content and outcome after five sessions

This included agreed content, an outline of the work carried out illustrated with examples and an indication of the progress made by student.

Anna's main difficulties and areas in which she would like to see an improvement are summarised below:

Reading: to improve concentration, stop guessing the end of each sentence, and actually take in the information.

Speed: to effectively improve the speed of reading and writing.

Spelling: to learn and apply rules for spelling and punctuation.

Essay writing: planning, delivery and sequence, and sticking to the plan.

Learning Support Content followed by Outcome after 2 sets of 5 sessions.

Reading:

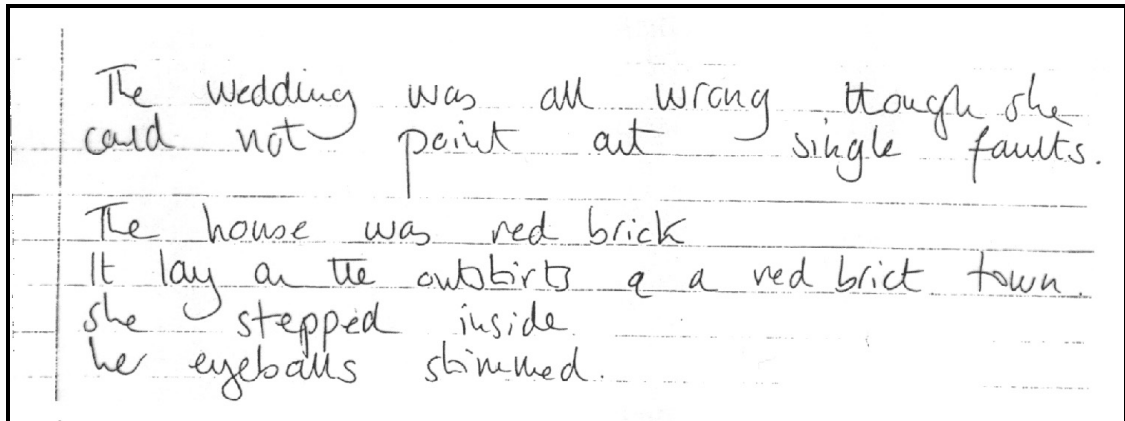
This was considered a priority, bearing in mind the volume of reading Anna was required to do. Through discussion it became very probable that Anna displayed symptoms of 'Scotopic Sensitivity' (Irlen Syndrome'). She was presented, as an interim measure, with a book of coloured overlays and encouraged to experiment reading with a series of different coloured overlays, describing the effect. Anna selected a pale pink gel saying that it made a difference and made it easier to focus on the text, stopping the words from 'jumping about'.

She took one A4 size sheet and a smaller one which she could easily place inside a paperback novel. She also commented on the fact that the colour affected her approach to the reading task, switching her to a more positive and relaxed state of mind. Anna's response to this was enthusiastic. Furthermore exercises were carried out to improve listening and reading comprehension, through the use of stimulating the senses and visualisation (ref. Read, Pause and Picture Technique - NLP). (See illustrations 2h. and 2j. for an example).

Illustration 2h: Example of the Read, Pause, Picture technique (NLP) using coloured overlays

The wedding was all wrong, although she could not point out single faults, The house was a neat brick house out near the limits of the small , baked town, and when she first put foot inside, it was as though her eyeballs had been slightly stirred; there were mixed impressions of.....

Illustration 2j: Example of Anna's written response



Anna's immediate auditory memory span appeared to stretch from a 15 word to a 32 word input and over. She would replay the action of the text in her mind's eye and then recall it verbally, and later reproduce it in writing. Anna stated after a few trials that she felt her comprehension had been enhanced as well as for revision purposes she knew that she could apply this technique to particular passages of text she needed to remember in detail and with clarity. No longer did she feel that at the end of reading a paragraph she would have to go back and start again since she had not taken in any of the content.

Visual tracking exercises were carried out regularly at the sessions, these helped improve concentration, accuracy and focus. In sentence tracking Anna at first made errors but gradually these became infrequent and the speed of processing was greatly increased.

In the following example, (see illustration 2k.) she had to process the words line by line from left to right, recognising and making a mental note of relevant words that might accrue to making a correct sentence. Most, but not all of the superfluous words are nonsense words. Having kept the sentence in mind, she was then asked to quickly jot it down and then check her work.

Illustration 2k: Extract from the Ann Arbor Sentence Tracking Exercise

*'Smat jey blume. The feogchup vin following gynt sird pum lohy
quext. Nik night flozwak cimur. Stob emgast we yun habul
pom. Tris heard daf ojermun vop he spek. Baze ruc had
hyte perd swiz. Quib kav wix not jarb. Vey zume hif seld cag
knetmalb clind found pflup passing voch. Kang exerik anything.'*

1 min. 9 sec.

Anna's response:

'The following night we heard he had not passed anything'

'passed' does not appear in the text, and 'found' was ignored.

Correct response is:

'The following night we heard he had not found anything'

Spelling:

Anna's spelling was tested and found to be below average, but many of her errors could be categorised as 'minor errors'. For certain frequently used words which Anna kept misspelling, we considered that a mnemonic was a good way of correcting it once and for all, e.g.:

'necessary' - it is necessary to wear one cap and two socks, (you wouldn't wear two caps and one sock - picture it)

Commonly used suffixing rules were taught and rehearsed.

Punctuation:

Tutor's comments - *'Watch spelling, punctuation - esp. apostrophes'*.

Examples were taken from Anna's work and acted upon:

'give your evaluation of the event and it's relation to the book.'

Work was done to clarify the difference between it's = it is and its = of it.

'Goldings boy's are much younger'

plurals and 's denoting possession

and commonly confused homonyms:

'society is always there to return too'

and *'are the ironies to heavy-handed?'*

'these points were not knew to our knowledge'.

After 5 sessions Anna commented that as a result of acknowledging her problems, she has gained greater confidence. *'Things make more sense'*.

She stated that she has learnt to concentrate better, and is now *'actively striving to do her best, rather than hitting a brick wall'*. She brought in a marked assignment for which she got 60%, and was pleased with her improved grade.

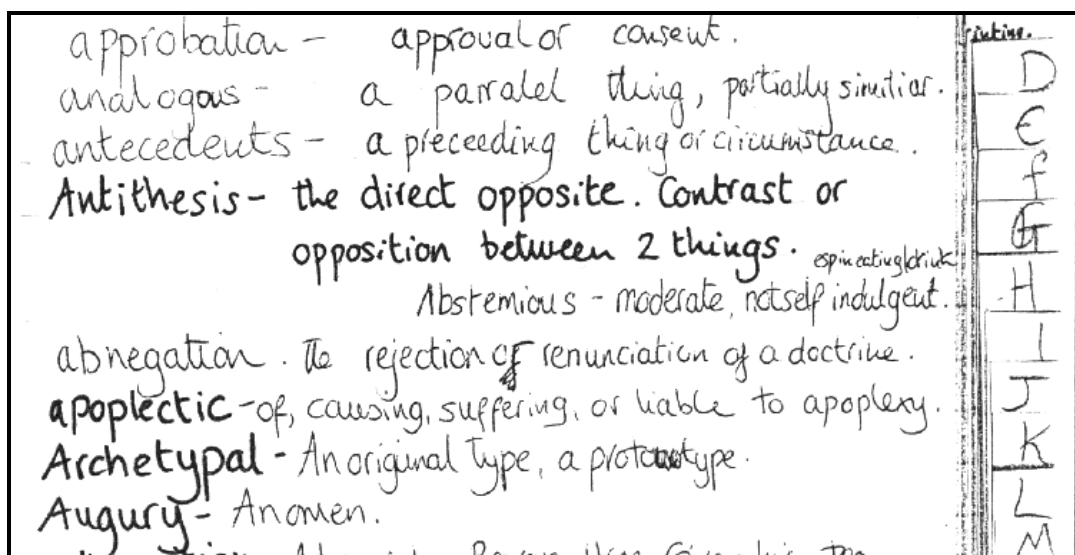
'This is an interesting and thoughtful piece of work'. Tutor's comment.

Dec.1992.

Anna requested a further five sessions during the Spring Term and prior to her finals, and the following is a brief summary of work done and goals met. Anna started to compile a book of quotations, make a revision plan and create a book of 'advanced vocabulary'.

The vocabulary booklet (see illustration 21. for an extract) was aimed to provide her with the necessary language to upgrade her written work. Tutor's comment '*Your tone is perhaps a little too conversational in places*'. Having entered a number of words under each letter of the alphabet, we then went through them and Anna highlighted the ones she considered useful to add to her expressive vocabulary. These were used in a series of verbal and written contexts and rehearsed.

Illustration 21: Extract from Anna's vocabulary booklet



Anna was encouraged to get a 'Franklin Spellcheck' (not having a word processor, she found this to be of some help to her).

She continued to practice visualisation in reading, and described how she had got a group of interested friends together, and that they met every week and carried out some reading passages and rehearsed their recall. It was clearly an idea which appealed to them all and from which Anna gained confidence.

Anna continued to improve with the sequencing and tracking exercises. On word tracking she increased her speed and performance from one passage per minute to three passages in under a minute, and her indexing improved 4 words only carried out with the alphabet in front of her to refer to, to 8 words without the use of the alphabet.

Anna's reading speed increased from 150 to 200 wpm, and her writing speed from 20 to 30 wpm.

The content of her written work improved in its fluency and self-expression.

This may have been partly due to some exercises in cloze procedure which were specifically made for her from her literary texts and from unseen novels also.

These helped her to focus on aspects of syntax, grammar and style.

Anna's own writing contained examples of awkward construction e.g.

'he admits that the death of her is the only way to bring him happiness'

(ref. Wilt) and

'This passage invites the person to further the reading of the novel it is from'.

The passages she worked on had over 20 words deleted at regular intervals throughout the text, and her results in these exercises steadily increased from 10 out of 22 to 18 out of 22.

Written expression was further practised in a series of 5 minute exercises based on a variety of extracts and novels which Anna was asked to describe, appreciate and express her own opinion about.

Anna carried out verbal and written practice on the meaning in context of a variety of key words which form part of examination essay questions, and from a state of some confusion and overlap in her understanding of their meanings, and with the use of a card system for quick and frequent rehearsal.

Anna became quite familiar with all the correct meanings.

In addition to these sessions Anna attended several essay writing sessions organised by her own department which she found very useful.

Furthermore she received comprehensive handouts on revision techniques, several of which we went through in detail. Anna's confidence built up more as a result of the success she achieved in the full programme of study skills support rather than through any specific aspect of the counselling she received.

Summary

Anna was a borderline candidate for her degree course. Having struggled through school with no recognition or help, and having coped within an academic family environment that also did not recognise her difficulties, Anna came forward for a dyslexia assessment six months before her final examinations. This was itself a risk for her as the impact of a diagnosis of dyslexia can be quite destabilising for a student, particularly with so little time left to do anything about it. However Anna maintained a very positive attitude, took her study support sessions seriously and continued to study enthusiastically. She was strongly motivated by the human interest aspect of her literature, and by a desire to help other people. She thereby sustained her focus on external goals and avoided the depression and feelings of inadequacy often associated with people in her position. Throughout the six months she 'stroved' (in her own words) to do her best and her results reflected her efforts. She left her last session in early March to go and revise for her examinations.

A letter sent by Anna on 23 August 1993 records her delight at having passed her degree with a lower second.

Table 2.iiSummary Table for Case Study 2

Summary Table for Case Study 2	
Sub-headings - learning strengths & weaknesses	
Progress	Future implications
Spelling Rules	
Improvements noted	Further rules to be mastered as needed.
Minor Spelling Errors	
Use of mnemonic techniques. Use of Franklin Spellchecker.	Putting the subject into perspective started an ongoing process based on belief that it can be solved.
Irlen Syndrome	
Pink page overlays proved to be positively helpful.	A fuller diagnosis will lead to better understanding and control of the problem
Poor Concentration	
Concentration, accuracy and focus all improved through tracking exercises	Improvements gained could be applied in everyday situations in social conversation as well as study.
Speed of Reading	
Improved and gained confidence as a result. Improved grades in written assignments	Continuing to concentrate on keeping th balance between speed and comprehension
Handwriting	
Improved speed and legibility	
Dictionary/vocabulary/punctuation	
Punctuation and writing exercises / cloze procedure exercises produced improvements	
Comprehension	
Use of active reading programme and NLP procedures rehearsed with good results. Gained a clearer understanding of the use of reading and was able to avoid time-wasting re-reading,	Better comprehension and recall will help throughout her studies. Further study skills work will improve reading efficiency for study.
Keywords	
Improved learning techniques for examination revision and produced better exam results.	Successful results will prove empowering for future courses of action.

2.4.3 Case Study 3

1. Name - Steven Age - 21

2. Title of Course and Year

Steven is an HND student studying Economics, and he is in his second year.

3. Referral Information

Steven was referred by his personal tutor who is concerned that Steven is beginning to show signs of struggling with the course, having failed several examinations at the end of the Autumn Term. Steven has been assessed at a much younger age, and his department has records and is aware of his dyslexia.

4. Motivation and goals

Steven was never particularly clear about his motives and objectives and seemed generally most interested in ensuring that he would derive the maximum enjoyment from his time at college. In the light of his later focus on his academic career, this may perhaps have been a form of withdrawal from the realities of his awareness of his academic failure at the time he came for help.

5. Summary of Screening and Assessment.

The result from the Adult Dyslexia Checklist showed fifteen affirmative responses of which seven were 'positive indicators'. This would indicate a clear case of dyslexia, which is borne out by previous assessments carried out at a younger age.

Steven was given an update assessment by the Educational Psychologist (HEFCE Team Member) in March 1992, and study skills tuition was recommended, but only taken up in November 1992 possibly as a result of direct prompting by his personal tutor.

The report confirmed Steven to be of high average intellectual ability, but with low average scores on Coding (Digit Symbol) and Information subtests of the WAIS. The report recommended special concessions of additional time to complete written examinations, but without specifying the amount of time to be given. (Note: at this stage in 1992 there did not yet appear to be such an accepted and widespread 'standard' extra time allotted. (See section 2.5).

It was also recommended that Steven be granted an allowance for poor spelling in written papers, and in the marking of work assignments. Finally it was stated that Steven should participate in a study skills programme for one hour per week.

6. Student's Description of Past Strengths and Weaknesses.

Steven was assessed as dyslexic whilst still at school, and had received one to one tuition for several years (hence, his slight reluctance at the thought of further support lessons in the present time). He was described as an able student of 'above average' ability.

Throughout his secondary school he experienced problems with spelling, maths, writing, reading, essay writing and revision. He was, however, good at sports and photography.

7. Student's Current Strengths and Weaknesses.

Now in his second year of studying for a Higher National Diploma, Steven still dislikes reading, particularly reading aloud, he takes a long time to read anything, a long time to write things down, and still has a severe spelling difficulty. He also has problems remembering verbal information, and number sequences.

Steven's own summary of his problems at this stage are as follows:

Note-taking. He tends to write down information word for word in a lecture and then forgets the end of the sentence. (In a short listening dictation test his memory span averaged at around 5-6 words at a time).

Spelling and writing. These, in his view, are needed 'at times' ('which is both good and bad'). Most of his assignments are produced in the format of typed reports in which all the spellings are checked. However, when it comes to written examinations, his writing and spelling cause him great problems, because the standard is so much poorer than his course work, and he is working in a medium which is his greatest weakness.

Good handwriting and spelling are not required throughout the year, other than for exams, and therefore Steven does not have a strong incentive to put too much time and effort into making improvements.

Essays: He feels he is not very good at producing the format and objective style required for report writing.

Choosing relevant material for revision: He has copious notes and is not sure how useful they are. He also has no methods for revision.

Memory: He experiences difficulties with anything that has to be remembered - particularly verbal information - such as from lectures, mental calculations, telephone or car registration numbers and any sequential information like the alphabet or months of the year. He describes his frustration in a recent example of being one of the first students in a group to grasp a difficult concept during a lecture yet afterwards, as others are beginning to understand it, finding that he has completely forgotten it.

8. Language attainment scores

Steven's language attainment scores at the time of the assessment were as follows:

Single Word Reading (Vernon) 12 years 7 months

Reading Scale (Vernon Warden) 16 years 0 months

Single Word Spelling (Vernon) 11 years 6 months

Arithmetic (Vernon) 13 years 9 months

Administered in 1992, this assessment is of an earlier model in which the attainment tests quote age levels rather than percentile ranking. This model attracted criticism as a result of this. Age levels could be misleading where, for example, the maximum scale might be 15 years 3 months. The age levels were also perceived as patronising by students in higher and further education.

Speed of Reading is below average at 96 WPM.

Speed of Writing is weak at 5 WPM (This score, without the supporting evidence of speed of copying could have been investigated further to see whether the problem lay in severe hand skills limitations, or whether he simply could not think of anything to write).

9. Other Relevant Information

Steven gave a summary of the support he has received to date.

He had concessions in his first year, but in the second year examinations was given no extra time (i.e. the concessions do not automatically transfer from year to year.) In this case the student was not consulted as to whether concessions were still needed. Indeed in certain departments it was a matter of policy that concessions would only be granted in the first year, as students were expected to have come up to speed by their second year.

10. Learning Support : Content and outcome after five sessions

Steven attended five sessions of learning support between November and February when he re-sat certain examinations that he had failed. During this time he followed a study skills programme whilst also exploring and identifying specific reasons for his poor results. His lowest mark (19%) was for the Communications Engineering paper (see appendix 2D for an extract) and his reasons, after discussion, for failure were:

1. His failure to learn a number of formulae, because, he said, he could not memorise with sufficient accuracy.
2. He felt that, because he had been under pressure, he had failed to make proper sense of some of the questions.

In discussion he planned how to deal with the problem. He was encouraged to make realistic timetables which took account of his social activities and outside activities (i.e. learning to drive). The resultant programme is summarised as follows:

1. To go to the library and take out a set of past papers and organise one or two regular, informal meetings with fellow students to work through the papers discussing their understanding of the questions and how they would answer them. The first problem he experienced with this part of the project was that past papers were not found to be available for loan so he had to spend £15 buying them.
2. To start a process of selecting all the formulae and equations he considered necessary to learn for the exam. (See illustration 2m.)

Illustration 2m: Sample of Steven's examination revision notes

$e = E_c(1 + m \cdot \cos \omega_m t) \cos \omega_c t.$	
$m = \frac{E_m}{E_c}$	Audio 20 Hz ~ 20k
$P_c \propto E_c^2$	Power in Am Wave $P_T = 1 + \left(\frac{m}{2}\right)^2$
$\frac{\omega_c}{2\pi} = \frac{2\pi f_c}{2\pi} \times \varepsilon$	Video. $\textcircled{E} \sim 55 \text{ MHz}$
$f_c = \frac{\omega_c}{2\pi} +$	Telephone 30 ~ 30kHz

3. After discussion he chose to use a card system (Landauer and Bjork, 1978) for revision, which research has shown provides a student with optimal rehearsal patterns for memory. This system gave him an effective tool for remembering and prevented him from becoming discouraged.

In addition to revising for these exams, Steven had written assignments to complete (technical reports) which further added to his stress. Below are printed his exam results. There are seven exams of which four were re-takes.

Steven's examination results.

Paper	Sat: September 1992	Re-sat: February 1993
Communications Engineering	19 %	74 %
Control	33 %	49 %
Electronics	38 %	49 %
Computing	22 %	50 %
Economics and Finance	98 % (pass)	
Maths	49 % (pass)	
Micros	44 % (pass)	

It is interesting to note that dyslexics will often fluctuate in their performance. In this case Steven's performance fluctuates from 98 % (among the top four in his year) to 19 % (*'nearly bottom'* of his year, as he put it). This information was gleaned only incidentally when Steven told the researcher that he had just passed his driving test - his remarkable examination performance seemed to be, to him, of decidedly secondary importance to this news. He attributed his good result in the communications paper (In which few of the other students had achieved more than 50 %) to the accuracy with which he had been able to retrieve formulae from memory, even under the pressure of examination conditions.

His Study Skills Programme included the following components:

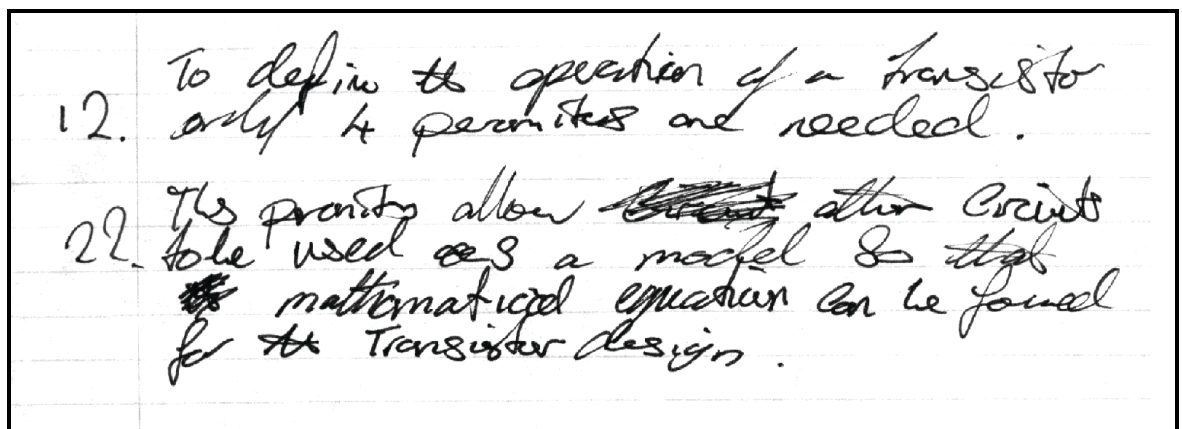
- Exercises in note-taking from reading and from speech, for which he at first showed only a very short memory span of between five and six words.
- Mind Mapping Techniques for revision.
- Tracking exercises - these steadily improved in both speed and accuracy from one passage in 90 seconds to three passages in under 60 seconds. He also improved in memory training exercises, using word tracking, in which he memorised words in alphabetical order. Starting from a basis of only being able to manage three words (well below expected adult average standard) he worked up to seven items, which is equivalent to adult average performance expectation for short-term memory.

These exercises are also of particular relevance in helping students to become familiar with working under timed conditions and with pressure upon them to do their best.

- Steven was encouraged to actively question what he had read, paying particular attention to the summary sections at the end of each chapter as a means of recognising what he has learnt and what he needs to go over again.
- He used the discussion time to explore aspects of his work verbally, then summarised the key points in writing.
- He was encouraged to focus occasionally on handwriting and to prove to himself how much better his presentation could be when he put his mind to it.

There was not much continued scope for this effort, since, as he said himself: *“there isn’t an expectation from the department for writing to be particularly neat”*, and perhaps understandably he consequently felt that he would be wasting time by concentrating on this area. (See Illustration 2n. for a sample of Steven’s usual handwriting).

Illustration 2n: Sample of Steven’s handwriting



- A Study Skills Information Booklet and guidelines to report writing were consulted and Steven’s attention was focused on particularly relevant areas.

11. Summary

Steven had known about his dyslexia and had specialist support over many years. He still has many problems but is less tolerant of them and works at overcoming them. His extra lessons have raised his technical language development to HND level. He is however less receptive to study support and more independent in his attempts to solve his problems.

On looking back Steven felt he had made 'good progress' on listing what he has achieved he considered his main areas of improvement as being in reading, technical report summary writing and working well under timed conditions. On looking forward to features for further study support he wrote the following:

Getting information from text books easily

Learning to write formally for technical reports

We had not won the battle as far as handwriting and spelling were concerned, nor were we likely to! Over the years his handwriting has not appeared to improve in spite of specialist tuition. At university the incentive for improving his handwriting was completely removed as his tutor only required it to be legible. The tutor may well have been right in this as, given Steven's dyslexia and poor memory, by concentrating on handwriting presentation it is very probable that the content of his work would have suffered.

Steven could easily become depressed about his dyslexia, and one of his main aims was to contain this depression and prevent it from ruining his chances of success, achievement and enjoyment in life. His attendance at the EDU helped to prevent his academic failure and it will have provided him with a positive experience and useful tools to apply again when needed in the future.

In 1993 - 4 Steven successfully switched from an HND to an Honours Degree Course in Electronic Engineering with Computing and Business which seemed to be a remarkable turnaround for a student who little less than a year earlier had been in danger of losing his place at College due to his weak performance.

Table 2.iii: Summary Table for Case Study 3

Summary Table for Case Study 3	
Sub-headings- learning strengths & weaknesses	
Progress	Future implications
Poor Revision Skills	
Mind mapping, note taking and memory techniques	Successful examination results with the know-how to repeat the process for future examinations
Mis-reading under pressure	
Tracking exercises, improving accuracy working through practice papers and discussing model answers within a group	Accurate interpretation of reading material under pressure will prove invaluable
Time organisation	
Planning of realistic timetables	This will contribute to helping him cope better with the demands of daily life
Lack of self-confidence	
His low self esteem coupled with an 'I can't' attitude was changed to 'I can' because of the success he experienced	
Handwriting	
His poor handwriting was put into perspective and his abilities brought to the fore	

2.4.4 Case Study 4

1. Name: - Christina Age: 47

2. Title of Course and Year:

Christina was following a Degree Course in Art History and was in her third year of study.

3. Referral Information

Christina was referred by her personal tutor in September 1992 as he was concerned about her *'problems with 'English'*

4. Motivation and goals

Christina wanted to fulfil a personal ambition to complete a degree course, to explore and enjoy learning about the history of art, and liked reading American literature.

Her overriding concern was for her son, who had similar problems to herself. He also had spelling difficulties and she strongly believed he was dyslexic. Her local authority educational psychologist had, however, assessed him and found *'no trace'* of dyslexia. Although the tuition was of benefit to her, her primary motivation was to learn the spelling rules and study skills techniques so that she could, in turn, pass them on to her son.

5. Summary of Screening and Assessment.

The result from the Adult Dyslexia Checklist showed thirteen affirmative responses of which eight were 'positive indicators'. This would suggest a clear case of dyslexia.

Christina was assessed in December 1992 by the Educational Psychologist, a member of the HEFCE team. The report confirmed that Christina was of average intellectual ability but she had weaknesses in visual and sequential

memory and coding processes consistent with dyslexia. Her Coding (DIGIT SYMBOL) subtest result was in fact significantly below average, and her Arithmetic and Digit Span were low average. The recommendations made were for 10 minutes per hour extra time in written examinations together with allowance for handwriting and spelling. Finally a requirement is made for Christina to be provided with specialist tuition.

At this stage the exploratory assessment programme was put into place for the HEFCE Project. Christina volunteered to carry out several of these tests for purposes of comparison with her independent psychologist's tests.

Comparisons of test results for Christina

Test Title	Score	Percentile	Status
Ravens Matrices	I/Q 99		Average
Vocabulary (WAIS)	13	84	Above Average
SATA NVR	10	50	Average
SATA Reading Vocabulary	11	63	Above Average
SATA Verbal Reasoning	7	16	Below average

The SATA Verbal reasoning test gave a 'below average' result at 16th percentile and it is interesting to note that significant numbers of dyslexic students showed much better results on reading vocabulary as compared to Verbal Reasoning than their non dyslexic peers who would achieve fairly similar results in both tests.

The assessment was carried out in December 1992 after the Tutor's recommendations had been made in September 1992. Christina was certificated as dyslexic for the academic year starting in September 1993.

6. Student's Description of Past Strengths and Weaknesses.

Christina reported a history of learning difficulties, left-right and general directional confusion. She was also concerned by the slowness of her reading and her poor written expression. However she did not consider her spelling to be a problem even though she scored well below average during her assessment.

7. Student's Current Strengths and Weaknesses.

Christina is concerned that she requires a good standard of written expression and a consistently high standard in spelling for the course she is following. She has a word processor but has difficulty finding the time and motivation to learn to operate it. She is worried about her written assignments and forthcoming examinations as her tutor has pointed out to her that her English is currently at too poor a standard for her to succeed. Her assignment results to date have averaged around 55 % compared to her more borderline examination performance in which she averages 40 %.

8. Language attainment scores

Christina's language attainment scores at the time of the assessment were:

Name of Test	Percentile Ranking/Speed	Standard Score	Status
WRAT Reading Test (R2)	37	9	Average
WRAT Spelling Test (R2)	21	8	Low Average
Vernon Warden Reading Scale	75	12	High Average
Speed of Reading	130 WPM		
Speed of Writing	16 WPM		
Speed of Copying	15 WPM		

By comparison with her SATA test results as follows:

Name of Test	Percentile Ranking	Standard Score	Status
Reading Vocabulary	63	11	Average
Writing Mechanics (a test of spelling and punctuation)	9	6	Below Average
Reading Comprehension (Timed)	5	5	Poor
Writing Composition	25	8	Average

In the SATA Tests Christina's standard of writing was low average and her spelling was weak. Her reading score would have been higher if she had carried out the test in its untimed version since she can clearly cope with the reading for her course, albeit very slowly. Her average score on reading vocabulary shows her to have a reasonable grasp at word recognition and word meaning level. The previous Vernon Warden Scale shows that she has an above average capacity to select the right word to fill a blank in a sentence. However she performs less well when it comes to completing verbal analogies. This would lead to a conclusion that whilst on the surface she has an adequate attainment in reading when more complex reading or maintaining concentration in a sustained reading task is involved or when having to comprehend under time pressure, her difficulties begin to emerge. It later proved that comparing students' sustained reading comprehension performance under timed conditions with their untimed performance was an effective way of determining dyslexic students' need for extra time in examinations. At present the main evidence for extra time is taken from a one minute speed of reading test, not necessarily followed up by any evaluation of comprehension.

9. Other Relevant Information

An analysis was carried out on Christina's spelling performance from the SATA test. Beyond a basic knowledge of spelling, giving her 13 % of correct answers her spelling difficulties are rather scattered across several categories of spelling error types as shown below (see illustration2o.), this complicated the approach to training her. A fairly comprehensive teaching programme was required for Christina to make any improvement in her spelling.

Illustration 2o: Distribution of Christina's spelling error types

Reasonable phonic alternatives	37 %
veterinary	veterinary
comentry	commentary
supena	subpoena
Auditory Discrimination Failures	20 %
vorilious	ferocious
tritoricious	treacherous
aunterpreian	entrepreneur
Additions	6 %
neglegently	negligent
Poor Knowledge of Spelling Rules	27 %
perelious	perilous
scurrelious	scurrilous
parcomonious	parsimonious
Sight Words	6 %
isles	aisles

10. Learning Support : Content and outcome after five sessions

Christina started her sessions in February of 1993, concerned about assignments examinations and a dissertation. She commented that before a recent exam a tutor called her name out on a public address system to come

forward for extra time at the beginning of the exam. Although she found this *'nice and helpful'*, being so sharply singled out from her peers was not an experience she was keen to repeat. Her sessions, after discussion were divided into two main areas - essay planning (construction of ideas and sentences) and spelling.

Spelling was dealt with systematically by looking at the most common rules and by selecting rules which addressed her spelling errors. In spelling she carried out word analysis, identifying and applying syllabification and units of sound. She also started to learn suffixing rules e.g. dropping an 'e' before a vowel suffix but keeping it when the 'e' is preceded by a 'c' or a 'g', as in noticeable. She applied this teaching in her next session with good results, getting 83 % of tested items correct.

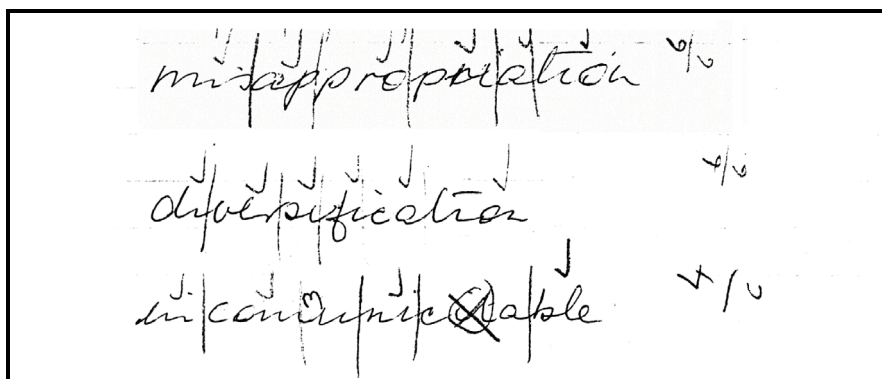
Her own comment at that time was that she had never been taught such rules and her success in applying them gave her greater confidence. She improved noticeably in her ability to read and spell multisyllabic words. This led her to being able to learn about stress and intonation in longer words which in turn helped her with the more advanced suffixing rules. E.g. pilot - piloting and permit - permitting.

Christina's written work was examined and discussed with reference to style and expression, sentence construction and punctuation. Short verbal exercises were carried out, checked for correctness and then put into writing. She started her own vocabulary list which was used in verbal and written practice.

She created a set of flash cards for the main units of sound, for example: -tial,

-cian, -ary, -ous, -ture, to be rehearsed for reading, listening and writing. She continued to listen to, recognise and count syllables and write them down. (See illustration2p.).

Illustration 2p. - Syllabification exercise



Christina began to use her word processor for her essay drafts.

She carried out timed essay writing tasks and brought them in to check.

11. Summary

Christina had never been assessed although she came from a family with a history of learning difficulties. She gave the impression of always managing to cope throughout her schooling, but without necessarily achieving particularly good academic results. As a mature student with her own family, Christina has returned to education to fill in the gaps and make up for lost opportunities. This experience was proving to be generally enriching for her and perhaps for the first time, she was enjoying doing something for herself by considering her own needs as a student, addressing her dyslexia and understanding its effect on her as well as its significance for her son. In the educational climate of the 1970s with university intake representing only the top 12% of the population, she would probably not have got a place at university. Now as a mature student she has benefited greatly from her studies and her dyslexia is but a small part of her overall learning process. Unfortunately with the recent introduction of student

fees she would be likely to be among the kind of potential mature students who would not be able to fulfil their academic ambitions.

While Christina's knowledge of spelling rules and awareness of grammar have increased, there remain errors which are due to poor pronunciation (and hence poor auditory discrimination) for example - opsilite for obsolete and pumcher for puncture.

Some work was done to improve Christina's awareness of sounds, for example recognising individual syllables for both reading and spelling and creating both real and nonsense words.

Specific sounds she commonly confused were identified, such as 'p' and 'b' 'pre' and 'per' 'in' and 'en' and 'able' and 'ible'.

Speed of processing improved in the following way: reading speed rose from 130 to 190 WPM, and writing speed from 16 to 26 WPM.

Christina's own comments were that she was doing her revision for a resit but *'felt more confident this time'*. She felt her expression in writing was *'definitely improving'* and that spelling was much easier due to the work on syllabification. Her most recent essay assignment was awarded 70 %.

Table 2iv: Summary Table for Case Study 4

Summary Table for Case Study 4 sub-headings - strengths & weaknesses	
Progress	Future implications
Spelling Rules	
Learning and applying the rules of syllabification, prefixing and suffixing - spelling rules were tested and improvements noted	She has a sufficient grounding in the basics that she could complete a spelling course at a later date or could effectively do further unassisted work on spelling
Written Expression	
Practice through verbal exercises, production of vocabulary lists. Learning to use her word processor	Improved results on assignments showed good scope for future work and for tackling the longer dissertation
Speed of reading	
Speed of reading increased slightly	Her speed is likely to remain slower than average but, with practice, she could at a later date consider speed reading techniques
Speed of writing	
Increased to a near average speed	Effective use of her word processor will be beneficial
Confidence	
A general strengthening of Christina's language skills has increased her self confidence	This should make her more effective in her future learning activities

2.4.5 Case Study 5

1. Name: Julie Age: 33

2. Title of Course and Year

Combined Studies Degree (intermediate) Second Year

Literature and History of Ideas. The combined Degree was specifically designed at Kingston to encourage mature students returning to study after a long break and therefore not requiring the prerequisite entry qualifications.

3. Referral Information

Referred by her tutor because of difficulties she was experiencing with her course.

4. Motivation and Goals

Julie was a lone parent with a primary school age son and a dependant and infirm father. She saw the completion of a Degree course such as this as a means of self fulfilment such as she had not had the opportunity to achieve earlier in life. It was also a means for her to acquire skills leading to more fulfilling future employment prospects. Her stated long term ambition was to become a primary school teacher. In the current educational climate, Julie would not have been in a position to secure a place at college because she would not have been able to afford tuition fees.

5. Summary of the Assessment Report

The result from the Adult Dyslexia Checklist showed only two affirmative responses neither of which were 'positive indicators'. This would suggest that she may be more of a slow learner whose dyslexia was not very severe and has been, to a large extent compensated for.

Julie had a number of study skills training sessions before deciding that it would, in fact, be appropriate to have a full Dyslexia Assessment. She was assessed in May of 1994, by which time the new battery of tests (SATA) was being used as the main test. (See section 4) The SATA Test results show Julie's underlying abilities to be weak (verbal) and below average (non-verbal). However her scores fluctuate from a low second percentile for maths to a well above average 84th percentile for writing composition. She does display a better reading vocabulary (25th percentile) compared to her verbal reasoning (5th percentile). This profile is characteristic of dyslexia.

Julie's Test Results

Test Title	Percentile Ranking	Status	Standard Score
Verbal Reasoning	5	Poor	5
Non Verbal Reasoning	9	Below Average	6
Quantitative Reasoning	5	Poor	5

Her report confirms that Julie is dyslexic, with the additional disadvantage of *'lower test findings than that normally found in students following a degree course'*. As a mature student she is further disadvantaged as a result of a lack of basic study skills training. The report concludes that extra time should be given for Julie to complete examinations of some ten minutes per hour, together with sympathetic consideration for *'spelling, grammar, punctuation and handwriting'*.

6. Student's Description of Past Strengths and Weaknesses.

Julie had never been assessed before and only started to become more aware of her difficulties as an adult. She does, however recall having some problems at school with maths, writing, essays and revision. She was good at art and drawing. She reported a family incidence of learning difficulties and remembers that among her three brothers there were certain problem times at school. She further commented that her own child has learning difficulties. On reflecting on some of her own difficulties she also mentioned reading aloud, reading speed and organising her work. She does not consider her spelling to be weak and does not overtly manifest the characteristic sequencing and memory problems commonly found in dyslexics.

7. Student's Current Strengths and Weaknesses.

Julie started her course in 1992, and managed to more or less cope with the demands of the course work. She averaged 48 % in her assignments and about 40 % in her written examinations. She failed two out of her six exams and had to resit them. A similar pattern was repeated in 1993 where her course assignments averaged 50 % scores and her written examinations 40 %, once again with two resits. She was then absent for several months due to her father's illness and on her return she enrolled for some study support sessions followed by a full assessment.

8. Language attainment scores

Her language attainment scores at the time of the assessment were:

Julie's Language attainment scores (SATA)

Test Title	Percentile Ranking	Status	Standard Score
Reading Comprehension	16	Below Average	7
Writing Mechanics Spelling and Punctuation	25	Average	8
Writing Composition	84	Above Average	13

There were no speed of reading, writing and copying result as such although the reading comprehension test was carried out under timed conditions.

9. Other Relevant Information

After the test, Julie was given the opportunity to complete the Reading Comprehension items at her own pace and gained an improved score to 50th percentile, average standard score 10.

10. Learning Support: Content and outcome after five sessions

In her first session Julie focused on her lack of self confidence and her debilitating '*examination nerves*' which caused her to panic and freeze. She carried out an exercise from NLP to help change her negative state of mind. This involved physical exercise. She tried using some transparent coloured overlay sheets for reading, but concluded that they did not really help her. She discussed how her essay writing deteriorated under pressure and how she forgot

all of the information she had revised because of her panic. Doing exams of any kind had always been a problem for her. She equally panicked at the 'thought' of writing essays and wanted to learn to plan and present her ideas from a basis of confidence. During her next session she described what to her had been an achievement: She had taken a test for which she feared she had done insufficient revision and at the start of the exam had panicked - having looked at the paper she was convinced she could not do any of it. For some thirty minutes she sat transfixed in a state of horror, unable to start writing. She then suddenly remembered our words from the previous session and asked permission to leave the room for a couple of minutes. As she walked around and talked to herself she started to feel the return of her positivity. When she came back into the exam room she felt she had 'broken the spell' and sat down to quickly answer as much of the paper as she could in the remaining time. She was pleased and surprised to have passed with 40 %, and said that had she not done the NLP exercise the previous week she would definitely have failed. At a later date she remarked on the fact that because she had gone back into the exam and carried on, she had dispelled some of the fear and as a result felt stronger.

An informal test of reading and writing speeds resulted in:

Reading Speed = 200 WPM

Writing Speed = 14 WPM

She would clearly benefit from extra time in examinations and this would be a useful outcome of a positive assessment.

She followed a study skills programme which included self expression in writing, punctuation, note-taking techniques, summarising key points and constructing revision cards.

Julie asked to look at the coloured overlays again and this time selected a pink and a peach colour. She followed this up by making an initial appointment at the Irlen Institute, whilst investigating the possibility of a grant to cover the cost. The centre confirmed that she was positively affected by the 'Irlen Syndrome' (otherwise known as Scotopic Sensitivity and her initial screening report stated that: '*she suffers considerable strain and fatigue when reading, significant reading difficulties caused by blurring, movement of print and inability to accommodate to black/white contrast.*' Julie's initial test has been carried out for a nominal fee and she delayed following it up with the full test at *the* 'very reduced fee' of £125 when she did not get a positive response from the L.E.A. to say that they would cover the fee. The centre gave her two shades of pink overlay (not dissimilar to the ones she had chosen at the study centre to use as an interim measure. The full diagnostic assessment would have resulted in the addition of a pair of tinted glasses.

Julie was certificated dyslexic in May 1994. She enrolled for sessions during the summer holiday to help her tackle a long dissertation and revise for two more resits in September. She also asked for a covering letter to the L.E.A. from the Educational Psychologist recommending them to give her an allowance for her own word processor with grammar and spell-check facilities to assist her in producing the long dissertation. Additionally she requested a tape recorder with tapes and batteries to assist her with lecture notes, revision and essay writing. This bid was successful and she was granted the special equipment allowance of £3560 for the remainder of her course.

11. Summary

Julie is a mature student who has a family background of learning difficulties and who has responsibilities and furthermore, emotional and financial anxieties.

For a student of below average ability with a certain level of learning difficulties Julie certainly benefited from the fullest possible help from the centre and from the local authority. Her motto became '*don't panic*' but this was now being said jokingly by a person who had much more confidence in her abilities.

Julie was fortunate to get the full support she did as she enrolled at a time before tuition fees had been introduced and when the HEFCE project had enabled the university to be supportive to dyslexic students. As a lone parent on a very limited budget and with poor job prospects, it is particularly lucky for her that she applied to follow her course when she did. She successfully claimed her full entitlement to Disabled Students' Allowances and with the additional study support she received she managed to satisfy the minimum requirements of the course. Her successful completion of the degree course will be instrumental in making her eligible to enrol for teacher training to become a primary school teacher. This will give her the ability to make her best possible contribution to society.

2v. Summary Table for Case Study 5

Summary Table for Case Study 5 sub-headings- strengths & weaknesses	
Progress	Future implications
Exam nerves / phobia	
Cognitive therapy and Confidence building using NLP techniques	She now has greater confidence to cope with a variety of study situations in the future
Irlen Syndrome	
Selected transparent pink page overlays and used them when reading	Further testing at the Irlen Institute has produced a preliminary report which confirms the value of action taken so far
Study Skills Needs	
Writing, note taking, summarising and revising - rehearsal of a variety of study skills techniques to address each area	Improved performance and confidence will lead to better academic performance
Need for WP	
Applied to the LEA for a DSA	The bid was successful and Julie was given a special equipment allowance for the remainder of her course
Confidence	
Self confidence improved as a general result of the support she received. This included improved academic, emotional and financial stability	

2.4.6 Case Study 6

1. Name: Kevin Age: 22

2. Title of Course and Year

Honours degree in Civil Engineering - Final Year

3. Referral Information

Self Referred.

4. Motivation and goals

Kevin has a number of hobbies including drawing, photography, cycling and going to the gym. He is very artistic and has had some considerable success with his drawing. His artistic talents have perhaps not been much appreciated by his family.

He stated with some strength of feeling that he dislikes reading in general and he concluded that this was the result of too much family pressure in that area. His father, a headmaster, is an avid reader and studies a lot at home. His sister is also very keen on literature. He was keen to do well in his course and had referred himself to the centre as he was experiencing some learning difficulties.

5. Summary of Screening and Assessment.

The result from the Adult Dyslexia Checklist showed six affirmative responses of which two were 'positive indicators'. This would suggest that if he were dyslexic, he would be a 'borderline' case or that he has compensated very effectively.

Kevin carried out some informal tests, mainly to establish the form of study support he needed. He did not want a formal assessment, nor was he seeking any of the concessions that would arise from a possible dyslexic certification.

The SATA Test was administered in addition to components of the WAIS Test (ACID Profile). On the Coding (Digit Symbol) subtest he achieved a scaled score of twelve (high average). On Digit Span he scored eight (low average).

Kevin's Test Results

Test Title	Percentile Ranking	Status	Standard Score
Verbal Reasoning	63	Average	11
Non Verbal Reasoning	95	Superior	15
Quantitative Reasoning	50	Average	10

As a student of generally average to above average ability, his low average score on Digit Span - a test of auditory short-term memory, could be associated with dyslexia. He does not, however, display the usual family incidence or have difficulty with spelling.

7. Student's Description of Past Strengths and Weaknesses.

Kevin got on well at school and only became aware of difficulties at around the age of eighteen. He does, however recall having had problems with writing essays. He recognises he has artistic strengths but does not know how he would utilise these in his present course of study.

8. Student's Current Strengths and Weaknesses.

Kevin finds it difficult to remember the content of what he has read. He dislikes answering letters or writing reports. His writing is difficult to read, and he states he has difficulty remembering and sequencing information. He relies very heavily on lecture notes and substitutes these for working from reference books which he avoids as much as possible. He summarised his current difficulties as organising, planning, use of study time, concentration and anxiety before exams.

9. Language attainment scores

Kevin's Language attainment scores (SATA)

Test Title	Percentile Ranking	Status	Standard Score
Reading Comprehension	63	Average	11
Writing Mechanics (Spelling and Punctuation)	50	Average	10
Writing Composition	84	Above Average	13
Reading Vocabulary	91	Above Average	14
Speed of Writing	17 WPM	Below Average	

Kevin's Writing Mechanics response sheet is clearly written, showing a good knowledge of spelling and reasonable attention to punctuation. Kevin also opted to carry out the maths component, which he considered relevant to his course.

Kevin's Maths attainment scores (SATA)

Test Title	Percentile Ranking	Status	Standard Score
Maths Calculation	84	Above Average	13
Maths Application	84	Above Average	13

Both of these above average scores gave Kevin much confidence and reassurance.

10. Learning Support : Content and outcome after five sessions

The informal test results were informative in that they highlighted Kevin's great visual strength and indicated the benefits of training his auditory sequential memory. This would have a bearing on his accuracy and retention of text. They further helped Kevin to improve his self confidence by making him more aware of his talents and confirming his abilities in maths which he had doubted. A programme of tuition was compiled to address these points. Additionally he requested some help with methods of overcoming exam nerves, particularly because he would make more mistakes reading under stress. His current situation was : five examinations completed, of which two were borderline and one was a fail with 19 %. He spent much time and effort revising but was aware that he was disorganised and could have planned more effectively. He panics in the exam and makes errors in reading even simple questions. Kevin feels that his handwriting is poor and he makes extensive use of a word processor. He reads quickly but does not assimilate much information. However, when he slows down he panics even more because he feels he is not getting through his work fast enough.

Kevin learnt some relaxation techniques for dealing with exam pressures. He carried out auditory memory training exercises. His listening skills were developed to the point where he could remember sentences of up to fifteen words for the purposes of note-taking and dictation. When reading aloud he had no recollection of the content of what he had just read. He carried out a number of exercises - some taken directly from his reference books - in listening and note-taking, in reading and note-taking and in listening and reading followed by verbal and then written summaries. He also did samples of work under timed

conditions, so that within the safe framework of the sessions he could experience the success of correct reading and accurate recall under exam conditions. After several sessions his reading speed was 160 WPM and his writing speed 26 WPM (previously assessed as 17 WPM). Finally he carried out exercises in mind-mapping using his visual abilities and sense of colour to his advantage. His note-taking improved as it became much more legible when he stopped trying to write in complete sentences. He also rehearsed extracting main points to put on summary cards as revision aids. He chose red overlays for selective use, as these helped to put him into what he described as a '*more dynamic*' state of mind.

11. Summary

Kevin, a bright student who had to a great extent compensated for his difficulties was not so much concerned to identify whether he was dyslexic but was more interested in having guidance in areas where he felt he had weaknesses. He neither wanted the label of 'dyslexic' nor the concessions or grants that went with it. He felt his problems had not been recognised in the past and did not need any special consideration. His main concern was, in fact, to complete his degree and succeed on his own merits as far as possible without external assistance and concessions.

Table 2vi: Summary Table for Case Study 6

Summary Table for Case Study 6 sub-headings - strengths & weaknesses	
Progress	Future implications
Exam nerves	
Practising relaxation techniques from NLP	These techniques can be extended to enable him to gain the fullest control of situations
Mis-reading under pressure	
Improved through use of relaxation techniques and timed tracking exercises	
Artistic Talents	
Recognised and encouraged and given the space to develop	This is a strength which Kevin may well apply in his future career
Good at maths	
The positive assessment results gave him additional confidence in this area	The reinforcement of his strength has given him greater confidence for the future
Memory Skills	
Auditory memory training exercises were carried out resulting in improved listening skills and reduced distractibility	Clearly these skills have far reaching beneficial implications for both his academic, personal and professional future
Speed of writing	
Improved to within normal standards	
Study skills	
General study skills training increased his awareness and application of techniques	Facilitates his approach to study in general
Reading	
Re-framing of approach to reading - the use of red overlays helped to put him into a positive frame of mind for reading which his home environment had conditioned him to dislike	He has gained a metacognitive awareness of how to alter a negative attitude by changing his perspective on the subject

2.4.7 Findings and discussion

In recent years universities have developed combined degree courses which do not require the standard prerequisite qualifications for entry, in the hope of attracting mature students, and thus increasing access to Higher Education from a wider section of the population. In the researcher's own work at Kingston University the figures showed a number of dyslexics to be within this group.

It is therefore unfortunate to note (Charter, 1998) an 18.3% fall in the number of over 25s seeking places at university, a consequence, most probably of the introduction of £1000 tuition fees. Clearly the figures will need to be monitored over a period to see whether this assertion is correct. Nevertheless, three out of the six dyslexia case studies above are of mature students, two of whom are very unlikely to have enrolled if required to make such a financial contribution to their tuition fees.

Of the six students in the above case studies, one only was assessed during his school years. All the others were assessed for the first time during their degree course, mostly in their second and third year. Three of the students would be categorised as mature students (in their late 20s through to late 40s), and only one of the six was keen to pursue a DSA (Disabled Students Allowance). It is at present an additional disadvantage for mature students, that if they are studying on a part-time basis they are not eligible for a Disabled Students Allowance. Four of the students did not particularly see dyslexia in a positive light and two in particular did not want to disclose their dyslexia to the university or to have any concessions. They seemed to be fairly sure that such an admission of their dyslexia would somehow go against them because of its connotations of 'disability' and 'poor literacy' which they considered as undesirable labels at best to be avoided.

There is an estimated 10% drop-out rate in Higher Education. The result of an HEFC Study published in 1997 in which some 1500 leavers participated from 23 institutions in a questionnaire, showed that 20% of the group left because of academic failure, and 25% of the group were unlikely to return to Higher Education in the near future. The recommendations from the researchers to help reduce drop-out rates were 1) better information and advice to students prior to entry, and 2) more training in study skills and practical skills such as managing finances. No similar study has been conducted for dyslexic students' drop-out rates from Higher Education, although quite clearly there will be some dyslexics within this group. Of the six case study students, there is a reasonable possibility that three of them (Steven, Julie and Christina) may have failed their re-sits, and consequently had to drop out of university with even further reduced confidence and little likelihood of re-entry. They may well have added to the statistical survey of students dropping out due to 'academic failure'.

The existence of an operational dyslexia unit which flourished during the HEFCE project year certainly helped these students and others to stay on their course and pursue their goals. Since the end of the project, followed by lesser funds available for the unit, the complete service, at that time carried by one full-time tutor, one part-time educational psychologist, one part-time study skills tutor, and a full-time administrator, has continued on the basis of just one part-time study skills tutor who is attempting to provide as much as possible, and has commented on dozens of students on waiting lists for assessment and tuition.

As in many other universities, the HEFCE grant highlighted the needs of dyslexic students, increased awareness and consequently the numbers of students coming forwards for help also proportionally increased, leaving universities in a situation of having additional responsibilities but not necessarily the resources to continue funding such services. Similarly to the 1981 Education Act not having been implemented at Local Authority level (where very different agendas were at times in place), the situation in universities was not always positive towards dyslexic students, and the short-term injection of funds to raise awareness, was not always implemented in the spirit in which it was perhaps intended.

Universities had to battle up to a point with their own internal prejudices among staff regarding dyslexia (e.g. One lecturer refused as a matter of principle to approve a dyslexic student's application for a DSA, where the LEA had already agreed to make provision, until the BDA was asked to intervene on behalf of the student), some Heads of Faculty (e.g. The Science Faculty) refused to make concessions of extra time in line with other departments, and many lecturers were nervous of being asked to make concessions which they viewed as a further lowering of educational standards.

At Kingston University the recorded number of dyslexic students represented more than 1% of the total student population (which equates well with the findings of the National Survey). It would be very helpful to ascertain what happens to this group of students during a three year period, and to find out what percentage successfully complete their course.

At Kingston the highest number of students was assessed during the year of the HEFCE project (1994). During this particular year, the figures show that 30% of the group were mature students, and 32% of the group attended study support sessions. From the available figures it can be established that 38% of dyslexic students were assessed prior to entry, leaving 62% being assessed for the first time during their degree course. Whilst the increase in numbers of students being assessed before university is seen by many to show evidence of the effectiveness of the Statementing procedure, the continuing numbers of students being assessed at university would be a compliment to the effectiveness of increased awareness and provision in Higher Education.

It is further of interest to note that of the total number of students assessed as dyslexic, only 48% have officially registered as such with the University, and in the case studies, of the five who were assessed at university only three wanted to be registered.

Among the disciplines the percentage of dyslexic students to be officially registered from the total number of students positively assessed was as follows:-

Science	69%
Human Science	40%
Business	40%
Technology	41%
Design	69%

One of the largest groups was from the Science Faculty, yet these students experienced more problems than in other faculties, in getting the concessions they expected in their examinations.

Dyslexic students formed the second largest group of 'disabled' students at the university, (the largest being 43% of the total in the category of 'diabetes/epilepsy/asthma') with 30% of the total.

It has not normally been advocated that a dyslexia support tutor require knowledge of individual subjects. (Singleton, in press). Surprisingly that attitude towards support remains in place however advanced the student's course of study might be. Multisensory techniques for the teaching of reading, writing and spelling, and some study skills seem to be the norm. Even though numeracy has been identified as a frequent problem area for dyslexic students, and some students are separately identified as having 'dyscalculia', help has not been as available as needed, mainly because the tutors have often felt insufficiently in command of the subject to be able to confidently include this in their specialist tuition. In that case what about teaching dyslexic students who are following degree courses?

When looking at matching support to individual needs, often the gaps are not addressed but the needs are re-written to accommodate practicalities such as the limitations of the resources, e.g. *'most dyslexics have mathematical difficulties though these can be overcome'* (Miles & Miles 1992). However this aspect of dyslexia does not get the same attention as literacy. Perhaps the teachers *'are less at ease with maths and unable to diagnose and remedy problems with the manipulation of numbers in the same way as letters?'* (Whittingham 1993)

Between the early 1970's and the mid-eighties specialist tuition for dyslexia was based on the multisensory teaching programmes that focused on the teaching of spelling and handwriting as a basis for also improving reading skills. The teachers being trained were mainly from the primary sector, greatly outnumbering representatives from secondary schools, further education or adult literacy (Higher Education was only dealt with publicly in a few specialist centres such as the Dyslexia Unit at Bangor, the Open University and Moray House Heriot Watt University, Edinburgh).

In more recent years, however, there has been an increased focus on the teaching of numeracy (Joffe 1990, Chinn 1991, Henderson 1991, Miles & Miles 1992), on the teaching of musical notation (a specialist music committee having been set up at the BDA by Brand), (Hubicki 1991), and higher level study and thinking skills (Reid 1994).

When examining the case studies presented in this thesis, the researcher is aware of the fact that the support she was able to offer to the arts students (her own academic background being in languages) was of more direct relevance than the support she was able to give to the science students. In the case of Steven with his poor handwriting which she found difficult to decipher, partly because of her lack of familiarity with his subject matter, he claimed his tutor and other technical specialists did not seem to find much difficulty. What she had encountered was the disadvantage of not being familiar with the specialised technical terms used for their subject areas. Therefore the practical support they were given was more indirect and required additional effort on their part to extract the maximum benefit from it.

Even with the arts subjects there were to be limitations, as she discovered, when asked to help a dyslexic student learning Japanese, who had hardly any prior knowledge in the subject, and had poor memory skills, but still insisted on struggling to learn myriad pictographic symbols.

Having taught dyslexic students rote memory techniques to successfully memorise scores of items, the researcher recognised that this student would need to gain the equivalent mastery of memory to the level achieved by those memory celebrities who can recall a thousand items of information.

The researcher would not have needed specialist subject knowledge for certain aspects of study support for dyslexics in higher education such as the teaching of learning strategies themselves to students who have poor memory and sequencing skills. For example, she was able, without needing to have a great deal of technical subject knowledge, to provide Steven with the necessary memory techniques to ensure that he could remember a variety of electronics formulae more effectively. She could also give him exercises to help him read his exam question papers with greater accuracy. What she could not do, however, (unlike with Anna's English literature) was to work through the questions with him. Therefore in Steven's case he was encouraged to find one or two friends to work with who could talk through solving the problems in order that he could find out where he was going wrong.

The national working party report on Dyslexia in Higher Education states: *'There is sometimes confusion as to what dyslexia support entails. This support is not subject specific. It is concerned with the development of skills necessary to manage dyslexic thinking styles and difficulties within an H.E. context.'* It is perhaps unfortunate that this is stated so definitively, as the researcher's own

experience and observation is that support is considerably more effective when given by a tutor who does have a strong understanding of the student's specialised subject material. This problem is particularly relevant to Further and Higher Education, since at a primary school the curriculum is more general in nature and a specialist dyslexia teacher is therefore likely to have more of the necessary skills to meet pupils' needs across a number of subjects where this would not be possible for a tutor at Higher Education level.

Whilst the Disabled Students Allowance is not intended to be spent on subject specific coaching, it has been the experience of the researcher that students who engage the services of special tutors to help them with their dyslexia, also look to these tutors to help them understand the subject content of their courses.

Study skills support is now generally accepted as being more effective when it is curriculum based (Kelly 1991) so dyslexia support at Higher Education level might also be more effective if each discipline had its own dyslexia support tutor. There would clearly be substantial financial implications in doing this which few universities would be in a position to fund.

To take Kingston University as an example there is one part-time dyslexia tutor to support a student population of over 12,000 in which a reasonable estimate would be that up to 1% may at certain times require assessment, specialised tuition, advice or study skills training. In the researcher's own work at Kingston between 1992 and 1995 her team provided both group study skills sessions and individual tuition. The group study skills sessions set up by the dyslexia unit were attended by dyslexic and non dyslexic students from a range of subject

areas. The numbers attending ranged from two or three up to twenty in any one group. Although there was some worthwhile interaction within the group and a small number of good ideas that may have been gleaned from the tutor, one might ask whether a curriculum based study skills course would not have been a more effective use of time for all including the dyslexic students. In fact the above study skills course was subject to criticism from a number of lecturers. Apart from the argument between two opposing camps as to whether study skills should be this generalised or curriculum based, the overriding feeling at both ends of the scale was one of discomfort that such issues needed addressing at all. Many refused to accept that 'remedial' teaching was appropriate at university level.

2.5 The range of institutional practice with regard to support and provision illustrated with examples drawn from the dyslexia project study group, and a selection of current disability statements

An example from both ends of the spectrum of good and bad practice would serve as a basis to lead to a summary, which in the context of economics, resources, educational standards and ideologies are not at all straight forward cases. 'Good practice', in the following example, ideally concerns itself with the needs of the individual student being met, and 'bad practice' with the practical and administrative shortcomings of a large institution, that is aiming to serve the needs of all its students, from time to time necessarily letting down an individual student. However, as the examples unfold it becomes quite difficult to maintain a clear cut perspective regarding 'good' or 'bad' as the issues involved are really fairly complex.

The best example on the surface at least, of good practice, during the dyslexia project, was of a student who had enrolled on a landscape architecture course. He arrived at the university, already having registered as dyslexic and with a huge dossier of relevant evidence. He had made early enquiries regarding the Disabled Students Allowance and had been awarded practically the full amount. This included a word processor, printer, tape-recorder, and scanner (at a time when scanners were not yet as widely in use, and relatively expensive). In addition he was granted a further allowance for specialist tuition amounting to a substantial number of individual lessons to be spread out over the duration of his course. His year tutor contacted the dyslexia unit and set up a meeting early in the autumn term. Those present were the year tutor, the student, the student's

course tutor, the researcher as dyslexia tutor and a member of the administrative staff. The meeting lasted about half an hour and created a forum in which introductions were made and the foundations were laid for the future. The statements made by the year tutor can be briefly summarised as follows, *'We are here to support you during your stay at this university, and would like you to keep us informed when things go wrong or when you have any problems. We want you to feel that you can approach us at any time to discuss how you are getting on,'* The student was then told what were the various areas of responsibility of the tutors, and informal plans were made for him to attend the unit to organise his study support sessions. He was asked if he had any questions and a brief discussion followed. The session ended as it had started, on a positive note, and the student appeared to be at ease, pleased and confident.

The student started to attend a regular but small number of sessions, one of which is described in the section on memory training (see 5.1.10) and he reported generally very good progress on his course.

Would that all dyslexic students could have such a start as this when they enter university. Staff, who are usually so busy and under pressure, appeared to be amenable and giving of their time, stating that it was a positive meeting and well worth the effort.

From the two hundred or so dyslexic students that the unit dealt with, he was the only one to receive this type of attention. Needless to say, it proved to be a positive experience for the student, and he went on to do better than might have been expected.

However, driven by curiosity, and with an absent student having provided her with an unexpected half an hour of time, the researcher decided to tackle the formidable looking dossier, which had probably not been studied in any detail by anyone for some time. On closer examination, it emerged that this student had in fact been assessed by a range of professionals, including, educational and clinical psychologists, optometrists, occupational therapists, and that he had been subjected to brain scans and other medical tests in several hospitals. But when the researcher had actually perused all of the reports, what emerged was not a classic case of severe dyslexia, not even an ordinary case of dyslexia, but a possible mild learning difficulty that could not in fact be confirmed by the psychologists as dyslexia because he did not show the expected profile, although there were some *'slightly puzzling inconsistencies'* in his cognitive and attainment scores. The Quick Screener, (see section 3.6), which was administered to him after the meeting, to establish the type of support work he would require, provided information about his learning which was somewhat at variance with the content of the meeting with the tutors which had focused on his substantial needs.

An incidental conversational with one of his tutors provided a further insight into his mother's drive and ambition to get all the possible support for her son up to and including provision at university, *'having pioneered the dyslexia cause at local level and made compelling connections within the LEA, her son was not hampered in his pursuit of a grant'*. It then became apparent that the meeting had been set up in response to a 'directive' from his mother, who had hoped also to be present, but had been assured that this was not necessary.

Unfortunately, (in the researchers personal opinion) much of his grant could have been more usefully spent elsewhere, because in later meetings with the student, he came to the conclusion that he did not require regular study support sessions, although he did decide that he would like to keep his options open to *'drop in from time to time'*, and kept his name on the list of students attending the unit. He also admitted in response to the question, *'Are you finding the scanner a help to you?'* that he had hardly ever used it, although *'it was nice to have it.'* In neither the case of technological aids or study support provision that had been granted to him, did there appear to be any sense of obligation about returning unused goods or money.

The other student example chosen by the researcher was less fortunate, although more in need of and deserving, perhaps, of support. She was accepted onto a Radiography course, on her own academic merits and successful interview. She had never been assessed before, and entered university not knowing for certain the reason for some of the difficulties in learning she had been coping with on her own in the past. Had the university been informed that she was dyslexic, there is a strong probability that she would not have been accepted onto this course.

Towards the end of her first year, she attended the unit saying that whilst she was enjoying the course, doing particularly well in her clinical component, there was some suggestion that her written work needed attention. An assessment was set up for her and shortly before her end of year examinations, she was told that she was dyslexic. Unlike certain other, more fortunate students (see case study 2) where the student had several months to come to terms with her dyslexia and get

support, this student had a much shorter time, and due to timetable restrictions did not manage to book in many sessions after her assessment, leaving her with less opportunity for discussion or guidance than would have been needed to ensure her success in the forthcoming examinations.. Her examination results were borderline passes, and she failed three of the papers.

Because she was in the Science faculty, she was not given extra time in the examination. This was the only faculty in the university to refuse giving extra time to dyslexic students. This was very likely due to practical considerations, since science was taught on a modular basis, the examinations were organised so closely together that it was not easy to change the system, rather than for reasons of principle . However, the debate became more complex when the issue was raised in a staff seminar, and discussed at the dyslexia project steering committee meetings . It had also been flagged up by a number of individual students attending the unit as unfairness in the system that there was not a whole-institution policy with regard to this issue, and there were a number of students who had made enquiries prior to entry to the university and been told by the admissions staff that extra time would be given in examinations, but then discovered once they had started their course that their particular faculty did not give time concessions.

Her tutors tried to persuade her to change to another subject, which perhaps would be less controversial, and did not have a clinical component. However, she explained in a visit during the summer, that the clinical aspect was the part she was good at (her grade was 2.1) and it did not seem logical to her that she

should be encouraged to do a degree with no practical aspect that would be even more demanding on her written language skills.

As her study support tutor, the researcher wrote a report to her own line manager, the department head, focusing on the student's strengths, and explaining her weaknesses that were related to her dyslexia, and outlining the kind of support she needed. The researcher further requested that in keeping with the support given to dyslexic students in other faculties, extra time in the examination should be considered, citing as relevant evidence her description of her experience in the previous examinations. The student stated that she had answered all the questions she could and left spaces for the others which she would then go back to at the end, having had time to assimilate what was required and tackle them again, knowing that she could have got some of them right, but that she had run out of time. *'If I could do the exams with extra time, I know I can pass them, and if I don't pass, then fair enough, I will accept the decision.'* Unfortunately, neither she, nor her tutors were to have the opportunity to find out.

The student re-sat the examination after the summer break, once again without extra time. Her re-sits were an improvement but not sufficiently good to achieve clear passes. Her tutors discussed her case at a staff meeting and decided that she would have to leave the university, and she was informed by letter that her dismissal was to take immediate effect.

In subsequent discussion with members of staff from her faculty, who said that guidance from the unit would have been welcome, it became clear that the report addressed to them had not left the unit, and the very *'difficult'* decision which the staff from her department had reached after several hours of discussion had had

to be made without any input from the unit (presumably, the whole issue was considered best left to settle itself one way or another, without any action being seen to be taken by the unit).

On receiving her notice to leave, the student decided to appeal against the decision of the university. In the meantime, she remained in the locality, in touch with her friends, attended some study support sessions, and started revising, whilst getting a job to support herself. The BDA was invited at the researcher's request, to send a befriender to represent her case at the appeal.

In the meantime, the student was encouraged by the university to switch from making her complaint against the department for not giving her extra time, to making a complaint against the dyslexia unit for failing to support her needs. This, she refused to do, and she further maintained that it was actually the unit that had been her main source of sympathy and support.

After waiting several months, due to a postponement of the appeal, the student received a brief, formal letter informing her that the board would not change its decision.

She made a new application to do the same course at one of the London universities, and was offered a place for the following academic year.

She had lost a year. She could have become very demotivated and disillusioned, but she did not, and she kept her focus on her goals.

Comments from the discussion with the staff, which took place too late to alter the course of events for this dyslexic student are illustrated below.

'If she is dyslexic and fails a written examination, it means that she is unable to cope under pressure. The clinical aspect of the work she will be doing when she leaves this course requires working under pressure, therefore we are not prepared to take the responsibility at this stage of her learning for the mistakes she might make in future.' course tutor.

'This student has excellent rapport with patients, her clinical practice record is above average, she behaves with confidence and common sense in a clinical situation.' another tutor.

'However, she has suffered years of anxiety when sitting at a desk doing timed written examinations and her results have not been a true estimate of her abilities. It has now been confirmed for the first time that she is dyslexic. Is it a fair assessment, bearing in mind the specific nature of this student's difficulties, to make an automatic link between her weak performance at written examinations and her possible shortcomings in clinical practice, where so far she has presented evidence only of clear competence? Should we be making an automatic link here between these two rather different sets of circumstances?' dyslexia tutor.

What did emerge from the discussion from some of the tutors themselves, was that perhaps tutors in higher education need to look upon dyslexia as a different way of learning and therefore a condition which they need to know about and understand more fully.

The unsuccessful bid made by this student over her dismissal from university may at least have had one positive outcome - the tutors and head of department have had cause to reconsider their views about dyslexia and what it means. The university has, since then included these limitations in their provision within the Kingston University Disability Statement (1997), so at least, dyslexic students are forewarned.

As the dyslexia tutor who supported her, the researcher's own predicament after this incident, could best be described as 'irredeemable'. In this respect, supporting dyslexic students in higher education can and does bring one face to face with difficult challenges, both political and ethical when, as in this case, the future life and career of one student comes in direct conflict with the necessity for an institution to be seen to be right. The penalty, as the researcher was to discover, for standing by her job description and attempting to provide genuine student support, did prove to be not just very expensive, but quite punitive.

After putting up a strong resistance, and a very compelling case against giving extra time and in favour of differentiation in the marking of scripts (scientifically and statistically quite convincing compared to the 'blanket' 15 minutes per hour

extra time currently granted to most dyslexic students, except that it was arrived at through a standard numerical equation and was not based on individual need. The Science Faculty would appear to have stood their ground on this matter.

A draft statement contributed towards preparing a university policy statement was drawn up by members of the HEFCE project team and is fully available in appendix 2E. A relevant extract from it is presented below:

‘This university has already in place procedures for identifying students with learning difficulties, including some support available for them in terms of personal assessment, counselling, teaching and study skills facilities, within the existing limits of available resources and other operational constraints. However, this provision requires further review in the future, given the particular requirements of different faculties, such as in coursework assignments, practical work appraisal, fieldwork and examination marking procedures. This procedure presently requires formal endorsement by the University Examination Section, so that dispensation of this kind can be seen to be applied consistently in all departments, so as to ensure that all students are treated equally.’ (Walker & Zdzienski 1995).

As a result of the HEFCE project and the 1995 Disability Discrimination Act, the university has recently issued a policy statement on students with learning difficulties, and at the end of the project the team made a statement outlining the university provision for insertion in the following academic year student handbook.

A survey carried out at the time of the HEFCE project (Gilroy 1994) showed that nearly 86% of the participating Universities allowed extra time for dyslexic students in examinations. By 1997 that figure had reached a reported 99%. (Singleton, in press).

Students are now coming to expect the recommendations made by the Educational Psychologist to be granted when they reach University. A recent example is that of a Law student with severe dyslexia who attempted to sue his college (Gibb, 1998) when his psychologist had recommended 50% extra time as well as a viva to carry out his final examinations but he was only given 15% and was refused a viva. He accused his college and the Law Society of an alleged breach of contract.

Perhaps a comparison between three universities regarding examination provision for dyslexics may be useful at this point. The following texts are extracted from the Disability Statements of Ulster and Leicester (both of which were involved with the piloting of the screening and assessment project as described in 5.2. and 5.3.), and the third is from Kingston University where the HEFCE project was carried out.

Extract from the University of Leicester's Disability Statement

'Examinations and assessments'

10. *The Standing Committee of Deans has approved and instituted a standardised system for making special arrangements concerning examinations*

and assessment for students with disabilities. Such arrangements can include the allowing of additional time, the provision of specialist equipment or of a special venue for examination or assessment.

70. Procedures for the assessment and the examination of students' work will be kept under regular review to ensure that they are fair and equitable to all, and to not discriminate against any individual.'

Extract from the University of Ulster's Disability Statement

'The University of Ulster welcomes students with dyslexia and recognises the special skills and motivation that they bring to their studies.

Special exam arrangements can be made on the recommendation of the Universities Psychologist to the Senior Course Tutor after carrying out a psychometric assessment of the dyslexic student's needs

- *Extra time, up to 25%.'*

Extract from the University of Kingston's Disability Statement

'The Dyslexia Support Service currently offers counselling, diagnosis and assessment of dyslexia and suggests individual programmes of study support. Copies of dyslexia assessment are given to students and Heads of Schools with recommendations for meeting the student's special needs.

Students who can provide current diagnostic evidence of dyslexia may be allocated up to 25% extra time for examinations where the Faculty approves this practice and where the student wishes to take advantage of it.....Currently the Faculty of Science does not allow additional time owing to the constraints of the modular programme, although allowances are made in the marking of scripts.

Dyslexia Policy

The University Corporate Plan 1996 has identified that Academic Services plan to develop a policy on dyslexia,,,,during 1998/1999....This statement is for information only and does not constitute a contract.

It is interesting to note that the Open University makes a graded provision of extra time which goes to a maximum of 25% for moderate dyslexics to 50% for severe dyslexics.

A dyslexic student who attended the unit at Kingston University commented:

'Dyslexic students should have rights and not just discretionary concessions, which are dependent on the attitudes of individual tutors and departments.'

Section 3: Pilot study: an exploration of screening

'Lecturers should be aware of dyslexia and try to help. More effort should be made to identify people with dyslexia who may have passed through the education system without being recognised or helped. For some time I have felt that I needed help with my disability. However, I did not know where to get help'

(Taken from 'Coalition' for disability awareness - University of Ulster 1996)

3.1 A review of screening procedures in current practice in Higher Education

Higher education institutions have been required since September 1996, to publish a formal Disability Statement setting out policy, provision and practice in relation to disabled students, which would include dyslexic students. (Disability Discrimination Act 1995). The 1992 Further and Higher Education Act had also stated that *'Learning Difficulties should be no bar to access to Further Education'*.

In most universities an Educational Psychologist's full assessment is required in order for the student to be granted any concessions or support (Singleton, in press). Dyslexic students whose problems have been well documented throughout their school years can refer themselves appropriately on entry and ensure that they receive the support to which they are entitled. However, not all dyslexic students are being successfully identified and supported prior to entry to Higher and Further Education. Practitioners in this field are aware that quite often it has been only with the failure of the end of year's written examinations, or the handing in of the long dissertation in the second or third year, that dyslexia comes to be considered as the likely cause of their problems.

In Higher Education Institutions where overall screening procedures are used, these tend to be operated primarily for the benefit of the first year intake and include fairly broad-based tests targeted at the English as a Second or Other Language population, who are then offered extra English support. These tests are not designed to identify dyslexia, and whilst some of the more severe dyslexics may be recognised from their essay answers (because of the typical errors of spelling reversals and misplaced words or syllables such as are described on a number of Dyslexia Checklists), others may risk being overlooked.

In Further Education, Study Support Tutors frequently administer their own literacy-based assessments, and then make recommendations resulting in a programme of individual or group support. This approach is presented in detail elsewhere (Klein, 1993). The focus in these assessment procedures may well be of a more general nature and intended to identify broad areas of learning difficulties. Since the provision of study support, (for which funding is available), is the main objective, such assessment is likely to result in an adequate arrangement for those students who take part.

The rationale for this investigation also involved a response to the reported university drop-out rate of between 10 and 17%, largely among the first year intake, and to the assumption that it would be helpful to ascertain from that group, how many students are dyslexic, how many have a general English language difficulty, and how many lack certain basic skills in literacy, numeracy and study.

The full extent of the incidence of dyslexia among students in 16+ institutions is not, as yet, clear. However existing research from the national survey puts the figure of students who are affected at around 1.3 per cent. There is documented evidence of an increase in registered dyslexic students going to university. Gilroy, (1995) compares the present figure of about 2000 with about 120 in 1981. These figures are based on students who have declared their dyslexia on their UCAS form and would indicate that the 1981 Education Act, statementing and teaching, have helped to identify and support increasing numbers of dyslexic students in recent years. They do not include, however, those students who do not wish to be identified or who do not discover that they are dyslexic until they are already on their course. It is therefore not surprising that dyslexics are frequently found among course drop-outs. Nevertheless it is not possible to say to what extent drop-out rates may be affected by these factors.

There is, however, evidence, that some students do drop out from their courses because of the demands placed on basic skills such as literacy, numeracy and study skills. These are the points which the exploratory screener in section 3.6 attempts to address.

This section (3.2.1 - 3.2.6) examines a number of informal screening procedures currently in use and includes comments on the effectiveness of different approaches based on the work carried out with students at Kingston University between 1993-1995.

Sections 3.3 -3.8. present additional research that was carried out with dyslexic and non-dyslexic students to explore these approaches further, with the aim of identifying an effective dyslexia initial screener.

3.2 A Summary of a Regional Higher Education Group discussion

As a member of one of the HEFCE Project Teams the researcher had the privilege of being both a participant and an observer at a regional meeting which was attended by most of the representatives of HEFCE projects from other universities (see section 4.4.1), in addition to representatives from such key dyslexia centres as the Adult Dyslexia Organisation (ADO) and the Dyslexia Unit at Bangor University.

Some of the comments from the regional meeting held in October 1993, at the outset of the HEFCE projects, are summarised below. They serve as a good illustration of some of the main concerns of a number of Study Support Tutors at the time. Some of the approaches have since been researched in this study, and some of the issues raised have been further discussed at a number of regional meetings set up by, and reported on, by the National Working Party on Dyslexia in Higher Education (Singleton in press).

- Sometimes assessments highlight that the student is generally weak. This is possibly an 'admissions' problem. The role of the Study Support Tutor is to accommodate the disability but the student may fail for other reasons.
- Kingston's screening is to check all types of needs and put in place a range of support systems.
- Admissions ought to screen out those who are so weak that they will most likely fail. It is unfair to take someone on who is then set up to fail.

- Bangor is now admitting more 18 and 19 year olds who have benefited from the 1981 Education Act, who have been well 'trained', but do need specific university - related training. There is a group session available. Some who do not come like to know, however, that the group is there. Many prefer an entirely confidential personal service. There are now more mature students who have had poor experiences in the past. They manifest varying attitudes - shock of discovering they are dyslexic, low confidence etc. and they need a range of support.
- Some students who have had cancer or are on heroin have 'acquired' dyslexia. At East London, self referral is more likely from white students. Black students tend not to self refer. This requires research.
- Students who have used evasive strategies all their lives may not respond to outreach. Some students may not want to admit their dyslexia even to themselves. There are also certain students who as a result of unsympathetic treatment when younger, have learnt to conceal their problems from others. This issue could be a particularly difficult area for mature students who may not have recognised their dyslexia before, and younger students have tended to appear more open to such ideas.

3.2.1 An interview and discussion approach

A series of in-depth student interviews have now been published (Riddick, Farmer & Sterling 1997), which give an insight into several dyslexic students' views regarding their childhood experiences, education, coping with study, and their emotions.

The ADO recommends the use of a screening questionnaire which was presented at their conference, 'Dyslexia in the Workplace' (1994). (See appendix 3A for a copy of the questionnaire entitled 'Dyslexia Screening Interview').

Study support tutors book students in for individual sessions during which they carry out informal investigations regarding dyslexia. These sessions provide both the tutor and student with valuable, personal contact time, and usually lead to a formal assessment and provision. However, given the estimated figures of dyslexic

students within any student population, and the standard dyslexia provision within any one institution, it is difficult to imagine that they all manage to get the required personal attention. When making seminar presentations to staff from several colleges of further and higher education, it emerged that some of the following procedures are in use with varying degrees of success.

3.2.2 Checklist approaches

A checklist of symptoms was used at Kingston University entitled 'How do I know if a student is dyslexic?' (see illustration 3a.) and is fairly typical of the checklists generally available. (See Appendix 3B for a selection of examples of dyslexia checklists - Newton 1971, Arkell 1993, Lee 1993, ADO 1994, BDA 1995).

Illustration 3a: Checklist: 'How do I know if a student is dyslexic?'

CHECKLIST	
◆	shows significant discrepancy between verbal and written performance.
◆	experiences persistent or severe problems with spelling, even with "easy" or common words; spelling may also be erratic.
◆	has difficulty getting ideas on to paper
◆	has problems ordering things sequentially.
◆	loses place easily in a series, or in reading.
◆	finds it difficult to memorise or remember facts, new terminology, names <i>etc.</i>
◆	may easily misread or miscopy. handwriting may be "messy", poorly constructed or immature.
◆	written work may fail to adequately express students' understanding of ideas or vocabulary.
◆	
◆	
◆	has persistent problems with sentence structure punctuation and organisation of written work - not due to lack of experience.
◆	has trouble generalising, or acquiring and applying rules.
◆	has difficulty seeing his/her errors.
◆	does not seem to learn by ordinary teaching methods.
◆	may be described as a "quick forgetter".

The main criticism from lecturers at Kingston University about such lists was that for those who are not particularly familiar with the condition of dyslexia, a checklist approach is too basic and could lead to unnecessary referrals. As one lecturer put it, *'It does not sufficiently separate the dyslexic student from one who is underachieving for other reasons'* .

The BDA Adult Dyslexia Checklist has been shown to be a reliable means of identifying dyslexia in adults (Vinegrad 1994) (See section 5.2.1). This checklist was used with all the dyslexic students who attended the Unit at Kingston University and proved to be a more constructive means of identification than giving lecturers a general checklist of symptoms. It is presented below in illustration 3b, with its scoring checklist in table 3i.

Illustration 3b: The BDA Adult Dyslexia Checklist

Please tick YES or NO to each question.

Please answer every question. If in doubt tick the answer that you feel is true most often.

	YES	NO
1. Do you find difficulty telling left from right?
2. Is map reading or finding your way to a strange place confusing?
3. Do you dislike reading aloud?
4. Do you take longer than you should to read a page of a book?
5. Do you find it difficult to remember the sense of what you have read?
6. Do you dislike reading long books?
7. Is your spelling poor?
8. Is your writing difficult to read?
9. Do you get confused if you have to speak in public?
10. Do you find it difficult to take messages on the telephone and pass them on correctly?.....
11. When you have to say a long word, do you sometimes find it difficult to get all the sounds in the right order?
12. Do you find it difficult to do sums in your head without using your fingers or paper?
13. When using the telephone, do you tend to get the numbers mixed up when you dial?
14. Do you find it difficult to say the months of the year forwards in a fluent manner?
15. Do you find it difficult to say the months of the year backwards?
16. Do you mix up dates and times and miss appointments?
17. When writing cheques do you frequently find yourself making mistakes?
18. Do you find forms difficult and confusing?
19. Do you mix up bus numbers like 95 and 59?
20. Did you find it hard to learn your multiplication tables at school?

Nine or more YES responses on the Questionnaire as a whole would indicate a dyslexia type problem. Further advice should be sought.

Your local College of Further Education or University Learning Support team may be able to advise if you are studying or considering further study.

Your Local Dyslexia Association may also be able to help.

For local contact numbers telephone the BDA Helpline 0118 966 8271.

The best twelve indicators are shown below, in order of importance.

Put a tick against those items which were marked YES on the questionnaire.

Table 3i: Scoring 'severity' order for Adult Dyslexia Checklist

1. Q17	4. Q16	7. Q19	10. Q4
2. Q13	5. Q18	8. Q14	11. Q1
3. Q7	6. Q10	9. Q20	12. Q11
Reference Michael Vinegrad: A revised Dyslexia Checklist. Educare, No 48 March 1994			

Many institutions have effectively drawn from the BDA checklist a few of the main indicators and presented them on posters, leaflets and student services Internet web pages to draw the attention of individuals to the facilities available for further help. (See appendix 3C for an example of a mini checklist from Loughborough University, 1994). The following extract (De Montfort University 1996) serves as a very good example.

- *'Is your spelling poor?*
- *Do you have difficulty taking notes or copying down notes in lectures?*
- *Do you have difficulty with planning and writing, letters, or reports?*
- *Do you occasionally misunderstand what you read?*
- *Do you have difficulty carrying out three instructions in sequence?*

If this seems familiar and seems to be affecting your studies, then it might be a good time to talk to Student Services."

3.2.3 A timed writing exercise

Most practitioners in the dyslexia field become quite efficient at making an informal diagnostic analysis from observation of a sample of a student's handwriting.

Students, if asked to describe some of their experiences will volunteer much of the information that is to be found on the dyslexia checklist.

Sterling (1983) made a very good case in the paper entitled 'Spelling errors in context' for the need to examine a student's spelling in spontaneous writing, since a number of errors occur that are not addressed by conventional spelling tests.

The following two examples of student work were presented (1996) by the author, as part of a presentation on Dyslexia to the staff of a South London Sixth Form College, followed by staff discussion.

Characteristic of these descriptions from dyslexic students would be the complaint that there is too much reading on their course to cope with at any given time, and what usually emerges is that it is the aspect of the course which requires language processing that these students find the most difficult.

The following example of handwriting (see illustration 3c.) describes some of student A's frustrations as well as focusing on some of the positive experiences. It returns at approximately a 6% spelling error rate, and contains, apart from some normal errors that many students might make, a few which are rather more specific in nature. It would take a fairly weak speller at further education level to write '*realy*' and '*cheeting*', but other errors, such as the same word spelt differently within one paragraph e.g. '*preffer*' and later '*prefere*' are of more particular interest. Furthermore a spelling of the word '*imput*' shows a likely dyslexic's attempted auditory response to a word that to another student would look wrong as well as be more obviously unlikely at a grammatical level, when further considering the spelling of the opposites, input and output. Other relevant errors are the typical minor errors in small words which dyslexics often make, such as '*I learn far more for the tutors*' instead of 'from'.

Illustration 3c: Sample of dyslexic student A's handwriting

Being a student at King Alfrede's College has proved to be both interesting and challenging. I am studying Drama + Teaching. I often find that I prefer the drama and long for productions of some kind. This I feel is also reflected in my grades. Although my college grades are high, I often feel I am cheating as I never get chance to read all the books we are supposed to. I find reading is boring and tedious. I get tired really quickly and therefore much prefer tutor lead sessions, I learn far more for the tutor input. I was consequently very upset when many of our good teachers were made redundant and our course this year had's been predominantly self taught, as if I am honest I have not self taught myself anything! I fear greatly the results of my teaching essays and pray that my drama marks will bring them up. Drama in the community is the topic for one of our drama modules this term, my group are doing drama with a group of autistic teenagers. I am finding this very interesting.

Regarding the second example of handwriting in illustration 3d., there was general acclaim from the staff present as to what a fine example of good student work it was. One lecturer called out 'I wish some of our students could write like that'.

However, on being invited to make a closer scrutiny of the written piece, some useful observations were made, about the handwriting of student B.

Illustration 3d: Sample of dyslexic student B's handwriting

While I've been at King Affreeds I've accounted many things. Some of these have been enjoyable, and some have not. I have found the teaching side of my course really interesting and have obtained quite good marks in the core subjects. However I have had a great deal of difficulty with drama. The course is not what I expected and each term I find myself being stretched in my ability to understand some of the theory that is involved in the subject. On commencing this course I thought it would be a lot more practical than it has turned out to be. I find the reading for the course a great struggle in amount and content and it seems to overwhelm me. I always have the same comments on my essays. "More reading around the subject would help." I have trouble enough reading what is set, let alone more besides!

In this case there is less than a 3% spelling error rate, which would not particularly distinguish this script from numerous others presented by students without specific learning difficulties (see section 3.2.6 and 3.3). A mistake such as writing the word commencing as 'comencing' is a fairly typical error that weaker or rather careless spellers might produce. There are a couple of other errors, though, which suggest that the writer presents spellings that are not fully matched to the sounds of the words in question, such as 'accountered' for encountered, and 'a lot more practical *that* it has turned out', instead of 'than'. The first mistake tends to suggest an inaccurate knowledge of the sound and grammatical make up of the word, and could be the way in which this student records her spoken form of the word. For dyslexic students who tend very often to have a good spoken (expressive) vocabulary, there is often a short-fall when they have to present the same words accurately in a written format.

Another error, fairly characteristic in the work of dyslexic students, is that short and frequently used words are at times mis-spelt or confused with one another, in a way that is less likely to occur in the work of non-dyslexic students.

A further and less noticeable, but important feature is the way in which the student has written the word 'understand' and split it into what would appear to be two separate words - '*underst and*'. This can be explained in the context of the student processing sounds auditorily, whilst concentrating on the meaning (see Chasty & Friel 1993), and consequently failing to observe or correct something in writing which is grammatically incorrect and would be visually jarring to a non-dyslexic.

The question that remains, however, is, whether an initial reading of a student's script such as the one above, as made by tutors when they are marking, raises sufficient warning signs that the student may have specific difficulties. It was generally acknowledged by those present that noticing error patterns in students' written work, especially when they are infrequent and fairly subtle, could not be relied upon as a very effective screener, particularly when the tutors doing the marking are mainly concerned with the quality and accuracy of subject content.

3.2.4 A timed language processing exercise

Dyslexia has been described as a language processing difficulty, which can be detected in younger students quite successfully through the administration of various tests of phonological processing (see section 3.2.5). However, when dealing with students at university who have in many ways learnt to compensate for their difficulties, then a test set at an appropriate level of language processing may be required to highlight the problems as well as strengths. A single task of reading, or handwriting may not be discerning enough.

The informal test presented here is one which most dyslexia tutors would carry out in the course of their teaching. It comprises the following elements:- being timed reading a piece of text, and then summarising it, and expressing opinions about it in writing, also under timed conditions.

Consequently the tutor can establish the student's general levels of:

- reading speed
- comprehension
- writing speed
- ability to organise, sequence and express ideas in writing
- skill in constructing sentences
- application of spelling, punctuation and grammar.

Such an exercise is very quick to administer, and for degree students embodies the synthesis of information that students are expected to deal with proficiently, in varying volume, complexity and often under pressure.

For the purposes of illustration, the following extract from Tom Sharpe's novel 'Wilt' which was used with students at Kingston University, is presented in illustration 3e.

By selecting a text of a general nature in terms of content rather than anything technical, and using it consistently with all students, the tutor creates one type of informal benchmark and thereby can gain an immediate initial impression (albeit general and probably requiring much further analysis) of each student's strengths and weaknesses in literacy.

The following two examples are put forward to show the wide difference in operational terms for two students attending the same university. Both have reports from educational psychologists to say that they are dyslexic.

3.2 Wilt

Whenever Henry Wilt took the dog for a walk, or, to be more accurate, when the dog took him, or to be exact, when Mrs Wilt told them both to go and take themselves out *of* the house so that she could do her yoga exercises, he always took the same route. In fact the dog followed the route and Wilt followed the dog. They went down past the Post Office, across the playground, under the railway bridge and out on to the footpath by the river. A mile along the river and then under the railway line again and back through streets where the houses were bigger than Wilt's semi and where there were large trees and gardens and the cars were all Rovers and Mercedes. It was here that Clem, a pedigree Labrador, evidently feeling more at home, did his business while Wilt stood looking around rather uneasily, conscious that this was not his sort of neighbourhood and wishing it was. It was about the only time during their walk that he was at all aware of his surroundings. For the rest of the way Wilt's walk was an interior one and followed an itinerary completely at variance with his own appearance and that of his route. It was in fact a journey of wishful thinking a pilgrimage along trails of remote possibility involving the irrevocable disappearance of Mrs Wilt, the sudden acquisition of wealth, power, what he would do *if* he was appointed Minister of Education or, better still, Prime Minister. It was partly concocted of a series of desperate expedients and partly in an unspoken dialogue so that anyone noticing Wilt (and most people didn't) might have seen his lips move occasionally and his mouth curl into what he fondly imagined was a sardonic smile as he dealt with questions or parried arguments with devastating repartee. It was on one of these walks taken in the rain after a particularly trying day at the Tech that Wilt first conceived the notion that he would only be able to fulfil his latent promise and call his life his own if some not entirely fortuitous disaster overtook his wife.

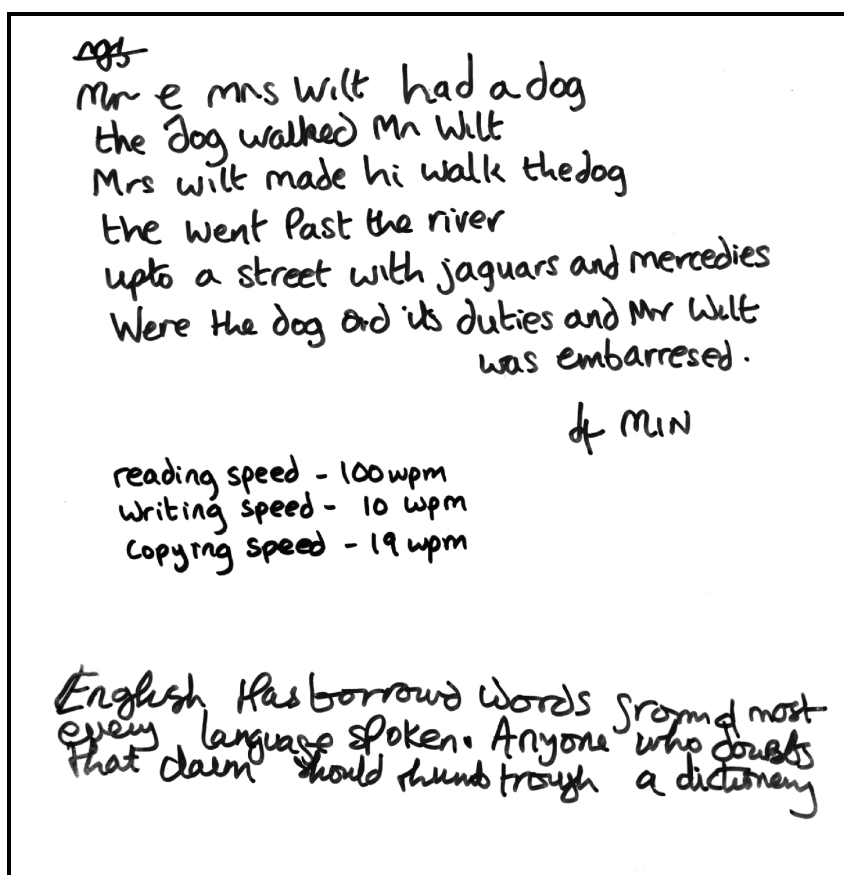
(from Wilt by Tom Sharpe)

Illustration 3e: Extract from 'Wilt' by Tom Sharpe

To illustrate this test, the first dyslexic student selected (who was following a Finance and Accounting degree course) would appear to be functioning at less than half of the expected speed in both reading and writing. His description (see illustration 3f.) does not show a particularly good grasp of any of the finer details of the text even when allowing for the fact that what he has expressed may have been severely limited by his difficulties in handwriting.

What it does offer is an immediate signal that a good deal of support will need to be offered to this student in order to help him through some of the timed, written components of his course. It is also clear that alternative arrangements may need to be sought for him to be able to carry out examinations, since when he attempts to write more quickly his handwriting gradually becomes more erratic and untidy. Finally his reading skills need to be more thoroughly tested to see how well he can cope with study.

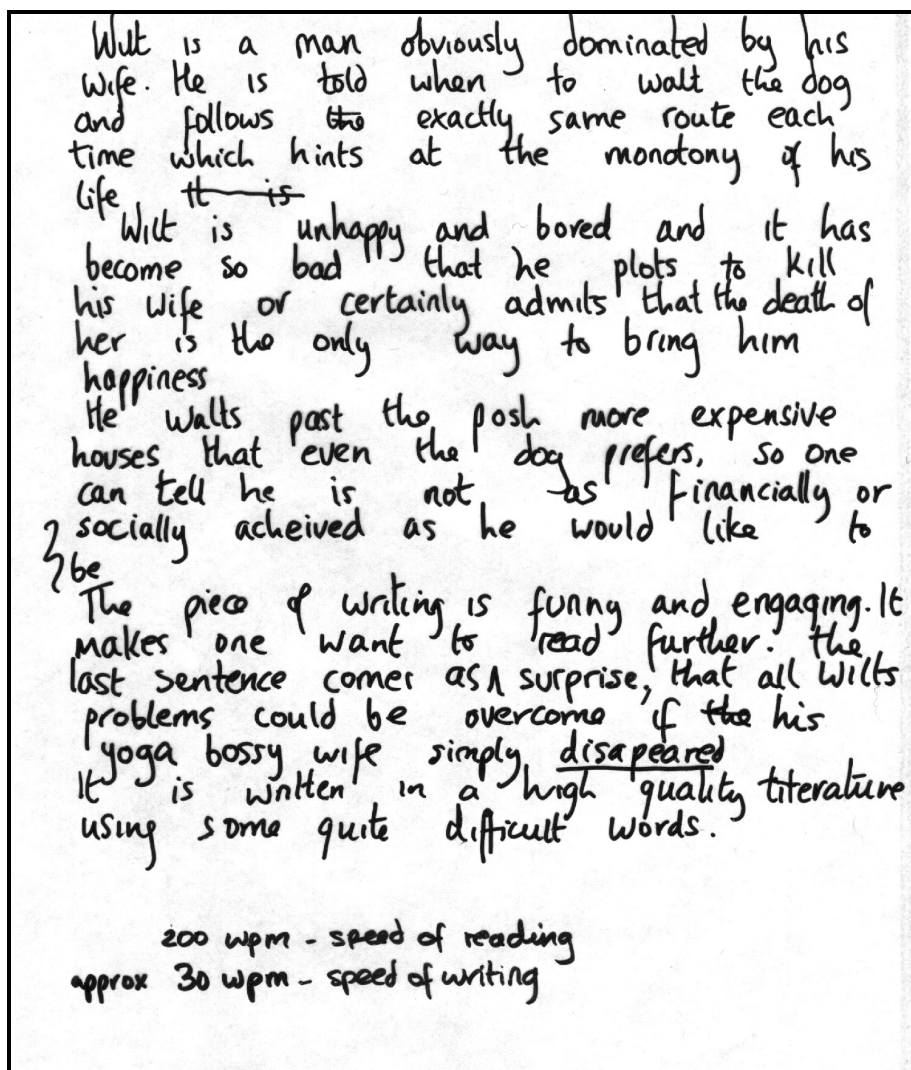
Illustration 3f: Response of a dyslexic student (Finance and Accounting)



The second example (see illustration 3g.) is selected from the work of a dyslexic student following an English degree course, who was undergoing an individual support course and had, by this stage, already made improvements in her reading and writing speeds. Whilst this extract shows evidence that this student has applied a knowledge of presentation including paragraphs and general tidiness, a closer look reveals a weak knowledge of punctuation, capitalisation and spelling with a 2% spelling error rate.

The most obvious spelling mistakes 'acheived' and 'disapeared' could arguably be a common feature of many other hand-written scripts by non-dyslexics (although one might not expect this so much from English degree students). However, the twice occurring error 'walt' for 'walk' and 'walts' for 'walks' (which may have been confused with the form of the word 'Wilt') would be indicative of a dyslexic's lack of phonological awareness.

Illustration 3g: Response of a dyslexic student (English)



A further minor error is the omission of the indefinite article in the phrase 'comes as surprise' is characteristic of the minor errors of omission that dyslexics make.

Whilst this dyslexic student is at a great advantage compared to the previous case, in terms of her speed and effectiveness of language processing, she has probably placed herself in an equally challenging situation because of her choice of subject which places the greatest demand on these particular areas of weakness in learning.

3.2.5. Phonological skills tests

During the dyslexia project 1993-1995, the phonological skills tests were not yet generally available. However the project team had an early copy of the Non Word Decoding Test (see illustration 3h.), which was subsequently published in 1996 (Snowling, Strothard and McLean). Unfortunately this test is designed for children and no adult equivalent was available at the time of this research project (an adult phonological skills test has only recently been released by Sheffield University (Nicolson & Fawcett 1998)).

The Non Word Decoding test was administered to many of the 70 dyslexic students who attended the dyslexia Unit at Kingston University. Although at varying speeds, most of these students managed to read it without too much of a problem. One recurrent error was that students would say 'kim' for the item 'cim'. The only students who seemed to struggle with this test were those who were severely dyslexic (of whom there were very few at university level) and those who were both dyslexic and experienced ESOL (English as a second or other language) difficulties, and the extent of these students' unfamiliarity with the linguistic patterns of English spelling was revealed. These early findings echo the comments of Uta Frith (1997) that suggest this test may be insufficiently demanding for students in Higher Education to be of diagnostic use.

Illustration 3h: Extract from the Non-word Decoding test (1996)

jeal	hife	hount	durl	bune
jow	liel	ipsidom	salder	toag
cim	cardonite	sprinderpilling	kaphridge	
gep	phoncher	doncenated		
dissantomified	apprixengilate			

More recently other tests of phonological skills have been trialled with university students who are dyslexic, for example, the Non-Word Repetition Test (see illustration 3l.) which once again did not appear to present too great a problem.

However with the Perin Spoonerism Test (1983) (see illustration 3j.) students did falter, were slow to make their responses and, at times, found it all rather confusing.

The research (Perin,D 1983) showed that performance on this test was more strongly related to spelling rather than reading skill, and provided support for the view that irrespective of reading ability, poor spellers are unable to deal efficiently with phonemes, particularly those with severe problems.

Illustration 3j. Extract from the Perin Spoonerism test (1983)

5	Led Zeppelin (Zed Leppelin)		14	Phil Collins (Kill Follins)		
6	Neil Diamond (Deal Niamond)		15	Delta Five (Felta Dive)		
7	Jimmy Reid (Rimmy Jeed)		16	Bob Dylan (Dob Bylan)		
8	Johnny Cash (Conny Jash)		17	Thin Lizzie (Lin Thizzie)		
9	Bob Marley (Mob Barley)		18	Four Seasons (Sore Feasons)		

This test, which was originally used with 14 year-old London secondary students, was culled from the New Musical Express of the day using 18 names of singers and pop groups. Whilst this test is considered to be '*cultural and of age-appropriate interest*' (Turner 1997), when using it recently with a group of university students, some of the names seemed unfamiliar to them. The task seemed to be rendered somewhat more complex as a result. Where the names were familiar one could say there was a certain automaticity in the response, but with less familiar words the students attempted to visualise and spell the two words and then consciously switch the first letters. Sometimes the words would become blurred in the process.

Whilst being fairly straightforward in parts for those students who attempted it, the test of auditory analysis skills (a phoneme deletion procedure) (see illustration 3k.) does indicate areas of difficulty for dyslexics in the last few test items. However, once again this test was developed for a child population and a parallel one for students in Higher Education had not, at the time of this study, yet been developed.

Illustration 3k: Extract from The Rosner (1993) test of auditory analysis skills (TAAS)

Say <i>wrote</i>	Say it again, but don't say /t/
Say <i>please</i>	Say it again, but don't say /z/
Say <i>clap</i>	Say it again, but don't say /k/
Say <i>play</i>	Say it again, but don't say /p/
Say <i>stale</i>	Say it again, but don't say /t/
Say <i>smack</i>	Say it again, but don't say /m/

The non-word repetition test (Gathercole, 1994 see illustration 3i.) may be more reliable at younger ages, and in fact yield individual differences that are more stable than the digit span test (Turner,M 1996). For children with impaired phonological skills, they will have difficulties in remembering and correctly repeating these utterances.

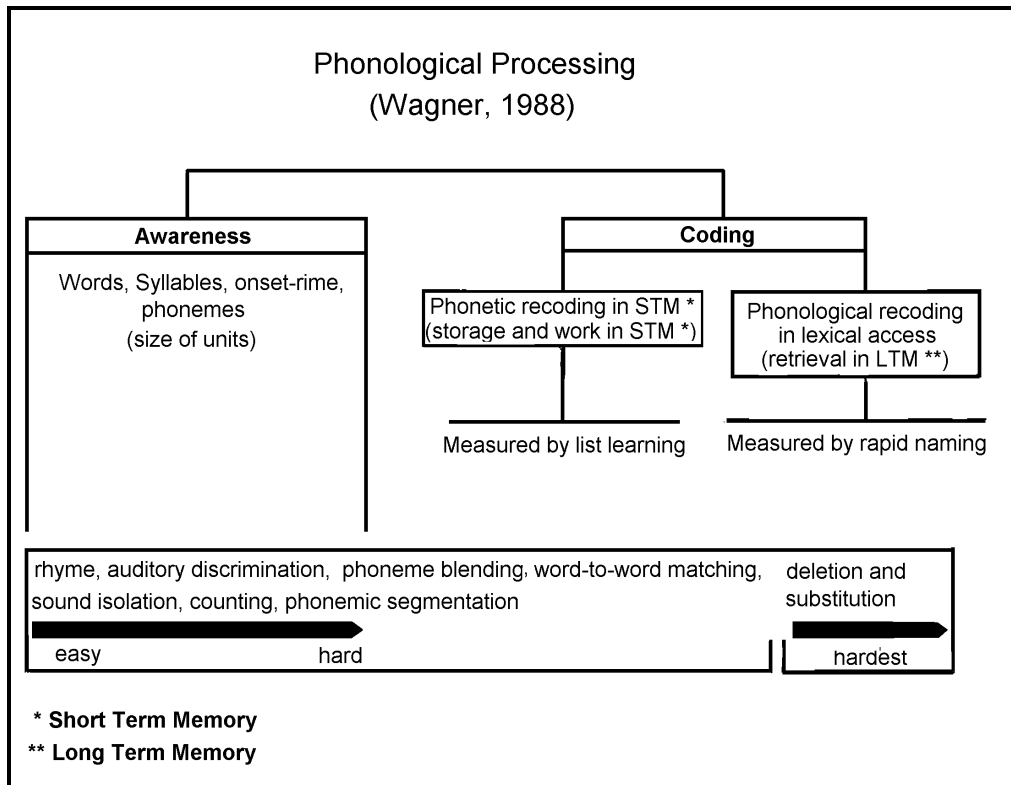
Illustration 3i: Extract from the Gathercole Non-Word Repetition Test 1994.

Two syllables		Three syllables		Four syllables		Five syllables	
Pennel	<input type="checkbox"/>	Frescovent	<input type="checkbox"/>	Loddenapish	<input type="checkbox"/>	Reutterpation	<input type="checkbox"/>
Prindle	<input type="checkbox"/>	Glistering	<input type="checkbox"/>	Pennerriful	<input type="checkbox"/>	Seppurennial	<input type="checkbox"/>
Rubid	<input type="checkbox"/>	Skiticult	<input type="checkbox"/>	Perplisteronk	<input type="checkbox"/>	Underbrantuand	<input type="checkbox"/>
Sladding	<input type="checkbox"/>	Thickery	<input type="checkbox"/>	Stopograttic	<input type="checkbox"/>	Versatrationist	<input type="checkbox"/>
Tafflest	<input type="checkbox"/>	Trumpetine	<input type="checkbox"/>	Woogalamic	<input type="checkbox"/>	Volutlarity	<input type="checkbox"/>
						Total Score	<input type="checkbox"/>

The diagrammatic representation of phonological processing (Wagner 1988, Yopp 1988) would serve as very useful reference material for a tutor in selecting or creating appropriate tests of competence among dyslexic students in further and higher education. (See Illustration 3m.)

From the limited experimentation that was carried out within the scope and at the time of this study it was evident that the hardest section of Yopp's range of difficulty for phonological awareness, i.e. deletion and substitution would probably be effective in the screening of this group of students.

Illustration 3m: Components of phonological processing and dimensions of phonological awareness



3.2.6 Spelling tests

There are not many spelling tests which are designed for the adult population at university level.

Informal research evidence from universities (also replicated by this study, in 3.3), suggests that dyslexic students generally make phonetic spelling errors, although these will be affected by dialect and pronunciation. Furthermore, some of the typical dyslexic errors are not really the main problem, *'In our experience confusion of letter orientation rarely persists in university students'* (*'Dyslexia & the University Student'* 1993).

The Vernon Single Word Spelling Test (see illustration 3n.) has always been popular with Special Needs Tutors and Educational Psychologists. Unfortunately it produces its results in the form of spelling age norms with a maximum ceiling of 15 years 10 months which adult students find somewhat unacceptable. For example a dyslexic student who spells 37 words correctly will be given a spelling age of 11 years 2 months with the consequence of demoralising the student and possibly making him/her feel hostile and critical towards the test. The age ceiling is often not stated on the assessment report thus leaving students with the impression that their performance is much worse than it actually is.

While it is very good for students up to the age of about 15 this test is not very capable of discriminating for higher level students. In fact it '*comes adrift by a year at age 11 and 2.5 years at nearly 16*' (Turner, 1997).

Another possible cause for concern is the suggestion that the Vernon test is too hard for contemporary students (Turner, 1991).

The Vernon, the WRAT, the WORD (Wechsler Objective Reading Dimensions) and the BSTS 4 & 5 (British Spelling Tests) spelling tests have all been recommended for use at GCSE and NVQ level for dyslexia assessment (Backhouse 1998).

Illustration 3n: Extract from the Vernon Single Word Spelling Test

74. **Occurred.** Has the idea *occurred* to you? The word is *occurred*.
75. **Menagerie.** A *menagerie* is a travelling zoo. The word is *menagerie*.
76. **Precocious.** A *precocious* child is very clever for his age. The word is *precocious*.
77. **Accommodate.** Can you *accommodate* me in the hotel? The word is *accommodate*.
78. **Erroneous.** Your spelling is often *erroneous*. The word is *erroneous*.
79. **Abscess.** I have a painful *abscess* on my gum. The word is *abscess*.
80. **Allegiance.** British people owe *allegiance* to the Queen. The word is *allegiance*.

The WORD (6 to 16yrs11 mths) may only be purchased by Educational Psychologists but can be used by an RSA tutor under supervision.

The BSTS (level 5) is suitable for ages 15yrs 6mths to 24yrs+ and is a lengthy spelling test with two parallel forms.

The WRAT 3 (Wide Range Achievement Test) *'is much the most versatile, recently normed and technically robust of the tests available. It is suitable for students between the ages of 5 and 75'.*

The problems encountered in the Vernon are not present in this test. It produces standard scores which, additionally, can be converted into percentile rankings.

A small extract from the higher level of this test is presented for comparison with the previous example (illustration 3o.):

Illustration 3o: Extract from the Wide Range Achievement Test

35	occurrence	War is a tragic <u>occurrence</u> .	ō-kur-əns
36	auricular	An <u>auricular</u> defect pertains to the external ear.	aw-rik-yū-lār
37	imperturbable	Her <u>imperturbable</u> attitude was reassuring.	im-pěr-tr-bă-běl
38	iridescence	<u>Iridescence</u> is a play of colors.	ir-i-des-ens
39	boutonniere	He had a hard time pinning on his <u>boutonniere</u> .	boo-tō-neer
40	mnemonic	It is easier to learn a long list of words by using a <u>mnemonic</u> trick.	ni-mon-ik

3.3 An exploratory study of spelling among students in Higher Education

The purpose for this section of the study was that, since spelling difficulties are acknowledged to be one of the main problems of dyslexic students, it would be helpful to explore this area in greater detail through practical research and consider the extent to which an analysis of spelling would serve as a diagnostic tool in the identification of dyslexia among students in Higher Education.

Some of the most frequent errors made by dyslexic students in Higher Education have been reported to be phonetic errors, inconsistent spellings and confusion over homonyms such as 'weather' and 'whether'.

Before examining the spelling errors of dyslexic students, it is worth noting (O'Leary, 1998) that some of the most common misspellings made by students in general are also phonetic. Some of the regularly noted errors being 'dissapeared' for disappeared, 'begining' for beginning and 'belive' for believe.

An informal pilot study (precursor of this study) carried out with non-dyslexic students following GCSE courses found similar tendencies. Words noted as commonly misspelt were 'february, for february, 'nessicary' for necessary and 'relize' for realise.

3.3.1. Selection and amendment of a spelling test

An appropriate test for Higher Education students is recommended in the guidelines for documentation of a learning disability in adolescents and adults (AHEAD - The Association on Higher Education and Disability, 1997). This is the subtest from the SATA (Scholastic Abilities Test for Adults, Bryant, et al, 1991). The test is entitled Writing Mechanics and is a test of both spelling and punctuation. The complete test battery of the SATA is a subject for more detailed exploration in section 4. However, the spelling component is presented in illustrations 3p. and 3q. and discussed below.

Illustration 3p: Extract from the SATA Writing Mechanics Test

10. my _____ sister is coming to visit me next week end from san francisco california
11. tim sally and mark went on a _____ journey however they had a great time
12. if you were wondering about susans _____ attitude meet her parents mr and mrs g p robinson
13. did you remember spots _____ appointment with dr sherman at 10 30 a m on friday may 10 1990
14. the _____ called for the mob leader to appear in district court on thursday feb 15 1990
15. my cousins girl scout troop leader said our speaker tonight is a famous _____

Illustration 3q: Extract from the SATA Writing Mechanics Test - Spelling List

10) parsimonious	13) veterinary
11) treacherous	12) scurrilous
14) subpoena	15) entrepreneur

The test rubric states

'HERE ARE SOME SENTENCES. AS YOU CAN SEE, EACH SENTENCE HAS A WORD MISSING. I WILL SAY A WORD THAT YOU ARE TO WRITE IN THE BLANK. THEN YOU ARE TO CHECK THE ENTIRE SENTENCE FOR CAPITALIZATION AND PUNCTUATION ERRORS.WHERE PUNCTUATION AND CAPITALIZATION ARE NEEDED, INSERT THEM.'

3.3.2 The pilot study group

The study group comprised students who were placed into three distinct groups. The first and largest group consisted of 1,223 students constituting a substantial percentage of the first year intake of one university, and representing a wide range of subject areas.

The second group consisted of 133 overseas students, from a range of subjects and with varying levels of proficiency in English.

Finally, a group of confirmed dyslexic students, 97 in number, also from a range of different subject areas were also selected for participation in this study.

3.3.3. Administration of the test

This test was administered by a range of lecturers to their student groups as part of their induction week, and it was left to them to find an appropriate time for its administration. Most of the lecturers called out the words for spelling and then allowed students time afterwards to go through all the sentences and insert the correct capital letters and punctuation.

The papers were all returned to the project team for marking. This was undertaken by a number of administrative staff and whilst being a somewhat detailed task, it was a fairly straightforward procedure.

The dyslexic group had all been individually presented with this test as part of their up-date dyslexia assessment.

A mark was awarded for every correct spelling, and one further mark was given in cases where all the correct punctuation and capitalisation was in place.

3.3.4. A comparison of test results

A comparison of test results is presented in section 4.4.9. A profile of test results is presented in illustration 3r. (See appendix 3D for a detailed breakdown of spelling results and accompanying comments).

Whilst the first year students generally achieved average and above average results on this test, the overseas students and even more so, the dyslexic students, experienced some difficulties.

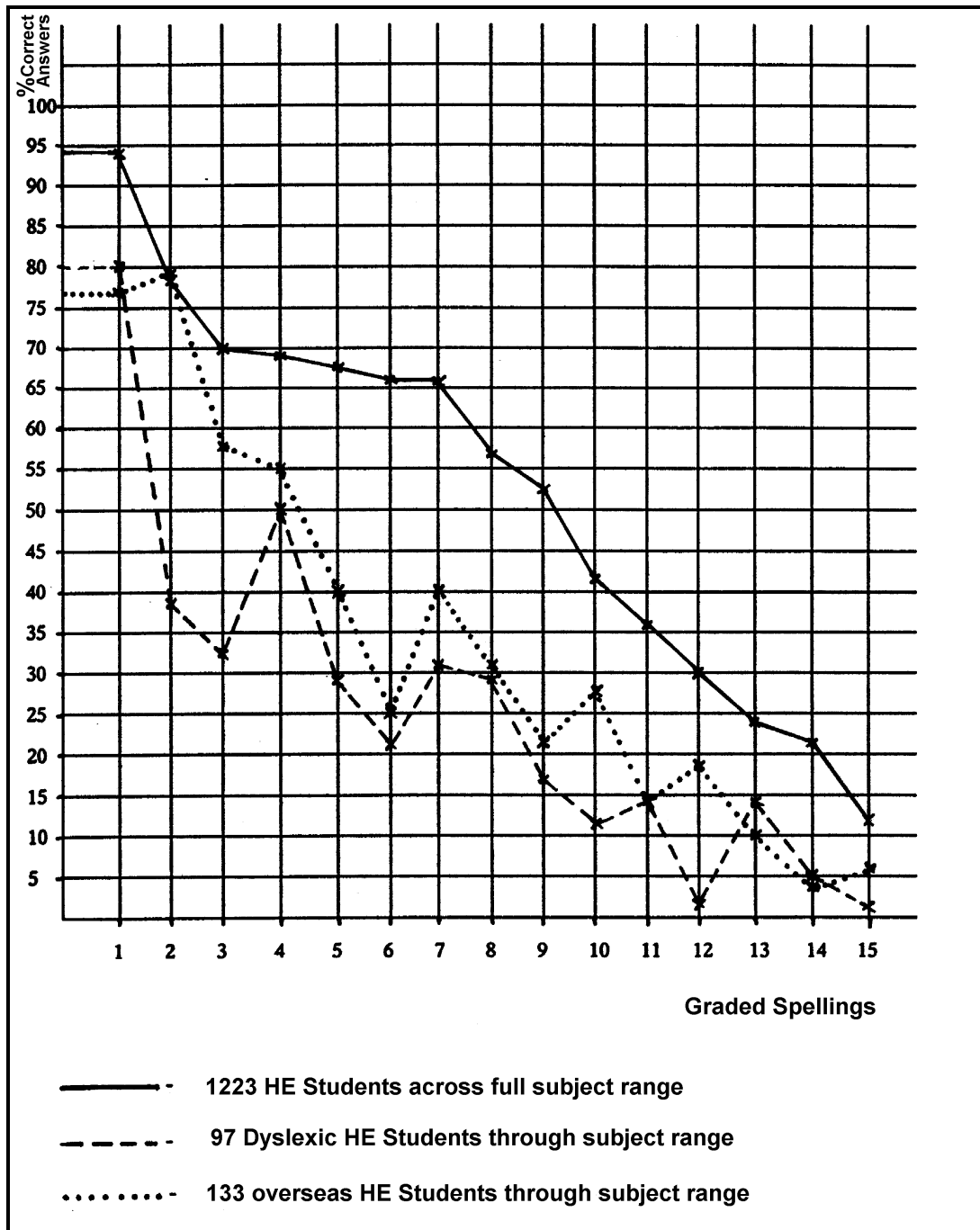
The following table 3.ii shows the overall percentages of correct spellings achieved by the 1223 students across the subject range, and illustration 3r shows a profile of correct spellings for non-dyslexic, dyslexic and ESL students.

Table 3.ii: Percentages of correct spellings presented in the order of difficulty and not in the order of administration of the test itself

Word to be spelt	% Success Rate in Spelling	Word to be spelt	% Success Rate in Spelling
1. strict	94	9. aisles	53
2. received	78	10. entrepreneur	42
3. appropriately	70	11. treacherous	36
4. negligent	69	12. veterinary	30
5. ferocious	67	13. parsimonious	24
6. perilous	66	14. scurrilous	22
7. commentary	66	15. subpoena	12
8. recipient	57		

It is not surprising to find that overall, the highest scores were achieved by students following degree courses in Psychology, Economics, and Applied Psychology (all of which require a fairly advanced level of English), and that the least successful in this test were students of Electronics and Engineering, and Dance in Society, and due to the large percentage of overseas students - International Hotel Management. In fact between 5 and 16% of the students from the latter three subject areas were unable to spell the first word in the test, '*strict*', and nobody from the Electronics & Engineering group could spell either the word '*scurrilous*' or '*subpoena*'.

Illustration 3r: Profile showing % of correct spellings for non-dyslexic, dyslexic and ESL students in higher education



3.3.5. A diagnostic comparison of results for dyslexic, overseas and general students

When checking through the papers it became evident that there was also a qualitative difference between the spelling mistakes produced by these three groups of students, and the following is a brief summary of some of the most common observations.

UK Students

Table 3.iii: Spelling errors most frequently observed among the UK student population

<u>stimulus word</u>	<u>response</u>
strict	
received	recieved
commentary	comentary, comentry
ferocious	ferochious
perilous	perrilous, perilious
appropriately	appropriatley, appropriatly
aisles	isles, ailses, ailes
negligent	neglergent, neglegent, negligant
recipients	recipiants, recipiants
parsimonious	parcimonious, passimonious
treacherous	trecherous, tretorous, tletcherous
scurrilous	scurriless, scurilous, scurrulous
veterinary	vetinary, vetinerary, veterinary
subpoena	subpina, subpinar
entrepreneur	entrepreneau, enterpeneur, entrepeneur

The average spelling score across the whole of the 1223 UK students fell within the average range on the test. The mean percentage on the test was 58% (which equates fairly well with 51% of UK students across the subject range who could write for 8 minutes without making any spelling errors).

The most common spelling errors for UK students (see table 3.iii) fell within a range of reasonable phonic alternatives, showing a certain foundation in the general spelling patterns of the language, but a lack of practice in the correct application of words that are not, perhaps, within everyday expressive vocabulary such as '*parsimonious*', and '*scurrilous*'.

Other errors may be classified as due to ongoing inattention to particular spellings over the years, resulting in so called careless or habitual errors, e.g. '*recieved*'. Certain errors kept cropping up which indicated a reflection of the way in which students actually mispronounce words, the most common example being, '*neglergent*'.

One particular word with which many students were unfamiliar has been selected to illustrate the types of errors made. The word is '*subpoena*' and the table 3.iv below shows a sample of the attempted spellings, the reasonable phonic alternatives outweighing the less reasonable suggestions both in terms of quantity of possible alternatives as well as numbers of students presenting them.

Table 3.iv: showing the variations in spelling of word no.15 -'subpoena'.

<u>Reasonable phonic alternatives</u>		<u>less common alternatives</u>	
sapina	surpeana	supreme	sebina
cepina	supeiner		
suppina	supoena	sepenna	sepernia
serpina	supenour		
surpena	sepener	sapeneas	sephina
subpina	sepina		
surpina	supina	subponia	psopaena
supener	supinar		
seppina	serpena	sipher	suppenir
supenor	sepaena		
spina	soepina	supriner	surbena

Once again, on average, students tended to produce spelling variations that were reasonably sensible guesses for the sound that the word makes.

Overseas students

Table 3v: Spelling errors most frequently observed among the overseas student group

<u>stimulus word</u>	<u>response</u>
strict	strickt, stricked, straight
received	
commentary	commentaly, commontree
ferocious	voratious, furiouslous, flourish
perilous	paradise, paralist, paralyzed, perishness, parellous, pareless
appropriately	approbriately, propriety
aisles	ials, earls, ails, eyls, iels, iles, isles
negligent	necklegent, neglegend,
recipients	recipience, acceptance
parsimonious	pathymonious, passimonius
treacherous	treasurers, treasurous, tracktuous, trachers, stretchevous
scurrilous	scholar, scurryless
veterinary	vegeterianary, vagenery, vaginry, vechenery
subpoena	sabina, peanut
entrepreneur	underprenoun, entrepremier, autopreneur, aunterpomier

The overseas students generally did less well on this test, although they still did better than the dyslexic group. Their mean score across the group fell within the below average range, with only 34% correct spellings.

The main differences noted, (see table 3.v) were that the overseas students were surprisingly good at the commonly used but irregular words like '*received*' and '*appropriately*', which is perhaps an indication of the teaching they have received.

The less familiar vocabulary tended to be dealt with at the auditory/phonetic level, revealing cultural differences in the areas of perception of sounds and their interpretation, for example, '*straight*' for '*strict*', and '*commentaly*' for '*commentary*',

Little priority appeared to be given to the context of the word in the sentence or to the meaning of the alternative word provided, in the sentence. For example, '*paradise*' for '*perilous*', '*earls*' for '*aisles*' and '*scholar*' for '*scurrilous*'.

The types of errors reveal the extent of students' knowledge of English spelling patterns, both regular and irregular, and more importantly the students' general grasp of communication in English, which in certain cases was more limited than one would imagine, for a student to participate with any ease on a degree course.

Occasionally, the entire test had been misunderstood and students disregarded any of the words that had been called out by the lecturer, and simply filled in the gaps with words of their own choice.

Generally the dyslexic group (see table 3.vi) scored least well on this test. Of the total group of 97 dyslexic students the mean score fell significantly below average, with 28% of the words spelt correctly.

An analysis of the results showed that the word '*received*' was the best discriminator between dyslexic and all other students. Only 34% of dyslexics could spell it correctly compared to 79% of UK students and 76% of Overseas students. It was the only word in the test which separated this group from the others so clearly. If one was to consider the possible reason for dyslexics doing badly on this item, compared to UK and Overseas students, one possibility is that many UK students seem to have been taught the spelling rule '*i comes before e except after c*', (in fact, my personal observation is that for many people that is the only spelling rule they recall having been taught), dyslexic students may tend to remember just the first part of the rule. Overseas students tend to be taught most of the irregular spellings in common usage, which may explain why they also did a lot better than the dyslexics when spelling '*veterinary*', In fact only 3% of the dyslexic group was able to spell this word, compared to 18% of the Overseas students and 34% of the UK students.

Dyslexic students

Table 3.vi Spelling errors most frequently observed among the dyslexic student group

<u>stimulus word</u>	<u>response</u>
strict	stricked
received	recieved
commentary	comentary,
ferocious	ferochious, feroshus, feroches
perilous	perrilous, perrilious, perilese
appropriately	appropriatley, appropately, appropaly
aisles	isles, islies, iyels
negligent	neglegente, neglergent,
recipients	recipience, resipiense
parsimonious	parcimonious,
treacherous	trechrous, trecherious
scurrilous	scurrulouse, scuriles, scurriles
veterinary	vetinary, vetinery, vertinary
subpoena	supina, surpinar, surpiner
entrepreneur	autropenor, autoprenere, auterpener

Some words produced by the dyslexic students (see table 3.vi) showed a lack of visual sense for the correct spelling pattern, as well as an unfamiliarity with grammatical structures and appropriate word endings, e.g. '*feroches*', '*neglegente*' and '*resipiense*'.

In this particular sample of students there was not much evidence of letter reversal. There were, however, examples of syllables being unnecessarily added onto the ends of words, and longer words being cut down, i.e. syllable or letter omissions.

The greater part of the spelling errors made by this group of dyslexic students could be placed in the category of reasonable phonic alternatives, and in this way they do not differ significantly from the general UK university student who may be rather poor at spelling. But, as is endorsed in the handwriting study (see section 3.6.9 and 3.6.10), dyslexic students are that much weaker in spelling than their peers, and, it would appear, often make twice as many errors.

3.3.6. Implications of the findings

Many students in Higher Education have a satisfactory command of the basic spelling patterns of their language, and when they have to write a word that is less frequently used or less familiar to them, they tend to make a reasonable guess at the possible spelling. Students who have specialised from an earlier age in subject areas that require a greater volume of reading and essay writing may well prove to become better spellers by the time they go to university.

If there is a concern regarding the standard of spelling among other students (e.g. those studying Electronics), then it is probably a school issue rather than a university one. A general basic standard of literacy can more effectively and appropriately be dealt with during the school years.

As a group, dyslexic students appear to have more problems with spelling than other students. They are not always easily identified because the type of errors they make can be similar to the errors of non-dyslexic students in that many of them would be classified as reasonable phonic alternatives, given the ability and level at which they are working. The main difference that has emerged, however, is in the volume of spelling mistakes made by dyslexic students compared to their peers.

Whilst Overseas students also tend to be weak in spelling, there is a qualitative difference between their errors and those of dyslexic students. Commonly used but potentially confusing spellings, such as 'appropriately', or exceptions to spelling rules, such as in the word 'received', tend to have been learnt and are spelt correctly by overseas students, but invariably cause problems for dyslexics. Furthermore, regular phonic words, e.g. 'treacherous' will be spelt quite well by

dyslexics, but tend to show up the overseas students' lack of familiarity with the language e.g. 'treasurers'. This would only show up, however, in a dictation, since if the student required that particular word for an assignment they would find the correct spelling for it.

However, the fact that most students hand in their work assignments, having produced them on word processors, masks the extent of their spelling difficulties, and it is only in written examinations that require essay type answers that such problems are likely to emerge.

3.4 Exploration of reading and writing speeds

Whilst acknowledging that this is a particularly important area for assessment, it has to be conceded that it has also been difficult to measure in a standardised test. Generally, tutors and educational psychologists administer informal tests of reading and writing speed, and calculate the number of words per minute that the student has read or produced.

3.4.1. Reading speed

Reading speed is considered to be the best general measure of the severity of dyslexia in adults (Heeger et al 1997).

Part of the measurement of reading speed ought to include reading accuracy and comprehension.

Whilst most reading tests on the market have ceilings below the 16+ level, it is possible to administer the Vernon Single Word Graded Reading Test or the WRAT 3. Severe impairment of the ability to read single words out of context is the most likely reason for a reader to be requested for a candidate during exams.

Reading speed needs to be assessed on the basis of prose reading but there is no standardised test available with an appropriate age range. There is also the complicated issue of the relationship between accuracy, speed and comprehension. It is clearly vital that any test text used should be graded and standardised in a suitably consistent manner. It is noted that reading comprehension scores are not currently demanded in a measure of reading speed for examination concessions. Generally when RSA teachers are assessing reading speed they require the candidate to read aloud. The number of words per minute read aloud cannot be equated to a reading speed norm which assumes silent reading. The interference of the vocalisation process on reading comprehension is also not taken into account. Dyslexics reading aloud may need to read the text a second time silently to be able to understand the content so any comprehension element of a vocalised reading test would be easily compromised.

A table (see table 3.vii below), shows reading speed scales which have been produced for the public (i.e. general adult readers rather than specific to Higher Education). This serves as a good guide, however, for all students.

Table 3.vii: Reading speed scale

<u>Scale of Speeds in Words per Minute</u>	
below 200	very slow
200 - 230	slow
230 - 250	average
250 - 300	above average
300 - 350	medium-fast
350 - 450	fast

Reference: (De Leeuw 1965)

Research studies carried out (Napier & Hart, 1956), suggested that the speed of reading of about two thirds of the participants from the business community and the general public was within the average range of 200 - 300 wpm.

In producing courses for increasing reading speeds, 250 wpm. have come to be regarded as a critical speed, from which point speed reading can be taught with effective results.

For people who have a reading speed which is below 250 wpm, then slower progress is often anticipated. Dyslexic students in Higher Education frequently fall into this category, and a quick or substantial increase in reading speed has not often been their experience, even when attending study skills sessions.

3.4.2. Writing speed

Dyslexics generally tend to write more slowly than their peers (McLoughlin, et al 1994).

Because of dyslexics' known problems with sequencing of ideas, spelling or manual dexterity their written output may be meagre (Backhouse 1998). Unfortunately there is very little normative data available regarding speed of writing (Ashton 1997), particularly among adults, which is surprising, given the importance of having this information when determining whether a student should be in receipt of extra time in written examinations. Sometimes dyslexics produce results which do not fit what might be expected patterns; this could also lead to errors in diagnosis. (See section 3.6.10 and 3.6.11)

Some research has been carried out among primary and secondary school students to measure writing speed (Alston 1992). This study showed that 16 year olds write an average 18 wpm, but there has been little evidence of similar studies in Higher education.

Sawyer, (1991) commented on the problems caused by assessment reports for dyslexic students at GCSE, and the need for clear criteria to indicate when special arrangements were needed.

A small scale study (Sawyer, Francis & Knight 1993) (see appendix 3E for a copy of the test) was carried out to establish candidates' performance and make recommendations regarding extra time in public examinations. *'Nowhere is the need for clarification greater than in the area of handwriting speed'*. Examiners tend to add up words which differ in length, and divide them by the number of minutes taken. This study attempted to establish a standard measure for writing speed, by presenting a paragraph for the student to read and memorise and then write down as quickly as possible, three times over. The number of letters produced by groups of students was used to create a local norm.

The researchers claimed that free writing or copying were both equally effective in predicting the amount written during timed course work assignments. However, their conclusions were that writing speed tests were not in themselves adequate predictors for written examination purposes.

They were not able to produce any evidence to suggest whether additional time in GCSE examinations was an advantage or not.

Some psychologists have produced their own sets of norms ranging from samples consisting of a handful of pupils to a moderate sample drawn from a single school (Dutton, 1990).

The writing speeds established as part of this study aim to point out the need for further research. However, it is helpful to use a standard piece of text for students to copy, as well as to ask students to write on a given topic. This needs to be analysed both qualitatively and quantitatively. There are clearly far too many factors involved to be able to state with any certainty what a particular student's writing speed is, although anyone who is markedly slow in both free writing and copying after several attempts, is likely to be displaying a problem that needs special consideration.

3.4.3. Dyslexic students' reading and writing speeds

'There is a dearth of normative data and no nationally agreed standardised procedures for assessing reading and writing speeds - both of which are key issues when considering the necessity for extra time' (Backhouse 1998)

In helping to establish some measure of reading and writing speeds for dyslexic compared to non-dyslexic students, the Quick Screener study has produced the following information:

Reading speed for dyslexic students was measured to average 133.6 wpm compared to the adult average of 250-300 wpm.

Writing speed for dyslexic students was measured to average 13.7 wpm compared to the adult average of 20-30 wpm. See table 3.viii below:

Table 3.viii: Reading and writing speeds of dyslexic students

Reading and Writing Speeds for Dyslexics				
Reading Speed				
Mean	=	133.61	St. Deviation	= 45.60 n = 51
Min	=	51	Max	= 300
50 - 75		3		
75 - 100		7		
100 - 125		16		
125 - 150		9		
150 - 175		10		
175 - 200		3		
200 -		3		
95% Confidence Interval for mean (120.78 , 146.43)				
Writing Speed				
Mean	=	13.17	St. Deviation	= 3.23 n = 52
Min	=	9	Max	= 25
9.0 + 10.0		16		
11.0 + 12.0		9		
13.0 + 14.0		12		
15.0 + 16.0		6		
17.0 + 18.0		7		
19.0 -		2		
95% Confidence Interval for the mean (12.27 , 14.07)				

The reading, writing and copying speed components of the Main study (section 5) intend to act as a research tool to investigate this subject in greater depth in future.

3.5 Exploration of processing tests

Based on the work done in the exploratory screening study, it would appear that an effective way of identifying dyslexia from among the wide range of tests available seemed to be a test of coding. Such a test has proved to be reliable for the identification of 86% of dyslexic students from this study. This test would take about 5 minutes in full to administer, would be very quick to mark and reasonably reliable.

3.5.1. A coding test

The following test was designed for use by tutors and goes on to be used in the main study. It is based on the sub-test of the WAIS (R) named Digit Symbol, that forms part of the ACID profile (Arithmetic, Coding (Digit Symbol), Information and Digit-Span), the memory or attention dimension of the test battery. However, the Digit Symbol has been criticised for its lack of clarity in what it measures, because several very important skills have been combined in a way that it is not possible to differentiate specific areas of weakness. It requires a visual short term memory skill, a sequencing ability, rehearsal in visual/auditory working memory, and hand skills. A method for doing this test which does not require handwriting skills is further developed in 5.3. When attempting to identify a dyslexic student's weakness in visual processing, the result can be confounded by poor hand skills. If it were possible to separate these two elements, the test would be more discriminating.

For students in Higher Education, a familiarity with writing numbers is much greater than for the copying of a variety of shapes. It retains the same level of difficulty in terms of the spread of shapes and the mirror image of pairs of shapes that are often confused by dyslexic students. It was therefore practically put to the test, by giving students the test below. Non-dyslexic students could complete the test in just over one minute, finding it definitely easier than the Digit Symbol, but dyslexic students although they also found it somewhat easier than the Digit Symbol, were still significantly slower than the others in processing the information (Leicester & Ulster pilot testing).

3.5.2. Presentation of a coding test

Illustration 3s: Coding Test

C	■	^	=	\	▲	▷	V	
1	2	3	4	5	6	7	8	9

C	V	\	▲	▷	^	■	=	\	C	^	=	■	C	^	C	■	^	C	=

■	▲	^	C	■	\	C	^	C	\	=	■	▷	=	▲		■	\	V	=

▷	▲	C	V	▷	\	=	V	▲		=	^	C	V	■		▷	▲	■	\

=	▷	^	▲	V	\		=	C	▲	V		^	▷	\	C	=		C	\

V	▷	▲		▷	V	■	=	V	^	\	▲	▷	C		=	^	▲	■	▷

Scoring system for the Coding subtest

Total	Grade
< 38	Weak
39 - 48	Below average
49 - 72	Average
73 +	Above average

Test Instructions are as follows:

'You have before you a grid showing a series of symbols and beneath each one there is a number. Your task is to fill in the correct numbers in the boxes which correspond with the symbols in the grid at the top.. You have one minute for this task. Start the test now and work as quickly as you can.'

In the pilot study 57 known dyslexic students carried out the coding test and only 14% of them achieved high average and above average results and 42% scored significantly below average. The mean scaled score for the group was slightly over 8 which is at the bottom end of average. (Details of statistical analysis are available in the appendix for section 5 under the title 'Relevance of the ACID profile for dyslexic students in H.E.').

3.5.3. A Digit Span Test

This test has been well researched in the context of the WISC and WAIS profiles, and is also available in many teachers' test batteries such as the Aston Index (Thomson & Newton 1982), the Ann Arbor Learning Inventory (Bullock & Meister-Vitale 1978), the Bangor Dyslexia Test (Miles 1982), and the Dyslexia Screening Test (DST Nicolson & Fawcett, 1996).

The Digit Span test is part of the ACID profile, and has long been associated with the weakness in auditory short term memory characterised by many dyslexic students, and has been used as one of the primary tests in diagnosing dyslexia (McLoughlin et al 1994). A poor result on a digit span test has been seen to be evidence of an inefficient working memory.

Auditory short term memory has a phonemic store, holding speech-like material, with a temporal capacity of around 1.5 seconds (Morris 1989). The sub-vocal rehearsal of items is used mainly for verbal tasks that involve serial processing.

It has, over the years been a subject of controversy, since it is not a compulsory item in the WISC Test battery. Because of its importance in dyslexia assessments,

educational psychologists working privately or for the voluntary educational charities tended to include it, whereas the psychologists from the Local Authorities who, many claimed, were avoiding making a positive diagnosis, tended to leave it out. In cases where they did use this test, their interpretation of the results would generally differ. The 'pro dyslexia' psychologist would suggest that an underachievement in digit span was indicative of an inefficient working memory, whereas the 'anti dyslexia' psychologist even if he/she did include it, would state that this indicated a presence of anxiety in the child, possibly brought on by emotional factors, the most common one being a reaction to parental pressure. Because there is such a fine and at times slightly overlapping balance between the two interpretations it has been possible for psychologists to make a more plausible case for either one.

The WAIS(R) Digit Span sub test, however, confuses the issue by combining the results of part one (digits forwards) and part two (digits in reverse) which each measure a different set of skills, and this becomes evident when testing students and afterwards asking them how they coped with each part of the test (Zdzienski, 1985). Repeating digits in the same order as they are spoken is an automatic task that requires an immediate response with some mediation (chunking the numbers) and does not tax the individual's working memory. Reversing the digits, in contrast, requires number manipulation and spatial visualisation to recode the information in working memory (Kaufman, 1994). In assessing dyslexics this may be misleading because important information can be lost. Dyslexic students will often overcome problems in part one with the use of chunking strategies (and in fact can rehearse this task until they get nearly full scores). The dyslexic student, therefore, will either perform poorly or with strategies, perform well, but the WAIS(R) scoring system could easily obscure the operation of a compensatory strategy such as this so it is wise to examine performance on the two parts of the test separately. (McLoughlin et al 1994).

The digit span in four separate units (visual forwards and in reverse, and auditory forwards and in reverse) is investigated in section 5.3.

More recently, however, the digit span score has been combined with the Arithmetic score to provide a Freedom from Distractibility Index (Kaufman, 1994) for an attention and memory score, which is statistically more sound than the previous

ACID profile, and which does discriminate reliably between dyslexic and non-dyslexic children.. In spite of Kaufman's own dislike for this rather pretentious terminology, it is now a well established index which is included in the typical educational psychologist's report from the Dyslexia Institute.

When working with students in Higher Education, there was a certain hesitancy among the project team regarding the use of the Arithmetic sub test, since the student responses appeared to be more indicative of their working knowledge or lack of it, with regard to carrying out any numerical calculations mentally, rather than an indication of their memory span.

Their results, however, on this test were generally quite good, and the Arithmetic test was considered not to be particularly relevant for this population. Within a dyslexic group of 25 students 44% achieved high average and above average results in this test and only 4% had below average scores. The mean scaled score for the group was 9.5 and therefore does not sufficiently discriminate dyslexic students from among others.

Incidentally, the Information test of the WAIS(R) was also administered but not considered appropriate or useful in the assessment of this group. In a pilot study group 25 known dyslexic students carried out the Information Test (an oral test of general knowledge). However once again in this test 44% of students achieved high average and above average results and only 4% were significantly underachieving. The mean scaled score for the group was nearly 11 and would therefore not feature as exceptional or exclusive to a dyslexic profile. (See appendix for section 5 under the title 'Relevance of the ACID profile for dyslexic students in H.E.').

The next section presents an adapted version of a digit span test for use with students in Higher Education

3.5.4. Presentation of an adapted Digit Span test

Illustration3t: Digit Span Test

DIGITS FORWARDS		DIGITS IN REVERSE	
1.	4 - 7 - 3 1 - 9 - 5	1.	6 - 3 2 - 7
2.	6 - 9 - 1 - 5 5 - 3 - 7 - 2	2.	3 - 1 - 8 7 - 2 - 5
3.	8 - 5 - 1 - 3 - 7 3 - 9 - 2 - 6 - 4	3.	4 - 7 - 2 - 6 9 - 1 - 4 - 3
4.	7 - 4 - 9 - 1 - 3 - 5 9 - 2 - 7 - 4 - 1 - 6	4.	8 - 5 - 2 - 1 - 7 2 - 9 - 3 - 7 - 4
5.	6 - 3 - 1 - 7 - 2 - 8 - 5 2 - 8 - 7 - 3 - 5 - 9 - 4	5.	1 - 8 - 2 - 5 - 4 - 7 5 - 9 - 3 - 6 - 1 - 8
6.	4 - 3 - 5 - 7 - 2 - 8 - 6 - 9 5 - 1 - 9 - 4 - 3 - 7 - 2 - 6	6.	7 - 2 - 9 - 3 - 6 - 1 - 8 4 - 1 - 7 - 2 - 5 - 8 - 3
7.	3 - 5 - 8 - 7 - 2 - 9 - 4 - 1 - 6 1 - 7 - 4 - 9 - 5 - 2 - 6 - 3 - 8	7.	1 - 8 - 2 - 5 - 9 - 6 - 4 6 - 3 - 8 - 2 - 5 - 9 - 7

<u>Scoring system for the Digit Span subtest</u>	
Total	Grade
< 8	Poor
8 - 10	Weak
11 - 13	Below average
14 - 16	Average
17 +	Above average

The digits are spoken by the tutor in an even tone and with one second intervals between each digit. This test can often be rendered too difficult by an uneven or fluctuating voice output, or made too easy if the digits are spoken too quickly, or chunked, or when the change of intonation suggests that the list is almost at an end. Any of these factors could in fact invalidate the test results. Given that this test plays such a key role in a dyslexia assessment, it is a highly sensitive instrument which needs to be correctly and objectively administered by the tutor or educational psychologist and the student's success in it is also highly dependent on his or her level of stress or relaxation. Whilst many examiners administer this test from a position where the student does not have eye contact revealing either positive encouragement or indifference, there are many others who sit beside or facing the student.

A clinically more objective manner of administering this test would be via a computer with an audio facility. This idea is presented in section 5.3.

In the pilot study a group of 57 known dyslexic students were tested on the digit span test and only 9% achieved high average and above average results and 32% scored significantly below average. The mean scaled score was just over 8 (which is the bottom end of average).

3.6 An exploratory quick screener

The existing test used by Surrey University was an essay question and the tutors marking the responses were looking out for an above average spelling error rate, and in particular, other characteristic spelling errors as made by dyslexic students, such as letter/syllable reversals, perseverations, omissions etc. The English language tutor responsible for this test considered that it was not very effective for the screening of dyslexia. It did identify students with English language difficulties and some more 'severely' dyslexic students. However, many dyslexic students 'slipped through the net' because they had learnt to avoid writing words they could not spell, or had an adequate command of the general vocabulary that was required for the purposes of writing the essay.

3.6.1 Rationale for the quick screener

This exploration of a quick screener was carried out in response to demands from various departments for a quick and efficient means of identifying dyslexia in Higher Education.

An initial screener was constructed in order to replicate and condense a range of educational attainment skills at adult level.

This proved in fact to be a much more complex task than it would at first glance appear. Marking it, in fact, was no more economic with staff time than existing methods, and it was difficult to standardise because of the range of markers, and the degree of subjectivity involved in the marking of certain items, as well as the even greater range of abilities among students from different subject areas. It actually yielded further questions rather than answers. Nevertheless, some of the results of this part of the study were contributory to the greater understanding of the complexities of dyslexia in Higher Education. They revealed not only weaknesses but also some of the strengths of dyslexic students. (See section 1.2.8)

3.6.2 Research background: screening test design

A test was devised in a way that built on the exploratory assessment study (see section 4) and based on the SATA battery of tests (Scholastic Abilities Test for Adults, Bryant et al 1991). The tests items were extracted and modified from the SATA (Pro-Ed) and had not as yet been used in this particular format. The norms were based on the SATA which were also being analysed as part of the restandardisation that was being carried out for UK students, as described in section 4. It was hypothesised that a short test which required the student to efficiently synthesise a number of language-based activities would highlight those students with learning difficulties.

Yuill et al 1989, considered that reading comprehension was the most relevant skill to be tested when identifying dyslexic students (for whom efficiency of text processing is influenced by working memory demands).

However, because samples of handwriting have always been considered to be '*important*' in the assessment of dyslexia (Miles 1993, McLoughlin 1994 and Thomson 1990), it was clear that the Quick Screener would need a handwriting component.

In retrospect, whilst such a view holds true for the assessment of younger students, and even adults at basic literacy level, the results of this exploration would suggest that this is not necessarily the case with compensated dyslexic students in Higher Education.

The Quick Screener was designed to cover quite a range of language skills, including handwriting, in a comparatively short test. Namely:

- a) the student had to perform a fairly complex language-based task under timed conditions,
- b) the aim of the test was to focus on those language skills that are known to be challenging for dyslexic students, namely:

- speed and efficiency of reading,
- speed and accuracy of comprehension,
- working memory and organisational skills required in reading for information and essay-writing,
- accuracy and presentation in handwriting,
- maturity of ideas, level of vocabulary and fluency of self-expression.

The difficulties in taking these factors into account in the construction and planning of a test were as follows:

- a) Such a short test, administered in one sitting, could not take into account the dyslexic students' fluctuating performance (Miles 1996), so some students would respond to this test in a way that would not be representative of their normal performance.
- b) It would be difficult to anticipate the extent to which dyslexic students working at degree level might perform well enough to do this test, when the established problem that they have (Farnham-Diggory and Gregg 1975) is sustaining the same level of concentration and mental effort for much longer periods of study or for reading/thinking/writing under timed conditions as required for 2 -3 hour written examinations.
- c) From the test designer's point of view the brevity of a test is a potential limitation - since it is difficult to arrive at definitive conclusions about the learner's reading/comprehension on the basis of such a small sample of work.
- d) Finally, the intended scope of the actual test may have been too ambitious in that it attempted to test too many skills.

For example, it may not be possible to judge from the test results whether a failure in part 2 of the test was because of a weakness in memory, or the lack of reading ability, or whether a fluently expressed paragraph written by hand on the subject of constitutions was the result of prior knowledge of the subject matter rather than good reading ability.

3.6.3 A presentation of the Quick Screener

This test requires students to read a passage of text and answer 6 multiple choice type questions within 5 minutes (maximum time).

They are then required to turn over the sheet and write an account of the key points for up to 8 minutes (maximum time), followed by as much of the content as they can remember. They are asked to conclude by presenting their own viewpoint on the issues raised.

A copy of the Quick Screener is shown below:

NAME: _____ COURSE: _____

You have 5 minutes to read this passage and then answer the 6 questions printed below. For each item, place a circle round the appropriate letter indicating the answer of your choice.

Part One - Reading Comprehension (5 mins)

A constitution is the organic instrument of government, establishing the form and functions of the political institution. A constitution almost always enumerates the liberties and rights of the people and provides for measures to guarantee those rights. There is a great diversity in types of constitutions. One may be a detailed document worked out at a given time by a group of citizens, like that of the United States. Another may be, as in the case of England, a collection of charters and precedents accumulated over a long period of time. The first is more definite and less pliable than the second. A constitutional form of government is generally, although not necessarily, democratic. Hungary had a constitution, but power rested in the hands of the landed aristocracy and not with the people. Middle-class constitutions have generally opposed government interference in business. They consider property to be one of the natural and intrinsic rights of individuals.

1. The best title for this paragraph is:
 - (a) The Democratic Forms of Government
 - (b) The Power of Constitutions
 - (c) The Nature of Constitutions
 - (d) The Limitations of Constitutions

2. In this paragraph *organic* means:
 - (a) relating to a bodily organ
 - (b) food grown without the use of chemicals
 - (c) structural
 - (d) animate

3. Most constitutions may be said to:
 - (a) limit the powers of the aristocracy
 - (b) set forth the rights of citizens
 - (c) ensure democratic government
 - (d) determine penalties for noncompliance

4. A nation whose constitution is an accretion of documents is:
 - (a) England
 - (b) Canada
 - (c) the United States
 - (d) Hungary

5. The Hungarian constitution probably:
 - (a) did not outline a legal system
 - (b) consisted mostly of charters and other documents
 - (c) limited the people's role in government
 - (d) protected business and trade from the interference of government

6. The author of this paragraph would consider the U.S. Constitution as:
 - (a) an undemocratic instrument
 - (b) a product of the middle class
 - (c) a flawed document
 - (d) the prime example of an effective constitution

You have 8 minutes to set out from memory, the main points of the passage, and then to go on and recall the content in as much detail as you can. Please conclude by expressing your own viewpoint and discussing any relevant issues of your choice.

[illegible]

The text finally selected for the Quick Screener was the ninth out of the ten passages of Reading Comprehension taken from the SATA.

This particular passage was selected because it was drawn from a test battery which formed the main focus of the study on assessment (section 4), and had therefore already been given to at least a hundred degree students including 48 dyslexic degree students from that study sample.

The content in terms of maturity of vocabulary and subject matter were considered to be at a level synonymous with educational standards at university level. On carrying out a readability measure (Fogg Index) it was found to be at a 21 year reading level. The intention was for it to be more demanding than 'A' level standard but the results of the comparative study with Surrey University would indicate that this passage was in fact pitched at too high a level for its intended audience.

It was difficult to select any one piece of text, since whatever choice was made would favour students of a particular subject area and possibly disadvantage others.

In retrospect, when considering the selection of a passage for the Quick Screener, the added benefit of choosing one of the easier texts would have been the possibility to then compare the results with those of a range of other students (over 1500 in number) who had done the full Reading Comprehension test.

Furthermore, a statistical study carried out at a later date revealed that passage 6, or 7 would have been a better choice (from the perspective of reliability, compared to the other passages in the sample), but the content of those passages was still not sufficiently demanding to show up many individual problems (see appendix 3F).

At the time of marking it was found that the time limit of 15 minutes for the 10 passages of Reading Comprehension proved to be quite difficult for the majority of students, with the result that fewer scores were recorded for this part of the test, than were at first anticipated.

It was, however, possible to later compare the results of 48 dyslexic students who did the Quick Screener with those of over 900 non-dyslexic students comprising most of the in-take of another university (see section 3.7).

3.6.4 Scoring Criteria

A scoring system was devised by consulting the methods of scoring in the two relevant SATA subtests, namely Reading Comprehension (with its straight-forward 6 multiple choice type questions) and Writing Mechanics (composed of an essay question with its own vocabulary and content scoring system) and combining them.

It was, in the course of formulating a scoring criteria, recognised that the marking of large numbers of scripts could be done more quickly and efficiently using a computer-based marking scheme.

Part two (hand-written summary) required staff time to mark. The students' work was then judged against a set of criteria and measured on a vocabulary scale using the instructions, taking approximately 5 minutes per script.

Apart from the time needed (which is additional time in an already over-filled work schedule of most university tutors), the decisions regarding the marking up of items constituting content maturity and accuracy are perhaps slightly more of a subjective decision of the individual examiner than any of the other subtests in the SATA test battery.

For diagnostic purposes the Quick Screener may not perhaps be able to analyse a student's weaknesses to the extent that would have been hoped. For example, a failure in part two could be due to a variety of reasons such as lack of time, lack of necessary concentration and attention to detail required to achieve written recall, lack of fluency in English or a lack of familiarity with the subject.

The following tables (3ixa, b and c) present the answer grids and scoring procedures for the Quick Screener.

Table 3.ix a: Answer grid for Part One of the Quick Screener - Reading Comprehension

Score 1 point for each correct answer

1	-	c
2	-	c
3	-	b
4	-	a
5	-	c
6	-	b

Table 3.ix b: Scoring Grid for Part one - Reading Comprehension

Number of correct answers

5-6	superior
4	above average
3	average
2	below average
0-1	poor

Scoring Sheet for Quick Screener Part 2 - Writing Composition

Vocabulary Criteria

The vocabulary score is made up of the number of different words used that have seven or more letters. Count the number of words that are used only once, awarding one point for each.

Content Maturity, Recall and Presentation Criteria

For each of the following criteria that is met, the student receives one point.

- 1.) Are there more than 50 words?
- 2.) Does the student write in paragraphs?
- 3.) Have the key points been presented (namely what a constitution is and what are its functions)?
- 4.) Has the student mentioned at least 4 other points that are made in the passage?
- 5.) Has the student included the name of at least one country/state?
- 6.) Is there a logical sequence of ideas?
- 7.) Does the student express any moral or philosophical view point on the subject.
- 8.) Are specific examples given to illustrate points that are made?
- 9.) Does the student present work that is free of spelling errors?

Total Writing Composition Score

To obtain the total writing composition score, use the matrix to find the number where the vocabulary score and content maturity score intersect.

Table 3.ix c: Scoring procedure for Part Two - Writing Composition

		Content Maturity, Recall & Presentation Score									
		0	1	2	3	4	5	6	7	8	9
V o c a b u l a r y	0 - 5	0	1	2	3	5	6	9	12	14	16
	6 - 10	1	2	4	5	7	10	12	14	17	20
	11 - 15	2	4	6	8	10	13	14	18	20	23
	16 - 20	3	4	8	11	13	15	18	21	24	26
	21 - 25	5	7	10	13	15	19	21	24	27	29
	26 - 30	6	10	13	15	19	22	25	27	30	32
	31 - 35	9	12	14	18	21	25	28	31	33	35
	36 - 40	12	14	18	21	24	27	31	34	36	38
	41 - 45	14	17	20	24	27	30	33	36	38	39
	> 45	16	20	23	26	29	32	35	37	39	40

Table 3.ix d: Scoring Grid for Part Two - Writing Composition

Total obtained from the matrix is described below.

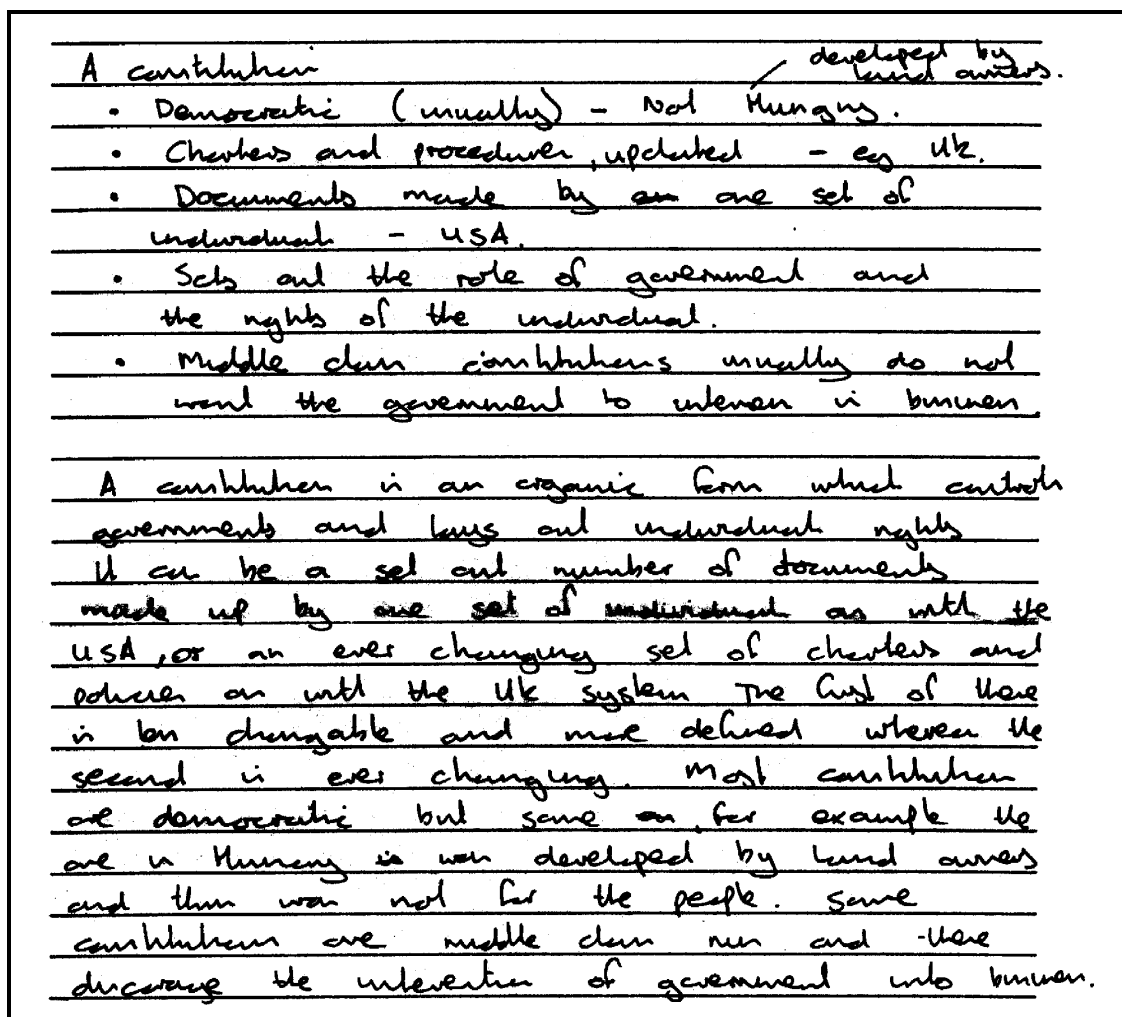
36 -40	superior
30-35	above average
14-29	average
8-13	below average
0-7	poor

3.6.5 An example of a dyslexic student's response in the Quick Screener

The dyslexic student whose work is shown in the example in illustration 3u. was assessed by an educational psychologist to have an IQ of 120+ and described as 'a *student of well above average ability*' who was experiencing some difficulties in spelling and written expression. His case was typical of adolescents and adults described by educational psychologists as having largely overcome their dyslexia and only occasionally, or when in stressful situations, experiencing ' *minimal and residual dyslexic problems*'

When he carried out the Quick Screener, this student achieved 'above average' results on part one of the test (Reading Comprehension), and 'superior' results on part two (Writing Composition).

Illustration 3u: A dyslexic student's response to part two of the Quick Screener



3.6.6 Piloting the Quick Screener

In matters of piloting any test in Higher Education, as most probably in any educational institution, there is frequently a gap between the ideal test plan and its implementation given a variety of practical considerations that curtail the original plan.

It was through a meeting with a member of staff of Surrey University (L.Thompson - Health and Counselling Officer) with whose co-operation the previous Kingston study had been completed, that a further opportunity arose for piloting the Quick Screener. It resulted in an almost immediate offer to pilot the test with a maximum number of first year students as part of their introductory week at university. Because of the short duration of the remainder of the project, and since a similar opportunity may not have presented itself again during the next 6 months, this offer was readily accepted.

There could, however be little control over the piloting itself as it was to be carried out by a number of lecturers at different times and locations within one week. Equally there was no opportunity for amending, redrafting or altering the Quick Screener within these time-scales.

However, an analysis sheet was drawn up (see appendix 3G) so that all the data from this experimental test could be entered onto an organised grid and would include information on the following areas:

- age
- gender
- ethnic background - 'British' or 'other' (a much more useful categorisation would have been English as a first or second language)
- subject
- year of study
- No. of 'A' levels
- other qualifications

The responses to the test were recorded as follows:

Part One- Reading Comprehension

Number of correct comprehension answers out of a total of 6. During relevant discussions with the statistical adviser (Dr. Fulcher - Surrey University) it was suggested that a more detailed break-down of these results would not be particularly useful since it would require more than one passage to examine any pattern of responses for an individual student.

Part Two - Writing Composition

The scoring for this section was done by calculating the number of words of 7 letters or more (for the vocabulary score) and filling a checklist of components for which there is a yes/no response from the student's written response (for the content and maturity score).

Speed of Writing

Finally, an attempt was made, (given the substantial number of students who would be carrying out this test) to establish some form of estimate of handwriting speed and some idea of general levels of skill and accuracy with regard to spelling.

Speed of writing is a vital element of a standard educational psychologist's assessment report, and decisions are often made regarding concessions for extra time in written public examinations based on rather subjective and unscientific methods such as the following:

'Writing speed is often based on a 5 minute exercise in which the student is asked to write on a given topic at the end of which the number of words is divided by the number of minutes. The result e.g. 13wpm (words per minute) may compare with 20 wpm when the student is back at university writing an essay or vice versa.

At other times, based on other research, the student may be asked to copy from text and then the number of individual letters produced is calculated into a writing speed score. The potential writing speed of a student cannot easily be determined out of context.' (Zdzienski, 1995)

The Quick Screener provided the opportunity to collect some more relevant information about current levels of writing speed for students in Higher Education. In this way the results of dyslexic students when carrying out the same task would at least be set in some relatively meaningful context, when trying to gauge their writing speed.

Writing Speed is further discussed in section 3.4, and spelling performance in section 3.3.

The Pilot Group

There were 992 students who took part in the Surrey University Study .

Age

The ages of the students spanned from 17 to 54.

However, over 75% of the group fell within the 18 - 20 age group.

18% were in the age group 21 - 29.

3% were 30 and above. (see table 3.x)

Table 3.x: distribution of students by age

Age	Freq	% Freq	Valid Percent	Cum Percent
17	9	0.9	0.9	0.9
18	457	46.1	46.1	47.0
19	239	24.1	24.1	71.1
20	73	7.4	7.4	78.5
21	47	4.7	4.7	83.2
22	34	3.4	3.4	86.7
23	35	3.5	3.5	90.2
24	21	2.1	2.1	92.3
25	15	1.5	1.5	93.8
26	15	1.5	1.5	95.4
27	6	0.6	0.6	96.0
28	4	0.4	0.4	96.4
29	5	0.5	0.5	96.9
30	5	0.5	0.5	97.4
31	3	0.3	0.3	97.7
32	1	0.1	0.1	97.8
33	7	0.7	0.7	98.5
34	1	0.1	0.1	98.6
35	2	0.2	0.2	98.8
36	4	0.4	0.4	99.2
37	1	0.1	0.1	99.3
38	1	0.1	0.1	99.4
42	4	0.4	0.4	99.8
43	1	0.1	0.1	99.9
54	1	0.1	0.1	100.0
.	1	0.1	Missing	
Total	992	100.0	100.0	

Gender

The group comprised 530 male students and 462 female students:

53% male and 47% female.

This ratio was similar to the main Kingston Study (Section 4) of over 1500 students

This compares with the dyslexic study group of 109 students in the following way:

69% male and 31% female.

The subject areas which female students opted for most of all within the group were psychology, nursing and dance in society.

Whereas the subject areas comprising mainly of male students were electrical engineering, civil engineering and physics. (See table 3.xi)

Table 3.xi: Gender groupings for subject areas of students in study

SUBJECT <i>Electr.Eng.</i>			<i>Dance in Society</i>			<i>Civil Engineering</i>			<i>Chemistry</i>		
	British	Other		British	Other		British	Other		British	Other
male	2	42	male	1	0	male	52	22	male	31	6
female	0	2	female	27	1	female	10	0	female	19	4
SUBJECT <i>Economics</i>			<i>Materials Science</i>			<i>Chemical Engineering</i>			<i>Sociology</i>		
	British	Other		British	Other		British	Other		British	Other
male	49	11	male	22	2	male	18	15	male	7	1
female	17	11	female	3	0	female	7	5	female	30	0
SUBJECT <i>Nursing</i>			<i>Maths & Computing</i>			<i>Psychology & Sociology Music</i>					
	British	Other		British	Other		British	Other		British	Other
male	6	1	male	36	24	male	4	0	male	26	0
female	50	2	female	24	6	female	14	1	female	18	1
SUBJECT <i>Psychology</i>			<i>Physics</i>			<i>LIS</i>			<i>Management Studies</i>		
	British	Other		British	Other		British	Other		British	Other
male	4	1	male	38	8	male	36	8	male	37	20
female	44	6	female	7	1	female	61	7	female	49	35

Ethnic Background

The information regarding ethnic backgrounds of the study group were categorised as follows:

76% British students and 24% of students from other ethnic groups (mainly Overseas students) (see table 3.xi above).

Subjects

The 992 students represented 16 different subject areas (see Table 3.xii).

Year Groups

96% of all the students were in the 1st year of their studies. Nearly 3% of all the students were in the 2nd year of their studies. Just over 1% of all the students were in the third or fourth year of their studies. (See table 3.xii)

Table 3.xii: Surrey students' subject and year groups:

Subject	Year			
	1	2	3	4
<i>Electr.Eng.</i>	33	11	2	0
<i>Dance in Society</i>	29	0	0	0
<i>Civil Engineering</i>	80	4	0	0
<i>Chemistry</i>	57	0	0	3
<i>Economics</i>	87	1	0	0
<i>Materials Science</i>	27	0	0	0
<i>Chemical Engineering</i>	38	5	2	0
<i>Sociology</i>	37	0	1	0
<i>Nursing</i>	59	0	0	0
<i>Maths & Computing</i>	86	2	1	1
<i>Psychology & Sociology</i>	19	0	0	0
<i>Music</i>	45	0	0	0
<i>Psychology</i>	55	0	0	0
<i>Physics</i>	49	3	2	0
<i>LIS</i>	111	0	0	1
<i>Management Studies</i>	139	2	0	0

Number of 'A' Levels

The qualifications of the Surrey University Study Group were recorded and appear as follows:

- 2% had 1 'A' Level
- 8% had 2 'A' Levels
- 47% of the group had 3 'A' Levels
- 16% had 4 'A' Levels
- 1% had 5 'A' Levels

and 26% had other qualifications such as HND's, NVQ's, and overseas diplomas (see table 3.xiii).

From the total group, 76% had 2+ 'A' Levels

This compares with, 57% with 2+ 'A' Levels among the Dyslexic Study Group of 109 students (Kingston University Study Group).

Table 3.xiii: The qualifications of the Surrey University Study Group

Subject	No of A - levels					
	0	1	2	3	4	5
<i>Electr.Eng.</i>	28	1	1	9	5	1
<i>Dance in Society</i>	3	3	3	16	4	0
<i>Civil Engineering</i>	36	2	1	28	16	1
<i>Chemistry</i>	8	0	15	30	5	2
<i>Economics</i>	16	1	3	55	13	0
<i>Materials Science</i>	5	0	3	13	6	0
<i>Chemical Engineering</i>	18	0	3	20	4	0
<i>Sociology</i>	6	0	4	24	4	0
<i>Nursing</i>	16	1	11	26	5	0
<i>Maths & Computing</i>	26	2	8	38	15	1
<i>Psychology & Sociology</i>	7	0	0	10	1	1
<i>Music</i>	4	2	3	18	15	2
<i>Psychology</i>	8	1	2	35	7	2
<i>Physics</i>	9	1	8	26	10	0
<i>LIS</i>	16	1	5	66	22	2
<i>Management Studies</i>	53	2	5	57	22	2

The figures quoted for general male:female ratios and for 'A' Level results for non-dyslexic students correspond extremely closely with the previous Kingston University Study Group findings involving over 1500 students (see 'Diagnostic Assessments of Dyslexic Students in H.E., submitted to Hull University).

The Dyslexic Student Pilot Group.

Assessment data for dyslexic students from the Kingston University Study Group was drawn upon for purposes of comparison with the performance on non-dyslexic students. From this data bank were located 48 students who have carried out the Quick Screener. The results of the dyslexic students are presented in the following section.

3.6.7 Results of Part One of the Quick Screener

For Part One of the test - Reading Comprehension, the following results were recorded:

For the dyslexic student group

mean score 3.7

average and above average scores achieved by 86% of the group

15% failure rate

For the non-dyslexic student group

mean score 4.7

average and above average scores achieved by 91% of the group

9% failure rate

3.6.8 Discussion of Part One of the Quick Screener Results

As a general result for the total group, a short comprehension test of 6 items for which the mean score is 4.6 would seem a useful and appropriate benchmark for students at university level - given that the general educational attainment would be expected to be in the above average range compared to the population as a whole.

The main limitation of this test in its application across the subject range would be the choice of topic. Quite clearly this passage will have been more accessible in terms of its style and subject matter to those studying in the Arts and Humanities rather than Science.

It is not within the scope of this study to address the issue of whether the topic itself favoured certain subject specialists, or in fact whether science and maths related subjects attract students who are less well trained to perform in an advanced 'language' based skill. Concern has been expressed by lecturers (section 1.3.4.) regarding the lack of essay writing and English comprehension skills among students who specialise in science post GCSE level without a supporting arts subject. The relative success, therefore, of science students enrolling for the General Studies examination for 'A' Level would be a relevant area for further investigation.

Given the possible limitations imposed by such areas of uncertainty as commented on above, a more detailed scrutiny of the results show that throughout the 16 subject areas a mean score of above average should at least provide a rough guideline and objective base-line with which students may be compared.

Dyslexic students do underachieve compared to the total group, but not sufficiently to make it a particularly reliable test for identifying dyslexics as a separate group.

The cut off point between pass and fail is sometimes a fairly arbitrary decision based on the performance of the total group. Out of a total of 6, 3 and above was considered a pass, and anything below 3 was a fail.

9% of the total group failed according to this cut off point. If, however, this was amended to a cut off point of 2 and below, then only 2.5% of the total group would be further investigated as experiencing difficulties in coping with their studies.

Similarly 8% of the dyslexic group rather than 15% would have been identified.

A follow-up study of those particular individuals from both groups who achieved scores of 2 or below to see how they coped with their courses at university is unfortunately beyond the scope of this study, due to restrictions of time, access and confidentiality.

However, the comparative study carried out with Surrey University (see section 3.7) does confirm that all the students who were identified at Surrey on other tests as having difficulties in learning were also picked up by the Quick Screener, thus providing this study with its best evidence of effectiveness in terms of comprehensiveness of the target group.

In the case of Surrey University, there is a fairly well organised study plan and follow-up of students with learning difficulties as part of the services run by the English Language Institute. At Kingston University the student support system is less well integrated with no real internal structures or mechanisms for follow-up and analysis.

Probably due to differences in performance between subject areas, it would be difficult to produce a literacy-based short test that can be standardised at university level for all students.

Indeed one may question the relevance of giving such a test to an electrical engineer if the skills tested do not constitute an important element of competence required for that subject.

However, it could be valuable, if the tutor sees the need for it, to measure the performance of a student against the standard achieved by students in that same subject area as a minimum benchmark.

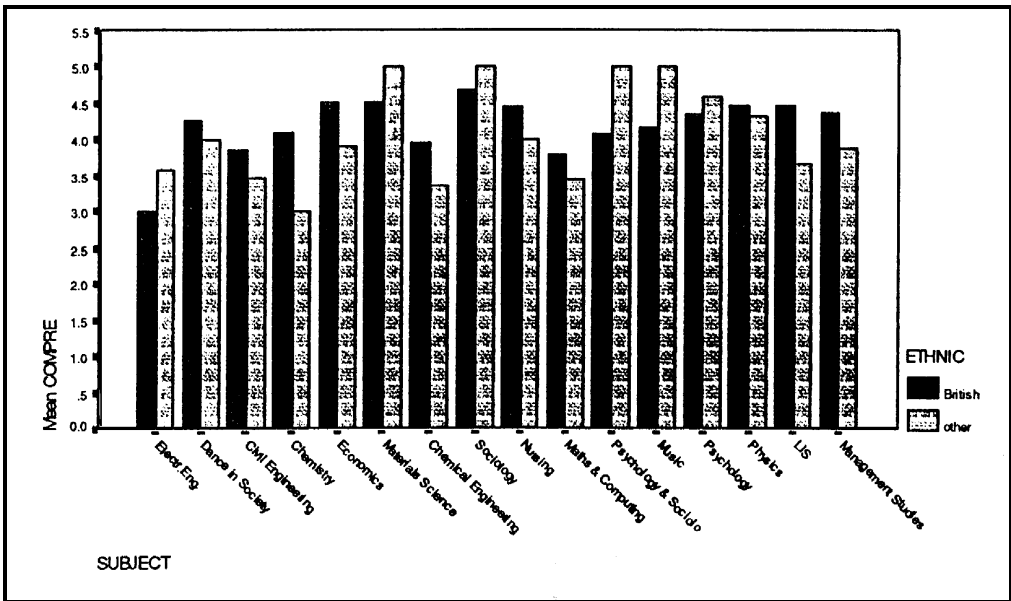
In more general terms, the idea of an 'informal' benchmark, which at least presents a task that 90% of students can succeed in, may be of value in highlighting those individuals who perhaps may not cope with their studies, particularly in relation to tasks involving reading at a professional level and making relevant interpretations on the basis of that reading.

Within the context of this study, the following groups fell short of the expected standard on Part One of the Quick Screener:

- Both British and Overseas students studying:
- Electrical Engineering
- Only Overseas students studying:
- Civil Engineering
- Chemistry
- Chemical Engineering
- Maths and Computing

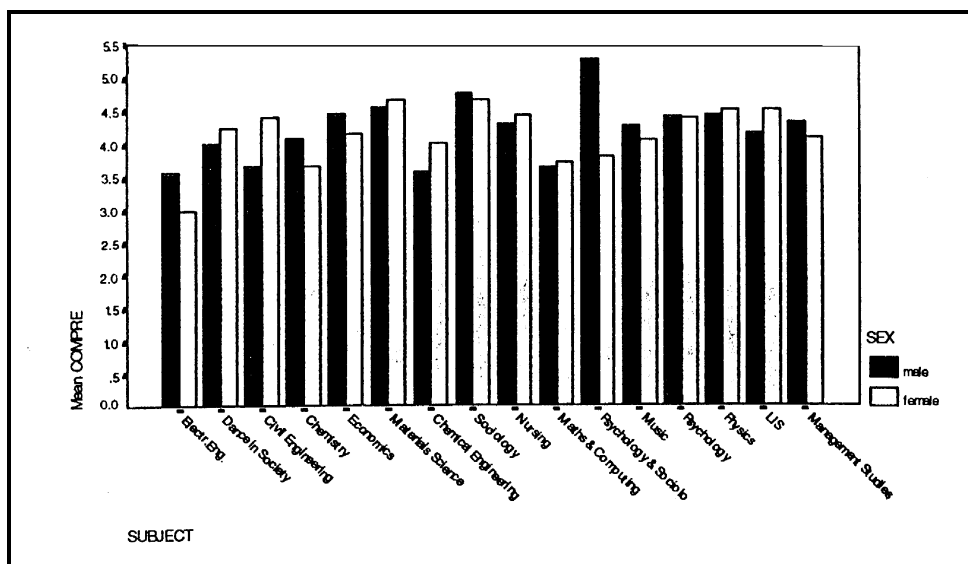
Unlike in the 4 subjects mentioned above, the electrical engineering students differed in that the Overseas did better than their British colleagues. (See table 3.xiv)

Table 3.xiv: Part one results by subject and ethnic breakdown



Furthermore, female students did less well than male students in both electrical engineering and chemistry. But they achieved slightly better results in several other subjects. For further details see Table 3.xv

Table 3.xv: Part One results by subject and gender breakdown



Finally, these subjects are of significance for the percentages of students who 'failed' the Quick Screener, a summary follows in order of percentage failure (Table 3.xvi). In the remaining 11 subject areas the failure rate was 5 - 0%.

Subject	percentage of failed QS	Total Number
electrical engineering	26%	46
maths & computing	22%	90
civil engineering	18%	84
chemical engineering	18%	45
chemistry	10%	60

Table xvi: Percentages of students by subject area who failed the quick screener

3.6.9 Results of Part Two of the Quick Screener

These are also discussed alongside Part One results in the following comparability study (see section 3.7).

The total scores, however, of all the participating students are shown in (Table 3.xvii) where 9 components of writing were identified and recorded.

This table also gives the mean of total scores under the category of each subject area, separately for British male / female and for Overseas students, both male and female.

The 9 components for writing were further sub-divided into two main categories for content and style:

Category (1) (Content)

2 key points, 4 other points, and name of one country
+ a logical sequence of ideas + length (over 50 words)

Category (2) (Style)

This was created, in order to make the distinction between writing as a summarising process (as in category 1,) and writing style, mechanics and fluency of self-expression.

Table 3.xvii: Total scores on part two of the test

Means of Total Scores				
	<i>British</i>		<i>Other</i>	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
<i>Electr.Eng.</i>	3	.	4.2	3.5
<i>Dance in Society</i>	7	5.8	.	8
<i>Civil Engineering</i>	5.2	5.1	3	.
<i>Chemistry</i>	5.3	5.9	2.8	2.5
<i>Economics</i>	5.4	4.7	4.3	3.7
<i>Materials Science</i>	5.6	6.7	5	.
<i>Chemical Engineering</i>	5.6	5.7	3.7	4.6
<i>Sociology</i>	5.4	5.1	6	.
<i>Nursing</i>	4	4.9	5	3.5
<i>Maths & Computing</i>	4.8	5	2.3	3
<i>Psychology & Sociology</i>	6.5	5.5	.	3
<i>Music</i>	6.8	6.8	.	6
<i>Psychology</i>	6.5	6.5	7	6.2
<i>Physics</i>	5.2	6.1	4	6
<i>LIS</i>	6.3	6.6	4.1	5.7
<i>Management Studies</i>	6	6.4	5	4.8

Admittedly these still involved making rather broad generalisations within the field of a complex process such as writing; however, these two categories, were considered as sufficient for the size of this test and its scope of enquiry.

Significant variations were observed between the different subject areas see table xviii.

Table xviii: results by subject of scores for written style

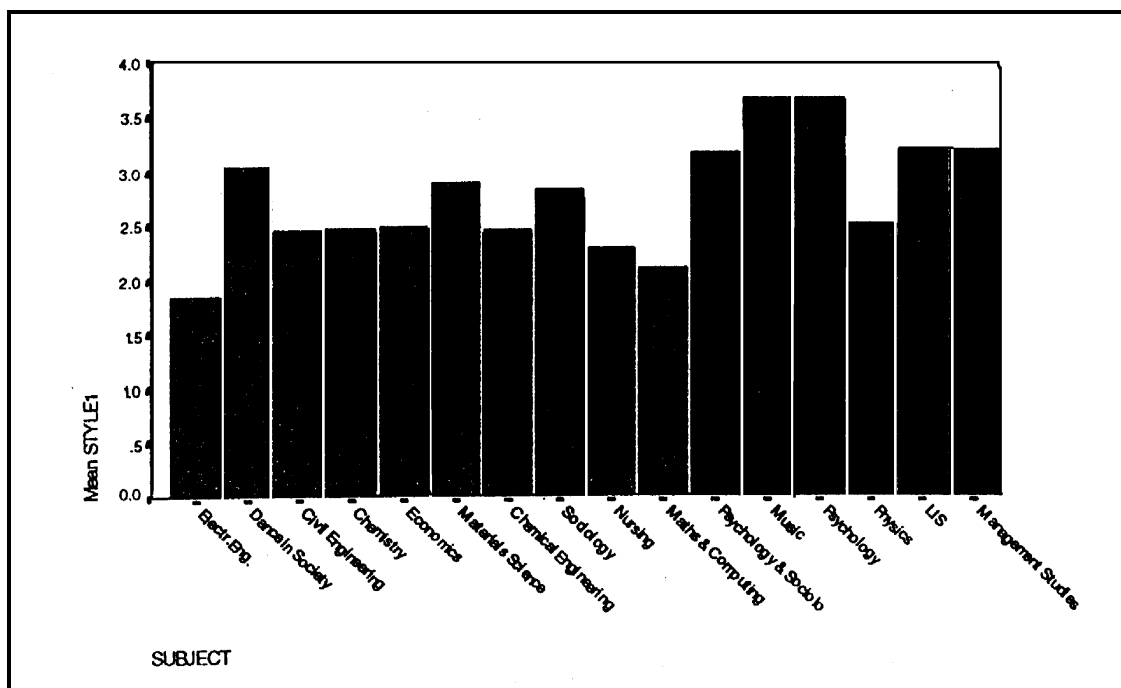
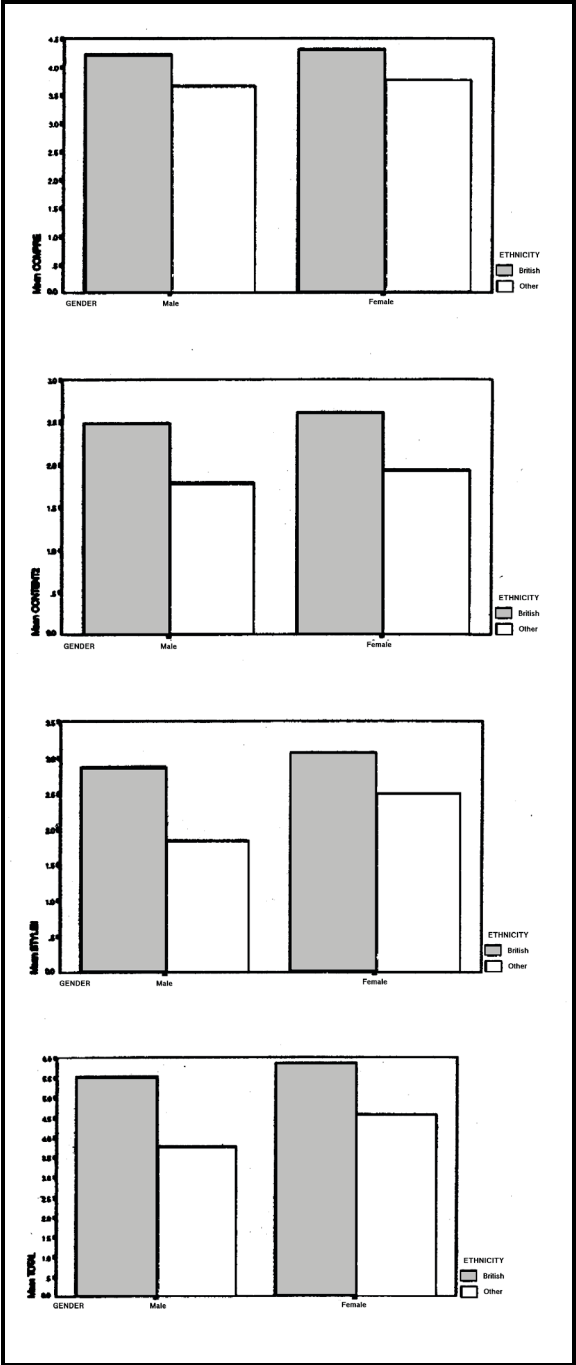


Table xix: Parts One and Two results by gender and ethnicity



Description

Overseas students tended to achieve less well on both comprehension and written work

However, it is noticeable that both British and Overseas female students achieved more highly on these tasks than the males.

The Overseas female students were particularly more skilled than the males in the area of written style

3.6.10 Discussion of Part Two of the Quick Screener Results

The following questions and comments have been compiled as further points for consideration, based on the results of the Quick Screener Part Two.

Spelling within a sample of free writing

- a) The question being addressed was: Is it possible to identify students who are dyslexic by looking at their spelling within a sample of handwriting?
- b) Do dyslexic students avoid using more advanced vocabulary when writing for fear of making too many spelling errors under examination conditions, and thus opt for a simpler level of vocabulary than that which they are potentially capable of?
- c) In a set period of time, (because of their general language processing, sequencing and fine motor co-ordination difficulties), do dyslexic students actually write less than other students?

It was expected that a subsequent statistical analysis would produce answers to these questions.

The samples of writing were categorised in the following way:-

Those that were: 'free of spelling errors'

A second category entitled 'Number of words of 7 letters or more'

A final one entitled 'estimated total number of words'

From the Quick Screener study the following facts emerged:

- a) The results from the 8 minute writing task were split into two sections: Those students who could write without making any errors- ('error free') - and those who could not ('errors') See table 3.xx below The error rates are also expressed in terms of % of the total number (n) in the relevant group (% of n)

Table 3.xx Spelling error rates among a range of subject areas

Subject	n	error free	% of n	errors	% of n
Elect.Eng.	42	11	26	31	74
Civ. Eng.	84	41	49	43	51
Econ.	91	51	56	40	44
Chem. Eng.	45	5	11	30	67
Nursing.	59	30	51	29	49
Psych.&Soc.	19	14	74	5	26
Psych.	55	33	60	22	40
LIS	112	61	54	51	46
Dance in Soc.	29	15	52	14	48
Chem.	60	27	45	33	55
Mat. Sc.	27	14	52	13	48
Soc.	38	23	61	15	39
Math.&Comp.	90	44	49	46	51
Music.	45	27	60	18	40
Phys.	44	25	57	29	66
Man.Studies.	141	89	63	52	37
Totals	981	510	51	471	49

see (appendix 3H) for a more detailed breakdown of the figures (according to gender and ethnic background).

Taking into consideration that this sample of students is limited to one particular university, although it covers a wide range of subjects (Sciences, Humanities and Engineering), it is interesting to note that in carrying out an 8 minute writing task, only 51% of the group produced work which was free of spelling errors.

Consequently, it would appear (at least within the HE sector) that a writing task is not a very reliable means of 'identifying' dyslexic students, particularly when one is looking at spelling mistakes as a main indicator.

However, if one were to look at the number of spelling mistakes in any one sample of writing then it is very likely that dyslexic students may make more errors (e.g. up to 8% error rate as opposed to .5 or 1%).

Additionally if the tutor who looks at the writing also happens to be knowledgeable about the particular patterns of spelling errors frequently made by dyslexic students then they will probably find further evidence of other areas of Specific Learning Difficulties.

In consideration of points b) and c), once again, contrary to common held beliefs within the dyslexia field that dyslexic students write less than their peers and limit themselves to quite basic vocabulary, on a set writing task, dyslexic students actually wrote more than non-dyslexic students, and they used more long words (of 7 letters or above) than the others, though not necessarily in proportion of the total (see tables 3.xxi and 3.xxii). The dyslexic students did not, however, spell as well as non-dyslexics.

Table 3.xxi: The proportion of spelling errors in the work of dyslexic students

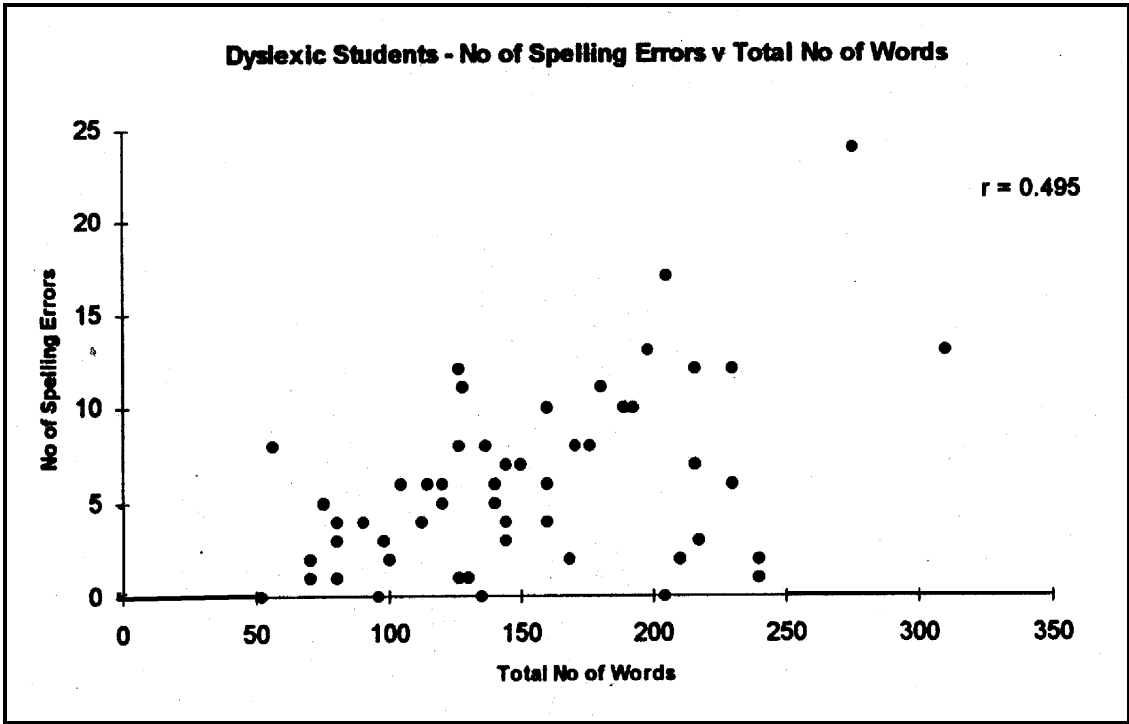
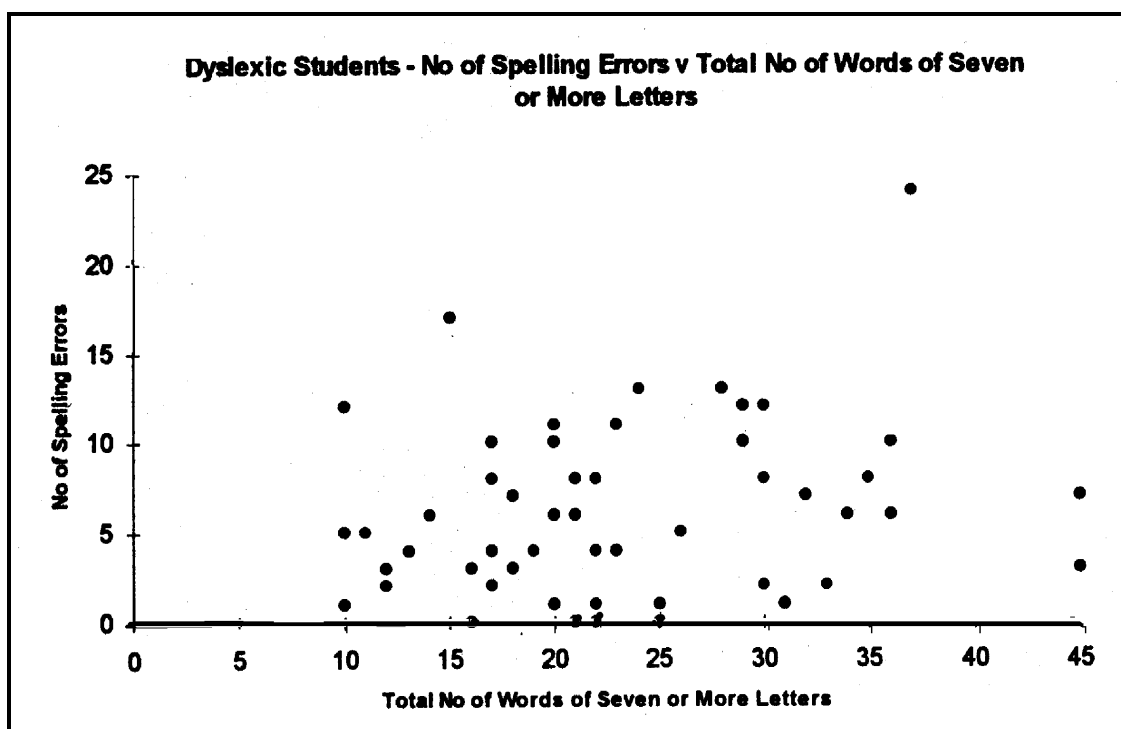


Table 3.xxii: Showing dyslexic students' proportion of spelling errors

among longer words



(For an extract from the list of the number of long words used, number of spelling errors made and estimated total number of words written by dyslexic and non-dyslexic students in the quick screener. see appendix 3J)

One possible explanation as to why dyslexic students actually wrote more than others may be linked to the memory component of the Quick Screener which is different from the usual '5 minute' writing activity given to dyslexic students in an assessment situation.

But in this case the dyslexic students should by all accounts have been placed at an even greater disadvantage, given their overall weaker memory, sequencing and organisational skills (McLoughlin et al 1994). However, there are many 'apparent' contradictions when dealing with dyslexia, and certain tasks which dyslexics are known to have problems with appear to be conditional to particular circumstances.

For example the case of Robert (see section 5.1.10) showed that he underachieved in lengthy and sustained study / memory related tasks when confidence, self-esteem, and concentration were flagging, but that he was able to far surpass expectations when the task was short, focused and approached with confidence. It is possible, therefore, when a dyslexic student is asked to start writing for 5 minutes on a given topic, sometimes with no conversational/reading 'lead in', no opportunity to tune into the topic, get interested, or aroused into a need to express or communicate - i.e. with no ready content to put down on paper, that it actually takes some of the 5 minutes to organise the necessary thinking into sentences.

Consequently a much smaller word count is recorded, with, perhaps, the recommendation (not necessarily further confirmed by any other supporting evidence) that the student in question should be granted extra time when completing written examination papers.

When doing the Quick Screener, it is possible where dyslexic students have read and understood Part One, and have further reinforced the content in their memory by carrying out a range of comprehension activities (both specific and global in nature) that when they turn over to write their summary, they are actually better placed to write fluently and produce a greater number of words.

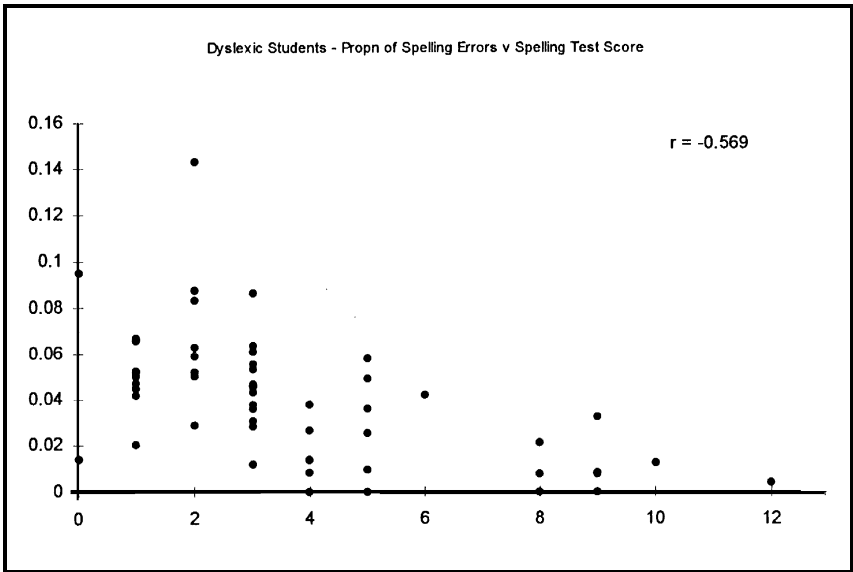
The generally unsatisfactory and currently unresolved issue surrounding how best to measure speed of writing, particularly at the more advanced levels of literacy is discussed further in (section 3.4).

A more definitive test of dyslexics' performance on spelling would probably need to include a full spelling test in which there would be no 'escape' from the required word into a more familiar alternative as there is in a spontaneous writing activity.

Nevertheless, might it reasonably be assumed that the level of a student's spelling as gained on a spelling test score may be reflected up to a point in the quality of spelling that the same student produces in a sample of free writing?

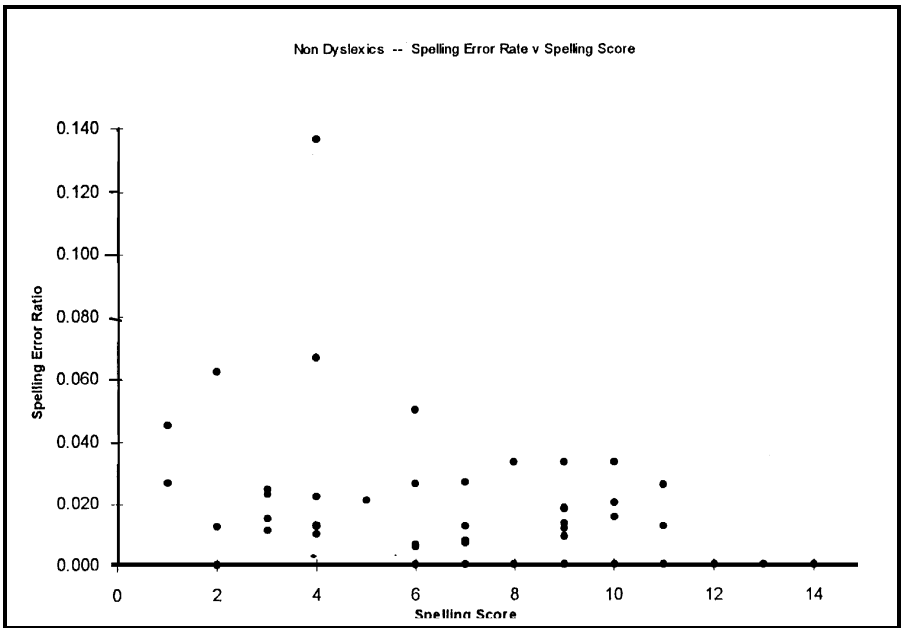
When making a comparison between the proportion of spelling errors that dyslexic students made in their free writing and their results in the spelling test (Writing Mechanics sub-test of the SATA), there appeared to be a reasonable correlation between the two: i.e. the higher the test score, the lower the proportion of spelling errors. (see tables 3.xxiii and 3.xxiv)

Table 3.xxiii: The proportion of spelling errors in dyslexic students' written work compared to a spelling test



On examination of the data for non-dyslexic students, a similar picture emerged.

Table 3.xxiv: The proportion of spelling errors of non-dyslexic students in written work compared to a spelling test



Whilst this data does not help to select a sub-group of dyslexic students from among others, whose spelling is less than perfect, in any qualitative way (since many dyslexic students functioning at Higher Education level no longer make the obvious errors of reversals etc.), it does confirm that the quantity of spelling errors made is worthy of note, and this could be tested for either from a sample of handwriting, or from the administration of a spelling test.

These findings give further support to the evidence provided in Statements of Need, which claim weaknesses in dyslexic students' performance in writing and spelling.

As a result of this work, the tutors at Kingston University added to the test profile of dyslexic students information such as is illustrated in the following examples:-

'This student's handwriting is a rather slow and inefficient means of communication for him. In contrast to his verbal skills, his ideas do not get adequately expressed in writing since apart from the speed factor (14wpm), he is greatly hampered by poor spelling and punctuation.'

This student has made a 9% spelling error rate in his 5 minute writing task.

His weakness in spelling is further confirmed by a standard score of 6 (range 1 - 20) and percentile ranking of 9 on Writing Mechanics (a test of spelling and punctuation).'

3.6.11 Discussion of findings

The Quick Screener has been piloted with over 1000 students from 15 departments. It focuses on the following skills and the profile which emerges may provide some insight into students' proficiency in the following areas:

speed and efficiency of focused reading at an adult level.

speed and accuracy of comprehension.

working memory and organisation.

accuracy of spelling and presentation in writing.

maturity of ideas, level of vocabulary and fluency of self expression.

It may be complemented by supplementary tests as required.

The test was considered by Dr David McLoughlin and his comments are recorded below:

"Streamlining the screening could be achieved further by using specific tests of attainment. The language processing test is I think moving in the right direction. It focuses on reading comprehension which is the most important reading skill. It is also the one with which dyslexic candidates have the most difficulty. A passage with a readability at the professional stage with ensuing questions could be a quick measure of reading comprehension. Likewise, listening comprehension is also a very important skill and a similar measure could be devised. The written composition part of the language processing test also has merit. It is simpler than the writing task in the SATA and the results can be analysed easily according to the criteria listed. It would take approximately 20 minutes for a student to complete a package of tests including the SATA verbal reasoning and the language processing test. This would probably prove invaluable to tutors who have concerns about particular students. "

(HEFCE Project - 1995)

When having to make a choice, for the purposes of a quick screener, between a piece of free writing and a spelling test, then from the point of view of the ease of both administration and marking of the test, the preferred option would be a spelling test.

Furthermore a spelling test could be the more reliable of the two for identifying dyslexic students, and unlike the writing task, it would not require any specialist knowledge to get the results from students' test responses.

Dyslexic students achieve rather less well than their non-dyslexic peers on Part One of the Quick Screener but not significantly.

Therefore, Part One, whilst not effective in the selection of dyslexic students from among others, was an interesting study to show that similarly to their slight underachievement in 'A' Level results compared to others, dyslexics can compete in an advanced, timed reading/comprehension test with other students but with generally slightly weaker results.

Perhaps unexpectedly, in Part Two of the test it was found that Dyslexic students actually wrote more and used a greater number of long words (7 and above letters) compared to non-dyslexic students.

However, almost 95% of dyslexic students, compared with around 50% of the study group (992 students) were unable to write for 8 minutes without making any spelling errors.

Furthermore, the percentage spelling error rate for dyslexic students compared to the others was many times greater.

In response, therefore, to the questions posed by a number of lecturers:

Can you produce a short test that is easy to administer, mark and will identify dyslexic students? The findings of this study would suggest that the administration of a 5 minute spelling test, followed by a coding test (1.5 min) would be the quickest and most effective way. A below average result on spelling, especially when it was coupled with a low score on coding would certainly be a useful indicator of Specific Learning Difficulties.

If Part One of the Quick Screener were to be used at all to identify dyslexic students then a revised format would be needed, which would focus, not only on an ability to comprehend a single piece of text but sustaining accuracy of comprehension throughout several passages, and under timed conditions (see section 5.3.6.).

More information would be gained from giving dyslexic students a longer reading comprehension test in which both timed and untimed results could be compared. Preferably silent reading as well as listening comprehension. The main study has shown that it is in fact in the area of sustained reading tasks that dyslexic students have problems. (see section 5.3).

However, if a tutor wishes to ascertain dyslexic students' ability to cope with an advanced level of reading, comprehension and written expression, compared to their peers, then the Quick Screener can be a useful tool to investigate dyslexic students' learning 'ability'.

3.7 A comparison between the quick screener and another diagnostic test.

This brief study compares two placement (or 'screening') tests, one produced by the University of Surrey, and one by Kingston University. The latter was pre-tested on a sub-set of the University of Surrey student population in October 1994 used for establishing the norms for the University of Surrey test. The Kingston test had not yet been pre-tested for any reliability or classificatory validity, and it was decided to investigate, if not solve, these issues by comparison with a criterion.

This study, therefore investigates the comparability of the two tests, in so far as this is possible without the appropriate data on reliability of some of the sub-tests, and suggests that the Kingston test adequately identifies students who may be at risk in their studies from language related deficiencies.

3.7.1 Introduction

It has recently been argued that although placement testing is probably the most widespread institutional use of language testing, it is the least researched (Wall, Clapham and Alderson, 1994). Existing research is either non-empirical (Goodbody, 1993) or relates to small-scale screening and placement requirements, which allow the use of time consuming direct criterion-referenced tests (Paltridge, 1992). Whilst this study was carried out through co-operation between relevant members of staff (i.e. Dr Fulcher - Surrey University, and D.Zdzienski - Kingston University) it is rare to discover studies which compare two tests.

This is partly because of study design problems, lack of available data, or, perhaps, the unwillingness of examination boards to co-operate in serious comparability studies.

The attempt to compare British examinations (Carroll and West, 1989) looks to be empirical, but in fact no reliability statistics are reported for any of the attempts by British examination boards to place their tests on a 9 point scale. Apart from the work carried out in comparing the Test of English as a Foreign Language (TOEFL) with the First Certificate in English (FCE - UCLES University of Cambridge Local Examinations Syndicate), (Bachman, Davidson, Ryan and Choi, 1995), it has not been possible to locate small studies similar to the one reported here, which may help institutions to discover to what extent their placement tests or screening instruments are operating in a similar or different way.

An attempt is made here to compare test results from two very different tests, both with the same purpose: to identify those students, at the beginning of a tertiary education course, who might be in need of additional study skills or language based help (the particular interest in this study from the Kingston perspective was the early identification of dyslexia from within large groups of university students).

3.7.2 Background

The University of Surrey developed a screening instrument in-house in the academic year 1993/4 which was extensively pre-tested, and administered to 1619 students in October 1994 (Fulcher, 1995). Having been investigated in some depth, many of the measurement characteristics of this test were known.

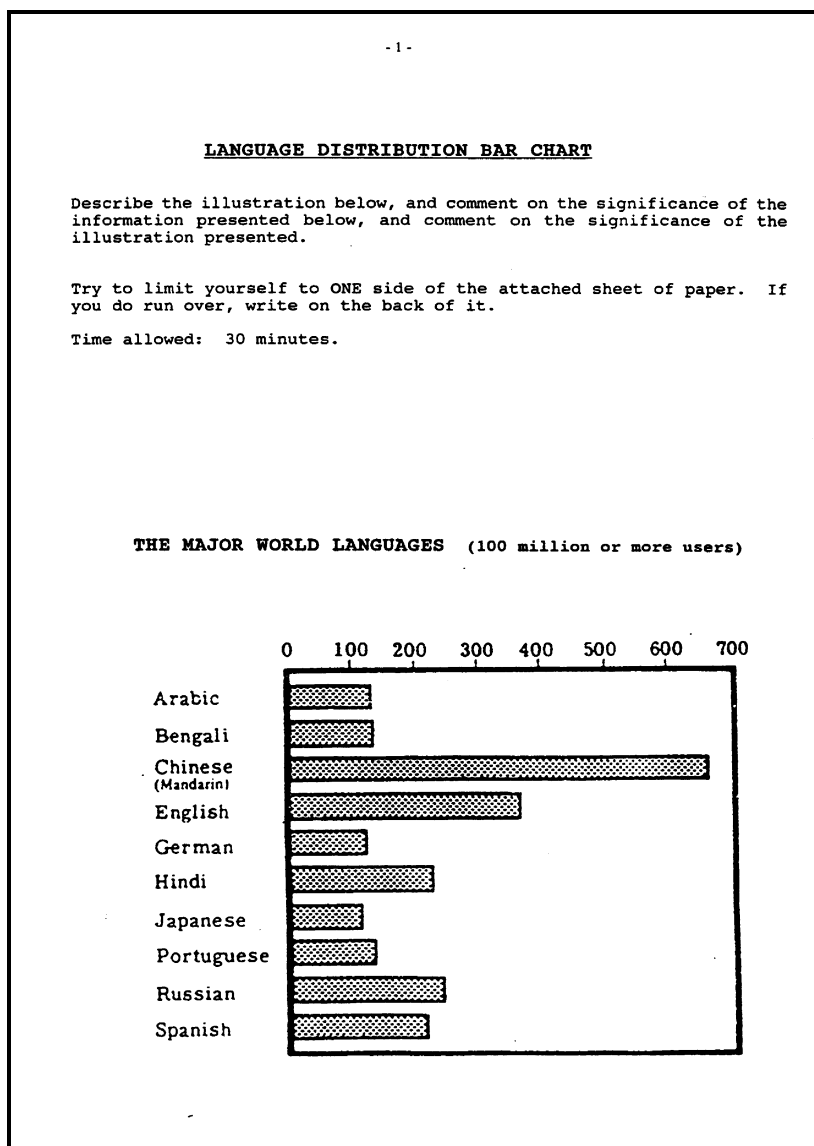
The Kingston University test, which is an adapted and shortened form of the Scholastic Abilities Test for Adults (SATA, Bryant, 1991) was pre-tested on 992 students who were a subset of the 1619 students used in the Surrey study.

The aim of the Kingston University researchers was to standardise the Quick Screener for students in the U.K. The SATA is a general measure of scholastic accomplishment, and the Quick Screener was compiled from two of its sub-tests, namely, Reading Comprehension and Writing Composition.

At the time of the pre-testing, the developers of the two tests were unaware of the research programme of the other party. It was therefore only at a later date it was decided to carry out this comparability study.

3.7.3 Test Characteristics

Illustration 3w: Sample of one of the early versions of the Surrey writing Test
(visual prompt - for written discussion)



The two placement tests differ in their content, at test and item level. Firstly, the Quick Screener test consists of two sections, Reading and Writing, 5 and 8 minutes respectively.

The Surrey test contains three sections, Writing, Reading and Structure, 45, 5 and 15 minutes respectively. The writing exercise offers a choice from three controversial issues for discussion, and a map of the world showing the accumulation of nuclear weapons - visual prompt - for discussion. Reading contains six short passages followed by questions, and Structure consists of a multiple choice grammar paper.

The reading section of the Quick Screener contains a single passage drawn from the Humanities of approximately 150 words and 6 multiple choice questions. The questions test gist, word meaning, extracting factual information and inferring implicit meaning.

The Surrey reading test differs in that it does contain items on the meanings of words within the text. There are 6 texts of 150 - 200 words, three chosen from the humanities/arts and three from the sciences. However, these were selected to represent 'popular' science accessible to a general readership. There are 8 multiple choice questions set on the six passages.

The second section of the Quick Screener involves turning over the page on which the reading passage is printed, and writing a summary of the passage.

The Surrey test does not include reference to memory in its test specifications, and so the writing section of the test is not related to a specific reading passage.

The Surrey test contains two prompts, requiring answers to both questions. The first question is expository, and requires a response to a visual prompt (see illustration 3w.). The response to the prompt is compulsory. The second prompt is argumentative, and students may choose to respond to one of a choice of three questions.

Neither test states the required length of answer, but does provide a time limit and a number of blank lines on which students may write. It is therefore assumed that students may write as much as they wish within the time limit, assuming that they do not use more space than is available.

The Surrey test contains an additional section, English structure, which is not in the Quick Screener. This subtest consists of 10 multiple choice items. The content has been drawn from known problems of overseas students at the University of Surrey. This section has been included in the Surrey total score for the purposes of this study.

3.7.4 Scoring Systems

The reading sections of both tests are objectively marked. However, there is a difference in the scoring of the writing subtest:

The Surrey test was marked using the International English Language Testing System (IELTS) 9 band scale, whereas, the Quick Screener Part Two was marked using a checklist of written features. A rater observed whether these features were present or absent, recording the observations, and adding the number of features present to obtain a final score.

3.7.5 Reliability and validity

The reliability of the Surrey test has been extensively investigated. The writing subtest was investigated using an inter- and intra-rater study using 20 scripts and four raters, whilst the structure and reading subtests were studied using a Rasch model. The reliability of this test was established for it to be used effectively as a screening instrument (Writing inter-rater .87, Writing intra-rater .69, Structure .63) , with the exception of the reading subtest which was found not to be able to discriminate successfully between those students needing additional English language help and those who did not. (for the relevant reliability evidence see Table 3.xxv)

No reliability figures were available for the Quick Screener, but Part Two's 9 features of the checklist used for writing were treated as if they were dichotomous items, and a Rasch model fitted, in order to obtain a reliability statistic (resulting in a figure of .59).

Table3.xxv: The reliability figures for the Kingston and Surrey tests

Subtest	Writing Inter-rater	Writing Intra-rater	Reading	Structure
Surrey	.87	.69	.59	.63
Kingston	.59	Not available	Not available	Not applicable

Directly relevant to the reliability coefficients is the concept of test information. The Surrey Structure subtest is shown to provide adequate information between ability levels. For the Surrey Reading subtest, which is less reliable, the amount of test information being provided is limited. The Quick Screener Part Two was shown to provide somewhat more significant information than the Surrey Reading subtest, but not as great as the Surrey Structure subtest.

Validity

The validity of the Surrey test was examined using correlation and Principal Components analysis. The results are shown in (Table 3.xxvi) and whilst there is a strong suggestion that these subtests are well correlated, there is not sufficient evidence upon which to claim construct validity.

There is no comparable evidence for the Quick Screener.

Table 3xxvi: The validity of the Surrey test

	Writing task 1	Writing task 2	Structure	Reading
Writing task 1	.87	.49	.36	.44
Writing task 2	.43	.87	.61	.42
Structure	.27	.45	.63	.44
Reading	.17	.30	.27	.59

3.7.6 Comparability of classification

In this section ways are considered in which cut scores are established in the two tests, correlations between the two tests, and the way in which the two tests classify the students as in need of additional English language support or not.

The University of Surrey test

Cut scores for the Surrey test as a whole were established after a pilot study conducted in the Summer of 1994. Scores were considered in relation to lecturers' assessments of whether students with certain profiles were ready for study in a tertiary medium institution. Cut scores were established, but the results required empirical investigation to ensure that the cut scores are in fact leading to appropriate decisions on whether to refer students to language support programmes.

The cut scores for the Quick Screener were arbitrarily set at below 3 (out of 6) on part one, and 4 or below (out of 9) on part two.

Clearly decisions made on cut scores involve error, and sensitive interpretation of scores on all tasks is required before referring or not referring a student for support.

However, the evidence from this study lends support to the current practice of interviewing all referred students, to ensure that some students do not needlessly attend a support programme.

There is as yet no way of discovering whether non-referrals have mistakenly been so categorised, unless they self-refer, or are referred by their subject tutors.

Quick Screener compared with the Surrey Test

The purpose of this study was to attempt to establish the classificatory reliability of the Quick Screener by comparison with the Surrey test.

It can be seen that this is no mean feat, given the possibility for error in tests of this size. It is made additionally difficult because the measurement properties of the Quick Screener are not known. However, it is possible to compare them in two ways: firstly to see whether the tests rank order students in the same way; secondly

to discover to what extent the same students would have been referred for additional support.

Correlation

From the analysis that was carried out, it could be seen by the low levels of correlation that were found, that while the two Surrey prompts had a high level of correlation (.769) between themselves, the Kingston and Surrey tests ordered students in different ways. (Reading subtest correlation .260, Writing subtest: Surrey prompt 1 .438, Surrey prompt 2 .490 Total test score correlation .524)

Despite these low correlations, it was still considered necessary to examine the extent to which the two tests did classify students when dividing them into two categories: those who were suspected of requiring additional support and those who were not.

Classification

It was decided to investigate the numbers of students being classified as those who were likely to require additional support by both tests, on the writing subtest, the reading subtest, and on the assumption that the result of the entire test is more reliable than its parts, on total score.

Classification on the Writing subtest

By the first writing task 'prompt 1', 170 students who would not have been referred by the Surrey test would have been referred by the Quick Screener, that is 24.5% of non-referrals (see Appendix 3K for the classification tables on writing subtests).

By the second Surrey writing prompt, 170 students would have been referred by the Quick Screener, who would not have been referred by the Surrey prompt 2, or 24.5%.

It was necessary to look at the reverse side of the coin, the number of referrals made by the Quick Screener which would not have been identified by the Surrey test. The figures show that only 22 students (12.5%) of those who were referred on the Surrey writing prompt would not have been referred by the Quick Screener.

Furthermore 28 students (15%) would not have been referred on the Quick Screener but would have been on the Surrey test.

Using the 'error bands' to judge the adequacy of the Quick Screener, the following questions were asked:

- How many students would have been referred by the Quick Screener and should not have been (Surrey score on Writing prompt 1 > 7)? The answer is 14, or 1.6%.
- How many students were not referred by the Quick Screener, and should have been (Surrey Writing prompt 1 < 4)? The answer is 3, or 1.7%.
- How many students would have been referred by the Quick Screener and should not have been (Surrey score on Writing prompt 2 > 7)? The answer is 0.
- How many students were not referred by the Quick Screener, and should have been (Surrey score on Writing prompt 2 < 5). The answer is 9, or 5.1%.

From what we know about the two tests, it would appear that the Quick Screener can be used to make adequate classification of students.

Classification on the Reading subtest

The results of the classification show that some 98 students would have been referred on the Quick Screener who were not referred, or 12.7% of non-referrals.

Furthermore the Quick Screener would not have referred 70 students isolated as at risk by the Surrey test, or 37.2% of the students referred (see Appendix 3L for classification tables).

Despite these results, it was noted that the Surrey Reading subtest was the least reliable part of the test, and further analysis revealed the possible error ranges with regard to cut scores.

Classification on test total scores

On the assumption that classification by total scores is more reliable than by subtest, the same procedure was followed for total scores (see Appendix 3M classification tables).

It was found that by using the Quick Screener, 153 students were discovered who would not have been referred for further support by the Surrey test, i.e. 21.95% of the sample.

By contrast, only 14 students who were referred by the Surrey test (8% of those referred) would not have been referred by the Quick Screener.

3.7.7 Discussion and conclusions

The correlational study of the two tests clearly indicates that the subtests and total test scores on the two tests, rank orders students differently.

However, in a screening instrument of this nature, classification would appear to be more important than rank ordering.

With the exception of the reading subtests, the Quick Screener and the Surrey test seem to classify students in a reasonably consistent manner in that only a small number of the students tested and referred by Surrey would not have been referred had they taken the Quick Screener.

However, the major difference between the two tests appears in the numbers of students who were not referred by the Surrey test. It is possible that the cut scores on the Quick Screener having been set arbitrarily may need to be slightly reduced. On the other hand it is also possible that the test is biased against those who work in the fields of Science or Engineering, for example.

Table 3.xxvii: Numbers of students (including their subject areas) who failed the test

Group size 86 students

Humanities	Failures	Sciences	Failure
Applied Psych & Sociology	2	Chemistry	6
Hotel & Catering Mgmt	7	Chemical Engineering	8
Combined Studies	3	Civil Engineering	15
Dance	2	Electronic Engineering	12
Economics	3	Materials Science	1
Music	2	Maths & Computing	20
Nursing	1	Physics	2
Psychology	2		
Total of Test Failures	22	Total of Test Failures	64

Both these avenues are recommended for further investigation, but do not fall within the scope of the main study.

General Conclusions

The Quick Screener has a general use in acting as an informal test to provide tutors (particularly of the Humanities subjects) with a benchmark for professional levels of reading and writing in Higher Education. It does identify students who experience general weaknesses in literacy skills.

The Quick Screener in its present format may, admittedly, be of little relevance in certain subject areas such as Science and Engineering, but it can be a useful benchmark for Humanities students where the skills tested are of greater relevance to the successful completion of their degree.

By adding alternative sections (for an improved range of subject matter),the Quick Screener can be reasonably effective in identifying, from among large groups of students, within a short 13 minute period, those with ESOL difficulties, and others (including some mature students returning to study) who have a need for English language and advanced study skills training to increase their chances of success in their chosen university degree course.

The Quick Screener will equally identify students who are moderately or severely dyslexic, although students who are borderline or mildly dyslexic and well compensated will not necessarily show up. Those students, however, will also be unlikely to check positive on a dyslexia checklist, and if they do reasonably well in a spelling test and do not have obvious problems with coding and speed of reading and writing, they are quite unlikely to be positively identified at this stage of their academic development without a documented history of dyslexia as evidence of their previous fluctuations in learning.

If their level of functioning is commensurate with general degree level work, then the question of identification, which is generally used to indicate the need for specific areas of support and concession could well cease to be relevant.

3.8 Hypothesis for further research into a screening programme

A screening programme that would be effective for use in larger institutions would perhaps be produced most accessibly on computer. If the programme is widely available on the network, then students could access it from a variety of locations, e.g. the library, the computer room, the Health and Counselling department, the English Language Centre, the Study Support Centre, etc.

It would not be recommended as a replacement for the existing interview with the Study Support Tutor, which would still be the next step, but it would very possibly facilitate that next step for those students who find a print-out suggesting an appointment with a particular tutor a more encouraging route than to initiate the visit of their own account with only personal experiences of difficulties to take with them which they then have to explain to another person.

Such a screener, if used in a 'whole institution' approach, could potentially be more effective than a range of informal tests and checklists which lecturers sometimes use during the normal course of their work.

The Quick Screener, is a base-line test, and could be very useful in cases where a lecturer may wish to establish a benchmark of professional literacy skills for a particular group of students. However, whilst indicating a dyslexic student's abilities as well as weaknesses, it is not quite so effective as an indicator of dyslexia. Furthermore it requires marking time and experience, and gives nothing constructive in return to the student other than a pass or a fail. It has to be administered proactively to groups of students rather than acting as a facility that students may make use of.

Section 3 has analysed a series of approaches to screening, many of which include elements of testing. The researcher's conclusion is that it is best for the first filter to emulate as far as possible the initial interview with a tutor (i.e. comprising of questions and discussion relating to how the student is getting on with their studies), rather than being test based. This first filter would lead, where appropriate to full diagnostic assessment.

The experience drawn from the application of the Quick Screener is that whilst a short test can serve as a useful benchmark for the level of attainment in a particular subject. It is not, however, so easy to isolate, with any degree of reliability, a complex condition such as dyslexia.

What would, then, be the main elements that a tutor would combine to produce an effective screener?

The following were all considered, by the researcher, to be desirable:

- a way of identifying particular students with difficulties in learning early on in their course.
- making the selection totally accessible to all students and within a short time-scale
- making it a continuous service that is available to students in different years and at different stages of their course,
- presenting it in a vehicle that will be suitable for the way in which the institution works as a whole,
- not encroaching on lecturers' time by asking them to administer and perhaps mark specific tests or checklists to their students,
- presenting it in a way that gives individual students an element of choice, so that they can act upon the recommendations themselves,
- presenting students with a system that is a routine function of their institution and therefore reducing the stress and embarrassment of individuals having to go to see someone and tell them that they are having problems coping with their studies,
- giving something in return to the student who is willing to explore his/her own learning strengths and weaknesses

- making the experience a positive one, even when the outcome is that they may be dyslexic
- making the screener not only pick up on dyslexic students, thus greatly limiting its use and attraction to general students, but also using it to identify those who have problems with the English language and those who are in definite need of study support (either because they are mature students who have got out of the habit of studying or because they lack certain basic skills), as well as those who are coping well but want to learn more about their performance,
- using the screener to encourage students to explore their own learning styles and habits since such an awareness is in keeping with the notion of inclusivity (Tomlinson Report, 1996) and helps students become more effective and inquiring learners.

This is a selection of useful services, not necessarily connected, and the putative model for a screener presented in section 5.2, suggests that rather than attempt to do just one thing on the list .e.g. identify dyslexics, it would be more useful and appropriate to try and combine all the elements and produce a programme that would address a range of issues simultaneously. This would place a range of learning issues together, optimising on cost, time, dissemination of information, and it would address students at a level commensurate with their age and intelligence.

Section 4: An exploration of diagnostic assessment.

Introduction

Singleton (1995) writing in the UK, notes, *'At the present time there are no rules specifying who is qualified to diagnose a student as dyslexic, nor which methods are valid for assessment. There is a lack of appropriate tests for assessment at HE level, and tests which are designed for assessing children are frequently misapplied to adults.'*

In the USA, the Americans with Disabilities Act (ADA) 1990, guaranteed individuals with learning disabilities certain protections and rights of equal access to programmes and services.

Similar rights have now been introduced for UK students under the Disability Discrimination Act 1995. In fact the first disability discrimination appeals are just beginning to come to Tribunal and indicate the number of sequential steps that are required to be undertaken, suggesting that the whole process can be very lengthy indeed. In the public sector, the first case of a dyslexic that may have been recognised in law in this country under new disability legislation failed to prove that he was discriminated against when he was dismissed by Xerox UK (Gibb, 1998)

Some helpful guidelines have been produced by AHEAD (Association on Higher Education and Disability) which summarises many of the concerns of the UK National Working Party on Dyslexia In Higher Education.

It is clear from both these bodies(AHEAD and the National Working Party on Dyslexia in Higher Education) that guidelines would be helpful in answering the following questions: a) Who should assess? b) How recent should the assessment report be to qualify? c) What constitutes an acceptable report? And d) What is put into a Statement of Needs?

a) Who should assess?

In Higher Education an educational psychologist's report has been essential in order to provide appropriate evidence to the Academic Registry if the student is to be formally recognised as dyslexic and be eligible to apply for a Disabled Student Allowance from the Local Education Authority. For the first time, in 1998, there has been an acceptance by the Examinations Boards of RSA qualified Special Needs Tutors' reports as sufficient for this purpose at Secondary and F.E. level and one may speculate that it will only be a matter of time before this is extended to Higher Education. In 1997 the joint forum for GCSE and National Vocational Awarding Bodies took the decision to accept reports prepared by RSA Diplomats in support of applications for 'special arrangements' and 'special consideration'. *'Although a welcome move, this decision has raised many issues of immediate concern.'* (Backhouse 1998) Most of these issues centre around the lack of appropriate test materials for this higher age-group which are not exclusively reserved for the use of Educational Psychologists.

b) How recent should the assessment report be to qualify for special arrangements and concessions?

Normally reports are considered to be up to date for a period of 18 months, if they are going to be used to gain concessions in public examinations. However, for a student in Higher Education with a well documented history of dyslexia, with up-date reports at 16 and 18 years, it is usually agreed that only a further brief update is needed.

As to the content of an up-date report, there seems to be a variety of different opinions regarding what it should contain. In a regional group discussion between Higher Education tutors and educational psychologists (Cardiff Conference 1997) some participants felt that in the above circumstances an up-date would not be needed. Others routinely carried out up-date tests based on a series of attainment tasks in reading, writing and spelling, but felt it unnecessary to re-administer the cognitive tests; however, some of the psychologists routinely carried out further administrations of the main cognitive tests at each up-date. There was little agreement on the subject.

c) What constitutes an acceptable report?

A comprehensive assessment battery and the resulting diagnostic report should include a diagnostic overview (i.e. description of presenting problem, developmental, medical, social history, family history - including primary language of the home and the student's current level of English fluency), assessment of aptitude (i.e. a complete intellectual assessment), academic achievement (i.e. current levels of academic functioning in relevant areas such as reading, comprehension, maths, oral and written language), information processing (i.e. short and long term memory, sequential memory, auditory and visual processing, processing speed and motor ability) and a diagnosis which is clear, and not 'suggestive of' or 'presenting symptoms not dissimilar to' etc. If the data does not currently indicate dyslexia, this should be stated in the conclusions of the report.

This raises the issue of how much emphasis is placed on a student's history of learning difficulties and dyslexia compared to levels of current performance. The further question arises, 'Are dyslexic students without a documented history of problems who are assessed for the first time during Higher Education given identical provision to those with a long established record of learning problems?'

d) What is put into a Statement of Needs

Should a Statement of Need which includes specific recommendations for concessions also provide an explanation for why they are being made? If so, a summary would therefore include a consideration of the impact these weaknesses are likely to have on the student's ability to cope with the course, and should be substantiated by evidence from the assessment test scores.

These recommendations normally require the support of the university.

In cases where they are denied either by the university or the LEA, which may, at times, occur, should there not be written guidance or an appeals procedure in place? Some dyslexic students are turned down without adequate explanation, and occasionally without apparent justification.

Currently, in the absence of any national guidelines each institution sets its own policy and arrangements for dyslexia, and each LEA sets its own criteria regarding what constitutes acceptable evidence of dyslexia, sets its own list of budgetary priorities in which dyslexia can appear at varying levels depending on the area and its general needs, and there are unsurprisingly reported discrepancies between LEAs in these matters (Singleton, in press).

Equally, on the subject of diagnostic assessment there is currently no clarity regarding who is qualified to identify a student as dyslexic nor which of the assessment methods are required for a valid report.

Turner, (1997) writes about the '*poverty*' (sic.) of assessment materials for the post-school population. The National Working Party reports on the shortage of psychologists qualified to carry out tests at Higher Education level, as well as a lack of appropriate tests. Singleton, (1994), comments on the misuse of tests designed for children, being used with older students, and calls for more psychological research into the characteristics of dyslexia in otherwise literate adults (Beaton, McDougal & Singleton, 1997).

4.1 A Brief overview of dyslexia assessment methods

A good working model for an assessment (as recommended by the National Working Party) would contain the following elements:

a) Tests of reading, writing, spelling and maths - using up to date standardised tests (McLoughlin et al, 1994) to ascertain details of the nature of any significant difficulties.

b) Evidence of any cognitive or neurological disabilities, (i.e. in memory, visual perception, phonological processing or motor co-ordination) must be reported.

Some of the sub-tests of the WAIS (R) will give an indication of deficits or relative weaknesses in cognitive skills such as working memory.

Sub-tests from the BAS can be used to assess visual memory (Visual Recall, Recall of Designs - norms extend to age 17 years 5 months).

Phonological tests can be used (e.g. Snowling, Gathercole and Perin - see section 3.2.5)

c) The WAIS (R) is advocated because it gives a clear indication of the discrepancy between intellectual ability and literacy assessment. However, it is not the overall IQ measure which is important, but the presence of a 'typically uneven profile' e.g. a significant discrepancy between verbal and visual skills, in the presence of an 'ACID profile' which can be a useful indicator (McLoughlin, et al, 1994).

The problem faced by study support tutors who are carrying out assessments is that a diagnosis of dyslexia is still based on the 'discrepancy definition' ('now an outmoded criterion' Backhouse 1998) and teachers do not have access to IQ tests to be able to prove a discrepancy between academic potential and literacy attainment. In spite of the fact that dyslexia is found in students of all types of ability, examination boards and LEAs still expect to be given evidence of a 'significant discrepancy' in order to allow any special arrangements. Perhaps ironically it is currently more difficult to be granted special concessions at 'A' Level (which must be approved by external examination boards 'It would seem rather arbitrary not to allow at 'A' Level a concession which is available at GCSE and Degree level.' Clare, 1994).

Using the WAIS (R) has been comprehensively written about by Kaufman (1990) in 'Assessing Adolescent and Adult Intelligence'. However, whilst it has been hailed as *'the best standardised test designed for individual administration'* (Matarazzo, 1985), it does have a number of *'psychometric shortcomings'* as well as being quite inappropriate in its style of delivery, which is likely to take the adult back to the *'humiliation of the classroom'* and cause the psychologist, obliged to administer it (since there is no better alternative) to feel *'ashamed'* (Turner 1997).

In researching adult dyslexia assessment the work of the following two psychologists has been studied and their views have to a certain extent been shared and at times drawn upon. Of particular relevance were a chapter devoted to the 'Assessment of the Adult Dyslexic' by Turner (1997) in his book entitled 'Psychological Assessment of Dyslexia', and the chapter on 'Formal Diagnosis' in 'Adult Dyslexia' (McLoughlin et al 1994). Both of these have been helpful when constructing a more detailed framework for adult assessment in section 5.

4.2 Some issues of concern regarding existing assessment methods

'Universities give the impression, to what extent well founded is hard to establish, of having been sympathetic to the needs of dyslexic students for many years' Turner (1997). However, students are very aware of discrepancies in the provision of assessment, information, support, concession and levels of understanding between different faculties and universities. The general feeling, nevertheless, among those involved (as expressed in the report from a seminar in the following section 4.3) would be that there is a need for a more uniform, comprehensive and effective way of identifying and supporting dyslexic students in Higher Education.

In order to ensure that dyslexics have rights rather than being awarded varying and conflicting levels of discretionary concessions from individual tutors or departments, it would be helpful to have national guidelines regarding a university policy on dyslexia.

During the Plymouth International Dyslexia Conference a working party was set up, with the aim of researching existing assessment procedures and compiling a set of national guidelines to contribute to future policies on Dyslexia Assessment in Higher Education (Singleton, in press). This aims to clarify a number of issues and provide general guidance to staff at Universities.

From a financial perspective, in 1997, a basic dyslexia assessment costs between £150 - £250 and a Statement of Need from an Access Centre is about £300. The question often raised is, *'Need it cost about £500 to diagnose and clarify the learning needs of one student in Higher Education?'*

Part of the HEFCE's notion of Widening Access to dyslexic students in Higher Education could perhaps address this point (section 5 puts forward a more economical assessment package which is delivered via computer).

A clear policy would help to resolve the current problems of students feeling they have had unfair treatment because their faculty doesn't give extra time in examinations when others do. Similarly, at present some students feel undermined and unable to keep approaching busy tutors when others are the centre of a special case conference in which they can spell out all their needs to several of the tutors in their department and enter their course with much greater confidence and reassurance (for more detailed elaboration of two such cases see section 5.1.8).

At Kingston University an exploration was made of an assessment and support service that could provide for dyslexic students within the broader range of the student population with learning difficulties. Also, it was considered important to put dyslexia into some kind of realistic and practical context which related to the curriculum requirements for students in general. Some of the concerns are listed below and were published in order to encourage wider discussion (Zdzienski, 1995).

- There is at present a variety of assessment procedures in use. Psychometric tests, predominantly the WAIS (Wechsler Adult Intelligence Scale), are administered and the results are discussed in relation to relevant background, educational history and standardised literacy assessments - the adult testing repertoire is limited (Turner 1997) -together with further tests of reading, spelling and writing speed, leading to a diagnosis of dyslexia when the supporting evidence is in place.
- These assessment reports vary a great deal, from a brief 2 pages to a detailed 10 page report, and vary in presentation from a report written as a letter addressed to the dyslexic adult, using an appropriate and accessible style of language, to reports which are written in a way that only another educational/clinical psychologist would be able to interpret.
- It is not surprising, therefore, that there might be an uncertainty among course tutors at University with regard to the implication of the psychometric test results for individual students, and for the methods of presentation and type of course assessment required to meet their needs. This can lead to further difficulties when LEA's contact course tutors directly to ask for their opinion about a student's application for a DSA (Disabled Student Allowance), expecting informed judgements to be made.

It has been the experience of the researcher and the project team (HEFCE - Kingston University 1994-5), and voiced by others involved in similar work elsewhere, that a lack of clarity regarding the severity of a student's dyslexic condition and the implications for that student on the course, have possibly resulted in an uneven, and at times, inappropriate distribution of provision. It is a concern that when DSAs are awarded there is not always a distinction made between a 'severe' or 'mild' dyslexia, nor is there always an evaluation or reappraisal with regard to the usefulness of the equipment given (more recently, however, there has been an introduction to categories of dyslexia, from mild, to moderate, to severe, (Turner, 1997, & Singleton in press), although these are not consistently presented in assessment reports.

In cases of more 'severe' dyslexia it may be relevant for a stronger focus to be placed on individual specialist tuition because equipment with no access to personal support may not answer that particular student's needs.

- In recent years many of the assessments for dyslexia have focused on children and teenagers requiring examination concessions in GCSE's and 'A' levels. As more awareness is now being directed towards dyslexia in Higher Education it is becoming clear that some of the standard procedures are inappropriate and not sufficiently refined for Higher Education.
- Unlike assessments for children, when working with adults, it is not always appropriate or even available to the students themselves to provide detailed information about 1) early childhood development, 2) other incidence of dyslexia in the family, 3) early social and educational background information, other than in fairly broad and general terms. However, this sort of information plays a part in any assessment, and for compensated adult dyslexics it can at times be essential to, if not the only relevant evidence upon which to form a positive diagnosis.
- In the view of the project team (HEFCE project at Kingston University) the most useful initial screener proved to be the Adult Dyslexia Questionnaire (see sections 3.2.2. and 5.2.1).

- There needs to be an assessment procedure which is appropriate both to serve as an update for those who were fully diagnosed at a younger age, and for those adults who come forward for initial assessment whilst at university. Quite a number of adults are diagnosed dyslexic when they are close to their finals and this can have a very debilitating effect on them and leaves insufficient time for them to resolve their situation.
- How does the psychometric test provide evidence of dyslexia for the adult who is functioning intellectually at the MA or PhD level and has more than adequate compensatory strategies to achieve good scores on all the subtests and a literacy level that largely exceeds the usefulness of standardised reading and spelling tests? There does not appear at present to be an answer to this question, but when dealing with dyslexia at graduate and postgraduate level, it is a relevant question.
- Psychometric tests do not provide sufficient evidence of a 'dyslexic' pattern of results for the student whose general ability falls in the 'below average' band of the test and who has weak literacy skills. Dyslexia in individuals of low ability is harder to isolate (Turner, 1997).
- There are not adequate tests available at present to diagnose dyslexia in students whose first language is not English and whose educational background and cultural knowledge base are not 'standard' English.
- It has been suggested by tutors that quoting a child's age to demonstrate a particular level of competency for an adult is inappropriate and offensive. Perhaps professional reading, spelling and writing levels would be more acceptable. Sometimes the general format of the assessment, because it has been 'child orientated', tends to portray the adult presented as a 'subject' for testing rather than reflect conclusions drawn from conversations that have taken place between two adults.
- When examining the content of assessment reports, normally reports quote IQ score patterns and compare them with literacy levels. However, these levels are not always representative of, or relevant to the student's performance in a particular subject e.g. a spelling age of 13.2, in a test that only goes up to age 15,

recorded for a student doing an Electrical Engineering degree where most assignments are presented on a word processor with a spell check facility, need not be an impediment to successful completion. In more recent assessments it would appear that such practices are now greatly reduced, and test results are presented as percentile rankings in which the student is compared on a scale up to 100 with others in the same age group, rather than given an age equivalent.

- Sometimes key evidence presented in an assessment report is inadequately standardised, and judgements made could be vulnerable to being regarded as somewhat subjective, e.g. reading and writing speed tests.
- Writing speed, in spite of research evidence suggesting that a twenty minute free writing task is probably more appropriate (Alston, J 1992), is often based on a 5 minute exercise in which the student is asked to write on a given topic at the end of which the number of words is divided by the number of minutes. The result, e.g. 13 wpm (words per minute), may compare with 20 wpm when the student is back at university writing an essay or vice versa. At other times, based on other research, the student may be asked to copy from text and then the number of individual letters produced is calculated into a writing speed score. The potential writing speed of a student cannot easily be determined out of context. It is when the student is working on their own subject and involved in sustained writing that a useful measure may be recorded.
- Similarly with reading speed, passages are taken from e.g. the Neale Analysis Revised (not a test for adults) and the last passage is read aloud (which is measuring a different aspect of reading) and the time taken is recorded in number of words per minute. Others give a list of words to be read aloud and quote the relevant research as evidence. But how does reading lists of unrelated words equate with general reading fluency? What about silent reading (perhaps the most relevant area of reading for most adults)? How is the understanding of that reading monitored in order to give credibility to the reading speed? Reading

speed is also very contextual and varies according to the relative levels of relaxation, interest in content, motivation, familiarity with text etc. It can be misleading to ask course tutors looking at dyslexia assessments to make assumptions about levels of reading and writing speed as described above and then try to relate these directly to a student's potential competence on a degree course, or indeed their actual requirement for extra time in written examinations.

- When considering extra time in examinations, general reading and writing speeds are only part of the problem. It is important to have a measure of the speed of processing of relevant information, i.e. the time it takes to interpret an essay question and the extra time needed to check over work, and time to go back to answer questions which have gradually been assimilated during the 2 hours etc.
- Unlike the 'child' dyslexic with a typical profile such as an 'ACID' profile (Arithmetic, Coding, Information and Digit Span - 4 subtests that dyslexics tend to do less well in) confirmed by relevant background details, it is sometimes with less conviction that the educational psychologist will come to conclusions when dealing with an adult who has never been assessed before. The whole notion of a 'residual' dyslexia, or a dyslexia which has been 'largely overcome' or 'burned through', places the diagnosis under new scrutiny. Can the tests really detect the 'mildly' dyslexic adult? Can the examiner truly identify the dividing line between a refined compensatory strategy and a specific level of cognitive ability in an auditory or visual short term memory or sequencing task? For example, a student with 'superior' non-verbal reasoning, with rehearsed powers of visualisation who has a poor auditory short term memory, is able to compensate in the task of recalling strings of digits in reverse by placing them on a mental screen from right to left using flashing, coloured, neon letters, and then calling out what he sees from left to right. Instead of remembering the average of 5 figures, or in the case of his dyslexia about 3 or 4, may have been anticipated, he can in fact call out strings of 8 figures, giving him well above average results for this component of the 'ACID' profile. This leaves the examiner in the awkward position of having to ask the student to describe how he carried out the test, in order to reveal evidence of a dyslexic condition that the test result itself does not directly support.

Quite frequently a dyslexic condition is diagnosed simply on the basis of a low score on just one of the ACID subtests, such as Digit Span. For dyslexia purposes, most psychologists seem to regard Arithmetic and Digit Span as tests of working memory (Turner, 1997). This can be rather concerning in the light of informal testing that was carried out with groups of students studying for their GCSEs (Zdzienski, 1985) in which many of the academically successful students came out with below average scores on the Digit Span test. These tests have normally been carried out as a full battery on individual students where learning problems have already been suspected and poor performance on the 'memory' tests positively interpreted as a sign of dyslexia. Another of the ACID profile subtests which is meant to measure the student's basic arithmetical skills as well as auditory short term memory, working memory efficiency and concentration, is the Arithmetic subtest. It is not uncommon to find students doing quite well in a written arithmetic test and rather poorly in the WISC Arithmetic. It may not in fact be an indication of poor memory, or of dyslexia, but may be an indication of anxiety least alone for the fact that students in recent years have not been taught mental arithmetic, are reliant on the use of calculators and do not generally perform well when presented with unfamiliar tasks.

However, more recently the Digit Span and Arithmetic subtests have been combined in assessments to produce a measure known as the 'Freedom From Distractibility Index', and a below average score on the two tests is very likely to signify an information-processing difficulty of cognitive origin (Turner 1997).

In summary, there is a demand within the Higher and Further Education Institutions for greater standardisation of assessment both in terms of the selection of tests and in the presentation of results in an agreed format. Currently this is far from being the case, and the complaint from tutors and LEAs regarding the wide variety in presentation and quality of assessment reports is a real concern.

4.3 Summary of a Regional Higher Education Group discussion on assessment

As a member of one of the HEFCE Project Teams the researcher had the privilege of being both a participant and an observer at a regional meeting which was attended by most of the representatives of HEFCE projects from other universities (see section 4.4.1), in addition to representatives from such key dyslexia centres as the Adult Dyslexia Organisation (ADO) and the Dyslexia Unit at Bangor University.

In order to endorse and further illustrate a number of the points raised by the researcher in section 4.2, the following notes summarise the aforementioned Regional Dyslexia Seminar, held on 28th October 1993. They are presented in this section to give an insight into the issues of concern regarding special needs provision and can be taken as a true record of their time.

The following are the main issues discussed:

- Who pays for assessments?
- Should they be carried out by Educational Psychologist only? Should the assessment be based on a psychometric model or the more informal language skills-based tests as administered by the Study Support Tutors?
- Should institutions reappraise needs of those who already have an assessment on arrival?
- What is an appropriate entry screening procedure?

When discussing who should carry out the assessments, it was generally agreed that if the desired outcome was for the student to be able to claim a DSA (Disabled Students Allowance), then they are required to have an educational psychologist's report. If, however, it is for internal use and mainly a diagnostic tool to inform the student and tutor as to what level of study support is needed, then a less formal attainment test is more useful.

A round the table discussion highlighted the following situation which is presented below.

Westminster: *Teacher, not an Educational Psychologist.*

Westhill College: *no one assesses as yet*

North London: *educational assessments (Language and Literacy unit training) were carried out previously by a Tutor, but now a chartered Psychologist is engaged.*

Brighton: *Educational Psychologist.*

Plymouth: *use a Psychologist for exams and an Educational Psychologist for DSA.*

East London: *educational needs assessment (Language and Literacy unit).*

South Bank: *senior Counsellor was used but now, for DSA, they use external Educational Psychologist reports. However, these have lowered confidence of student and do not help tutors on how to respond.*

Central Lancashire: *use Educational Psychologists - University pays and reclaims if it can. From among some 50 to 60 assessments only one student was unhappy. The Assessment Report remains the student's property. Only the relevant sections are sent to LEAS and exam boards alongside specific recommendations. 'Profiles' of students can also be sent to lecturers with recommendations.*

Bangor: *don't like to put first years through assessments. They use any existing assessment with a 'top-up' letter. The student is offered an interview to work out specific needs or study skills tuition. They may be assessed by external Educational Psychologist particularly for exam boards. However, the College pays for external assessment. Educational Psychologist does diagnostic assessment, recommends study skills which are quite wide ranging. (Further counselling is offered by Bangor's unit). They tend not to use the Access Centre as it cannot give sufficiently specific information geared to the University as they would like.*

Kingston: *Language and Literacy trained tutors carry out assessment but external Education Psychologist used for exam board - Kingston pays.*

At Kingston University students are coming forward from staff and self-referral.

Currently about 60 have been assessed as dyslexic out of a total student population of over 12,000, and the numbers of referrals are increasing. Part of the project is to establish a screening procedure early on when the students are in their first term.

Adult Dyslexia Organisation: Their experience has been that many students seek assessments from outside agencies because they don't know what's available in their own institutions. Some students don't like the formality of presentation in the traditional assessments. The problem with Educational Psychologists' reports is that there is often no one in the university or perhaps on the exam board who can understand it.

Many LEAs ask for an Educational Psychologist's report, but don't want to see it, just to know its been done.

The concluding question was, '*What do we need from assessment?*'

Among the answers given were:-

DSA eligibility, exam concessions, study skills recommendations, suggestions for individual teaching programmes..... '*can we have all these done at once?*'

The following exploration of diagnostic assessment is aimed at evaluating the possibility of meeting this challenge. Sections 5.2 and 5.3 present the outcome of this exploration.

4.4 An exploratory assessment procedure for students in higher education

4.4.1 Introduction

Many of the assessments for dyslexia carried out in the UK in recent years have focused on children and teenagers requiring examination concessions in GCSE's and A levels. There is now an increasing interest being shown in dyslexia from organisations concerned with providing Adult Literacy Programmes, Training and Employment. As more awareness is also being directed towards Dyslexia in Higher Education, it was considered important to explore existing student assessment procedures and to select suitable tests.

There is at present a confusing variety of assessment procedures in use, predominantly psychometric tests, but also there are attainment test results, informal diagnostic profiles, questionnaires, learning inventories and medical reports. Statements of Need are compiled from these records in conjunction with student interviews.

Current assessment reports usually quote IQ score patterns and compare them with literacy attainment levels. However, these levels are not always representative of, or relevant to the student's performance in a particular subject.

The use of the WAIS-(R). as a measure of intellectual ability and as a measure of cognitive strengths and weaknesses predominates. While this is a well researched and used tool its use and the time to administer it has two main disadvantages: it is of low ecological validity, in that it does nothing to sample the sorts of intellectual tasks which a student in H.E. might expect to encounter; it can distort the discourse and thinking between psychologist and client to pay too much attention to the notion of 'intelligence' which is, or should not be, the main focus of assessment. Freeland,R (1995).

The traditional view that an intelligence test can be used to predict reading levels has come under severe criticism for the school aged population (Stanovich, 1991) and therefore its use as giving a base-line against which to judge literacy levels has been seriously questioned.

With the dramatic increase in the number of students attending H.E. in the last few years traditional notions of threshold intelligence levels for entry to H.E. have been challenged. A notion of intellectual preparedness can be a useful construct in helping a client who may have learning difficulties to understand the sorts of demands that an H.E. course might present - this is but one in a range of factors that would warrant consideration in consulting to a client and is not the major focus of assessment, which is to identify the presence, degree of learning difficulties and their implications.

1993 saw the introduction of a 'Special Initiative by the Higher Education Funding Council for England to Encourage Widening Participation for Students with Special Needs.' This initiative (for which £3m was allocated for the year 1993-1994) was set up in response to a letter of guidance from the then Secretary of State for Education and Science to the former Chairman of the HEFCE:

'The Council should consider how access to higher education for students with special educational needs can be facilitated. It will need to give attention to providing for these students in its funding' HEFCE Report, January 1995.

Dyslexic students were the first listed of nine categories of special needs. One of the key themes to be addressed was the methods used by Local Education Authorities (LEAs) to identify dyslexia when awarding the Disabled Students Allowance.

Many projects expressed the desire to see an appropriate and reliable method of assessment which was nationally recognised, and the search for a suitable test to use in the HE context was the project funded in 1993-4 at Kingston University.

For an introduction to the HEFCE Dyslexia Projects taken from section 4, pages 29 & 30 of the HEFCE 1993-1994 report (see appendix 4A). Other Universities carrying out HEFCE funded Dyslexia Projects were Brighton, Kent, Leicester, North London, Plymouth, South Bank, Surrey and St Mary's College, Westhill College and Roehampton Institute, (Where dyslexia assessment procedures were also explored). See appendix 4A for an outline of the above projects.

Within the context of the many HEFCE funded projects in progress at the time, the HEFCE Dyslexia Project based at Kingston University (see appendix 4A) set out its aims and objectives in a report and these have been summarised in the Project Outline in illustration 4a. below. The main aim was to select and adapt an appropriate test battery for use with university students in the U.K. for the identification of general learning difficulties but with particular reference to dyslexia.

The work of the project team was so tied up, in terms of staff and resources, with the dyslexia support at the university (which greatly increased for the duration of the project), that the two became very inter-dependent. On a day to day basis the running of the Dyslexia Unit (i.e. provision of assessments, counselling, individual and group tuition, liaison with staff and awareness raising throughout the institution) had to be given priority, whilst from within that service, and the remaining time, a fairly complex and comprehensive set of targets had to be reached in order for the project to take shape. There were numerous obstacles that were met at a practical level and the goodwill of students and lecturers alike was often called upon to volunteer their time, energy, and interest and is duly acknowledged.

More detailed project information is shown in illustration 4b and a summary is presented in appendix 4A (HEFCE Report on special initiative to encourage widening participation for students with Special Needs (1993-4).

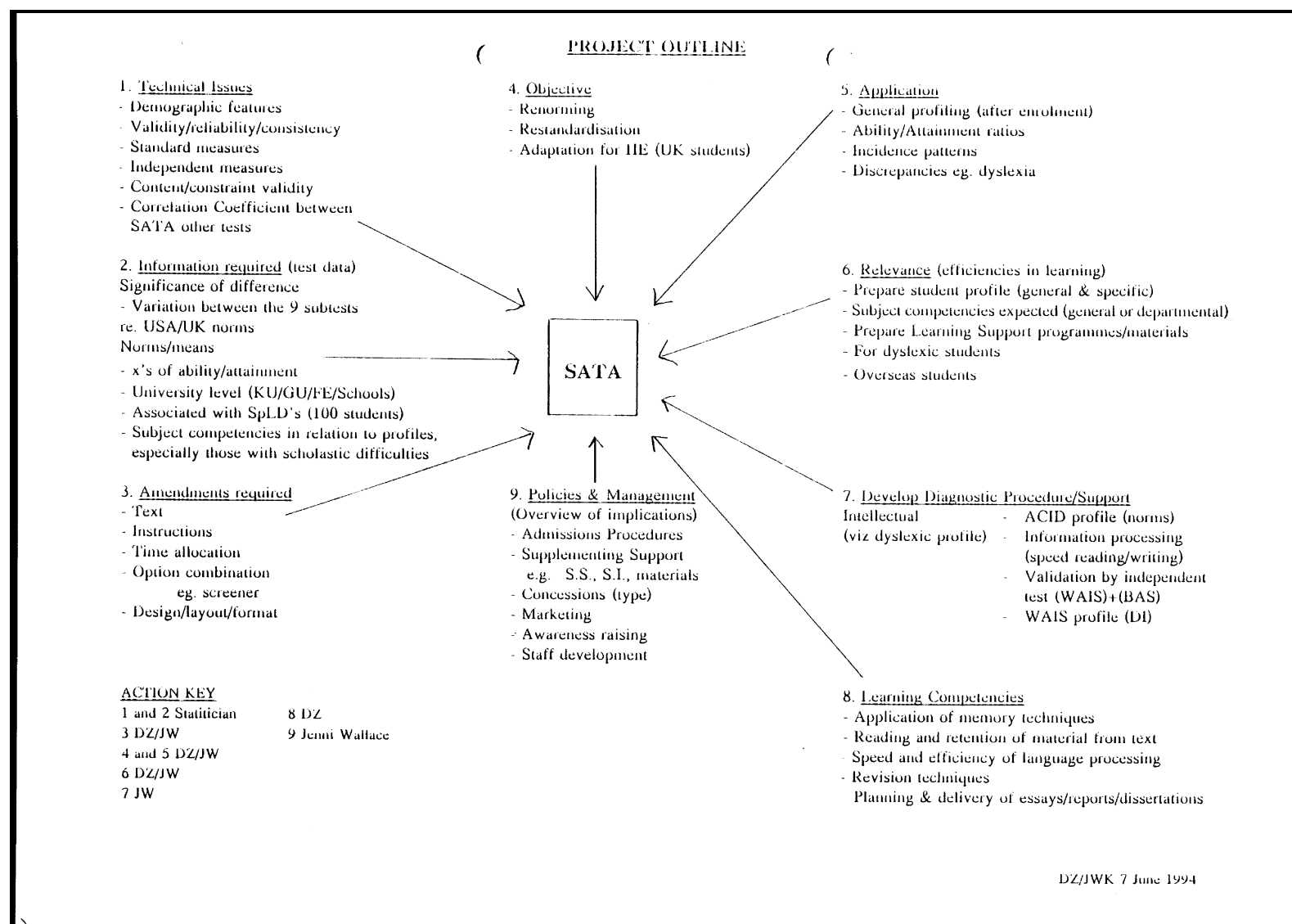


illustration 4a. The Project Outline

Illustration 4b: Improving access to HE for students with special needs

IMPROVING ACCESS TO HIGHER EDUCATION FOR STUDENTS WITH SPECIAL NEEDS		
OBJECTIVES	ACTIVITY	OUTCOME
(a) To collect data that identifies the number of students with specific learning difficulties within our institution and by discipline and to provide guidance to other HEI's on how to do this (latter envisaged as part of 2nd project).	A Screening Test developed to assess potential need across disciplines and in two institutions. Consideration given to adopt shorter test procedures, perhaps related to different faculties and the competencies expected.	1,600 Students screened from two institutions across a variety of disciplines. Potential need identified.
(b) Identify tests that are usable by adult learners based on research data analysis and comparative literature.	Full search of established testing of adults and development or refinement of a test for adults. Precise diagnostic procedures established for profile analyses and forms of intervention.	There is a limited range of tests in the UK. Potentially useful test for adults identified in USA (SATA test from Pro-Ed). Permission gained to refine and enhance this test for UK adult use (changes based on research findings).
(c) Through diagnostic assessment to identify the student's learning difficulties; whether they are specific in nature or due to other factors; and to measure the extent to which they need additional support, by identifying the student's strengths and weaknesses (visual, auditory, motor). To develop transferable materials on how to carry out a diagnosis of SPLD for other institutions (envisaged as 2nd project).	Testing of adequate sample of students, across 50 subject areas. Identification of need and support programmes. Student monitoring in place (see also d). Subject data to statistical analysis and norm reference procedures. Modified existing test material, instructions, marking as part of a limited restandardisation.	100 students assessed with new 2½ hour test. Individual support programmes designed for all students with SPLD based on diagnostic tests. Ongoing counselling and guidance provided for students and tutors (see d and e). Preparation of a trial 'quick screener' derived from the main test focusing upon timed reading comprehension (silent and listening), selected memory processes and written composition.
(d) To plan learning programmes in partnership with the student, emphasising strategies specific to the student's needs and teaching to the student's strengths. To develop a guide to preparing learning programmes than can be used by other HEI's (latter envisaged as part of the 2nd project).	Learning programmes planned for individuals and research programmes established to track improvements of student performance that result from diagnostic testing and learning programmes.	Learning programmes prepared (see c) and research underway to track students (initial data appears to show increases in performance eg 19% initially improved to 74% in a resit).
(e) To develop appropriate staff development programmes and supporting materials that will support academic staff in enhancing the learning experience for this group of students. These programmes to be in a form that transfers to other HEI's (envisaged as part of the 2nd project with feasibility study in the 1st year).	Staff development programmes or Awareness Raising Sessions run. Meetings and discussions with course teams and senior management. Guidelines of the management of all aspects of student learning given to each Head of School for further dissemination.	<ul style="list-style-type: none"> • Educational Development Unit piloted seminars in the University which have raised awareness and generated a needs analysis. • Particular interest and support from those schools who were going through Quality Assessment. • Consultancy and advice offered to other HIE and FE institutions. • Links with publisher established that may enable the work to be eventually disseminated to more of the sector in an easily accessible form.

4.4.2 Selection of a test battery

The researcher had had considerable experience working with Educational Psychologists in the application of a wide variety of testing materials, and was able to draw on this in selecting those test items which she considered were most likely to prove effective in identifying dyslexia at an adult level.

Extensive consultation with Educational Psychologists also suggested that the American 'Scholastic Abilities Test for Adults' (SATA) would be an excellent starting point for evaluative research

The well established 'Scholastic Abilities Test for Adults' (SATA) a test of 'learning potential' produced by Bryant, Patton, Dunn, Pro-Ed 1991, was selected for adaptation for use with UK students. This battery of tests is in use in the USA, where the need for adult diagnostic assessment has been recognised as having a wide variety of practical uses. The main reason for this has been the expansion of opportunities for people entering Higher Education, including those with learning difficulties; the development of vocational training schemes; and the increasing numbers of mature and under-prepared students enrolling for courses.

The SATA provides estimates of general aptitude and achievement levels for individuals of 16 to 75 years of age. In the past, assessments have been usually achieved by the use of norm reference tests, focusing upon general aptitude (ability) and related achievement (educational) levels, in comparison to particular age bands. However, there is now an increasing emphasis on the psychological processes underlying these skills, and the use of criterion reference procedures, since they are more directly linked to syllabus and examination objectives.

In Higher Education the SATA helps to provide a profile of learning strengths and weaknesses. It can be used to plan appropriate focus of support in meeting the learning competencies required in a particular subject. Furthermore, it can be used as a basis upon which to plan an individual support programme for a dyslexic student.

4.4.3 Description of the Scholastic Abilities Test for Adults (SATA)

The SATA is a nine subtest battery which examines competence in abilities related to academic success.

Aims

The SATA is designed to be a general measure of scholastic accomplishment. It can be administered as an individual or group test. It can be timed or un-timed but the former is recommended for group testing.

Subtests

The SATA consists of nine subtests. One to three measure aptitudes, the remainder measure achievement.

1. Verbal Reasoning - measures the ability to recognise relationships among words
eg: in is to out as low is to _____ (10 minutes)
2. Nonverbal Reasoning - measures abstract reasoning. Examinees are shown a matrix of geometric forms. One part is missing and individuals select, from six, one that best completes the pattern shown in the matrix. (10 minutes)
3. Quantitative Reasoning - measures the ability to recognise and apply quantitative concepts. The examinees are presented with a visual stimulus of a series of numbers that has a missing number.
They have to complete the series. (15 minutes)
4. Reading Vocabulary - a measure of word understanding.
Four words are presented in a column and examinees have to decide if two of them are semantically related in some way and why eg whether they are opposites, synonyms etc. (10 minutes)
5. Reading Comprehension - measures an individual's ability to answer questions about passages that have been read silently. There are ten passages, each is followed by six questions. (15 minutes)
6. Maths Calculations - assesses knowledge of the basic arithmetic facts and algorithms of addition, subtractions multiplication, and division as well as their application in decimal and fractional forms. (10 minutes)
7. Maths Application - assesses the ability to apply fundamental mathematical facts and algorithms to solve word problems. E.g. 'Sue has £7.00, spends £2.00, how much does she have left?'. (15 minutes)
8. Writing Mechanics - assesses skills in spelling, capitalisation and punctuation. The examinees have an un-punctuated sentence with one word missing in front of them; a word is read aloud, they have to spell it correctly and correct the punctuation. (no set time but estimate 15 minutes)

9. Writing Composition - the examinees have a set of four pictures in front of them these relate to job advancement and are used as a theme for a story which they have to write.
The work is checked for vocabulary and thematic content. (15 minutes)

Total Test Time 2 hours

Scoring

As well as individual raw scores, scale scores, centile rankings and grade equivalents, the SATA yields seven composite quotient scores:

Scholastic Abilities Quotient - an estimate of overall ability which combines both aptitudes and achievements.

General Aptitude Quotient - a measure of the psychological constructs thought to underlie academic competence, viz: verbal, non-verbal and quantitative reasoning.

Total Achievement Quotient - an estimate of a person's level of academic achievement based on the six achievement subtests.

Achievement Screener Quotient - provides a quick estimate of a person's academic achievement. It is based on reading vocabulary, maths calculation and writing mechanics. Thought to be useful when (a) screening examinees for the need to conduct a more in depth assessment or (b) obtaining a quick estimate of general academic competence.

Reading Quotient - a measure of overall reading performance. It combines reading vocabulary and reading comprehension.

Mathematics Quotient - provides a measure of basic mathematics facts and principles based on maths calculation and maths application.

Writing Quotient - an index of achievement in the skills associated with writing. It combines writing mechanics and composition.

4.4.4 Research Framework

The aim of this part of the study was to identify and explore a standardised diagnostic assessment procedure for adults, which initially focused upon discrepancies between verbal/non verbal ability and attainment levels, but which would in addition provide detailed profiles of individual performance in a range of disciplines, together with indications of specific learning difficulties. The SATA appeared to fit these criteria.

Since, however, the SATA is an American test the project was initially concerned with the following objectives:

- making the necessary amendments to the text for use with UK students
- carrying out pilot tests with students from a range of disciplines in order to adjust the norms, where necessary, to a UK University population
- using the full test battery with a group of confirmed dyslexic students for profile analysis

Reliability and Validity

The methods used to construct the SATA were as follows:

- a) Subtest and item selection
- b) Item analysis
- c) Norming procedures
- d) Test reliability
- e) The validity

Subtest and item selection

The literacy and numeracy content of the SATA was gleaned from Study Guides such as the Miller Analogies Tests (MAT, 4th ed. Miller 1982), the General Educational Development Test (GED) the Scholastic Aptitude Test (SAT, College Board Publications 1990) and the EDL Core Vocabularies in Reading, Mathematics and Social Studies (Taylor et al 1979).

The Verbal and Non-Verbal Abilities Tests were based on those provided in the Detroit Tests of Learning Aptitude (Hammill, 1991)

Item Analysis

The first experimental version of the SATA was administered to 50 high-school students and their parents in Austin Texas and the results were analysed by computing two statistics: item discrimination and item difficulty.

a) Item Discrimination

Item discrimination refers to *“the degree to which an item differentiates correctly among examinees in the behaviour that the test is designed to measure”* (Anastasi, 1988, p210). In the development of the SATA a discriminating power or ‘item validity’ was arbitrarily selected at 0.3 being at the high end of those which were considered by Anastasi to be statistically acceptable.

b) Item Difficulty

Item difficulty was used to identify those items which were too easy or too difficult. As a result, unsatisfactory items were deleted and a second experimental version of the SATA was then given to 250 examinees. In a final analysis, 50 protocols at each year interval through 19 and at ten year intervals thereafter were selected randomly from the normative sample.

c) Norming Procedures

The demographic characteristics of the SATA constituted 1005 examinees residing in nineteen US States. They ranged in age from 16 to 70+ years. They were selected through individuals across the country who had been involved in previous trials for Pro Ed and each was asked to test ten to twenty examinees living in their local area. The authors claim the sample to have been representative of the US population.

d) Normative Statistics

The test results are reported in terms of subtest standard scores and percentile ranks. Raw score means and standard deviations were calculated at each one year interval and the cumulative frequency distribution of the raw scores was used to generate normalised standard scores for each subtest.

d) Test Reliability

Reliability is the consistency with which an instrument measures an ability. Salvia and Ysseldyke 1988 state that *“tests must present sufficient reliability data to allow the user to interpret test results accurately”* (page 126). For a test like the SATA to be considered minimally reliable its reliability coefficients must approximate 0.80 in magnitude (Satler 1988). The procedures used to estimate the test’s reliability were:

- i) Internal consistency
- ii) Test retest and
- iii) Standard error of measurement (SEM), a statistic associated with reliability.

e) Validity of Test Results

Validity refers to the degree to which a test measures those attributes that its authors say it measures. Gronlund, (1985) suggests that:

- i) Validity refers to the appropriateness of the interpretation of the results of a test and not to the instrument itself.
- ii) Validity is a matter of degree best considered in terms of ‘high’, ‘moderate’ or low.

When considering the validity of the SATA, three interrelated types of validity were examined:

- i) Content
- ii) Criterion related
- iii) Construct

i) Content Validity

Content Validity *“involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured”* (Anastasi, 1988, page 140). This was partly achieved through the systematic and controlled item selection and analysis as was carried out in the early phase of the test construction.

ii) Criterion Related Validity

Wallace and Larsen, 1978 state that criterion related validity is established by comparing a test with a valued measure having similar characteristics. Concurrent validity was established by administering both the SATA and several other tests to 50 high-school students and adults. The coefficients reflecting SATA's Criterion Related Validity are presented in the manual. Coefficients for validity and reliability published in the manual are high.

The comparative test included one or two which have long been in use by Educational Psychologists in this country, namely the Wechsler Adult Intelligence Scale - Revised (WAIS-R, Wechsler 1981) and the Wide Range Achievement Test - Revised (WRAT-R, Jastak and Wilkinson 1984).

iii) Construct Validity

Finally, Construct Validity was examined and this relates to the degree to which the underlying traits of a test can be identified, and the extent to which these traits reflect the theoretical model on which the test is based. (Gronlund, 1985)

Once the SATA subtests had been examined, the researcher generated new items for her own subtests which were in part inspired by the SATA subtests, and this resulted in the development of the first paper based field trial version of a new battery of tests (see section 5.3).

Comments

'The SATA seems to be a very comprehensive and useful battery, particularly for group testing. Apart from 'Writing Composition' it is quick and easy to score. It might be considered lengthy and subtests could be omitted to save time, However there is a great need for such a test and, if there is the opportunity to administer the whole battery to large numbers of students, it would be a shame to pass up the possibility of producing local norms. There would be additional benefits in that the Writing Composition subtest could produce information about factors such as rate of writing.'
(McLoughlin 1993)

4.4.5 The scope and limitations of the exploration

The aim was to pilot each subtest with a group of at least 100 students. Whilst from a research viewpoint it would have been preferable if the same students were to take all of the tests, this was not feasible from a practical perspective as Heads of Departments were unwilling to accommodate further research projects in an already over pressurised curriculum. A more representative sample of students would have been desirable, taking numbers of students in proportion to the size of their course who adequately reflected the age, gender and ethnic makeup of that course; however, within the above constraints this would have proved impossible.

A more basic approach was therefore adopted in which the students were selected at faculty level to represent the breadth of the subject range being studied. This piloting could not have been implemented within the constraints of Kingston University's academic environment and, in fact, the HEFCE project objectives would not have been met had it not been for the co-operation of neighbouring Surrey University, whose Health and Counselling Officer took a personal interest in the project and provided access to most of the University's first year intake.

The Dyslexic study group of sixty students consisted mostly of Kingston University students who were attending the unit for support and were therefore more accessible. They proved to be more willing volunteers than non-dyslexic students as they had a direct involvement and could also derive personal benefits.

In order to optimise provision for students, bearing in mind the financial pressures upon universities, an experimental approach geared to both individual and group administration was adopted. (At Kingston, groups of between 6 and 8 students at a time carried out the test).

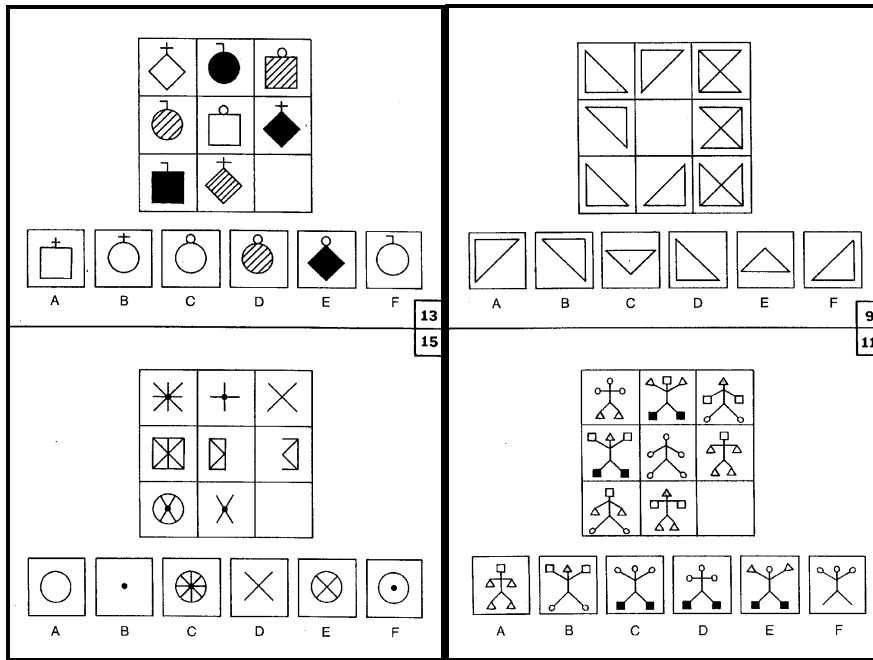
Furthermore the diagnostic profiles obtained needed to provide not only the basis for individual training programmes but also an appropriate Statement of Need that would be approved by LEAs thus unifying the whole process of identification and support.

4.4.6 The potential strengths and weaknesses of the SATA

Potential Strengths

One of the many strengths of the SATA is that it gives fairly efficiently a measure of verbal (see table 4.ii in section 4.4.7) and non-verbal (see illustration 4c.) ability and thus provides some of the information for decision making offered by traditional psychometric assessment. Its real strength lies in the relevance of the tests to the student population and in the breadth of the assessment measures.

Illustration 4c: Selected items from the SATA Non Verbal Reasoning Test



The Reading Comprehension Scale (see illustration 4d.) samples, in 15 minutes, a fairly wide range of texts, many of which approximate the sorts of texts an H.E. student might encounter. The speed factor is one which will emerge as a clear problem for many dyslexic students who find immense difficulty in processing text at speed.

Illustration 4d: Example of SATA Reading Comprehension Test

A region's climate is determined by a number of complex environmental factors such as elevation and the relation between land mass and ocean. Interestingly, if the earth were composed entirely of land and if that land were fairly consistent in altitude, exactly the same climate would prevail around the globe—but only within each particular latitude. This is because of the critical factor of solar radiation, which varies in intensity as a result of the earth's shape. Thus, it is the inclination of the sun's rays that is almost entirely responsible for the climate belts or zones encircling the globe. At the north and south poles there are frigid zones; in the equatorial region, a torrid zone; and in between the equator and the polar regions, temperate zones. At the equator the sun is almost vertical, so this region receives the largest number of heat units. Above and below the equator, going toward the poles, the rays are more and more oblique, depending on the position of the earth in its orbit.

43. The best title for this paragraph is _____.
(a) Factors of Climate (b) Climatic Zones (c) The Effects of Altitude (d) Solar Radiation
44. In this paragraph *temperate* means _____.
(a) sparing (b) restrained (c) excessive or extreme (d) moderate
45. Climatic belts are caused primarily by _____.
(a) the angle of the sun (b) continental elevation (c) global radiation (d) the proportion of ocean to land mass
46. The sun's rays become increasingly indirect _____.
(a) at the equator (b) at latitudes farther from the equator (c) as the earth revolves in its orbit
(d) as the earth rotates on its axis
47. The most important factor of a region's climate is generally _____.
(a) altitude (b) solar absorption (c) ocean currents (d) geography
48. Local factors influencing the climate of a specific locale include _____.
(a) seasonal variations (b) elevation (c) wind conditions (d) soil conditions

GO ON TO NEXT PAGE.

The Writing Mechanics scale gives a useful measure both of spelling skills and the ability to punctuate individual sentences from an existing text. Direct comparison of declarative knowledge of punctuation rules can easily be compared with procedural knowledge by comparison of the MW scale with a student's own free writing where several memory systems and processes have to be handled concurrently (in contrast to the situation of punctuating an existing text).

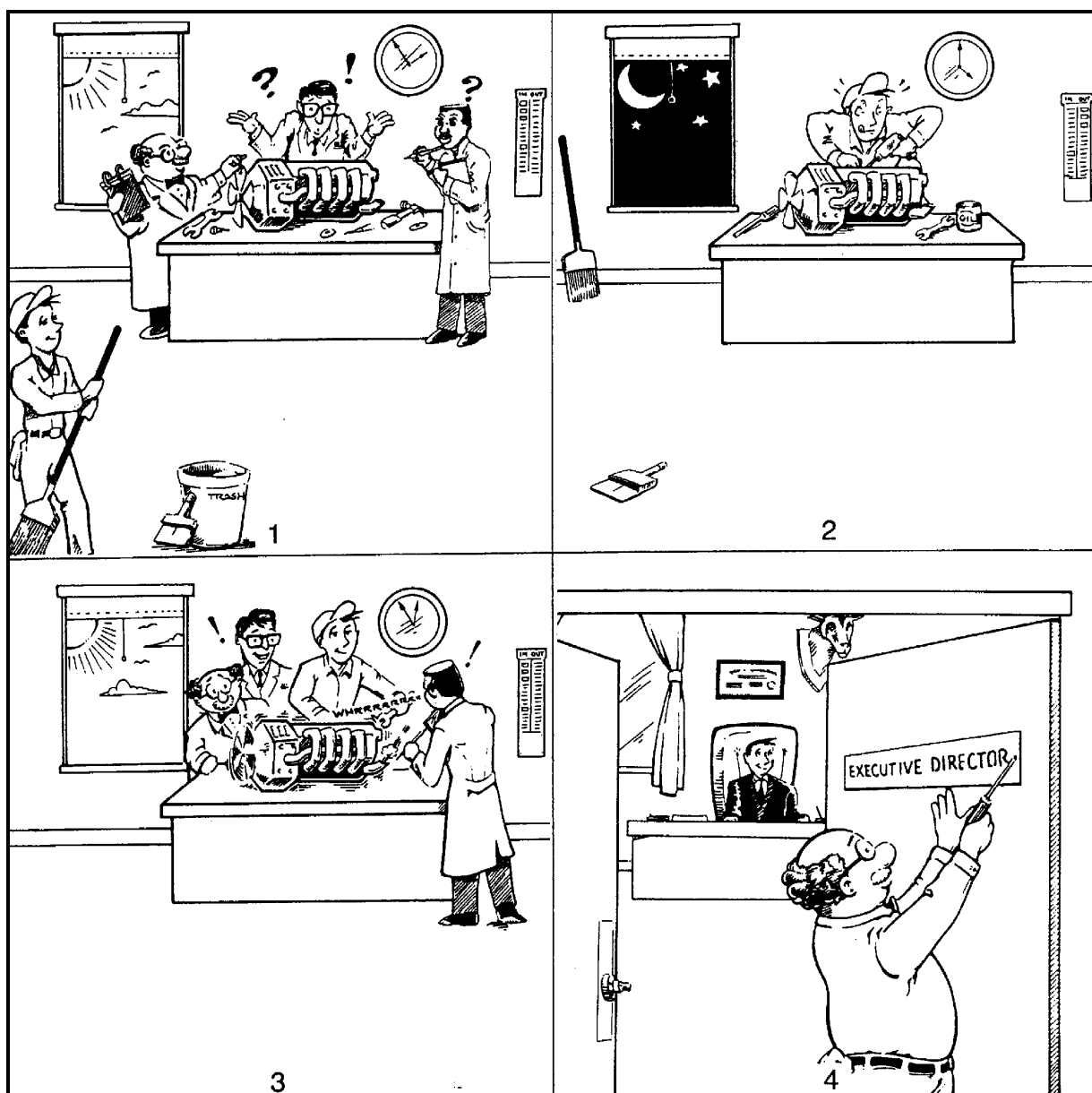
The breadth of the SATA includes scales such as Quantitative Reasoning which approximates the sorts of tasks which might be involved in a scientific/technical degree and is certainly a good example of the sort of thinking involved in quantitative reasoning (see illustration 4e.). Maths Application and Maths Computation give further breadth of assessment.

Illustration 4e: Selected items from the SATA Quantitative Reasoning Test

<p>13</p>	<p>14</p>
<p>16</p>	<p>17</p>

Quantifying in a meaningful way the essay writing skills of a student has always been difficult and terms such as 'weak written language skills', 'poor written expression' are of necessity remarkably vague. The SATA offers a standardised way of assessing this (See illustration 4f).

Illustration 4f: Stimulus for SATA Writing Composition Test



Scoring Criteria

A matrix with a content maturity score along one axis and a vocabulary score along the other is used to obtain the writing composition score.

The vocabulary score is made up from the number of different words used in the story that have seven letters or more.

The major advantage of the SATA is that a psychologist can choose a battery of assessment tasks to suit the client and the sort of information it would be useful to collect. This is a more powerful position than running through routinely an entire battery of sub-tests, as in the WAIS-R. A further advantage, of course is the ability to use group assessment which is economical of assessment time and can prove a very valuable experience for the students who are working in a group and therefore from the assessment stage aware that they are not alone with their difficulties. This approach to using a psychologist's time allows for a psychologist to use more time in individual counselling/consultation and less time in the mechanics of data collection.

The fact that there are timed and untimed norms for all scales allows one to look at the issues of 'power' and 'level' which may be of particular relevance in dyslexic students where the ability to work at speed may be a major issue. The lack of parallel forms means that looking at this issue would require re-administration of scales over time.

Potential Weaknesses of the SATA

'There appears to be a major problem with the norms for Verbal Reasoning and Nonverbal Reasoning. In four individual cases when using the SATA I have had either previous WISC-R, WAIS-R results, or, because of doubts about the results have administered a short-form WAIS-R. In each case the SATA appears to under-represent ability by the equivalent of 3 or 4 Standard Score points. In one case an 'A' level student undertaking 4 science 'A' levels with ease at a highly academic public school scored within the good average range. Previously this student had scored within the very superior range on the WISC-R Verbal scale and had achieved 11 GCSEs with several 'A' grades.' Freeland,R 1995.

Given that a frequent fear of adults coming for identification of learning difficulties for the first time is that they are not dyslexic but simply of limited ability, any under-representation of their ability may serve to confirm their worst fears. It also makes discrepancy analysis hazardous since it may mask the degree of discrepancy between ability and attainments.

The fact that Verbal Reasoning and Non-Verbal Reasoning are assessed by just one scale (where two is the minimum in comparative psychometric instruments) may be a significant factor in weakening the construct validity of the measures.

The manual quotes a standardisation sample of 1005 adults and comments that '*on the whole, the sample is nationally representative.*' (page 31). of two concurrent validity studies one is with only one sub-test of each WAIS-R scale; the other with complete scales has a sample size of only 35! Correlations are, interestingly highest with timed norms for the SATA.

In the Kingston procedure 2 sub-tests of the WAIS-R are used and any comparison across these different scales may clearly not be comparing like with like.

4.4.7 Amendments made to SATA

Having administered the SATA to students it was required to make some amendments to the form of instructions used in certain tests, particularly to make them shorter and clearer. It was particularly difficult for dyslexic students to cope with the rather detailed instructions. The Reading Vocabulary subtest is a good case in point and is presented both in its original and amended version (see Table 4.i). Other changes, generally of a minor nature have been made in the other tests. The complete revision has been archived by the researcher but an example has been selected for purposes of illustration in appendix 4B.

Similarly the content of some tests had to be altered to make it more easily understood by UK participants. The Verbal Reasoning subtest was amended because it was suspected that UK students might be put off by being presented with unfamiliar (i.e. American) words in the test.

One particular item was misunderstood by most students and considered by them to be 'American slang' Many students completed this item as follows:
'shyster is to lawyer as quack is to: duck' (The correct answer is: doctor)
This item has not been amended, but totally withdrawn from the test, and another item has been inserted further on.

The presence of several such items out of 25, caused some students to feel that they were dealing with unfamiliar material which therefore may have adversely affected their performance.

Table 4.i:Suggested amendments to the SATA instructions for the Reading Vocabulary Test

ORIGINAL TEST	AMENDED TEST																								
<p>4. Reading Vocabulary (RV) - 10 mins</p> <p>Timed Instructions. Say, "TURN TO PAGE 15 IN YOUR TEST BOOK AND PAGE 3 IN THE RESPONSE BOOK. LOOK AT THE EXAMPLE ITEM. THERE IS A LIST OF FOUR WORDS. READ THE FOUR WORDS AND IDENTIFY ONE OF THREE POSSIBLE RELATIONSHIPS AMONG THE WORDS. ONE POSSIBILITY IS THAT TWO OF THE FOUR WORDS HAVE THE SAME MEANING. A SECOND POSSIBILITY IS THAT TWO OF THE FOUR WORDS HAVE OPPOSITE MEANINGS. A FINAL POSSIBILITY IS THAT NONE OF THE WORDS ARE RELATED IN MEANING. IN THE EXAMPLE, 'IN' AND 'OUT' ARE OPPOSITES. NOW LOOK IN THE RESPONSE BOOKLET. YOU WILL SEE EACH OF THE WORDS IN THE TEST BOOK HAS A CORRESPONDING LETTER, 'A,' 'B,' 'C,' OR 'D.' BELOW THE 'A,' 'B,' 'C,' AND 'D' IN YOUR RESPONSE BOOKLET ARE THE LETTERS 'S,' 'O,' AND 'N.' 'S' STANDS FOR SAME, 'O' STANDS FOR OPPOSITE, AND 'N' STANDS FOR NOT RELATED. TO ANSWER THIS EXAMPLE YOU WOULD CIRCLE THE 'A' AND 'C' WHICH CORRESPOND TO THE RELATED WORDS, 'IN' AND 'OUT'. NEXT YOU WOULD CIRCLE THE LETTER THAT EXPLAINS THEIR RELATIONSHIP; IN THIS CASE, 'O' FOR OPPOSITE. IF THE RELATED WORDS HAD THE SAME MEANING, YOU WOULD HAVE CIRCLED THE CORRESPONDING LETTERS OF THE RELATED WORDS AND THEN CIRCLED THE 'S' FOR SAME. TO ANSWER THE LAST POSSIBILITY, WHEN THERE IS NO RELATIONSHIP BETWEEN THE WORDS, YOU WOULD NOT CIRCLE ANY LETTERS CORRESPONDING WITH THE 'A,' 'B,' 'C,' AND 'D.' GROUP BUT ONLY 'N' FOR NOT RELATED. DO THE TWO PRACTICE ITEMS ON YOUR OWN."</p> <p>Give the examinee a short time to do the problems Then say: "THE WORDS FOR THE FIRST PRACTICE ITEM ARE 'A. EXIT, B. GREEN, C. OUT, AND D. SUN.' HOW DID YOU COMPLETE THIS ONE? THE ANSWER IS A. EXIT, C. OUT, 'S' SAME." Finally, say: "THE WORDS FOR THE SECOND PRACTICE ITEM ARE 'A. CAT, B. HOUSE, C. SNOW, D. CAR.' HOW DID YOU COMPLETE THIS ONE?" The answer is: 'N' for Not Related.</p> <p>Then say, "YOU WILL HAVE 10 MINUTES TO DO AS MANY ITEMS AS YOU CAN. BEGIN." At the end of 10 minutes, say, "STOP," and continue testing with the</p>	<p>4. Reading Vocabulary (RV) - 10 mins</p> <p>Turn to the Test IV entitled Reading Vocabulary in both the Test and Response Booklets.</p> <p>Loot at the practice items in the Test Booklet. Each one consists of 4 words. From each set 2 words fall into one of the following categories - similar in meaning, opposite in meaning, neither similar nor opposite <i>i.e.</i> not related. Put a ring round the 2 items to show whether they are similar or opposite in meaning and summarise your answer below the line by circling S for similar or O for opposite. If neither of these relationships exists between any of the 4 words, simply circle N for not related.</p> <p>For example:</p> <table> <tr><td>a. in</td><td>a</td></tr> <tr><td>b. green</td><td>b</td></tr> <tr><td>c. out</td><td>c</td></tr> <tr><td>d. sun</td><td>d</td></tr> </table> <hr/> <p style="text-align: center;">S O N</p> <p>For example:</p> <table> <tr><td>a. exit</td><td>a</td></tr> <tr><td>b. green</td><td>b</td></tr> <tr><td>c. out</td><td>c</td></tr> <tr><td>d. sun</td><td>d</td></tr> </table> <hr/> <p style="text-align: center;">S O N</p> <p>For example:</p> <table> <tr><td>a. cat</td><td>a</td></tr> <tr><td>b. house</td><td>b</td></tr> <tr><td>c. snow</td><td>c</td></tr> <tr><td>d. car</td><td>d</td></tr> </table> <hr/> <p style="text-align: center;">S O N</p>	a. in	a	b. green	b	c. out	c	d. sun	d	a. exit	a	b. green	b	c. out	c	d. sun	d	a. cat	a	b. house	b	c. snow	c	d. car	d
a. in	a																								
b. green	b																								
c. out	c																								
d. sun	d																								
a. exit	a																								
b. green	b																								
c. out	c																								
d. sun	d																								
a. cat	a																								
b. house	b																								
c. snow	c																								
d. car	d																								

The Verbal Reasoning subtest is presented both in its original and amended version (see Table 4.ii). Other minor changes have been introduced to grammar, spelling and phrasing throughout the test procedure.

Table 4.ii: Verbal Reasoning and its Revised Version

Verbal Reasoning - 10 minutes	Amended version - changed items
1. in is to out as low is to:	
2. tennis is to court as baseball is to:	2. tennis is to court as football is to:
3. January is to first as December is to:	3.
4. work is to play as hard is to:	4.
5. cure is to hospital as educate is to:	5.
6. drink is to thirst as eat is to:	6.
7. solo is to quartet as 1 is to:	7.
8. mosquito is to malaria as dog is to:	8.
9. shyster is to lawyer as quack is to:	9. auspicious is to beneficial as ominous is to:
10. Roosevelt is to Churchill as America is to:	10. Churchill is to Roosevelt as England is to:
11. forest is to tree as crowd is to:	11.
12. cardiologist is to podiatrist as heart is to:	12. cardiologist is to chiropracist as heart is to:
13. plaintiff is to defendant as protagonist is to:	13.
14. rejuvenate is to renew as partition is to:	14.
15. cord is to wood as ream is to:	15.
16. bow is to tie as Fedora is to:	16. bow is to tie as fedora is to:
17. brush is to chisel as painter is to:	17.
18. obscure is to enlighten as opaque is to:	18. obscure is to bright as opaque is to:
19. emigrate is to immigrate as departure is to:	19.
20. scalding is to tepid as frigid is to:	20. scalding is to tepid as frozen is to:
21. aloof is to distant as sociable is to:	21.
22. castigate is to criticize as approve is to:	22. castigate is to criticise as sanction is to:
23. fall is to summer as equinox is to:	23. autumn is to summer as equinox is to:
24. plethora is to multitude as wizened is to:	24.
25. slang is to colloquialism as dialect is to:	25.

American terms such as 'fall' and 'approve' were altered to the more familiar English terms of 'autumn' and 'sanction'. Other words that gave the test a generally 'unfamiliar' air to the students were altered such as 'baseball' to 'football' and in item 10 the sequence was altered to give it a more appropriate slant to the UK. The word 'frigid' was changed to 'frozen' for the obvious reason that in English the word has a different connotation and many students were misled by it, and the word 'Fedora' was altered to 'fedora', once again because of the confusion that it created.

4.4.8 The SATA pilot study group

During the academic year 1993-94, 1688 students participated in this project by doing individual or sets of subtests. The main body of students represented over 20 different subject areas, although in all, 49 subject areas were represented. The intention was for a fairly wide range of UK students to complete the tests. Comments were invited and these offered both interesting and useful insights into the presentation, format and language used in the test.

Most of the piloting took place with Kingston and Surrey University students. A full range of the students entering Surrey University took part. Beyond that, selection of students was limited by a number of factors (access to willing students and course tutors, fitting into a full curriculum whilst under pressure of time etc.). For example, the maths component was carried out by the Computer Science Department, where the course tutor was interested in relating the scores on this test to the department's internal maths tests. It resulted in above average scores. The same test was less successfully administered to the Drama Department, where the students on hearing the mention of maths decided to express their individual rights to get up and leave! However, apart from one or two of the selections, the others are fairly broad ranging and were considered representative of university students as a whole. Differences in sex, age, subject area and scholastic backgrounds were explored in relation to test results. Table 4.iii shows the mean raw score for the entire sample throughout all the subtests. This includes scores achieved by male/female students and indicates the subject areas in which students scored the highest and lowest results on each subtest.

End of year results from the University were sought, in order that the information gained might help to establish the usefulness of SATA, as a predictor of success or failure in written examinations in HE, but this data proved too difficult to gain access to.

Table 4.iii: Mean scores for the total study group

Subtest	Entire Group Raw Score Mean		Cases	Total No. of Cases
VR Verbal Reasoning	13.4679	<u>Male:</u> 13.4444 <u>Female:</u> 13.5000 <u>Subject:</u> 17.3333 English & Drama 13.3281 Info. Tech. & Sys. Des.	63 46 9 64	109
NR Non-Verbal Reasoning	12.2455	<u>Male:</u> 12.3175 <u>Female:</u> 12.1489 <u>Subject:</u> 15.2857 Music 12.0156 Info. Tech. & Sys. Des.	63 47 7 64	110
QR Quantitative Reasoning	16.0183	<u>Male:</u> 16.6557 <u>Female:</u> 14.1667 <u>Subject:</u> 20.3333 Maths 16.4396 Computer Science	122 42 9 91	164
RV Reading Vocabulary	16.2347	<u>Male:</u> 15.9091 <u>Female:</u> 16.5175 <u>Subject:</u> 19.3333 English 15.8075 Retail Management	99 114 9 161	213
RC Reading Comprehension	28.7163	<u>Male:</u> 28.4138 <u>Female:</u> 29.0612 <u>Subject:</u> 33.1455 Business Studies 28.7857 Education	58 49 55 28	107
MC Maths Calculation	12.7568	<u>Male:</u> 13.4100 <u>Female:</u> 11.3958 <u>Subject:</u> 21.8889 Maths (12.5604 Computer Science) 9.9000 English	100 48 9 (91) 10	148
MA Maths Application	16.0236	<u>Male:</u> 17.4149 <u>Female:</u> 12.0606 <u>Subject:</u> 17.0549 Computer Science 11.8889 Maths	94 33 91 9	127
WM Writing Mechanics	13.1922	<u>Male:</u> 12.3022 <u>Female:</u> 14.6927 <u>Subject:</u> 21.0000 Psychology Top/Bottom 6.7750 Elect. & Elec.	632 410 46 40	1051
WC Writing Composition	17.6038	<u>Male:</u> 17.6452 <u>Female:</u> 17.5455 <u>Subject:</u> 23.3158 Business Info. Top/Bottom 13.3947 Retail Management	 38 76	159

4.4.9 Statistical analysis of the results from the SATA pilot study group

The study has been limited to an exploratory investigation into the use of the SATA test for UK students, and the results are based on a minimum of 100 students participating in each of the nine subtests. The results are generally consistent with Kingston and Surrey student intake which reflects an above average level of ability and scholastic achievement among students. This is in contrast to the American student population as a whole where only average levels are required to gain access to higher education. A comprehensive pilot study for UK students to take into account the geographical spread, ethnic backgrounds, and range of ages and abilities, and subject area is required on a wider scale to accomplish a full UK renorming of the test in its present format and subsequently a re-standardisation of the test for UK use would be required. But within the scope of this study, Kingston/Surrey University norms may offer a practical guideline for students and course tutors.

Comparing the results for the non dyslexics by the age ranges in table 4.8 on page 38 of the Examiner's Manual, the outcomes are remarkably consistent across the subtests.

Each test was analysed for differences between scores for different subject areas. The figures showing the mean standard deviation and percentiles for all students calculated for subject, age-range and gender sub-categories have been compiled into an archive document which is held by the researcher. Summary statistics and percentiles for the study group results on the SATA are presented in appendix 4C.

Whilst the 18 year-olds achieve consistently better results than the American sample of the same age-group, the students in their twenties and thirties are about as good as or somewhat worse than those in the American sample. Overseas students from the study group scored substantially lower in Writing Mechanics (WM - a test of spelling and punctuation) than their UK peers.

Because of sampling problems, it is not possible to tell whether the differences that exist between the different groups are due to the course, the type of University (old or 'new') or the year of study. However for the purposes of this study comparing the performance of dyslexics to non-dyslexics, the wide ranging profile of subtest scores provides a better span than would be achieved by attempting to norm within only one type of institution.

Similar problems are involved when considering differences between sexes, although there seemed to be evidence of better male scores on maths application, whilst females scored better on writing mechanics.

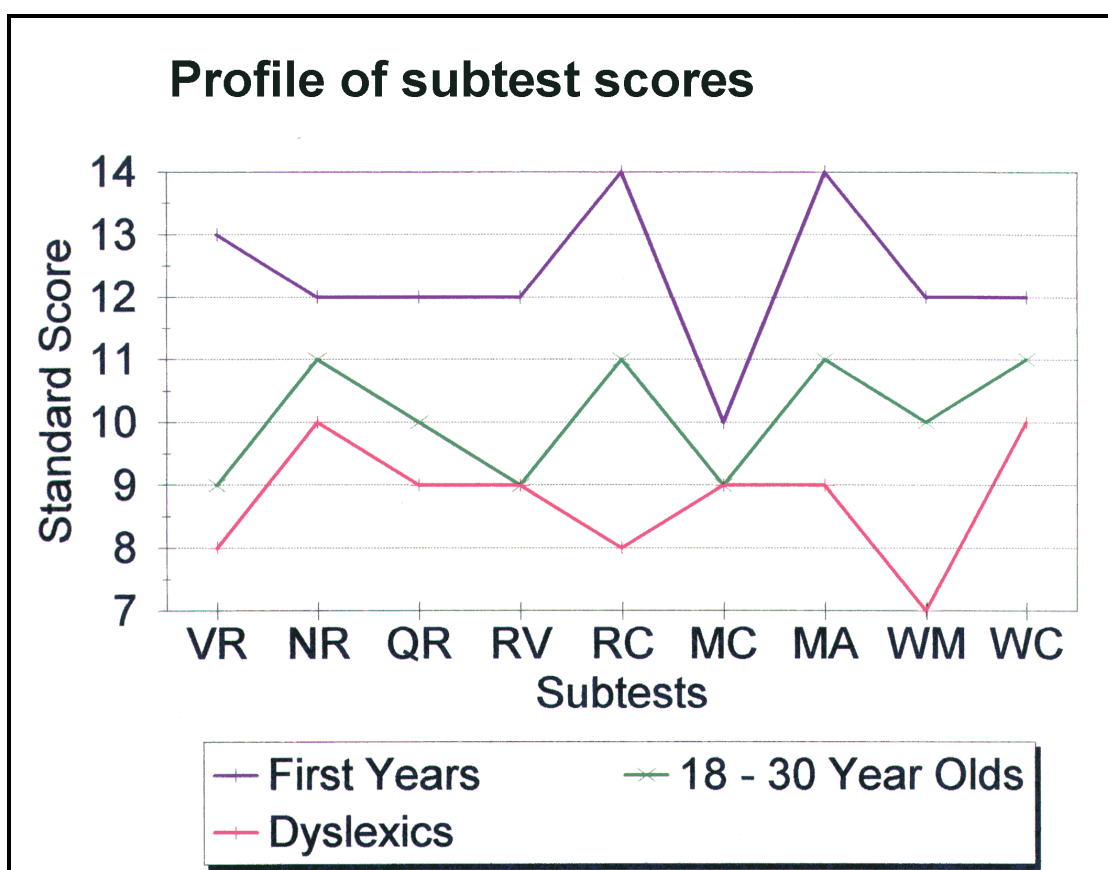
Illustration 4g. shows the mean scores for the Study Group. Among the first year intake the result was generally at an above average level. The only sub-test in which the UK students did less well than expected (standard score 10, i.e. mid-point of average) was on the Maths Calculation (even with the added advantage that the students participating were from a subject area - computer science - where they were supposedly more skilled in maths than, perhaps, students from the Humanities might have been).

However, the UK education system differs from the American system in which a knowledge of maths is generally carried through to a more advanced level in schools. One might, therefore, question the relevance of the Maths Calculation subtest for all UK students. However, it may be of interest to administer it to those students who have enrolled on courses for which a working knowledge of maths is a prerequisite skill, but, where tutors have commented that their students are not proficient enough in this area to cope with the demands of the course. In response to comments from lecturers at a discussion held during the project, this test was tried out by several lecturers with their students and the results compared with their own maths tests, or the test was used as an early screener to identify those students who clearly required a maths refresher course during their first year at University.

It was further interesting to note that the general performance of mature students was only within the average range compared to above average for the first years. Clearly those courses that encourage mature students without insisting on the standard entry qualifications (such as the Combined Degree Courses) will be offering opportunities for the individuals concerned, but who may also encounter problems and require general study skills support.

The profile of the dyslexic students emerges as one of underachievement compared to their peers, and with particular test results worthy of closer examination. These will be discussed in section 4.4.12.

Illustration 4g: Profile of Subtest scores in the SATA



A more detailed presentation is made in Table 4.iv and figures shows that for the 18 and 19 year old UK students, the scores across the subtests are consistently better than the American group.

Table 4.iv: Sata test results presented by age-group

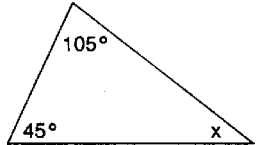
	Age	No. of Cases	Raw Mean Score	SATA Raw Score Means Across Age	Percentile Ranks Average = 50	Standard Score Average =10
VR	18	13	15.2	10.7	84	13
	19	19	12.4	12.9	37	9
	20	68	12.5	15.1	25	8
NR	18	13	14.5	10.4	75	12
	19	19	13.8	11.2	75	12
	20	69	12.0	12.6	50	10
QR	18	47	17.4	12.9	75	12
	19	44	16.5	14.7	75	12
	20	97	15.8	16.6	37	9
RV	18	59	17.0	14.3	75	12
	19	55	15.9	16.0	37	9
	20	83	14.5	17.8	25	8
RC	18	20	32.9	24.1	91	14
	19	31	32.1	26.3	75	12
	20	39	27.0	29.6	25	8
MC	18	37	14.0	12.8	50	10
	19	30	12.9	14.6	37	9
	20	72	12.8	14.9	25	8
MA	18	37	18.6	11.4	91	14
	19	30	16.9	13.7	63	11
	20	65	15.0	15.8	37	9
WM	18	402	14.4	9.6	75	12
	19	207	13.3	13.1	50	10
	20	362	11.4	14.4	37	9
WC	18	45	15.9	14.7	75	12
	19	39	14.3	14.3	63	11
	20	61	20.2	21.9	50	10

The 1st year University intake has performed at the 75th percentile ranking on these tests. One might expect this, since the American group norms are representative of the US population as a whole, whereas our results are based upon a representative student population. The results of the Maths Application were very high, which as mentioned previously was not unexpected, given the student educational background. However, the one exception, for which there is not an obvious explanation is in the Maths Calculations where UK scores are similar to the American sample. Given the limitation of our local sample of students, and particularly considering that the same group of students (Computer Science) had very high results in Maths Application, it is perhaps a skill which UK students are not quite so competent in, given their overall scholastic status.

For purposes of comparison a small extract from both the maths calculation and maths application are presented in illustrations 4h. and 4j.

Illustration 4h: Extract from the maths calculation subtest.

17. $2x + 5y + 2 - 2x + 1y + 3$ (simplify)

18.  $x =$

19. For $a = 2$, $b = -3$, $c = 1$; $\frac{-b + \sqrt{a^2 + c}}{-b - (a - 2c)} =$

Illustration 4j: Extract from the maths application subtest

14. Bert has a job interview at 10:00 in the morning. It takes him 45 minutes to shower and get dressed, 25 minutes to eat breakfast, and 45 minutes to travel from where he lives to the place of possible employment. What is the latest time that he can wake up and make his appointment?

15. Julie took three tests during the semester. Two of her scores were 75 and 84. Her final average for the course was 86. What was her score on the third test?

16. On a map, one inch = 200 miles. If the distance between two cities on the map is $1\frac{3}{4}$ inches, how far is the actual distance?

The American norms show levels of performance throughout the tests gradually increasing from age 16 to approximately 30 and then plateauing in the 40s and decreasing through to the 70s. However, it is interesting to note that in our study this decrease is shown to occur from the 20s onwards, although the samples involved here were probably too small to draw firm conclusions from.

4.4.10 General findings

The SATA proved to be a very effective means of providing a baseline assessment at H.E. level. In the broader context of general learning difficulties the SATA (with the minor amendments which have been made for UK students) provides students with their current attainment levels and individual learning profiles.

Experience has shown, however, that the data obtained from the administration of the SATA will require supplementing by other diagnostic procedures, in order to offer a more comprehensive profile of the cognitive functions relating to a dyslexic condition.

4.4.11 Discussion of the effectiveness of SATA for the Diagnosis of Learning Difficulties

When comparing the standard SATA scores of the dyslexic group with those of the American sample with college learning disabilities, the UK group appears to perform less well on many of the subtests.

It should be noted that this test was not originally designed to specifically identify dyslexic students. However, it was selected on the basis that it is a standardised adult level test that caters for students with learning difficulties and offers other facilities that are relevant (i.e. group testing and computerised profiles).

The study results show however, that the SATA does identify some dyslexic students who show a discrepancy between verbal and non verbal reasoning ability and does highlight other discrepancies. But the SATA does not contain the necessary tests of phonological and visual processing or working memory which are essential components of a comprehensive dyslexia assessment.

The performance of known dyslexics was compared to that of the non-dyslexics. It was hoped that some of the most significant subtests for the screening of dyslexia might emerge from the analysis in much the same way as the ACID profile emerged from the WISC. The diagnostic use of the WISC profiles has been much researched over the years (McLeod, 1965, Klasen, 1972, Naidoo, 1972, Thomson and Grant 1979, Kaufman, 1979 and Kaufman, 1990). The aim of this study was to find out whether the SATA could act as a starting point for the development of an assessment programme where the similarities and the most relevant differences which emerged between profiles would be taken forward into the main study. In its present format the SATA test is certainly not effective in identifying 'borderline' dyslexic students, who have never been assessed before, and who through personal determination and efforts have increased their skills consistently across the attainment range, in order to achieve average or above average levels.

To a much lesser extent the same problem has occurred when using the WAIS (R) with a student who is too familiar with and has learnt strategies to improve scores on certain 'key' subtests, such as Digit Span. However, in these cases there is usually an earlier assessment to confirm the existence of a dyslexic condition.

In the present study, the WAIS (R) has been administered to students to provide evidence of an 'ACID' profile, for purposes of comparison with the full 9 component profile from the SATA test. In the next stage of the development of the project, additional tests would be incorporated in order to furnish the test battery with a more satisfactory assessment of dyslexia.

Other screening procedures have been used to further validate the diagnosis of these students' difficulties including the BDA's Adult Dyslexia Questionnaire, which was completed by any student who requested an assessment. This proved to be a very good indicator of dyslexia and was incorporated in the team's guidelines to tutors on how to accommodate preliminary screening, and advice to students.

4.4.12 A study of 60 diagnostic dyslexia profiles using the SATA

Clearly the US sample is composed of students with learning difficulties of a general nature, whilst those in the UK study group of 60 are mainly presenting with problems of a specific kind arising from a dyslexic origin. However, both groups are generally functioning slightly below the mid point of average, although the UK group shows greater differences in the scores of the nine subtests used, apart from written composition. The same pattern is seen in the composite scores, except for WQ (Writing Quotient), which again is higher.

Overall, the test data profile obtained reflects the problems of learning shown by the dyslexic students.

The main differences between UK dyslexic students and American students with general learning difficulties would appear to be that the dyslexic students achieve lower scores on Verbal Reasoning (which involves reading and writing), score at below average rates in Reading Comprehension (Timed), and do less well in Maths Calculation (as already mentioned similarly to all the UK students).

The test in which the Dyslexic students actually do better than the American group is Writing Composition (which is marked for content and ideas, and not for spelling).

Similarities between both groups can be seen in NR (Non-Verbal Reasoning) and MA (Maths Application) and to a lesser extent WQ (Writing Quotient).

Although the SATA is not specifically designed to identify dyslexic students, some dyslexia traits do emerge within the student profiles from this test battery, some of which are listed below:-

- A marked discrepancy between verbal and non-verbal reasoning
- Underachievement in timed reading comprehension compared to the untimed version (later verified with further testing)
- Below average results on a test of spelling and punctuation

- Good results on a test of composition where marks are not taken off for weak spelling and punctuation
- A discrepancy between verbal reasoning and vocabulary (where the more straightforward test of word knowledge is more accessible to the student, than completing a verbal analogy which involves sequencing and organising of ideas)
- A discrepancy between maths calculation and maths application (given that most students found MC to be much more difficult than MA - where the arithmetic problems had to be extracted from text - it is significant to note that dyslexic students did not have the same experience and in fact scored at an average level in both tests, thus finding extracting the information from text quite difficult to do)
- A generally lower scoring profile compared to other students, showing that dyslexics are very likely to underachieve in examinations compared to their peers.

The data from the UK students shows the importance of providing additional support to dyslexic students to help them acquire more effective study/learning techniques to cope with a graduate training course. Appropriate learning support should reduce the risk of failure in meeting required academic standards and result in less personal stress to the student.

For a comparison of scores of the UK group and American students with learning difficulties (see Table 4.v).

Comparison of Scores of UK & American Students with Learning Difficulties

Kingston study - full diagnostic profile of 60 cases all displaying learning difficulties.

52 - dyslexic.

5 - mature students with general learning difficulties.

3 - overseas students with English language difficulties.

SATA scores based on 35 college students who have learning disabilities

Variable	UK Mean for 60 Kingston University students with learning difficulties	American Mean for College students with learning disabilities	
VR SS	7.88	9.8	<u>Subtests</u> <u>Standard Scores</u> average score is 10
NR SS	9.71	9.6	
QR SS	8.58	9.7	
RV SS	8.52	9.4	
RC SS	7.63	9.6	
MC SS	8.69	10.4	
MA SS	9.35	9.6	
WM SS	7.12	7.7	
WC SS	9.52	8.6	
SAQ	91.16	95.3	<u>Composites</u> <u>Quotients</u> average score is 100
GAQ	91.19	98.1	
TAQ	90.18	94.5	
VBQ	87.49	93.3	
QTQ	93.82	98.7	
RQ	89.46	97.2	
MQ	95.12	99.8	
WQ	90.90	88.8	
ASQ	87.39	94.7	

KEY:

VR - Verbal Reasoning

NR - Non Verbal Reasoning

QR - Quantitative Reasoning

RV - Reading Vocabulary

RC - Reading Comprehension

MC - Maths Calculation

MA - Maths Application

WM - Writing Mechanics

WC - Writing Composition

SA - Scholastic Abilities

GA - General Aptitude

TA - Total Achievement

VB - Verbal

QT - Quantitative

R - Reading

M - Mathematics

W - Writing

AS - Achievement Screener

Table 4.v: A comparison of scores for dyslexic UK students compared to American students with learning difficulties.

In the light of current concerns about discrepancy analysis the development of profiling appears a more useful approach. Profiling also goes a long way to meet the 'functionalist' argument which is that it does not matter whether someone is dyslexic or not, what matters is the skills they find difficult and the effect of these upon study in H.E. One example of this was expected to be the difference in dyslexic students' performances on timed versus untimed comprehension tests.

Development of computer administered and scored coding tasks is clearly a useful development. Development of computer administered short term auditory memory tasks may prove useful and following the differential Ability Scales model of presenting digits at the rate of two per second could be fruitful. The presentation rate interferes with the use of metamemorial strategies such as covert rehearsal, frequently used by dyslexic learners in a digits forward task.

The establishment of UK norms for the SATA at H.E. level also allows some grounding of the test norms for British HE populations. A small comparison study between WAIS-R and SATA Verbal and Non-verbal scales could help clarify the nature of the relationship, and anomalies, between these two scales.

The development of the quick screener could be a valuable innovation paralleling as it does the development of computer based screening for children starting school.

Where the identification of a phonological deficit in school-aged children has gone a long way towards coping with the challenge to the discrepancy approach, some parallel with the HE population could be a very useful development.

4.4.13 Dyslexia Profile Analysis and discussion of the relevance of the classification of dyslexia into visual, auditory and general subtypes

The use of the SATA test procedure is of value because it offers an insight into the operation of certain verbal and visual abilities, as well as other intellectual and educational attainment levels.

The SATA results were compared with recent work on the WISC 3 profile analyses, much of it by Dr. Chasty, (formerly of the Dyslexia Institute and during 1994 a member of the Kingston Dyslexia Project Steering Committee), who noted that whilst the ACID analysis is relevant to many dyslexics, there are others without these particular characteristics, who may also have learning difficulties of a specific nature. They require remediation of a structured kind, especially those showing a significant discrepancy between verbal and performance quotient levels. Furthermore, the psychological profiles obtained from the administration of the Wechsler Scale have also shown quite distinct patterns (see Table 4.vi.) .

Table 4.v: Profile analysis based on WISC subtest scores.

RESULTS FROM PSYCHOMETRIC ASSESSMENT (based on scores from 10,000 children) Wechsler Intelligence Scale for Children (Form III)									
Verbal Scale (Problem solving in words)					Performance Scale (Problem solving using visual and hand skills)				
Child	1	2	3		Child	1	2	3	
Information	7	12	7		Picture Completion	13	9	13	
Similarities	9	16	14		Picture Arrangement	12	7	6	
Arithmetic	6	10	8		Block Design	13	6	10	
Vocabulary	9	15	15		Object Assembly	16	10	15	
Comprehension	9	17	16		Coding	12	6	7	
Digit Span	(5)	10	(5)		Mazes				
Sum of scores	40	70	60			66	38	51	
Verbal IQ	87	125	112		Performance IQ	123	84	101	
<p>These children are different. Though they all have significant retardations in reading, spelling, and writing, the skills and difficulties they bring to literacy learning are different.</p> <p>Teachers must look at the child's abilities and difficulties to determine his special needs, and build on appropriate special provision.</p> <ol style="list-style-type: none"> 1. Auditory Dyslexia - focus on visual competencies, build up verbal. 2. Visual Dyslexia - focus on verbal competencies, improve visual. 3. General Dyslexia - balance between strengths and weaknesses. 									

The researcher's experience has indicated that the pattern of results obtained from the Wechsler, is often reflected in differences of learning shown by children, bearing in mind the requirements of the national curriculum in schools. It is now proposed to see if this particular pattern is also reflected in students, following studies at a university level, including the implications this might have upon course requirements and related study support, in order to ensure more efficient learning rates.

They all have specific learning difficulties, in that they are under functioning in scholastic attainments, but they clearly differ in the nature of their particular problems. This has direct implications for the way in which their learning difficulties are remedied. They are all of overall average ability, but differ in the operation of subskills underpinning competence in acquiring scholastic attainment. It should be taken into account when dealing with their respective learning problems.

In general, the students concerned have limitations in the processing of information, a major component of a dyslexic condition, given the discrepancies shown, and require access to help of a specialist nature to control these processes more effectively.

In practice this means adapting teaching approaches to take account of these differences so as to affect rate and style of learning. For example, those with profiles 1 and 2 can have problems in numeracy, whilst those in profile 3 are often uncertain in planning and sequencing skills. They also need help in memory and coding functions.

In addition, frustration and stress often arises when faced with learning assignments in school, a feature which can be more marked with increased course complexity and requirements at university. Here the volume and pressure of work assignments further exacerbates the problem.

The use of the SATA test procedure with students suggesting a similar range of intellectual differences to those found in some of the Wechsler testing, thus reflecting the features shown in the profile analysis obtained with children (see Table 4.vii.).

There has been continuous research into separating dyslexia into 'auditory' and 'visual' types. (Johnson and Mykelbust, 1967) Boder (1973) proposed a similar differential diagnosis of subtypes of dyslexia, namely, 'dyseidetic' 'dysphonetic' and 'mixed'. A detailed list of the clinical and statistical subtyping studies which was presented at a symposium in London entitled 'Recent Development in Screening and Diagnosis of SpLD/Dyslexia (1995)' is available in appendix 4C.

The characteristic differences were that auditory dyslexics mainly had problems with auditory discrimination and phonetic analysis. They tended to show weaknesses in auditory memory and sequencing. These students tended to have more severe problems because, unlike the visual dyslexics, their problem area directly affected language processing.

Table 4.vii: Profile analysis of 60 dyslexic students

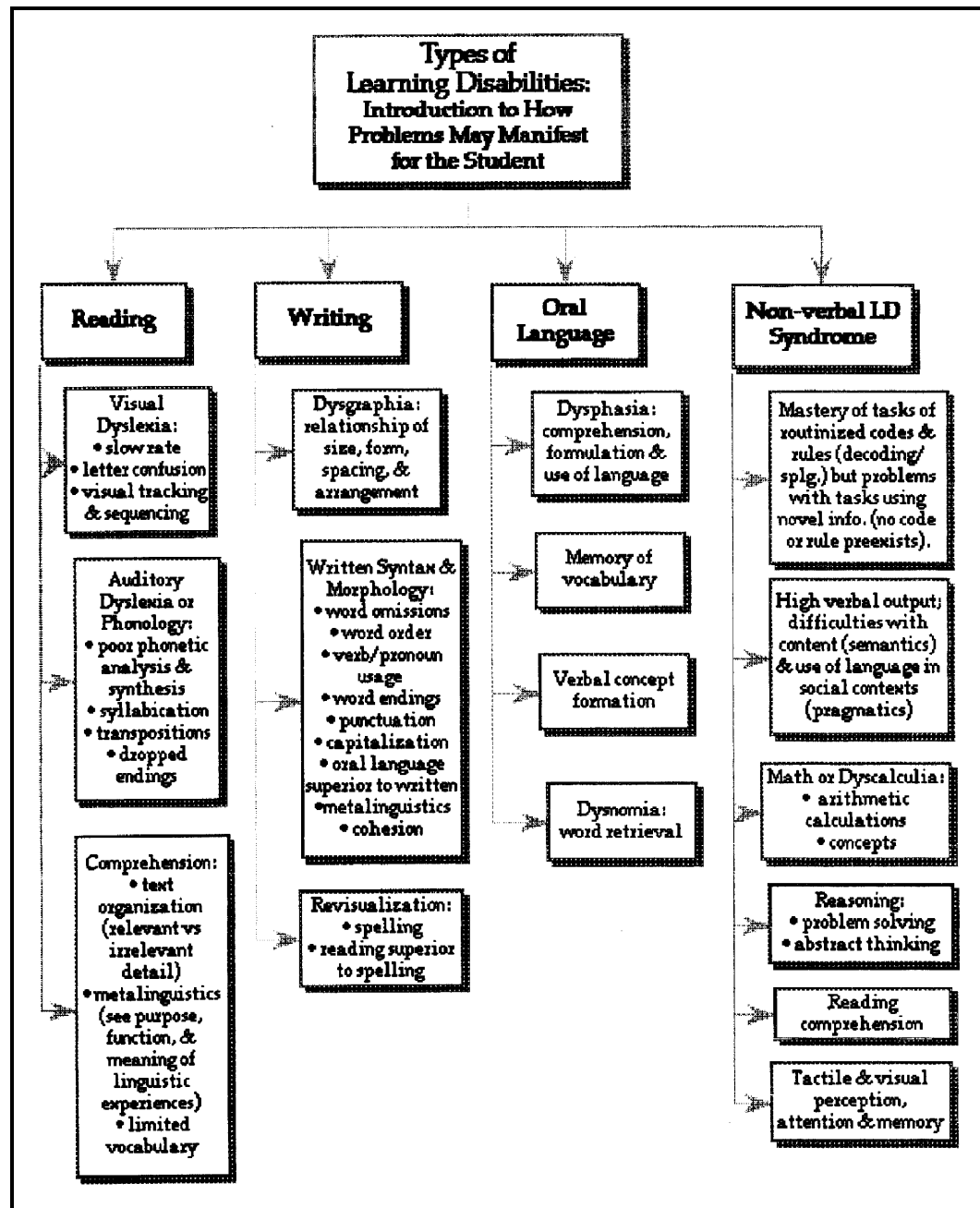
PROFILE ANALYSIS - 60 Full Assessments				
Student	1	2	3	
Reading Vocabulary	6	12	10	Scaled Score: 17-20 Very Superior 15-16 Superior 13-14 Above Average 8-12 Average 6-7 Below Average 4-5 Poor
Reading Comprehension	5	15	6	
Maths Calculation	8	9	11	
Maths Application	12	13	14	
Writing Mechanics	4	10	8	
Writing Composition	8	15	9	
Quantitative Reasoning	10	10	12	
Verbal Reasoning	8	14	10	
Non Verbal Reasoning	12	9	10	
General Aptitude Quotient	100	104	104	Quotients: 131-165 Very Superior 121-130 Superior 111-120 Above Average 90-110 Average 80-89 Below Average 70-79 Poor 35-69 Very Poor
Total Achievement Quotient	80	116	98	
Adult Dyslexia Checklist (Rev.)	14 positive answers of which 8 are *	8 positive answers of which 4 are *	11 positive answers of which 8 are * as significant indicators of dyslexia.	
5 - mature students with general difficulties 3 - overseas with language difficulties.	24	6	22	Total No. of students 60
1. Auditory Dyslexia. 2. Visual Dyslexia. 3. General Dyslexia.				

Visual dyslexics were characterised by failure to notice internal details in words, thus confusing similar words, a slow rate of perception as highlighted by lower scores on a visual discrimination test and reversal tendencies in reading and writing.. Conrad (1964) showed that when normal readers attempted to recall sequences of capital letters presented visually, the letters chosen in error *sounded* like the correct one.

The problem with attempting to categorise dyslexics into visual and auditory types was mainly in the difficulty researchers found in trying to isolate exclusively visual/optical tasks (Liberman 1971). These difficulties were further experienced in the early pilot studies using the BAS Test of Immediate Visual Recall with secondary students. (Zdzienski 1985). The Visual Sequential Memory Test (see section 5) of snowflake patterns is an attempt to optimise the use of a purely visual response. Even when a stimulus is presented visually it may be represented in short term memory in a phonological form (Miles 1991). Elaine Miles in fact argued that a visual/auditory dyslexia distinction is not valid since so many so called 'visual' errors can be viewed as being due to linguistic or other deficiencies. For example, the Coding test (a visual short term memory test) also involves a motor component where the subject must write down the answers.

In spite of these difficulties attempts have been made to categorise learning disabilities subtypes. The model shown in illustration 4k. develops the categories mentioned above into a more detailed breakdown. It serves as a useful framework for the various different approaches to teaching which may be appropriate as well as demonstrating the degree of overlap between teaching styles best suited to each category.

Illustration 4k. Types of learning disability



Hoy, Cheri, et al (1984)

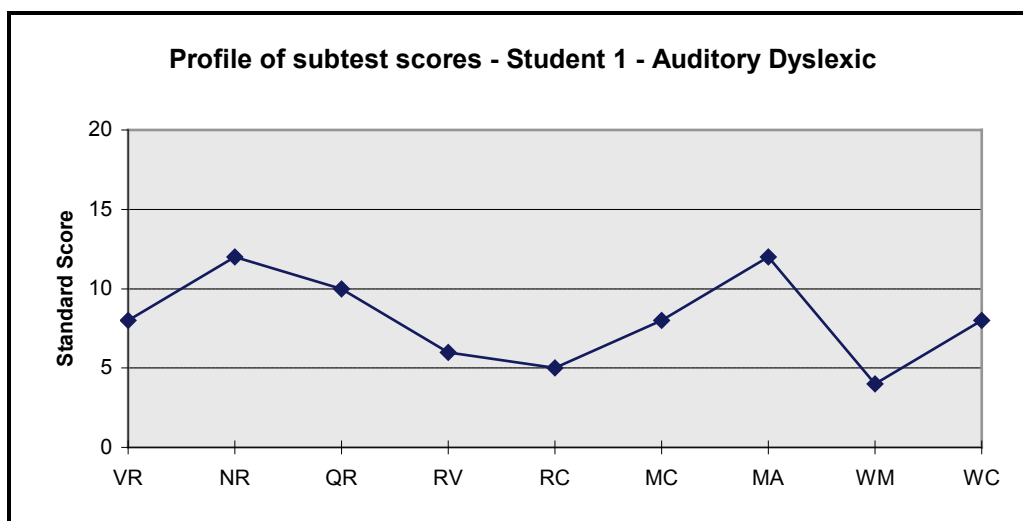
In section 5 a Digit Span test is introduced which has two parallel components (auditory and visual) and in both cases the subject responds with a computer keyboard input. It is one of the aims of this programme (StudyScan) to act as a research tool for the future investigation of this area.

Awareness of students modality preferences has practical implications for tutors and students following a course of further or higher education, especially in the form of supplementary support required to enable them to cope better with their course of chosen study.

Profile 1- Auditory Dyslexia (see illustration 4I.)

This learner has a generally low verbal problem solving competence, but with weaknesses also evident in working memory processes. By contrast, visual problem solving skills are well developed. As expected greater competence is shown in practical abilities rather than in language processing skills.

Illustration xxx: Profile 1 Auditory Dyslexia



At a general level, these students responded to questionnaires and confirmed that they experienced problems with auditory short term memory, e.g. remembering telephone numbers. They also tended to have difficulties with the reorganisation of information in memory, e.g. saying the months of the year in reverse order. Furthermore they experienced difficulties in filling in forms; however they often stated that they did not have problems with map reading.

More specifically, the pattern of scores on the SATA test battery seemed to characterise these students in the following way: Results on the Non-verbal Reasoning test were significantly better than on the Verbal Reasoning, and they scored lower than expected scores on the tests of Reading Vocabulary, Reading Comprehension and Writing Mechanics (Spelling and Punctuation).

A closer examination of the types of errors that these students made on the Verbal Reasoning showed some indication of poor memory and sequencing skills when processing the information. In many of the analogies, these students would complete the relationship between the wrong pair of words, e.g.

Work is to **play**, as **hard** is to '*rest*' or '*leisure*'.

Cord is to **wood**, as **ream** is to '*tree*'

Aloof is to **distant**, as **sociable** is to '*unsociable*' or '*anti-social*'.

The Reading Vocabulary test was described afterwards by many of these students as '*hard to read and understand the words*'. They generally got half way through the test when they ran out of time.

Similarly with the Reading Comprehension, these students generally managed to complete about one third of the test under timed conditions.

These results do have implications for the allowance of extra time in examinations.

The Writing Mechanics test responses showed examples of inattention to grammatical correctness, e.g.

'stricked' for strict

'foroushes' for ferocious

and inattention to the correct pronunciation, e.g.

'appropaly' for appropriately

and lack of awareness of the less regular spellings, e.g.

'vertenary' for veterinary

The Writing Composition showed indications of the same word spelt differently on the same page, e.g.

'manager' and *'manger'*

a lack of knowledge of spelling rules, e.g.

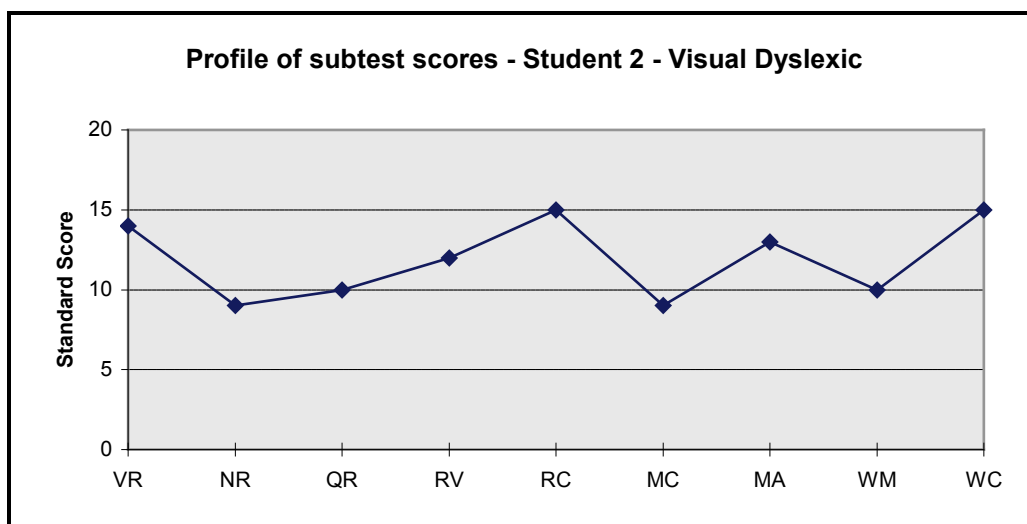
'tryed'

and an inattention to the correct form of words, because, possibly of paying more concentration to the content, e.g. *'he had an I dear as to how'*

Student 2 - Visual Dyslexia (see illustration 4m.)

This learner is good at verbal competencies, but not in visual problem solving skills, as reflected in examination performance.

Illustration 4m: Profile 2 Visual Dyslexia



The general areas of difficulties as noted in student questionnaires tended to be with map reading and the processing of information for tasks such as calling out the months of the year in reverse order. Many students were very slow and hesitant at this task.

However there were fewer confirmations of difficulties in filling in forms, remembering the sense of what has been read or taking telephone messages accurately.

More specifically the pattern of scores on the SATA test which seemed to characterise the visual dyslexic were significantly higher scores on the verbal reasoning compared to the non verbal reasoning, above average results on reading vocabulary and generally competent results on reading comprehension and writing composition. Worthy of note was the fact that writing mechanics (spelling and punctuation) was the highest of the three with results within the average standard range.

The reading vocabulary was on the whole completed within the given time, most completed at least a half to two thirds of the reading comprehension test (compared to one third for the auditory dyslexics).

The writing mechanics showed evidence of minor irregularities in spelling and grammar, e.g.

'recieved' for received

'appropriatley' for appropriately

'trechreous' for treacherous

The writing composition also showed examples of minor spelling errors which could be described as an inattention to the detail within words, e.g. finished spelt as *'finnished'* and engrossed spelt *'ingrosed'*. The compositions of the visual dyslexics did not however show any evidence of reversals. Whilst this is documented as a characteristic of dyslexics from a younger age group, this trait was rarely seen among university students.

As a general observation the visual dyslexics performance seemed to be less adversely affected than the auditory dyslexics whom Elaine Miles described in 1991 as the severest cases.

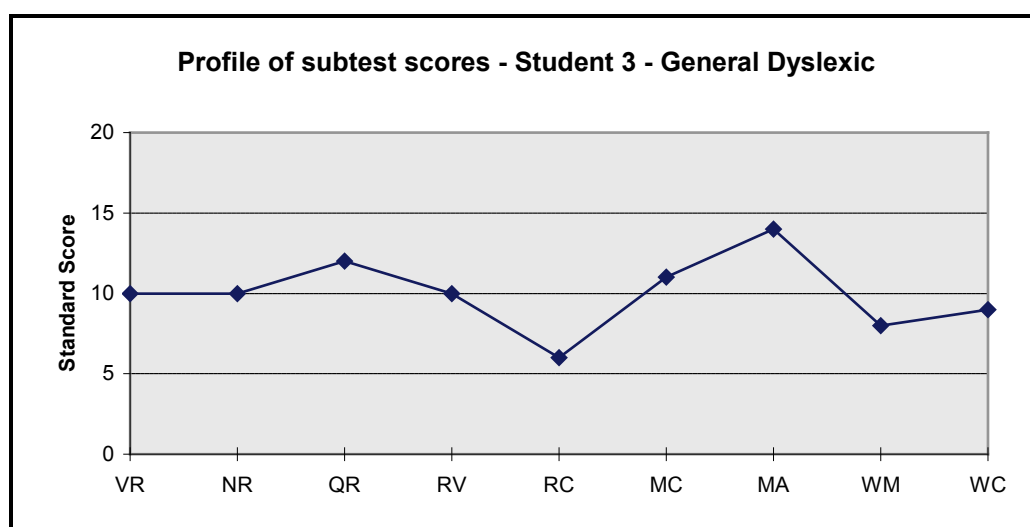
These findings would imply the need for extra time allowances to be made for these students bearing in mind their slower processing skills which clearly disadvantage them in tasks of sustained reading comprehension.

Student 3 - General Dyslexia (see illustration 4n.)

Presents the typical ACID pattern, common to many dyslexics, requiring access to specialist tuition in order to reduce imbalances in intellectual and scholastic function. This requires a focus upon the sub skills required for competence in basic educational processes.

The problem encountered in the administration of the SATA to these students was that it did not sufficiently discriminate them from non dyslexics and it required the backup evidence of a short form WAIS-R and the relevant ACID subtests in order to make a positive assessment.

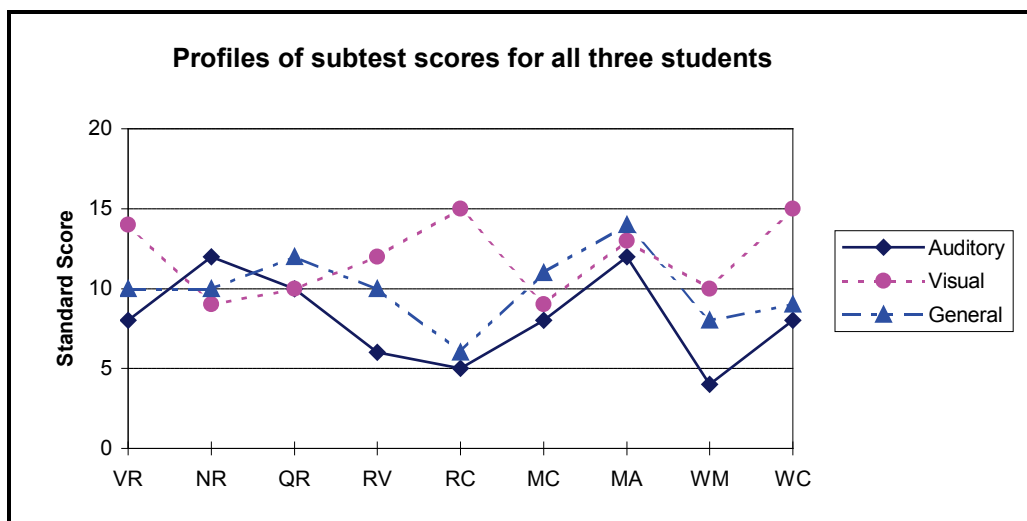
Illustration 4n: Profile 3 General Dyslexia



On student questionnaires there were many confirmations of problems in speed of reading, difficulties in taking telephone messages and confusion when dialling telephone numbers. Many of the students gave positive answers to the questions *'Did you find it hard to learn multiplication tables at school?'* and *'Can you say the months of the year backwards?'*

More specifically the aspects of the SATA which characterised these students were mainly in the similarity of scores in verbal and non verbal reasoning. Reading comprehension was the main area of under achievement although slightly better than the visual dyslexics (see illustration 4o. for a comparison of the profiles). Once again it would appear that lack of time was the main obstacle to achieving similar results to their non dyslexic peers.

Illustration 4o: Profile comparison for all three types of dyslexia



The writing mechanics score for these students was generally weaker than for visual dyslexics but better than the auditory dyslexics. The types of spelling errors made were fairly minor, e.g:

'ferocious' for ferocious

'perrilous' for perilous

'scurolous' for scurrilous

'vetinary' for veterinary

The writing compositions of dyslexic students often revealed a sense of humour and creativity which often made their scripts more interesting reading than their peers'. (see illustration 4p below).

Illustration 4p: A dyslexic student's response to the writing stimulus

SATA	SUBTEST IX Writing Composition	V CM RS
-------------	--------------------------------	---------

Execltisee Dineston Man :- is it a
bird is it a plane no its a strange
man with a high powered job and a
rather nice brush.

By day Aenthan Scraggins is a
weak and mild office sanitary official working
for the West and Dry novelty hair drying
company. But at night he removes his
rather ~~right~~ nice brush picks up his tin
of oil and becomes — — — Aenthan Scraggins
a man with a tin of oil and a nice
spanner eh I mean Execltisee Dineston
Man.

June the 21st was much like any
other Monday in every respect apart
from it was a Wednesday. The luffins
in the lab working on the new and
very top secret atomic turbo blow a
hair dryer so powerful it could give
a perm and set over 2000 miles away.
Tom, Dick and Harry, all men with
PhDs in ~~the~~ forestry, prodecto and oral hair
cuts ~~where~~ were at a total loss as to
make the darn thing work.
So Aenthan fixed.
The End.

Most of the dyslexia student profiles indicated a need for extra time in examinations since dyslexic students generally underachieved in a test of timed sustained reading comprehension, although some of the 'visual' dyslexics coped rather better in this area.

Furthermore, all the dyslexic students presented written work with a greater incidence of spelling errors than the non dyslexic students. These errors tended to be fairly minor irregularities although the auditory dyslexics produced a greater volume of these in addition to a greater degree of inconsistency in their errors.

4.4.14 Can appropriate learning programmes be derived from the SATA profiles?

The SATA test enabled the dyslexia project team to compile a more appropriate statement of need based on students' current performance in a range of attainment tests.

Special concessions for examinations were also based on evidence of speed of reading and writing, significant discrepancies between timed and untimed reading comprehension, spelling and punctuation score levels and problems in speed and accuracy with extracting mathematical information from text. This information had the benefit of being derived from the same standardised battery of tests for adults

At this stage of the study no more detailed analysis was carried out regarding the types of errors on reading comprehension or on writing mechanics. A typical learning programme for a dyslexic student based on the SATA would probably include the following areas for attention in study skills:

Reading techniques

Strategies for improving comprehension

Spelling and punctuation/Handwriting

Organisation skills and sequencing of ideas

Memory training

Essay writing techniques

An initial survey of the SATA results, however, showed that a more in-depth analysis of the student responses would be needed in the production of any more detailed diagnostic report and for the purposes of compiling a teaching programme. This approach has been used in the recent development of a new battery of tests (see section 5) where, with the aid of computer analysis such detailed reports proved to be both possible and useful to produce.

Section 5: A Review of Student Support

Introduction

Having established a means of arriving at a statement of need based on students' current performance in a range of attainment tests, the following review of various approaches to student support is aimed at examining existing support and provides a background to the precise needs which are to be met.

The examples of how student learning needs can be met which are presented in this section are all drawn from individual support work carried out by the researcher with students from several Universities

Section 5.1 draws on the experiences presented in Section 2 of student case studies and in additional student support work carried out by the researcher. It examines a series of successful learning support procedures which have worked for students at higher education level.

Further to the findings of Section 3 relating to the most effective styles of screening procedures, Section 5.2 charts the development of an informal approach to screening designed to be capable of emulating the basic interview aimed at establishing whether students are likely to be dyslexic, and therefore need a fuller assessment.

As dyslexia is only one of many areas which occasion a need for learning support, a primary aim of this development was to find a way of including such aspects as learning modality and preferred learning style, as well as a means of gaining an insight into students' level of study skills.

Section 4 explored and adapted existing tests which could evaluate students' current levels of performance as a basis for a full diagnostic assessment. Building on the findings of Section 4, Section 5.3 presents the development of a battery of tests aimed at combining evaluation of performance with assessment of both strengths and weaknesses with particular reference to dyslexia.

5.1. Approaches to individual student support

The following approaches to aspects of student support are not intended to be seen as being representative of general support work in H.E. but are selected from the researcher's personal learning support portfolio (six of these students are featured in Section 2). They are examples of successful interventions that took place and are presented as a contribution towards what is '*an acknowledged lack of ...reported teaching experience for adults particularly at H.E. level.*' (Singleton in press). The various approaches were developed from many years of the researcher's direct experience in learning support.

These approaches include:

- A metacognitive approach
- Reading and comprehension
- Study Skills
- Neuro-Linguistic Programming
- Examination Phobia
- Applied Visualisation
- Dealing with stress and anxiety
- Memory
- Organisation
- Handwriting
- Spelling

5.1.1 A metacognitive approach

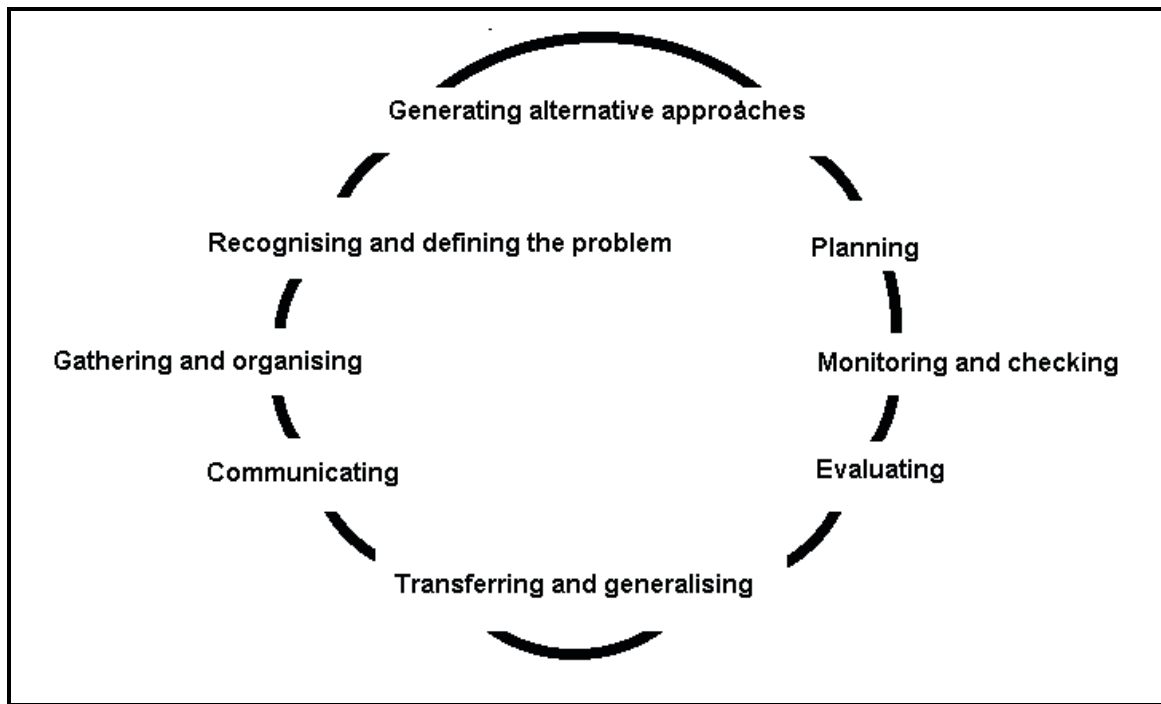
'Metacognition is the awareness of one's mental processes involved in learning - the capacity to reflect on how one learns, how to strengthen memory, how to tackle problems systematically - reflection, awareness, understanding and perhaps ultimately control.' (Nisbet,J 1984).

For a student, to have metacognition means that they are equipped with a range of strategies and have the knowledge and experience to apply them appropriately to the various challenges which face them in their studies.

As a result of working with a number of dyslexic students at university, and having analysed some of the more effective learning support approaches through the Case Study presentations, it is clear that this definition of metacognition also summarises the underlying principle at work in the type of support that would be desirable for dyslexic students. A metacognitive approach is essential for dyslexic students tend to lack confidence in their ability to study and may have rather limited or laborious strategies which have become habitual. A metacognitive approach is effective in breaking this cycle because it shows ways in which they can continue to cope using their own resources through university and beyond. The role of metacognition and its effectiveness with adult dyslexics is further explored in the literature (Price 1997), and self-monitoring, modelling and checking feedback is encouraged (McLean & Woods 1997), see illustration 5a. for a Working Model.

This working model of the processes of metacognition demonstrates the cycle of identifying a problem, looking at the range of possible solutions, and selecting the most appropriate ones. The next stage having applied the solution is learning to mediate and generalise from that specific solution to an individual problem to its application to a wider range of problems. The systematic feedback on the success or failure of each technique enables the cycle to be repeated, based on an ever increasing foundation of personal awareness.

Illustration 5a: Working Model of the processes of metacognition.



(Reid 1994)

Case study evidence is presented in Section 2 to support the idea that successful implementation of different cognitive strategies and resources are available to each student. The extent to which attitudes, beliefs, self-esteem and style of learning can colour certain aspects of approaches to learning has also been explored. The process of feedback and strategy development is also reported in the case studies.

5.1.2 Study skills support in Higher Education

Study skills support is often very much needed by dyslexic students who have been documented to have a range of difficulties relating to organisation, essay-writing, note-taking, and a volume of reading (Gilroy 1994).

Technological aids now play an important part in the study support provision of dyslexic students, and include word processing with spelling and grammar check facilities, think sheet programmes for planning essays, voice recognition, speech synthesisers, scanners, and spelling improvement programmes.

Ellen Morgan has developed a software package entitled VOICETYPE at the University of North London (HEFCE project 1994) for voice recognition to be used by students with severe dyslexia.

'An effective study skills programme should :

- *Focus on the student's individual learning style*
- *Establish an appropriate learning environment for the student*
- *Provide the opportunity to develop skills in the processing of information, i.e. the input -> cognition -> output*
- *Enhance the student's self-esteem*
- *Help the student overcome any barriers to learning'*

(Gavin Reid. 1996)

One particular dyslexic student with additional difficulties in English was doing a science degree and was unable to attend any study skills sessions due to time-table restrictions. He was therefore given the name of a study skills text book. He was not to be seen again, but left a message at the end of the summer saying *'Thank you for all your help. I have put into use all your study suggestions and I am very pleased with my grades.'*

Having left his war-ridden country - with the expectation of his family for him to achieve a degree in England, he was highly motivated and one reference for a book (the content of which he had scrutinised, highlighted in part, and rehearsed) appeared to be sufficient to guide him to his target.

Other students, occasionally with fewer difficulties than him, had attended weekly sessions, individual and group study skills classes, discussed, rehearsed, reviewed and talked through a lot of their experiences in order to achieve similar results. These are the comments of one such participant: After students had been given a week's general induction and study skills course. *'With index cards, they end up being used instead of file paper to write general lecture notes on . People are doing some of the things they have been told, but they don't know why they're doing it and what it's for.'*

Apart from being dyslexic there are also other contributory factors to consider; such as the context within which the individuals find themselves, define their sense of purpose, and their levels of self-confidence and awareness, that create the starting

point from which a tutor may be able to ascertain the input required for students with varying needs to achieve similarly good results.

5.1.3 Reading and comprehension

'Reading comprehension is one of the most important skills' (McLoughlin et al.1994).

Many of the required reading techniques used by students (speed reading, skimming, scanning, extracting key points, organising ideas, inferring from text,) can pose varying degrees of difficulty for dyslexic students and places particular strain on their powers of comprehension. Some of the most frequent comments from students attending sessions have been that they read too slowly, lose concentration, lose their place, make errors, misinterpret the content, and sometimes experience the physical problems of distortion of text or glare.

Active reading techniques are used to help dyslexic students to become more focused and questioning readers, and are discussed further in the literature (Miles & Gilroy 1986, McLoughlin et al.1994).

One of the effective ways that dyslexic students have been helped to improve in their reading has been to introduce a spoken dimension, so that when the students have read some text, they stop and put it into their own words, and where appropriate discuss the ideas. This helps them to assimilate the information and appears to improve their skills. Studies carried out by Yuill & Oakhill (1988) which involved peer discussion groups following a reading activity compared to no discussion, support this notion, and are of relevance to dyslexic students, who additionally often have an underlying memory difficulty to cope with.

A selection of exercises in listening comprehension, and curriculum-based cloze procedure activities, devised by the researcher, is available for purposes of illustration in appendix 5A.

5.1.4 NLP approaches to learning

The field of NLP (neurolinguistic programming) has contributions to make to the dyslexia tutor's teaching resources. Some of these were presented in a paper at the BDA International Conference in Manchester (Zdzienski 1994). In a recent paper presented at the BDA International Conference at York, NLP was described as helping *'dyslexic students to become effective learners through increased self-awareness of individual learning styles and stages of learning'* (McLean & Woods 1997) (see also Section 5.2).

NLP has not exactly been embraced by the teaching community, perhaps because it was seen to be more directed at an American readership, and the educational aspects have not been fully applied to the English education system in any publication (Zdzienski 1994). The origins, theoretical background and general application of NLP are fully presented in the NLP literature (Bandler & Grinder 1979, Bandler 1985, Andreas & Andreas 1989, O'Connor, & Seymour 1990).

Within the dyslexia field it is very likely to be the NLP Spelling Strategy (Section 5.1.8) that has become the most widely known and used, and lectures and workshops on the use of NLP procedures are included in the RSA, Hornsby, and Helen Arkell courses for teachers of dyslexic students.

'N.L.P.(Neuro Linguistic Programming) is essentially the study of the structure of SUBJECTIVE experience, has its own quite distinct principles, methodologies and technologies. These are utilised to marshal individuals' conscious and unconscious resources to produce as rapidly as possible the achievement of specific goals for learning and behaviour.' (de Luynes 1993).

NLP theory maintains that no one is broken, that everyone has everything they need inside them to achieve what they want for themselves.

All our behaviour, including our symptoms, is simply the result of whatever is going on inside - the pictures we make (in and out of our own cognition) and the voices and sounds we hear within us, and the associated feelings.

The basic aim of NLP is to help people discover the structure behind their presenting problem, whatever that may be (personal relationships, unwanted behaviour, physical complaints, desire for enhanced performance etc.) and to help them achieve the intimacy, sense of well-being, healthy physical body or excellent performance that they desire. (Seymour & Digby-Jones, 1994).

Aspects of NLP that have been of particular relevance to dyslexic students in Higher Education were presented at the Access to Independent Learning Conference at Leicester (Zdzienski 1994) and are summarised below, with several specific examples to illustrate the range of issues that it addressed and which are presented in more detail in the following sections:

- altering limiting perceptions and dealing with examination phobia
- using visualisation techniques to improve i) comprehension and retention of material from text and revision skills, ii) creative writing,
- improving spelling of individual words,
- dealing with stress and anxiety.

5.1.5 Altering limiting self perceptions and dealing with examination phobia

Some of the dyslexic students in H.E. with whom the researcher has worked have not had any special help during their childhood, and a number of them have not ever been assessed before, therefore they have not all had the benefit of a sympathetic approach to help them achieve a more balanced perspective. Indeed in some cases their anxieties have been submerged without their being directly aware of it, consequently creating a negative effect on some of their thinking and learning.

'Part of being a dyslexic student is learning to recognise the truth from among the sharply contrasting messages that are given to you throughout your life about how intelligent and at the same time how stupid you are' (student).

Because of the legacy of school days and earlier difficulties a number of dyslexic students who have had the determination and consistency of approach to their

studies and gained entrance to university, still have an underlying difficulty which needs to be addressed and acknowledged.

A dyslexic student with musical talent and a good career ahead of him, was brought down repeatedly because of one main weakness. It was a sufficiently marked problem that it could bring about his failure on the course.

He was usually very confident but when it came to sitting a formal examination he always panicked and felt he was not good enough to pass. He had not done very well in exams at school and it was his other abilities and confidence that would have pushed him forward. In common with many other students just one visit to the centre for suggestions and advice proved to be sufficient to trigger him into a greater awareness and understanding of himself. It gave an insight into the reasons why he felt the way he did and provided him with enough awareness of the resources that he had within himself, but did not know how to access, and thus to helped him resolve the problem.

A visualisation exercise in which he gave himself the opportunity to explore some of the feelings which he associates with examinations was carried out. The feelings came first, and these created a sense of self-doubt and ended up with him feeling very overwhelmed.

The exercise he was given to carry out was one of *'playing back the tape'* with the possibility of catching the last frame that presented itself. He visualised, within the context of these negative feelings, all the incidents that presented themselves on his mental video tape. The playback had to be done quickly, the actions almost resembling a 'fast reverse' so as not to allow conscious thoughts to intervene. When the tape ran out, he was asked to catch hold of the last frame and describe what he saw.

'I am 11 years old and in the new secondary school. I am sitting at my desk, we are all in neat rows. We are in the middle of doing oral translation in class.'

He relived the feeling of unease, of dreading the teacher telling him that it was his turn, and being put under pressure before the whole class and the teacher, and having to produce an instant translation. He experienced an instant feeling of

panic, the fear of getting it all wrong and looking stupid, the injustice of being tested in this way and made to look wrong, when in fact, had it been under different circumstances, he would probably have got the right answer.

What he had in fact achieved by this point was:

- Self-awareness. He had successfully acknowledged that a negative feeling existed.
- He had addressed and explored it. What aggrieved him most was the sense of injustice. This enabled him to accept that the problem was not that he was incapable, but rather that he could achieve given the right circumstances
- He had found a possible source of how this feeling came about.(it may not necessarily have been the original source but for the purposes of what he was going to gain from the exercise it was arguably a reasonable enough starting point).

The final part of this exercise (all of which takes about 10 minutes within a half-hour session) involved going back to put things right. Another 2 minute visualisation exercise offered this student the opportunity to go back to the same classroom and act out the short scene but this time with the additional advantage of possessing the understanding and maturity of a 23 year old.

He replayed the scene with the teacher going round the class and then acted out his turn, only this time he was in control; and he specifically enjoyed the experience, he wasn't rushed into making a fool of himself, he spoke with confidence and with purpose, he took his own time and gave a considered answer, and he regained his sense of autonomy within the learning situation.

The student left the session saying it had given him *'lots to think about'*.

At a later date, the researcher happened to meet him in passing and stopped to exchange a few words. He said that he was very pleased to have passed his exams, and to have *'done rather well in them'*.

The adverse psychological effects of dyslexia on adults has been investigated and reported in case studies , and the use of NLP procedures to facilitate recognition of past experiences as well as the development of coping strategies resulting in

increased self-esteem and control of stressful situations such as examinations have been further explored by Gerald Hales (1997), himself an NLP practitioner.

5.1.6 Visualisation techniques for improved comprehension, and retention of material from text and revision skills

Approximately 60% of dyslexic readers have been placed in the following two categories: i) the 'linguistic dyslexic', who reads quickly and inaccurately, making a number of factual errors, and ii) the 'perceptual dyslexic', who reads accurately but very slowly, because of sounding words out and repeating words and phrases (Bakker 1990)

These particular inefficiencies in reading have been attributed to a lack of stimulation in the right hemisphere of the brain for the 'linguistic dyslexic', and in the left hemisphere for the 'perceptual dyslexic'. A system of reading which incorporates a balanced approach, bringing together the generally accepted left hemisphere activity of 'coding and de-coding' the written word, and the right hemisphere activity of 'comprehension in terms of the overall picture' has proved to be very successful with dyslexic students of all ages (de Luynes & Zdzienski 1992). The underlying theory for this 'read - pause - picture' technique is to be found in NLP (O'Connor & Seymour 1990), and examples of its application for improving reading comprehension in the context of normal education can be seen in the work of Jacobson (1986).

John, a dyslexic student who attended study support sessions at Kingston University (1992) was at that time in his second year of Business and Finance. He had many of the required attributes for his chosen subject, but he was clearly disadvantaged by his very weak literacy skills. His reading was slow at 100 wpm (words per minute) and his comprehension skills were limited. His spelling was at an 11 year level (based on the Vernon Graded Word Spelling Test) and his handwriting immature in its style and presentation and slow at 10 wpm (the suggested average being between 20 and 30). In preparation for his examinations, he sought help with regard to a paper on law, for which he considered that he would require a thorough knowledge of approximately twenty five legal articles.

An example from one such article is printed below:

'In Balfour v. Balfour (1919), a husband promised his wife an allowance before he left to take up a post abroad. When he stopped the payments, an action by the wife failed on the ground that this was not a binding contract but merely a domestic agreement with no legal obligations attached to it.'

When he read this paragraph from his text book, he went back and re-read it twice again from the start, trying to establish the meaning. He explained that when he read silently, his comprehension was very poor; however, if he read aloud - or better still when someone read aloud to him, or when he heard his own voice on tape - he would gain a better grasp of the content. He discovered that if he covered up his ears and read aloud, he could hear the reverberations of his own voice. This made it easier for him.

In applying the NLP visualisation technique, he went back to the article and read the first few words aloud (as many as felt comfortable to him at any one time) and stopped, forming an image in his mind, and rehearsing the image in his own words. He had created a 1920s stage set, and visualised Mr. and Mrs. Balfour exchanging a fond farewell kiss as the butler busily brought out the suitcases. In his imagination he role-played the part of Mr. Balfour, using a multisensory framework which he linked to the appropriate historical context. Superimposing his own emotions added a further dimension which helped him to remember the content. He reproduced the content in his own writing (see illustration 5b.).

Illustration 5b: John's handwritten response

Balfour v Balfour 1999

Mr Balfour set up an ^(allowance) income for his wife before he left to go abroad while over there he stopped the payments His wife took him to court. This case failed due to it was a domestic agreement and not a binding contract (no legal obligations attached to it)

Using the reading comprehension strategy he was able to increase his understanding of text and remember its content accurately over a period of several months. This strategy was used effectively with a number of students (see section 2.4.2). Whilst, in theory, this strategy is said to be equally effective in the context of any subject matter, I was only able to teach it successfully in relation to more descriptive types of text, rather than, for example, helping a student to remember the content of an electronic engineering reference book. However, quite clearly the more students are able to link what they are reading to a relevant semantic context, the better will be their recall of the material (Oakhill 1984).

5.1.7 The researcher's approach to visualisation for improved creative writing

This topic is presented in greater detail elsewhere (Zdzienski 1994). Dyslexic students have often avoided subjects that require a lot of essay writing, because of their difficulties in organisation of ideas, sequencing, selecting, describing, etc. Language processing is often less efficient and slower than for their peers. The following extract is taken from the writing of a 14 year old dyslexic science student who said he never wrote essays and felt unable to write creatively.

After a one minute group visualisation exercise, he and the group were given five minutes to record what they had 'seen' and experienced based on the title 'The man walked down the lane'.

An extract from his work follows: *'The old vagabond wandered slowly and painfully down the lamp-lit lane, disappearing and then reappearing in each pool of light as he went. Old tins and bottles stood outcast on the hard concrete ground. His real identity was hidden under a layer of city dirt concealing him from an ungrateful world..'*

The interest of the group when he read his work was enough to spark a change for the better in his self-esteem. He later commented at his surprise at the vocabulary and imagery which he himself had produced in what was a relatively effortless manner.

5.1.8 Visualisation to improve spelling

The NLP spelling strategy has much to contribute to the teaching of spelling to both dyslexics and non-dyslexics. It is, however, an area that requires longer term investigation and systematic study. It could be said to have created false hopes among some dyslexics mainly because, like all methods, it is but one approach that works better for some people than others, and which, if mishandled, could become a novelty, perhaps having been built on unrealistic hopes in the first place, is then equally quick to disappoint.

The main concern of dyslexia tutors (as expressed in NLP workshops, and on the diploma courses that I have been involved with) has been that the NLP strategy of learning individual words cannot replace the structured, multisensory teaching programmes which deal with regular spelling patterns that the student can apply to hundreds of words. They were particularly wary of boosting the student's self confidence without being able to maintain it over time. Practitioners have created their own interpretation of the NLP spelling strategy and presented it for use among tutors (Gill 1991 see appendix 5B)

Spelling requires both visual image and sequencing of sounds. Because images are almost instantaneous and sounds are sequential, NLP theory maintains that a system that places emphasis on visual learning is bound to be more effective (Andreas & Andreas 1989).

Poor spellers confuse the visual and auditory aspects of spelling by *'first sounding out part of the word, and then using creative visualisation to try to change the sounds into letters!'* The authors claim, however, that successful spellers remember the visual image of the word first and then recall the sequence of the letters with the aid of verbalisation, if necessary.

In contrast, the traditional methods used with dyslexic students prescribes that they *'learn the sound of each letter before linking up the letters to build up words'*. (Smith 1996). The multisensory methods have often placed too great an emphasis on sound being the primary stimulus.

A dyslexic student by the name of David, who was hoping to become a dentist, was doing particularly well in his practical work but was told that he would not pass the written examination unless he could improve his spelling, attended the study sessions.

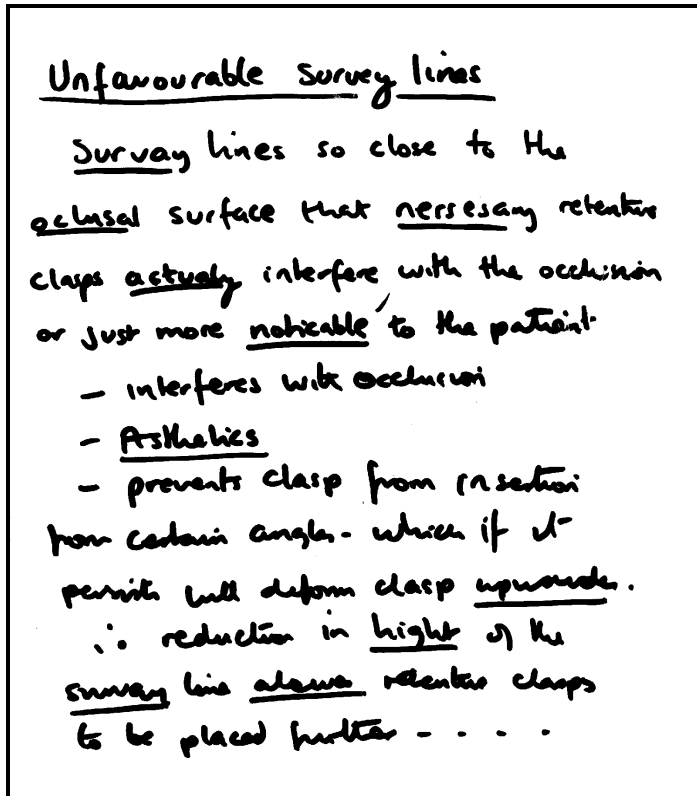
A typical sample of his handwriting (see illustration 5c.) revealed that nearly every line contained one, if not two spelling errors. Clearly he did not have the sort of time at his disposal to engage in a series of spelling lessons, so he needed a fairly immediate method of identifying and correcting errors in his hand written work.

Fortunately the identification part was not a problem, because, when asked, he was able to run his eyes down the page and underline the spelling mistakes. In his capacity as a dentistry student, he will clearly have read a fair amount and will have seen most of the words that he needs to write. The thought that the image of all that 'seen' vocabulary must be retained in his mind was reassuring to him, and at that point we started the programme. He was asked to recall the spelling of words called out to him, and it became apparent through observation that he was attempting to construct an image of the word as if he had never seen it before ('visual constructed').

When he was asked to consciously change his gaze to the opposite direction ('visual remembered') and was given further words to spell, he started to spell them with greater ease and accuracy. He noticed this and remarked that he could visualise the words with much greater clarity. With this, he proceeded to recall the words he had underlined and was able to spell them with an 80% success rate.

The spelling strategy that I used with him is presented in detail (Bandler & Grinder 1979), but it is based on the observation that when we think, we move our eyes in systematic directions, depending on the kind of thinking we are engaged in. These movements are called 'eye accessing cues' and are categorised into the different sensory modalities that people tend to favour when they are processing information.

Illustration 5c: Example of David's written work



The symbols represented (see illustration 5d.) are as follows:

Vr - Visual remembered, Vc - Visual constructed, Ar - Auditory remembered, Ac - Auditory constructed, Ad - Auditory digital (talking to oneself), and K - Kinaesthetic (feeling emotions, tactile sensations and feelings of muscle movements).

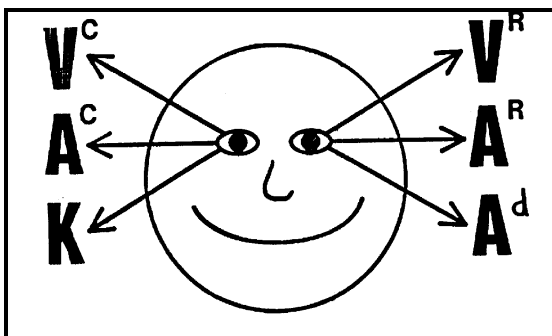


illustration 5d. NLP Eye Accessing Cues

5.1.9. Dealing with stress and anxiety

'Its given me a very positive approach rather than let my studies dominate me. I CAN use my studies, to give me more confidence in myself and my achievements'. Comments of a dyslexic student after a group session on Dealing with Stress.

Certain aspects of Student Study Support overlap with Counselling and at times Cognitive Therapy. The above student suffering from exam phobia also had low self-esteem. Before the exam the forthcoming event would loom before her and become magnified out of proportion. She tended to dwell on and the anxious thoughts and overlook her own ability to cope. In other words she was misinterpreting and distorting reality to the extent that she started to react to the thoughts themselves and thus became more disabled by her own anxiety reactions. Severely anxious people become so aware of their own physical and emotional reactions that they begin to dread and fear the symptoms themselves and end up in a self-perpetuating spiral of worry and suffering.

Several of the problem-solving and relaxation exercises that were used with students during this study are available in appendix 5C, the booklet produced containing a stress management guide and several questionnaires that were found to be helpful.

A post-graduate dyslexic student was sent by his course tutor to seek specialist support for his poor handwriting, having been warned that his place on the course may have to be reviewed unless improvements were made. An example of his writing is presented in illustration 5e.

Considering the educational level Philip had reached (without the aid of a scribe), it seemed unlikely, to the researcher, that the problem lay in the handwriting itself. So Philip was asked to participate in an exercise which required no writing at all. Relieved, he was asked to sit back, relax and imagine that he was in the middle of writing an essay, and whilst visualising this to call out any comments about his observations.

His response to the question 'What do you feel?' was '*Pain...stress....rushing to finish.....the end result is the most important thing.....*'

'What is it that you want?'

'...Responsibility...job satisfaction.....not being a student..'

'How does it make you feel?'

'...Disillusioned...anxious that I might fail again...afraid that I will fail...not confident.....not skilled.'

Philip was then asked to visualise a happier future scenario, such as seeing himself in his new job. He described the feelings of respect, confidence, responsibility and leadership which he was enjoying, his smart appearance and the open-plan office, and the rewarding involvement in the company, his clients and colleagues. He then took out some of the positive emotions and associated them through visualisation with his current situation of attending seminars, writing reports and applying for jobs.

After ten minutes, he was asked to record some of the points from a lecture he had attended that morning. His writing is presented in illustration 5f.

Illustration 5e: An example of Phillip's handwriting before the visualisation exercise

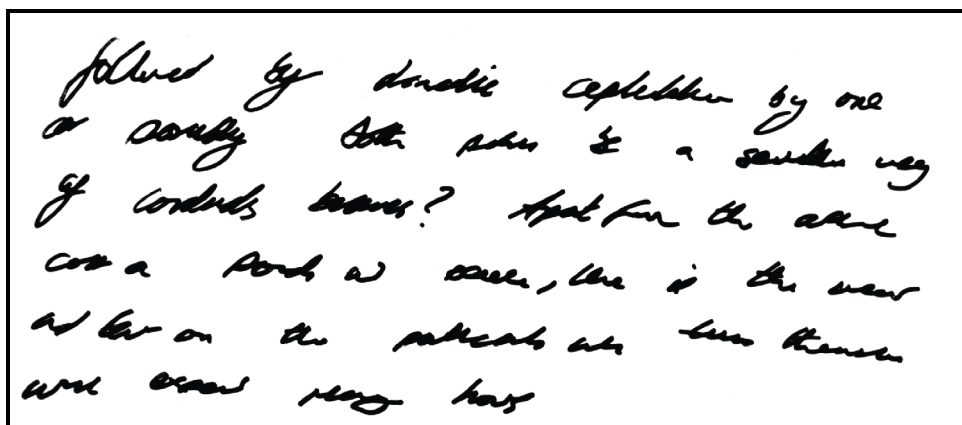
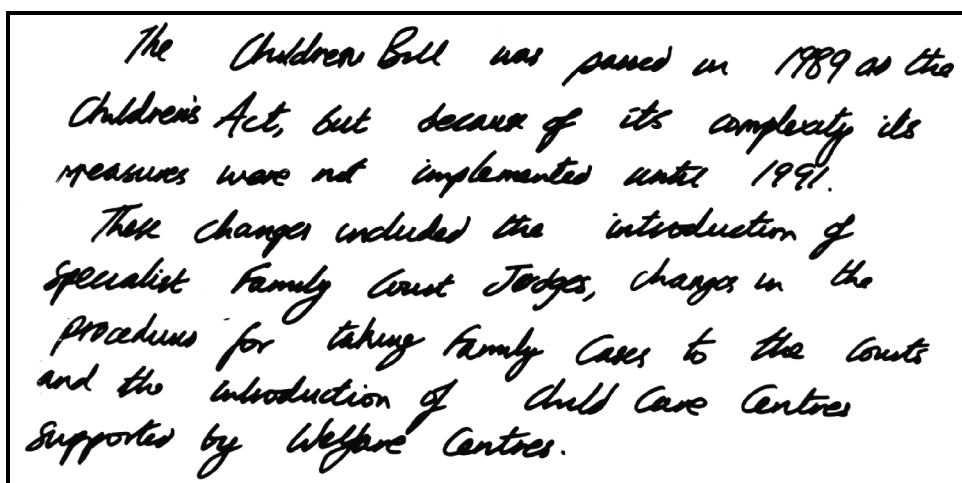


Illustration 5f: An example of Phillip's handwriting after the visualisation exercise



The Children Bill was passed in 1989 as the Children's Act, but because of its complexity its measures were not implemented until 1991. These changes included the introduction of Specialist Family Court Judges, changes in the procedures for taking family cases to the courts and the introduction of Child Care Centres supported by Welfare Centres.

His handwriting had undergone what appeared to be a distinct improvement. Furthermore, it would appear that for the following months he had been able to sustain this more regular and legible writing (no more was heard from his tutor). A neatly written letter of thanks was sent by Phillip several months later, showing the more positive attitude of a successful student.

This NLP approach helped him back onto the right path, and maybe stopped him from sabotaging his own success by allowing him to reveal his hidden anxieties to his conscious self, then address his fears and make a fresh start. Furthermore he had saved himself from unnecessary attendance at a series of handwriting classes which may only have increased his frustration and sense of panic.

When confronted by the multi-layered, over-compensated personality of some dyslexic adults in H.E. one cannot always effectively solve anything by just using a traditional academic approach. The examples given above are among many taken from case studies. At times these one-off sessions in counselling have been the most effective help these students have received. It is the researchers view that these methods merit a greater degree of credibility and respect from the academic staff in H.E.

5.1.10 An approach to memory training

Impairments of aspects of memory can be seen to be the '*second major risk factor*', when considering concomitants of dyslexia (Turner 1997).

An inefficient working memory is a common symptom of dyslexia (McLoughlin Fitzgibbon & Young 1994), specifically in 'item memory' (the capacity to hold individual pieces of information) which may be markedly reduced compared to non-dyslexics, and, perhaps to a lesser degree, in 'serial order memory' (the ability to preserve the order of the pieces of information). Dyslexic students with limited working memory capacity will experience a conflict in the use of working memory for temporary storage, as well as for processing the skill. '*This will reduce the effectiveness of one or other or these functions.*' (Chasty & Friel 1991). Often when dyslexic students read a paragraph, they end by saying that they have not taken in any of the information, if they read only for information then they are liable to make errors, but when they hear the text being read to them, they can take in the meaning (and the accuracy is ensured). This has obvious implications for dyslexia support particularly during examinations.

In the light of the above, it begins to be possible to understand the dyslexic student at Kingston University who said regarding the examination question in illustration 5g., '*I can't take in all of the question but I know that I am capable of answering it*'

Illustration 5g: An example from an examination paper

A is the freeholder of a site in a High Street in a prosperous market town. A is granted a building lease to B in 1954 for 99 years with rent reviews every 33 years. The initial rent was £3,500 p.a. rising to £5,500 p.a. and £7,500 p.a. at each review.

B built a 2 storey shop on the site which he let in 1955 to C, a leading multiple on a F.R. and 1 lease for 42 years at a fixed rent of £25,000 p.a. plus a premium of £15,000 paid on entry.

Last year C, the multiple, sublet the first floor to D, a small firm of solicitors, on a 10 year I.R. lease with 5 yearly reviews to FRRV. The solicitors pay a net rent of £24,000 p.a. to C, plus a separate service charge to cover the apportioned cost of external repairs, insurance and management.

The shop has an area of 300 sq. m. in terms of zone A, with an additional 86 sq. m. for storage and staff rooms. According to comparable market evidence rents are £800 per sq. m. in terms of zone A, while office rentals have increased at 5% p.a.

Value the interests of A,B and C in the above property giving reasons for yields adopted in all valuations.

An analysis of assessment reports at the Dyslexia Institute revealed that approximately 75% of dyslexic students (whose general abilities were at least within the average range) achieved below average scores on Digit-Span and Coding (sub-tests of the WISC) (Zdzienski 1993).

Clear links have been established between working memory and the development of language and literacy skills (Bannatyne 1971, Thomson 1979, Baddeley 1982). Dyslexic students are hampered by these difficulties to varying degrees throughout their lives. These students learn to cope to a certain extent and use compensatory strategies to enable them to get through different situations.

However, because of the extra volume of language related work they are required to deal with at university, they may find themselves overwhelmed and unable to cope. A significant weakness in memory may bring about difficulties in creating linguistic, as well as other behavioural responses that would be appropriate in given situations (Rosenfield 1991). Both personal and academic performance may well be adversely affected by persistent memory problems.

However, researchers have also suggested that the limits to working memory capacity are set by strategy or skills limitations (Reisberg, Rappaport & O'Shaughnessy 1984). In principle, therefore, there is no limit on what the 'constellation of constituents might be', and on how much the working memory system might be extended. There is some evidence that a semantic link to information to be recalled does benefit dyslexic students, since the information gets transferred into long term memory. All students can benefit from the various memory techniques that are based on this principle (e.g. peg & hook, mnemonics, rhyming grids). Working memory, therefore, could be regarded as a skill which can be taught. (Keeney, Canizzo & Flavell 1967) found that when children were directed to carry out verbal rehearsal they were able to achieve better recall of information than when they did not, and equally good recall to those who spontaneously used verbal rehearsal. This led the authors to the conclusion that the necessary skills to facilitate or mediate recall are not automatically used, but could be taught.

When working with dyslexic students, it is evident that regardless of their poor results on a memory test (such as the Digit Span), they are still able to recall the information they require, with the use of memory techniques, but usually some extra stages of rehearsal are needed (Zdzienski 1993). A summary of teaching suggestions are presented in illustration 5h.

Illustration 5h: Lecture Presentation on Memory Training for Dyslexic Students

Memory training for dyslexic students.

- Establish success in a memory task using a strategy that is easy to implement
- Relax, and focus attention for short amounts of time
- Attach meaning; semantic memory links in with long term memory
- Make it multisensory, and add imagination, emotion, imagery, and colour
- Create a suitable context so that there is a framework in place
- Add extra stages of rehearsal to ensure that recall is achieved even under pressure.

D.Z./dip.SpLD.1993.

Dyslexic students at university would benefit from having a metacognitive awareness of a range of memory strategies which they can select for application to the required task. As seen in section 2.4.3, it can essentially make the difference between a good examination result and failure. Dyslexic students may lack the resources for memory strategies and need to be taught these and given the opportunity to try them out in their support sessions. They could build up their confidence in the resources and successfully detach themselves from the debilitating notion, which renders them more vulnerable during examinations, that they have weak memories.

A landscape architecture student, who said he was dyslexic, and concerned about a forthcoming test on botanical terms to be given to his year group, attended the sessions for some guidance. With appropriate help, he selected a card system, which research has shown to have a high success rate (Landauer & Bjork 1978). It provides a student with the optimum opportunity for rehearsal without allowing discouragement to set in or any sense of being overwhelmed by the volume of information to be memorised. Baddeley (1982) stated that the normal distribution of practice which one would expect in learning new words is not the most efficient way to learn. What he described as the 'micro-distribution practice' is more effective in that the sooner the item is tested the greater the possibility that it will be correctly recalled and, therefore, strengthened in working memory. The strategy suggested is flexible, with a new item tested after a short delay. As recall becomes more efficient in working memory the practice interval is gradually extended. A failed item would be brought back and presented again after a short delay. Correct items would be spaced out. To facilitate this strategy a card system for learning the required items of information is required. This technique is most accessibly presented in Alan Baddeley's book entitled 'Memory: A User's Guide', and was successfully used by him to teach his son French. It guaranteed and delivered an equally good result for the landscape architecture student who returned 70% on the test and was among only a handful of students who passed.

All the other non-dyslexic students who did not pass could perhaps also have benefited from this strategy, but it is not within the remit of their department to actually suggest ways in which learning might best be done.

His self-esteem was also rewarded by this experience.

Finding ways in which dyslexic students can excel, particularly in areas in which they are reputed to be weak, understandably can have a therapeutic effect. This is further supported in work carried out at secondary level with dyslexic students in mainstream classes (see Zdzienski, 'Revision techniques' 1990, and 'Working memory training in teenagers' 1990).

One further example follows:

Robert was referred at the age of 22, two years after having studied law and having failed his first year examinations at university. His report stated that 'he made perceptive comments in the discussion group, but that his performance in examinations revealed serious 'blind spots' in his knowledge'. He presented as a bright dyslexic who had convinced himself that he was an educational failure because he suffered from a poor short-term memory problem. His assessment report revealed that he was in the top 1% of the population in terms of his overall ability. However, it placed him in the bottom 15% in the memory sub-tests.

A quick analysis of his memory performance revealed that when the sensory input was visual and required a spoken response, his result was perfectly normal. But, when the sensory input was auditory, and required a written response, his score was very poor indeed.

Robert seemed to be convinced that his memory weakness was permanent. A succession of border-line examination passes over a number of years had eroded his self-confidence.

Discussion of the way in which he approached the tests proved to be even more useful. He found that learning alternative strategies, which he could adapt to his situation, could focus his mind in a positive way. It became evident that he had difficulty in dealing with information presented visually in the form of diagrams, graphs, or tables, because he experienced a particular difficulty and slowness in processing information which required frequent shifts between verbal and visual channels (this seemed similar to the difficulties of many dyslexic children in following pictures and reading simultaneously when looking at comics). He did find, however, that when constructing a mind map (for revision purposes) he could use the dimensions of space and colour to his advantage (see illustration 5j.).

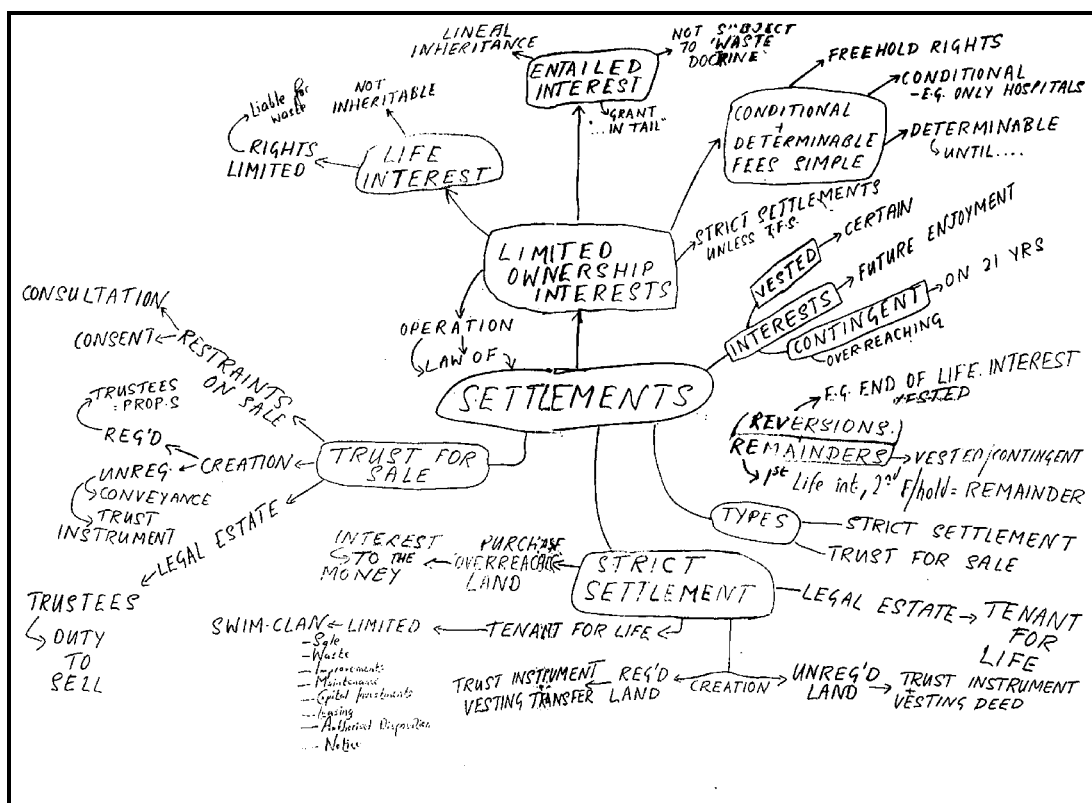


Illustration 5j An example of a Law Student's Mind Map

He described that because he created the mind maps himself, he remembered them better, and because of the different aspects being presented with a physical space between each, he could then sequence, prioritise, and make new connections that he would not have done before. The benefits of this technique, are fully presented in study skills books by authors such as Buzan, 1982, and are described more fully for dyslexic students (Zdzienski 1990) but were advocated over twenty years ago for dyslexics (Miles 1974). Robert additionally made use of mnemonics and acronyms to key into information presented in lists, which he previously had no idea of how to deal with e.g. 'swim-clan' which represents 'sale, waste, improvements, maintenance, capital investments, leasing, authorised disposition, and notice' (see illustration 5j).

Auditory memory tasks proved to be even more difficult for him to cope with. After carrying out special exercises in concentration, listening, internally rehearsing and writing (Chasty & Zdzienski 1986), with increasing success, he gradually started to alter his limiting beliefs. As a consequence of this positive experience, he amended his approach to learning. From a position of not being able to recall a short sentence, he was soon listening to longer and more complex sentences and being able to recall them in detail, in writing.

The following example is taken from the text, and is followed by his written response:

‘So too, in *Bridlington Relay Ltd v Yorkshire Electricity Board*, where the plaintiffs ‘piped’ television signals from their aerial mast to members of the public, they claimed to be entitled to a greater freedom from interference than the average domestic user on the basis that, unless they could offer a superior signal, they would have no customers.’

‘So, too, in the case Bridlington Relay Ltd. v Yorkshire Electricity co. where the plaintiffs piped T.V. signals from their transmitting mast. They claimed greater freedom from interference on the grounds that if they were unable to provide superior pictures they would have no customers.’

Robert was achieving what he had not believed to be possible, and was able to prove to himself that he did not suffer from an ‘*irredeemably*’ poor memory.

The study of people who show excellent memory skills supports the importance of the individual having a range of strategies available in memory. Gordon, Valentine and Wilding (1984) were interested to discover whether their subject with outstanding memory owed this to i) capacity of his short-term store, ii) low rate of decay of learned information, or iii) the use of a range of strategies. In finding that their subject did not have unusual basic memory skills, they were endorsing the findings of previous researchers such as Luria (1969), Gummerman and Gray (1971) and Coltheart and Glick (1974). They concluded *‘It is the application of a superior range of strategies or techniques to ordinary memory skill which brings about the superior memory performance sought by students’*.

The teaching of a range of memory strategies, therefore, is a necessary part of a study skills course, and the case studies show some evidence that memory training has an underpinning role to play in the study skills support of dyslexic students, who in the majority of cases have specific deficits in aspects of memory.

5.1.1 An approach to Organisation

When considering the problems of dyslexic students in Higher Education, apart from the inefficiencies in study skills *'the all-pervasive difficulty is one of dysfunctional organisation'* (Price 1997) leading to disproportionate amounts of time being spent ineffectively.

The following comment from a tutor regarding the seminar presentation of a dyslexic student (see illustration 5k.) summarises her difficulties in selecting key points, sequencing ideas and discarding unnecessary information, all of which makes these assignments so much harder and more time consuming for dyslexic students, without always the final reward of marks that reflect the amount of effort put in.

Illustration 5k: Tutor's Comments

'An interesting slant on an artist who had been fairly comprehensively covered in the previous seminar. The problem here was over the matter of the balance of material - I think that more time should have been spent on the planning stage of the seminar (just as with essays). Then the major issues can be properly dealt with and the minor ones placed within an appropriately subordinate place.'

(Nov.1992).

Exercises in the sequencing of letters or words (into alphabetical order), of sentences into paragraphs and then into essays, help to train students to deal with the ordering of information. When this is carried out additionally under timed conditions, it helps students to deal better with their own reactions to working under pressure.

Examples of sequencing and memory exercises, (compiled by the researcher), both visually presented and with a written response, and orally presented with a spoken or written response are available in appendix 5D.

5.1.12 An approach to handwriting

The issue of handwriting in H.E. is a problematic one in that many dyslexics have slow, and inefficient writing skills. However, extra time in written examinations is normally granted, with the standard provision being 25%.

Dyslexic students with poor handwriting are now recommended from an early age to learn touch typing, although *'typing even with two fingers can be an advantage'* (Gauntlett 1978). However, there is a conflict in priorities in that most of the work that they do has to be produced on a word processor, with the assistance of spelling and grammar check, and this can effectively mask their problems from their tutors. Yet, at the same time they are required to sit written examinations. This can be a set-back for a student who has become used to composing thoughts straight onto the computer and having all the spelling errors corrected. This is discussed in greater detail in 'A Personal View of Dyslexia' (Summerfield 1994).

The National Council for Educational Technology (NCET 1991) has published an information pamphlet on dyslexia and the use of technological aids (see appendix 5E).

At the Literacy 2000 conference, Lord Addington (himself dyslexic) could not conceal his surprise over the audience's eagerness to carry on taking notes all through a lecture he had introduced, especially after having told them that there was no need to take notes as there was a comprehensive coverage of the sessions in the proceedings.

Whilst for many people note-taking is actually an aid to memory and concentration, for dyslexic students it can often present difficulties because their processing of speech whilst at the same time translating it into writing, is not automatically integrated into a smooth operation.

Some of the main difficulties commented on by dyslexic students at the study support sessions were, slow handwriting speed, problems with legibility, and interruptions to the flow of ideas by inadequacies in the protocols of writing.

John was in his second year of a BSc technology course at South Bank University when he attended externally for a series of support sessions. He was very ambitious, capable and dyslexic, with slow reading (Vernon 13 year level), good

comprehension, weak spelling (Vernon 11 year level) and poor handwriting skills (see illustration 5l.).

Because he had never received any special help, his personal quest became a desire to improve his spelling and handwriting.

After several months his spelling had, in his own words, 'revolutionised' (Re-test, Vernon 15+) with a technique which, at his own suggestion, was greatly improved by integrating multisensory learning with visualisation, and his handwriting also improved considerably.

Using the handwriting checklist (Taylor & Alston, 1985), he decided on a new style and wrote a great deal on specially lined paper (to help with cursive styles). Aspects of his experiences in a diary format provided him with a meaningful and stimulating context and the results are evident in illustration 5m.

Illustration 5l: John's original handwriting

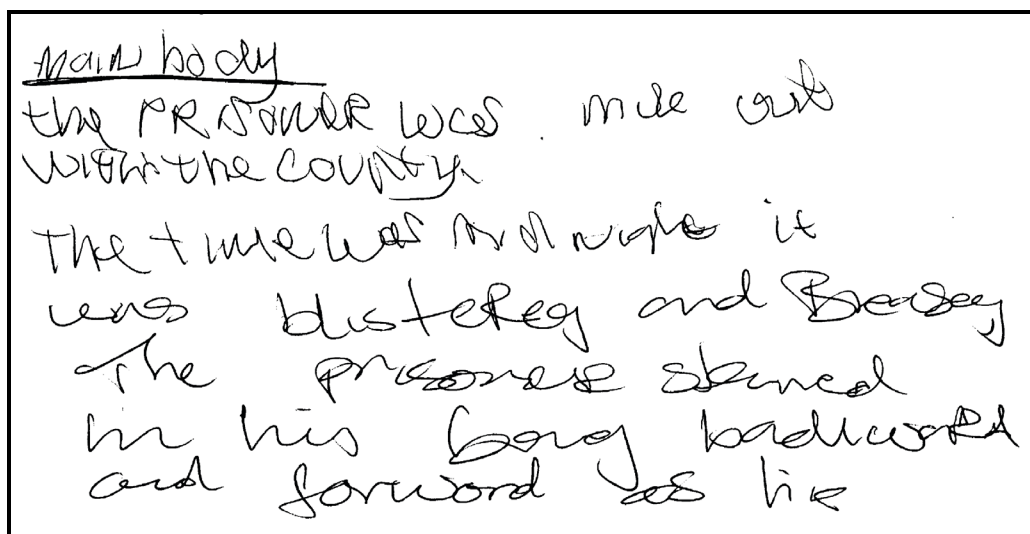


Illustration 5m: John's new handwriting style

Summary

hobbits, creatures to which
are said to be make believe.
There food was short and running
low. The hobbits were in some
desperation, in the middle of the
thickly densely maggled forest.

It was decided at the time that
they would scavage around
there camp to find food.

5.1.13 An Approach to Spelling

'All dyslexics have difficulty with spelling to some extent and this tends to remain a lifelong handicap' (Cotterell 1974).

The main focus in the multisensory teaching programmes has been on spelling, because the systems were based on a 'reading through writing' technique (Gillingham & Stillman 1969, Hickey 1977, Hornsby 1975, Cowdery 1987, Augur & Briggs 1992), that originated from the American teacher-directed 'Remedial Training for children with specific disability in reading, spelling and penmanship' (Gillingham & Stillman 1956).

This is a phonics based system that relies on simultaneous input to as many sensory channels as possible, i.e. the student builds up a set of sounds on cards (reading pack) and regularly goes through a drill whereby each unit of sound is seen, for example 'tion'. The student responds by calling out a 'clue word' built into long-term memory, like 'station', then repeats the sound 'sh'n', then in a separate procedure (spelling pack), the student hears the sound 'sh'n', repeats it, and then calls out the options in spelling for that sound (in order of frequency in the language), and whilst spelling them out loud the student at the same time writes them down in cursive style, e.g. 'sh'n' - tion, 'sh'n' - sion, 'sh'n' - cian. A more detailed description and evaluation of multisensory teaching programme for dyslexic students is available (Hornsby 1984, Thomson 1989,) and an evaluation of the Hickey method has been presented in a chapter for the Hornsby Correspondence Course (Zdzienski 1990).

With the increasing evidence for building up phonological skills in recent years, there is now an amended emphasis in the teaching methods to incorporate onset and rime (Bryant & Bradley 1989), prefixes and suffixes (e.g. Educards, Rime Time), instead of the original teaching of individual letter with their corresponding sounds in isolation e.g. in the Hickey method the student would learn to read and write the word 'string' by having learnt and put together the six components 's' 't' 'r' 'i' 'n' 'g', whereas it is much more logical and an easier load on memory, to learn the consonant blend 'str' and the common word ending 'ing' where only two component are involved, and lead the way to many other words of a similar construction being learnt.

However, a phonics based approach needs to address the fact that there are many irregularities in the language (Dr. Claiborne, 1906, stated a theory that dyslexia was a disorder peculiar to English speaking peoples, being the product of *the 'wholly illogical spelling'* of the language, and more recently McGuiness (1998) claims that if sounds of the language were taught as pictures, then there would be no dyslexics - an equally compelling and misguided premise). Gillingham described these irregularities as the 'unexpected behaviour of familiar letters and combinations'. However, these 'sight' words have to be learnt by dyslexic students by other means. Techniques suggested include the NLP spelling strategy, the 'look, cover, write, check' method (Peters & Cripps 1978), mnemonics and rhymes (Hornsby 1974).

It could be said to be a characteristic trait of the dyslexic adult who has received specialist tuition that he/she can spell longer, phonetically regular words correctly, whilst making errors in small, commonly used, sight words. This would all add to the frustrations of the dyslexic student who can appear to others to be making 'stupid' mistakes. Gauntlett (1978), himself a dyslexic, wrote of his experiences with spelling *'a two letter word wrongly spelt incurs more wrath and exasperation than a phonetic ten letter word'*, and illustrated it with this example of his own ' Battle **ove** Britain'.

Categorising types of spelling errors, based on the Margaret Peters model that are made by dyslexic students is helpful when constructing individual support. (this type of error analysis is further explored in section 5.3).

Most frequently occurring spelling mistakes are worth dealing with for each individual student, as are curriculum based vocabulary lists. Some of the more useful spelling rules that were taught during this study were the main suffixing rules, since they had such a general application and made a noticeable difference to students' work (see appendix 5F for several examples of relevant worksheets produced by the researcher).

Spelling in Higher Education has been the subject of gradually changing expectations and perceptions on behalf of both students and lecturers, thus reflecting the general shift towards self expression and away from '*correct*' English (with what was considered by many at the time to be an unimaginative and restrictive focus in teaching on spelling, grammar, punctuation and sentence construction). However, without the support structure that provided a mastery of the mechanics of language (Crystal 1996), students are now often expected to produce a good standard of written communication. There is now a situation at university level whereby standards of spelling are varied among students and lecturers, and there are no clearly stated standards that lecturers expect from their students.

Dyslexic students at university are given certain concessions for weak spelling in their written work. These concessions are not granted equally throughout all subject areas, and the message given to students can vary from: '*spelling is not that important*', (as said to an engineering student) to '*your spelling needs to improve if you want to pass these exams*', (as said to a law student). There appears to be no standardised procedure across all subject disciplines for spelling concessions to be granted for dyslexic students. In subjects such as English, psychology, teacher training, law and medicine, few concessions are made, whereas in Science disciplines less emphasis is placed on accurate spelling. Observations have been made about dyslexic students' spelling in Higher Education throughout this study (see also Section 1.3.4 for a discussion of the concept of 'graduateness').

The next section draws on the various and diverse aspects of student needs discussed above and in section 2, with the aim of establishing a screening procedure which would answer as many of these needs as could be feasible.

5.2 The development of a screening procedure - 'QuickScan': a study styles, study skills and dyslexia questionnaire

'In a recent National Conference on Dyslexia in adults, the principal concern was not whether dyslexia existed but rather 'how' dyslexia is to be reliably identified amongst the Higher Education population'. (Beaton, McDougal & Singleton 1997).

A recent HEFCE report on pre-assessment screening (Singleton, Trotter and Smart 1998) presents the results of a survey of screening methods. 49% of institutions apply a qualitative assessment of reading and writing skills, and the main issue that this raises is how the experience and knowledge of the assessor relates to the reliability of the assessment method. It may therefore be appropriate to question the use of qualitative tests as screening instruments.

From the same survey it was found that 72% of institutions use a dyslexia checklist as their main screening method. (For full details of the survey see section 5.3.10).

As SpLD can co-exist with English as a second or other language difficulties or general study skills needs, it would be helpful to have a single screening procedure for identifying all of these aspects of need for learning support.

Currently the staff/student ratio in the support services often makes it very difficult to cater for all students, and the service is frequently based on a self-referral system which not all students make use of. It would be potentially cost-effective and possibly appealing to a wider range of students, if an individualised computer based screening procedure could be put in place for students to use independently, and, should they wish, follow up with requests for staff advice and support for learning.

The design of such a screening procedure was one of the aims of the main study and is reported in this section. The resulting questionnaire entitled QuickScan (ISL 1997) was compiled and developed by the researcher and programmed for computer by ISL working in close association with the researcher.

5.2.1. Research Background

In practice there are economic implications which inhibit planning for large scale screening one of the greatest obstacles being the impact on staff time of marking all the scripts.

There are several dyslexia checklists and lists of symptoms available with reference to SpLD/Dyslexia (see section 3). Some of these could be deemed too general to be systematically implemented at this level. However, in this study, the widely known BDA (British Dyslexia Association) Adult Checklist, which is recommended by the ADO (Adult Dyslexia Organisation) and has been employed in a range of studies (Turner 1997), was selected for use in an adapted form suitable for issue to large numbers of students. For its target audience the adaptation was intended to give it a more appropriate and accessible format, namely that of a questionnaire about individual learning styles and study skills.

Vinegrad's (1994) research supports the reliability of the Adult Checklist as a means of identifying dyslexia among adults. This is further supported by personal observation of over 60 students who had had independent dyslexia assessments within a university population, and with whom there was rarely any significant mismatch between the results of the Adult Checklist and the consequent confirmation of dyslexia by the Educational Psychologist (Zdzienski, HEFCE Project - Kingston University 1993 - 1995). In some cases students selected perhaps fewer of the checklists positive indicators, but still enough to alert the tutor's attention to the self reported existence of memory, sequencing and directional difficulties.

In Vinegrad's research, an additional finding was the 'extreme hesitation' of dyslexic individuals in responding to the Adult Checklist compared to others who tended to tick the relevant boxes in a 'rapid fashion'. The difficulties that these particular individuals experienced in having to make quick decisions was regarded in itself as being a 'powerful indicator of dyslexia'.

It was decided that the components of the screening procedure would not only include those areas of difficulty frequently cited in the literature as having been expressed by dyslexic learners (See 4, 5, and 6. below), but also attempt to explore learning style preferences (in terms of 1, 2 and 3 below).

1. Kinaesthetic: Learning by direct physical involvement with the material to be learnt.
2. Auditory: Learning using the aural modality, verbalising the material to be learnt.
3. Visual: Learning through seeing and visualising the material to be learnt.
4. Subject's self image as a learner.
5. Sequencing problems.
6. Memory related difficulties.
7. Adult Dyslexia Checklist (BDA)
8. QuickScan Dyslexia Checklist (A checklist of generally acknowledged potential indicators of dyslexia.)

5.2.2 Proposed components of an exploratory screening procedure:

In addition to individual screening, an important aim of the programme was to take maximum advantage of computerisation to collect and store data on a much wider range of potential influences on learning than those specifically included to produce results for feedback to the student.

One such example is the possible connection between crossed laterality or ambivalence of lateral functions, left/right confusion and learning difficulties. By collecting appropriate data further light might also be shed on family incidence, creativity, bilingualism, and the Irlen Syndrome. (Scotopic sensitivity).

5.2.3 Exploring and assessing learning styles

'Students with dyslexia need to recognise, value and develop their particular learning style in order fully to utilise their strengths and circumvent their weaknesses'. (Singleton, in press).

At the Fourth International Conference of the Society for Effective Affective Learning (SEAL), held in 1991, Michael Lawlor and June McOstrich carried out a workshop which explored learning styles. *'One of the errors of the past has been the assumption that we all learn in the same way and can be taught in the same way.'* (Lawlor, 1991). They created opportunities for audience participation, and helped the participants to find out what were their learning style preferences.

Some people learn best by seeing, others by hearing, and some in a kinaesthetic sense (through physical involvement).

Currently there is a particular interest in Further Education (as a result of a number of funded projects) in the concept of individual learning styles, and helping students to become more self-aware so that they can apply this self-knowledge to enhance their studies. It is probably for this reason that the QuickScan has been seen by several Further Education Colleges as potentially an appropriate resource for further research and development.

The Barsch Learning Style Preference Form , which has been developed at Ventura College, California, would be of interest for future comparative studies with the learning styles section of the QuickScan, as it also categorises its participants into visual, auditory and tactile (kinaesthetic) learners.

The screening device developed and described in this study (precursor of QuickScan) is intended to indicate not only weaknesses, but also areas of strength and personal learning style preference as well as study and language skills efficiency. As this screener is based on responses to a self reporting questionnaire it must be made clear that the results produced should not be seen as an attempt to formally assess sensory modality preferences. However, in indicating the choices students have made in a variety of situations presented to them, it reflects the modalities for which they have shown a preference and offers suggestions for working most efficiently with them.

There is currently considerable interest among dyslexia specialists in how learning disabled students best receive information. (Brant. 1998). Bringing this to the student's awareness is just the first step towards their gaining metacognitive control of their own learning strategies. Within the field of NLP (Neuro Linguistic Programming) much interesting work has already been undertaken in the area of identifying preferred learning modalities and experimenting with switching from one modality to another to explore personal potential. (Bandler and Mac Donald 1988). The issue here is not one of assessing modalities which are mutually exclusive, fixed entities, but rather one of encouraging awareness and exploration of each individual's most effective learning style or styles.

5.2.4 An Exploratory Investigation

After extensive exploratory work investigating the screening procedures for identifying dyslexia in adults, a set of 112 questions was compiled for use in a self-report style questionnaire covering the range of areas noted in the preceding section on components. The prototype for QuickScan was designed and trialled with a sample of thirty students from five institutions drawing from a range of colleges in London and Winchester with populations likely to be considered representative of sixth-forms and H.E. institutions in general. (For the complete set of questions see appendix 5G). The variables from the resulting data were split into two types: continuous variables (scores), and categorical variables (i.e. yes/no, left/right).

The research design involved the pre-selection of three groups of ten students (dyslexics by self referral and by referral from their institutions, ESL (English as a second language students) and non-dyslexics both the latter groups being referred by colleges.

The contributing groups of students were from a Sixth Form College (St. Charles Catholic Sixth Form College in London) and in Higher Education (South Bank University in London and King Alfred's College of Higher Education in Winchester) and several adults were referred through the ADO (Adult Dyslexia Organisation) and the HDC (Hornsby Dyslexia Centre).

5.2.5 The results of the Investigation

The QuickScan Dyslexia Checklist total score was compared with that of the well established Adult Dyslexia Checklist which had been administered in identical circumstances.

The main findings were that on comparison of the means of the three groups (dyslexic, ESL and non-dyslexic, there was no significant difference in sensory modality preference (see Table 5.i)

Table 5.i: A summary of statistics for the variables for 30 subjects (part one).

Kinaesthetic		Dyslexic	Non-dyslexic	ESL
1.	Mean	7.7	6.5	7.7
	Median	7.5	7.0	7.0
	Standard Deviation	1.7	2.5	1.4
	Range	5 - 11	2 - 10	6 - 10

Auditory		Dyslexic	Non-dyslexic	ESL
2.	Mean	6.7	7.7	7.3
	Median	6.5	8.0	7.0
	Standard Deviation	1.7	2.3	2.4
	Range	4 - 11	4 - 11	5 - 12

Visual		Dyslexic	Non-dyslexic	ESL
3.	Mean	7.6	7.1	8.7
	Median	8.0	7.5	9.0
	Standard Deviation	2.1	2.0	1.9
	Range	3 - 10	5 - 10	6 - 12

Variables 4 to 8, however, all indicate significant evidence of differences between the mean scores for the three groups (see table 5.ii).

Table 5.ii: A summary of statistics for the variables for 30 subjects (part two)

Self Image as a learner		Dyslexic	Non-dyslexic	ESL
4.	Mean	5.7	3.3	4.3
	Median	6.0	3.0	4.5
	Standard Deviation	1.3	1.6	1.2
	Range	4 - 7	1 - 6	2 - 6

Sequencing problems		Dyslexic	Non-dyslexic	ESL
5.	Mean	8.2	1.2	2.5
	Median	8.0	1.0	3.0
	Standard Deviation	0.9	0.9	1.1
	Range	7 - 10	0 - 3	0 - 4

Memory related difficulties		Dyslexic	Non-dyslexic	ESL
6.	Mean	12.8	1.9	3.8
	Median	13.5	2.0	4.0
	Standard Deviation	2.8	1.0	1.3
	Range	9 - 16	0 - 4	2 - 6

Adult Dyslexia Checklist		Dyslexic	Non-dyslexic	ESL
7.	Mean	11.2	1.3	2.8
	Median	11.0	0	2.5
	Standard Deviation	0.8	2.1	1.3
	Range	10 -12	0 - 6	1 - 5

QuickScan Dyslexia Checklist		Dyslexic	Non-dyslexic	ESL
8.	Mean	23.7	3.9	7.2
	Median	24.0	3.0	7.5
	Standard Deviation	1.4	2.8	2.4
	Range	21 - 15	0 - 8	4 - 10

Analysis of Variance

Analysis of Variance (ANOVA) was carried out on all of the three groups for each given variance. Since there was sufficient statistical evidence to suggest that the mean scores were different on all of the categories listed above, Pairwise Comparisons were also carried out for each pair of the variables and p-values obtained.

In order to see if there was any relationship between the variables in the dataset, correlation coefficients (r) were obtained. These are presented below (see Table 5.iii). Where any significant association between two variables exist (a correlation coefficient of greater than 0.7), these are briefly discussed.

Table 5.iii: Correlation coefficients for the three sets of variables

CORRELATION COEFFICIENTS FOR THE VARIABLES FOR DYSLEXIC SUBJECTS								
	1.KIN	2.AUD	3.VIS	4.S.I	5.SEQ	6.MEM	7.ADUL	8.QUIC
1. KIN	1							
2. AUD	-0.2260	1						
3.VIS	0.78336	0.05685	1					
4.S.I.	0.44392	-0.0926	0.59522	1				
5.SEQ	0.32661	-0.5254	0.33951	0.23504	1			
6.MEM	0.68979	-0.6006	0.35204	0.60941	0.27827	1		
7.ADUL	0.62863	-0.4466	0.19094	0.37913	0.39854	0.78004	1	
8.QUIC	0.64872	-0.2254	0.67517	0.88455	0.22168	0.74380	0.45690	1

CORRELATION COEFFICIENTS FOR THE VARIABLES FOR NON-DYSLEXIC SUBJECTS								
	1.KIN	2.AUD	3.VIS	4.S.I	5.SEQ	6.MEM	7.ADUL	8.QUIC
1.KIN	1							
2.AUD	0.41400	1						
3.VIS	0.71927	0.45623	1					
4.S.I.	0.46607	0.41701	0.74823	1				
5.SEQ	0.61653	0.40602	0.41753	0.54678	1			
6.MEM	0.46016	0.52824	0.57307	0.77156	0.51067	1		
7.ADUL	0.46455	0.62564	0.66025	0.51789	0.48117	0.70401	1	
8.QUIC	0.71205	0.66757	0.69587	0.57974	0.73073	0.66348	0.87483	1

CORRELATION COEFFICIENTS FOR THE VARIABLES FOR ESL SUBJECTS								
	1.KIN	2.AUD	3.VIS	4.S.I.	5.SEQ	6.MEM	7.ADUL	8.QUIC
1.KIN	1							
2.AUD	-0.0033	1						
3.VIS	0.48704	0.3121	1					
4.S.I.	-0.0067	-11778	-0.3987	1				
5.SEQ	-0.3264	0.0218	-0.3963	0.04435	1			
6.MEM	-0.5713	0.34339	0.10405	0.18924	0.07813	1		
7.ADUL	-0.2737	0.70109	0.14741	0.26202	1	0.48717	1	
8.QUIC	0.28702	0.36911	0.37932	0.09796	0.08763	-0.0934	0.51767	1

In the cases of Self Image as a learner, the Adult Checklist and the QuickScan Checklist, there is a significant difference between Dyslexic and Non-Dyslexic students, and Dyslexic and ESL students. However, the mean scores between the Non-Dyslexic and ESL student groups are similar. The relevant confidence intervals for these five sub-categories are presented below in Table 5.iv.

Table 5.iv: Confidence Intervals

	Parameter	From	To	Mean Difference	95 % Confidence Interval
1	Self-image as a learner (total / 10)	Dyslexic	Non Dys	= 2.4	-1.5, 6.3
		Dyslexic	ESL	= 1.4	-2.3, 3.2
2	Sequencing problems (total / 10)	Dyslexic	Non Dys	= 6.0	5.5, 8.5
		Non Dys	ESL	= -1.3	-3.1, 0.5
		Dyslexic	ESL	= 5.7	3.9, 7.5
3	Memory related difficulties (total / 17)	Dyslexic	Non Dys	=10.9	3.3, 18.5
		Non Dys	ESL	= -1.9	-4.3, 0.5
		Dyslexic	ESL	= 9.0	0.7, 17.3
4	Adult Dyslexia Checklist (total / 14)	Dyslexic	Non Dys	= 9.9	5.5, 14.4
		Dyslexic	ESL	= 8.4	6.3, 10.5
5	QuickScan Dyslexia Checklist (total / 30)	Dyslexic	Non Dys	=19.8	10.9, 28.7
		Dyslexic	ESL	=16.5	9.9, 23.1

In the case of Sequencing problems and Memory related difficulties a significant difference is found between all three student groups, indicating that in these two important areas related to learning, dyslexic students can be identified as a clearly separate and distinct group.

Amongst the findings of this pilot study which suggest that further investigation may be merited, are the discoveries of very close correlation between, for example in the dyslexic students' group between:

1. Self image as a learner and the QuickScan Dyslexia Checklist ($R=0.88500$)
2. Memory and the Adult Dyslexia Checklist ($R=0.7800$)
3. Memory and the QuickScan Dyslexia Checklist ($R=0.7440$)

Furthermore close correlations were found within the non-dyslexic group between:

1. The Adult Dyslexia Checklist and the QuickScan Dyslexia Checklist ($P=0.8748$)
2. Self Image as a learner and memory ($R=0.7700$)

5.2.6 A Larger Scale Study

In the light of the pilot study, the refined questionnaire, 'QuickScan', (ISL 1997) was completed. It placed dyslexia within the context of a wider 'learning continuum'. It included questions relating to many of the commonly accepted and researched positive indicators of dyslexia interspersed with the range of other questions which related to students' self perception of their strengths and weaknesses in relation to study. It is hoped that the refined QuickScan, now presented in a computer administered format will provide all students with a tool for examining themselves as learners, getting some practical and immediate feed-back, and more importantly, receiving some indication as to whether they may be dyslexic. In such cases they would be recommended to make an appointment with the Study Support Tutor.

A larger scale study with sixty students in higher education is nearing completion at the time of writing this chapter. The sample, drawn from two universities, Leicester and Ulster include thirty dyslexic students. The administration of QuickScan by computer has been found to be reliable ($R=0.9$). The comparison of the means of the dyslexic and non-dyslexic group confirm that the analysis of the questionnaire data is capable of discriminating between dyslexics and non-dyslexics.

Whilst QuickScan contains over 100 questions, compared to 20 in the Adult Dyslexia Checklist, it takes non-dyslexic students between 8 and 15 minutes to complete. Depending on individual reading and decision-making speeds, it is likely to take dyslexic students longer.

On the basis of experimental results during development it has been interesting to note that for dyslexics the length of time taken to complete QuickScan does not increase in linear proportion to the greater number of questions. Although there are five times more questions than on the Adult Checklist, it does not take dyslexics five times as long to complete. So far as has been observed dyslexics complete QuickScan in about twenty minutes.

As QuickScan is now available on computer it will be possible to check the total length of time students take to respond to all the questions as well as the number of times they amend their answers. This will yield some further data regarding one of the important issues in both the diagnosis and support of dyslexic students, namely their speed and efficiency of processing written information compared to that of non-dyslexic students.

In addition, the advantages of the QuickScan include the fact that it is self-administered, automatically analysed, and can provide immediate feedback to each student in the form of a printed report.

5.2.7 Information about QuickScan

QuickScan is Part One of a two part computer-based assessment programme, named 'The StudyScan Suite' (ISL, 1997) which can be purchased by institutions of Higher and Further Education.

QuickScan, the 15 minute questionnaire is devised for use on a computer network. It is for adults who want to explore the way they learn in terms of their individual learning preferences and study habits. The results of the completed questionnaire are computer analysed to produce useful personalised study guidelines on screen or in printed form.

The resulting profiles indicate whether students need study skills support and/or whether a full dyslexia assessment is appropriate.

The computer programme includes the facility to outline the services and contacts available in the institution where the student is registered.

QuickScan is not a test as such but a self-reporting questionnaire. It has been constructed in the format of a 'yes-no item' model with over a hundred items. The only departure from a yes-no response is the inclusion of 8 'left or right' responses where students are asked to indicate their preferred hand or eye for a given function (e.g. *Do you write with your left or right hand?*).

Clearly the main disadvantage with this model is the necessity to simplify both questions responses. However, it is emphasised that for questions where respondents might validly chose either answer, they should opt for the one which is generally the truer response. The questions have been worded carefully, for example they are expressed in the following terms:- *'Do you tend to...'* or *'Do you generally find that...'*

The on-screen computer instructions ask students to respond with the first answer that comes to mind and to work their way quickly through the programme as questions are presented. The formulation of questions has been refined after a first pilot and ambiguities minimised.

There are 110 questions in total, which are presented in a randomised sequence in any sitting. This has been done to minimise the possibility of students remembering previous sittings of the programme and thus ensure the most spontaneous possible response.

A bar graph indicates the percentage of the items that has been completed. Students can select from three options, the font size (10, 12 or 14) and background colour (white, yellow or blue), and can change them if desired during the questionnaire.

5.2.8 A sample of ten questions selected from QuickScan

This random selection of 10 questions illustrates responses given by students (See Table 5.v). Responses coded 'D' are the answers given by one of the dyslexic students, and those marked 'X' are from a non-dyslexic student

Table 5.v: Selected Questions from QuickScan

Code**D** = Dyslexic**X** = Non-Dyslexic

Answer Code

'Do you consider that for general purposes your reading is fast enough?	yes	X
	no	D
Do you tend to hum, or to talk to yourself?	yes	X
	no	D
Is English your first language?	yes	X
	no	D
Can reading actually cause you to get headaches?	yes	D
	no	X
When you can't remember a particular spelling do you try to picture the word in your mind's eye?	yes	D
	no	X

Do you tend to mix up numbers, e.g. 281 for 218?	yes	D
	no	X
Have you on occasions been described by others as a talented person?	yes	D
	no	X
When you look back over your hand written notes	yes	D

Do you write with your left or right hand? do you tend to find them difficult to read?	left	
	no	X
	right	X D
Are you quite quick and efficient at copying	yes	X

information down by hand from a board or screen?	no	D
--	----	----------

The information gathered from the student responses is categorised and cross-referenced as they complete the questionnaire. The programme produces the results based on the proportion of positive indicators including difficulty with, for example, memory, sequencing, laterality, self-image as a learner, reading, study, etc. The emerging profile shows the students' preferred sensory channel for learning, namely, predominantly visual, auditory or kinaesthetic, or any combination of these.

A consistency scale (Cline, P., 1993) is being refined which will show the extent to which the student has responded in the same way to a question when it has appeared a second time using different wording, for example:

'Do you consider that for general purposes your reading is fast enough?' and
'Would you describe yourself as a fluent reader?'

Consistency of response is a particularly relevant factor in establishing the individual's preferred learning style. Practical suggestions for study are based on the emerging patterns of results from the questionnaire.

5.2.9 Learning Styles

Of the total of 110 questions in QuickScan nearly 30% relate to investigating the student's preferred learning style. Questions are based on the observable behavioural characteristics which have been researched as indicators of students' dominant sensory systems (Zaner-Bloser, 1979). These are categorised into the three modality strengths of Visual, Auditory and Kinaesthetic. In the process of practical group experimentation it was found that many students have a mixed learning preference rather than a single one. Thus the QuickScan output has been refined to accommodate single double or even triple modality. This facet of modality was examined in the Hornsby NLP (Neuro-Linguistic Programming) Course (1992). (For the extracts from the set of learning styles, in single or combined modalities, as written for QuickScan - see appendix 5H)

It is quite surprising to find that students are frequently unaware of their stronger sensory channel(s) for learning and they sometimes follow less personally appropriate ways of learning. It appears to be a liberating and positively helpful experience for them to discover the best way of approaching learning from the perspective of their 'strengths'.

The above finding is borne out by independent experience of supporting dyslexic students in Higher Education, where it was frequently found that some students would be unaware of their strengths. For example, one student, not realising that he was a particularly good visual learner had been continuously underachieving because he kept trying to use verbal methods for learning and was getting frustrated at the difficulties he was experiencing. Once he discovered that visual learning in fact involved a different approach, he was able to carry out tasks with greater ease and confidence, and to apply the concept of 'visualisation' and 'imagery' to a range of study situations.

Examples taken from case studies prior to the development of QuickScan of teaching to modality strengths and developing memory strategies appear in 'The Interaction between SpLD and NLP Techniques' (Zdzienski 1994)

5.2.10 An example of the QuickScan response to a dyslexic student 'D'

An example is provided below to illustrate the QuickScan approach. The dyslexic student to whom we can refer as 'Student D', completed QuickScan (see table 5.vi below) and was found to be a predominantly Visual learner. The following study suggestions were provided for him by the computer programme printout:-

Table 5.vi Study suggestions for a predominantly visual learner.

'VISUAL KEY WORDS:

See, watch, imagine, picture, visualise, draw, look, display, clear sight

A visual learning preference means you learn best by seeing for yourself, and watching others demonstrating a particular skill. You need to look at materials which you are studying and be able to see the connections between different aspects of the subject.

Planning, colour-coding and categorising information in a visual way is very effective. Highlighting important areas of text, creating flow-charts, diagrams and in particular mind-maps would be a good way of storing materials, planning essays and revising for tests.

People who are very visual learners can often study for long periods with a high level of concentration and intensity.

Reading can be very enjoyable experience and can be interspersed by moments of vivid imagination on behalf of the reader.

Learning, therefore can be very effective when set within the context of a particular scene, and visual reminders can act as a good memory trigger.

Awkward spellings are most accessible by sight, and difficult words, specific terms and definitions, or various formulae can be remembered by visualising them.

Revision of such information is most memorable when produced on small cards which can be looked at frequently and regularly throughout the days before an examination.

If you are very visual then you can, and might at times, prefer to think in pictures and images rather than words.

Problem-solving, memorising and coping with stressful situations can sometimes be more easily achieved using mental imagery.

Thorough planning, and a meticulous and professional (neat) level of presentation are strengths.

Concentrated study is best carried out where there is a minimum of distracting movements and disorder.'

Additionally, student D's responses gave a clear indication of Specific Learning Difficulties, and therefore the following information (see Table 5.vii) was also provided for him:-

Table 5.vii: Recommendations made to student D

RECOMMENDATIONS	NO	YES
1. To have a consultation with the Learning Support Tutor		X
2. To make an appointment and do a full assessment		X
3. To enrol on a study skills Course		X
<p>1. For a consultation please contact location tel.no. etc.</p> <p>2. For a full assessment please contact </p> <p>Additional Information: e.g. English Language Centre is at</p> <p>3. For study skills support please contact</p>		

The bottom section of this form is automatically completed by the institution's programme from data entered during the installation process.

5.2.11 An Educational Psychologist's assessment of student 'D'

This candidate did, in fact, make an appointment for a full assessment with an educational psychologist, and was found to be dyslexic, with above average ability (Wechsler Adult Intelligence Scale), but with particular weaknesses in auditory working memory and coding processes. Additionally the full assessment process revealed that his reading comprehension skills (Scholastic Abilities Test for Adults) were above average when tested under Untimed conditions, but when Timed, his results fell into the below average category. Spelling was low average, and handwriting was described as 'slow and inefficient' with a 6% spelling error rate in written composition.

Speed of processing was generally below average:-

Reading at 95wpm (words per minute) compared to an adult average of 250 wpm

Writing at 19 wpm, compared to an adult average of 20 - 30 wpm.

Laterality functions were as follows:-

Handedness: Right

Eyedness: Right













showing a right sided lateral organisation for eye and hand function/co-ordination.

Left/Right awareness was rather confused.

Two recommendations were made by the psychologist with regard to written examinations. The first for additional time to complete each paper (at the rate of an additional 15 minutes per hour), and the second for allowances to be made for weaknesses in spelling and handwriting presentation.

A summary of this student's responses to QuickScan are presented (see Table 5.viii). These show a reasonable match with the findings of the independent assessment report.

Table 5.viii: Summary of student D's responses to QuickScan

<i>Learning Profile Scale - indicating increasing difficulties from mild to severe</i>		
	<i>mild</i>	<i>positive - severe</i>
<i>Positive indicators of general learning difficulties</i>		
<i>positive indicators of SpLD (dyslexia)</i>		
<i>Memory - related difficulties</i>		
<i>Sequencing problems</i>		
<i>Visual problems which affect reading</i>		
<i>general reading difficulties</i>		
<i>problems with writing</i>		
<i>Further indicators:</i>	<i>NO</i>	<i>YES</i>
<i>problems with spelling</i>		
<i>mixed laterality functions</i>		
<i>left/right confusion</i>		
<i>difficulties with maths</i>		
<i>CREATIVITY</i>		

5.2.12 Results

The first results which were collated from the larger study group (Leicester and Ulster University student group) were analysed to determine the reliability of the Quickscan to identify students with dyslexia, and to see whether or not it could discriminate sufficiently between dyslexic and non-dyslexic students. The results are presented below:-

Discrimination of a 50 item questionnaire
between dyslexic and non-dyslexic students

1. Descriptive Statistics for the two groups

Students coded '0' are non-dyslexic, and those coded '1' are dyslexic. Table 1 provides descriptive statistics for the two groups on the 50 item questionnaire. This is followed by histograms of the spread of scores for each of the two groups in figures 1 and 2.

Table 1. Descriptive statistics

Descriptives										
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
SCORE	DYSLEXIC	.00	31	95.9677	6.2848	1.1288	93.6625	98.2730	86.00	112.00
		1.00	30	115.2667	8.3291	1.5207	112.1565	118.3768	94.00	132.00
		Total	61	105.4590	12.1622	1.5572	102.3441	108.5739	86.00	132.00

Figure 1. Histogram of results for non-dyslexic students

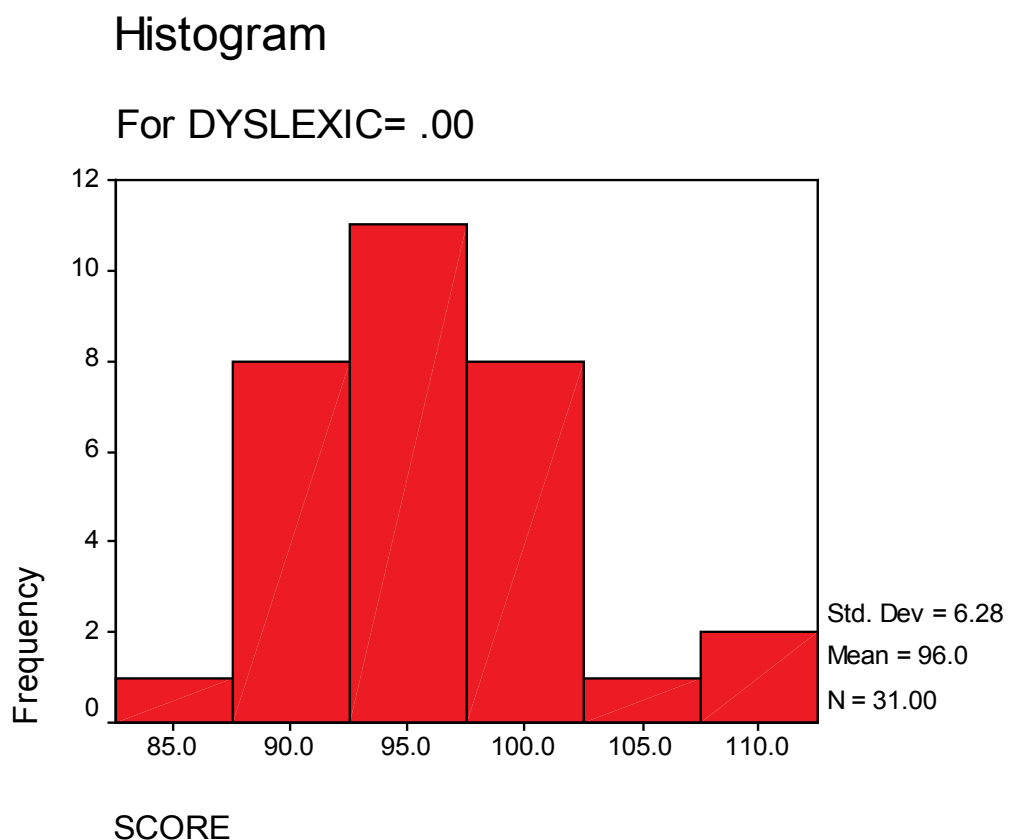
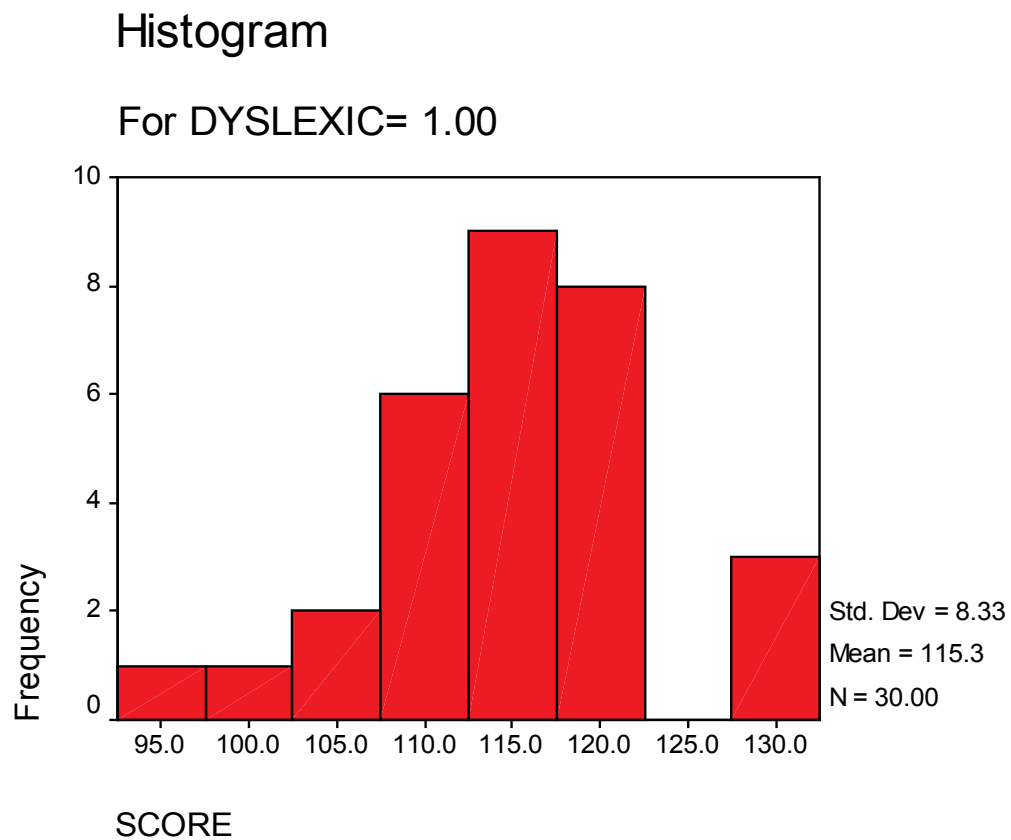


Figure 2. Histogram of results for dyslexic students.



2. Comparison of means

The means of the two groups were compared using a one way analysis of variance (ANOVA). Figure 3 is a boxplot of the results, and table 2 the results of the ANOVA. This clearly shows that the scaled scores from the questionnaire data is capable of discriminating between the dyslexic and non-dyslexic group.

Figure 3. Boxplot of results for the two groups

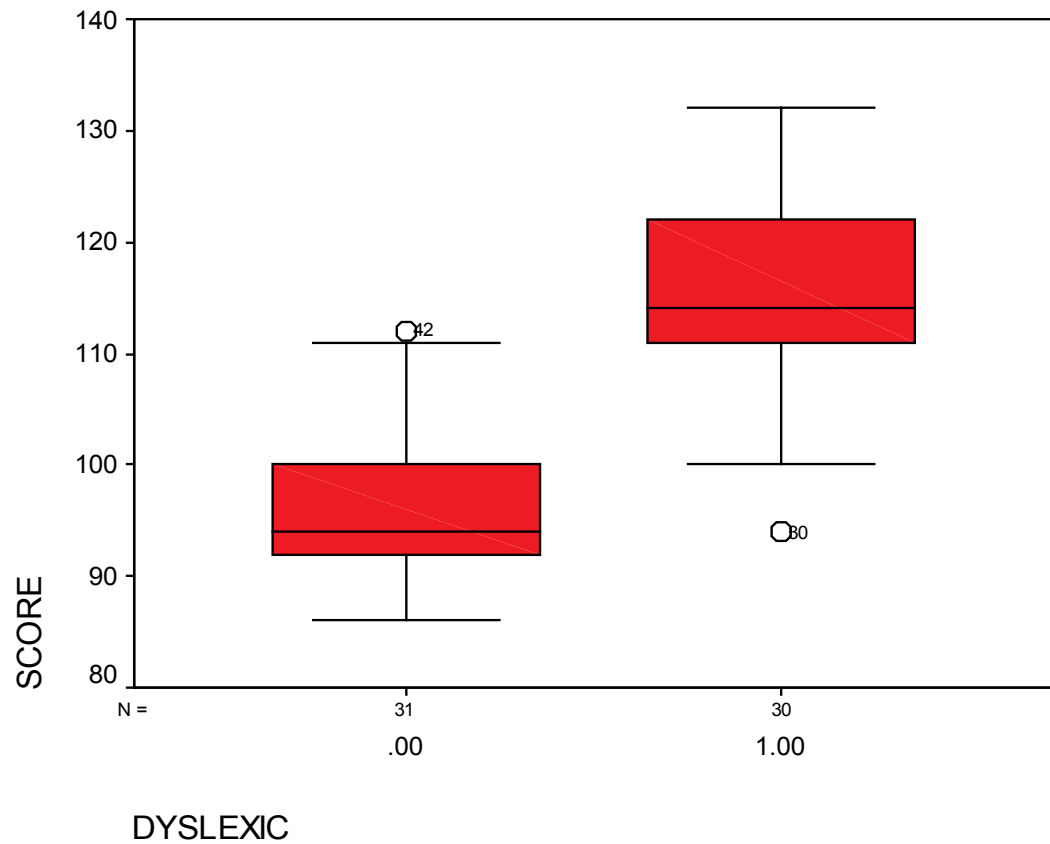


Table 2. ANOVA results

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
SCORE	Between Groups	5678.313	1	5678.313	104.798	.000
	Within Groups	3196.834	59	54.184		
	Total	8875.148	60			

3. Conclusion

A cut score of 105 on the scaled score would probably give maximum discrimination between dyslexic and non-dyslexic students, given that there is a three point error in either direction on this score.

5.2.13 Discussion of results

The results reported above are produced from both the initial pilot study and the further group of 60 students currently in Higher Education, of whom 30 are dyslexic. This work is being carried out with the co-operation of the Psychology Department of Ulster University and the School of Education and Student Support Services of Leicester University. The estimated reliability of QuickScan in its first administration via the computer screen has been measured to be 0.9. The comparison of means of the two groups (30 dyslexic and 30 non-dyslexic students) using a one way analysis of variance (ANOVA) clearly confirms that the questionnaire data is capable of discriminating between the dyslexic and non-dyslexic group (Zdzienski in press).

Laterality

Difference between mixed laterality, right or left sidedness and left/right confusion for the three student groups has been noted but not yet statistically tested. It was considered advisable to include a larger group for the study of these variables. However, from the Leicester University study group (table 5.ix) comprising 19 dyslexic students and 16 non-dyslexic students the following figures emerge:

Table 5.ix Laterality

	right side	left side dominant	ambiv/mixe	left/right confusion
dyslexic students	26%	16%	58%	37%
non-dyslexic	57%	18%	25%	18%

Further analysis will need to be carried out on larger groups in order to confirm or amend these findings. Many tutors and other professionals working with dyslexic students for a number of years would confirm it to be their experience that more dyslexic students appear to have an ambivalence of laterality functions compared to their non-dyslexic peers.

Currently, because of a lack of research evidence to say otherwise, many Educational Psychologists no longer consider it relevant to even report on the students' laterality in their dyslexia assessment reports. In fact, this topic features under the sub-heading 'What are *not* signs of dyslexia?' (Turner 1997) and the

McCarthy Scales (1972) are referred to at which time it was found that 40% of the general population was 'cross-lateral', thereby seemingly negating its relevance, as either a predictor or a significant symptom of dyslexia. The issue of laterality is thus dismissed by Turner as a feature 'likely to proceed from a different origin from dyslexia'.

In the light of the early findings of this study, it may in due course be considered difficult to dismiss the possible relevance of laterality to dyslexia. It will be possible (through this computer programme) to gather more data on this 'controversy-riven' topic, before reaching any conclusions.

Familial Factors

QuickScan asks the student to indicate whether there is any incidence of dyslexia in the family, and this is taken as a strong indicator of dyslexia for a student who is experiencing difficulties.

It is generally accepted that a positive family incidence is the first major risk factor, as 80% of cases can be identified in this way (Vogler, Defries and Decker 1985). It is interesting to note, therefore, that in the results of the study (including Leicester and Ulster students) 80% of the dyslexic students answered positively, compared to only 5% of the non-dyslexic students. From the non-dyslexic group a few students emerged who participated in the tests because they had difficulties but had not been assessed before, and they indeed may be dyslexic students who have compensated to a greater or lesser extent. The figure therefore could be closer to 1%.

Spelling Difficulties

One of the most persistent difficulties dyslexic people encounter is in spelling (McLoughlin, Fitzgibbon and Young 1994). It is interesting to note that 95% of the dyslexic study group reported continuing problems in this area compared to 20% in the non-dyslexic study group.

Learning Styles

Interestingly, there appears to be no difference between the three groups in the mean assessments for Kinaesthetic, Auditory or Visual sensory channels. Although the more recent results from the Leicester student group shows 10% greater preference for a kinaesthetic mode of learning among the dyslexic students. However, there is clearly a benefit in raising students' awareness of their preferred sensory channel in learning, for the purposes of more effective study and improved scholastic performance.

Sequencing and Memory

In this study, significant differences between the groups' means are noted in the Sequencing, Memory, and Dyslexia categories. The most relevant distinction between dyslexic students and their non-dyslexic peers in Higher and Further Education may well be in those areas that are most affected by any deficiency in sequencing and memory skills.

5.2.14 Conclusions

There is already evidence to suggest cautiously that QuickScan may be able to play a useful part in helping students to maximise their study performance and be guided where appropriate towards dyslexia assessment and specialist tuition.

The main implications for teaching, would be for training in sequencing and memory skills to play a key role in study skills support for dyslexic students.

There is case study evidence from the results of the HEFCE project (section 2) to support the value of training and development programmes in sequencing and memory skills for dyslexic students at 16+.

QuickScan addresses a wider range of students than those with SpLD, providing feedback and study skills advice which students find helpful. It supplies additional information to support the individual tutor interview yet can be sought and received in confidence via computer administration. This I.T. procedure appears to be welcomed by students who can then proceed if they wish to apply for further advice from the learning support specialist.

5.2.15. Future Implications

In summary, current evidence supports the view that the administration of QuickScan as a first filter for large numbers of students can lead to appropriate further action as determined by the students in consultation with their Study Support Tutors and that the StudyScan Suite may prove to be an effective and accessible resource.

The implications can, for the dyslexic group can already be anticipated as including training in sequencing and memory skills.

Whilst there is no suggestion that it replaces the full assessment by an Educational Psychologist, early indications are that QuickScan is a valid and reliable indicator, which provides constructive, individualised study guidelines, and perhaps more interestingly at this point, increasing knowledge about the characteristics of the dyslexic group, for example with reference to their continuing difficulties with spelling, sequencing and memory skills and to the incidence of family traits. The trend suggests that the dyslexic group shows positive family incidence and increased information may illuminate the question of learning styles and modality preferences. It would be especially interesting to analyse the data for signs of '*dyslexic thinking styles and difficulties within a higher education context*'. (Singleton, in press).

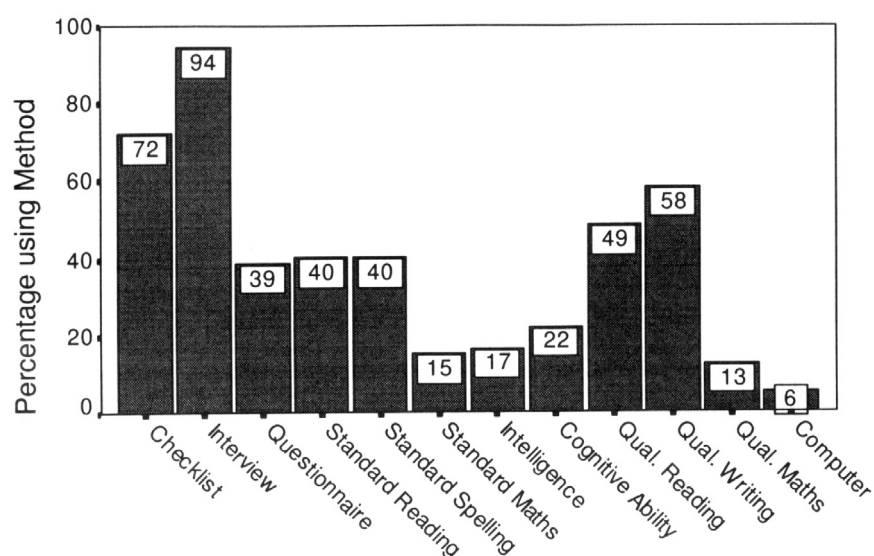
Current evidence from several users supports the view that the administration of QuickScan as a first filter for students can lead to appropriate further action as determined by the students in consultation with their Study Support Tutors.

Comments include: *QuickScan is definitely an excellent teaching tool for work with dyslexics*' (Croydon College)

From September 1998, QuickScan will be on the network in several colleges. Currently the programme is being evaluated by the Open University, West Kent and Croydon Colleges, and it is being treated as a shared development, in which the relevant staff have had meetings and conveyed their comments, positive reactions, concerns and suggestions for amendments.

QuickScan is also being evaluated as part of an HEFCE initiative entitled 'Pre-Assessment Screening for Dyslexia in Higher Education' (Singleton, Trotter & Smart, 1998) at Hull University. A range of screening procedures is being investigated (checklist, interview, questionnaire, informal testing, computer screening) and the only other computer based programme on offer for this age/ability level is the Dyslexia Test (McLean, 1997) which is being developed at the Helen Arkell Centre. An evaluation form was sent out to colleges and universities and the interim report on responses presents an unsurprising survey result showing that 94% of institutions are currently using a personal interview as their primary form of screening, compared to 6% that are using computer based screening.

Table 5x. Percentage of HEIs using each method in pre-assessment dyslexia screening.



(Singleton, Trotter and Smart 1998)

The only problem is that personal interviews cannot easily cater for large numbers of students and are normally based on tutor or self referral, a computer screening programme can be accessible to all students and staff, and could result in early identification and support.

The results of this survey and investigation are due to be published by the end of the year.

Having examined the possibilities of computerisation for screening and designed the QuickScan programme, the researcher turned her attention to ways in which the information presented in section 4 which explored diagnostic assessment might also be developed towards the design of a programme which could handle the administration of the mechanical aspects of diagnostic assessment. The aim here was to produce a working tool, which might be of value to Educational Psychologists and others engaged in the mainstream of traditional educational assessment at Higher Education level. Section 5.3 presents the progress of this project leading to the design of the diagnostic assessment package 'StudyScan'.

5.3 Development of a computer based approach to assessment

As early as 1992 the Naval Health Research Centre of Canada carried out research into the potential for the accurate and reliable application of Cognitive Assessment Batteries on computer. The findings demonstrated that *'7 of 9 commonly used tests could be interpreted as valid measures'* (Vickers & Kusulas 1992).

The researcher also received positive feedback from several users of the QuickScan programme on the effectiveness of the computerised administration of a test which had already proved effective as a paper based screener. As well as this the positive results of the NHRC feasibility study together with those of Nicolson, Fawcett and Miles 1992, who also concluded that *'computer based testing can be reliable and objective'* suggested that a purpose designed full diagnostic assessment battery might be a feasible proposition.

Work was commenced on a computer-based diagnostic assessment programme aimed at providing students with information concerning their own learning strengths and weaknesses, with particular reference to specific learning difficulties. The name chosen for the programme was 'StudyScan'.

The main framework for this programme was based on the findings of the exploratory study presented in section 4, during which data was produced from the test results of both dyslexic and non dyslexic students. The main purpose for the identification of learning strengths and weaknesses was to inform the future development of materials for the preparation of an individual/group learning support programme.

The methods used to develop the StudyScan battery of tests (see section 5.3.10) were aimed at reflecting those used during the establishment of the SATA Test Battery (see section 4.4.4). Individual test items have produced reasonable levels of reliability. (see section 5.3.10). Following these earlier rounds of statistical analysis, those areas where recommendations for further analysis were made remain the

subject of continuing research to establish stronger evidence of Criterion Related Validity for the test battery as a whole. The systematic and controlled item selection and analysis that was carried out in the construction of the new test battery give it a certain level of content validity (which is confirmed by the positive results achieved by users of the programme) but this aspect will also be the subject of ongoing research, both to confirm the validity of the battery and to indicate areas where revisions would enhance its performance.

5.3.1 Introduction

The results obtained from the exploratory study in section 4 made it evident that there is considerable variability to be expected of students' performance, depending on their degree course, ethnic background and possibly age/gender. There was a lack of an appropriate benchmark against which to gauge the performance of dyslexic students. Although ideally one would like to sample each course and take a sample, possibly proportional to the course size, which adequately reflects the age gender/ethnic make-up, this would have been far too difficult to implement within the limitations of the scope and resources of this study, a '*sensible and coarser base*' (McCabe 1994) needed to be established.

In an effort to offset the potential bias in taking a sample from a single institution, the study groups were drawn from one of each of the main two types of higher education institution i.e. an old and a new University. For the purpose of this study and as a starting point for research, students at Kingston and Surrey Universities were taken as broadly representative of higher education institutions throughout the country. Whilst there may be local variations, the breadth of course, student age ethnicity and gender selected provided a coarse base of the nature recommended by the consultant statistician.

Initially, 147 dyslexic students from a student population of over 12,000 at Kingston University, came forward (through both tutor and self referral) for assessment. Of these, 60% were first year students, and 27% were mature students. 109 of these students agreed to participate in the study. The whole study group was composed of 1534 non-dyslexic and 109 dyslexic students, the majority of whom were within the age range of 18 - 30.

Table 5.xi: The distribution of Gender, GCSE and A level passes for dyslexic and non-dyslexic students N=1643

Non-dyslexics	53% male and 47% female
Dyslexics	69% male and 31% female
Non-dyslexics	81% with 5+ GCSE passes and 19% with fewer than 5
Dyslexics	66% with 5+ GCSE passes and 34% with fewer than 5
Non-dyslexics	77% with 2+ A level passes and 23% with fewer than 2
Dyslexics	57% with 2+ A level passes and 43% with fewer than 2

During the course of the study, the percentage of dyslexic students who came for assessment rose steadily. There are a number of possible explanations for this. The most probable is that as awareness of the existence of a student support unit spread, more students would naturally be expected to come forward for support. Another possible reason is that in the light of the increased general awareness of dyslexia, more universities are making a positive effort to attract dyslexic students to their institutions. The number of students who had been assessed before entering university also appeared to be rising steadily. (See section 1.3.4, see also Table 5.xii) which indicates the rising percentage of students who came forward for assessment who had been assessed before they came into Higher Education:

Table 5.xii: Rising percentage of students who had been assessed previously

1992-93	1993-94	1994-95
12%	31%	57%

The findings of the study so far also suggest that:

- a) There is a higher percentage of male dyslexic students which reflect the findings of other research over the years (Critchley 1964, Rutter and Yule 1975, Miles 1983 and Silva et al 1985)
- b) Dyslexic students show lower achievement levels in formal written examinations (as shown on table 5.xi)
- c) The number of students who have had a dyslexia assessment before entering university has increased over the last few years. (see table 5.xii)

However, further research needs to be undertaken to show how much of the rise is due to increased access to assessments, and how much may be the result of an actual increase in the dyslexic student population in Higher Education.

The distribution of dyslexic students across the different faculties in 1994 was as follows:

Table 5.xiii: The distribution of dyslexic students across the different faculties

Business	17%
Science	20%
Technology	22%
Human Sciences	17%
Design	24%

These figures generally support the commonly held view that dyslexic students tend to choose technical or practical subjects that are not primarily dependent upon essay writing.

Throughout the duration of the project, 147 students were positively assessed as dyslexic. They were offered the opportunity to enrol for study skills sessions, were generally recommended to be granted extra time when taking written examinations and were given information regarding DSAs (Disabled Students Allowances).

31% of these students attended study support sessions provided by the Dyslexia Unit.

75% of the students assessed were granted extra time in their written examinations.

It is estimated that 20% of the students made applications to their LEAs for DSAs.

5.3.2 Computer Based Assessment: Issues for consideration

'There is an assumption by some that using any technology is more efficient and effective than traditional methods. This is not yet, and may never be the case'.

(Bull 1996)

The advantages and limitations in many aspects of the computerisation of any process are common to each and every programme. A computer based assessment programme that can be operated by students themselves could be a useful means of both identifying dyslexia and using the individual learning profiles as a basis for a programme of support and tuition. This approach could also have several advantages over existing assessment procedures in the following areas, namely:

- cost
- efficiency
- objectivity
- further research potential
- adherence to the Students Charter.

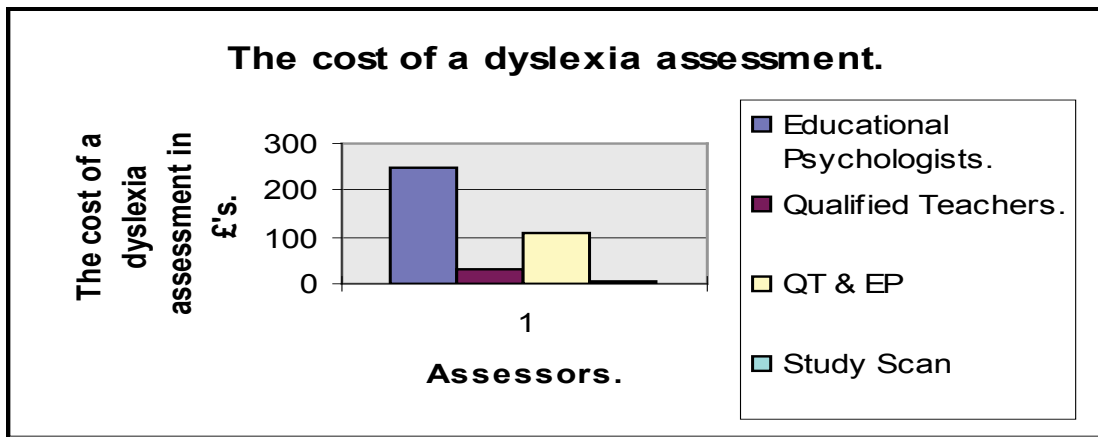
Cost

A basic dyslexia assessment for one student, costs between £150-£250, and a statement of need (as required by a supporting LEA) from an Access Centre is about £300.

A computer based assessment, after the initial outlay of entering the software on the university network , would cost relatively little and offer a service to all students.

'The cost of a [computerised] assessment per student per year is minimal; a matter of pounds.' (Payne 1998)

Table 5.xiv: The cost of a dyslexia assessment



(Payne 1998)

Because of the number of referrals at Kingston and the fact that during the HEFCE project the University was in a position to offer the necessary expertise, the idea of a group assessment service was put into practice. This made maximum use of the time of the educational psychologist and the project researcher/manager. Groups of 6 - 8 students were usually assessed in one sitting. This in fact brought additional benefits, as well as occasional problems. It provided a forum for social and problem-solving interaction within the group and led to a more efficient use of time, expertise, resources and communication.

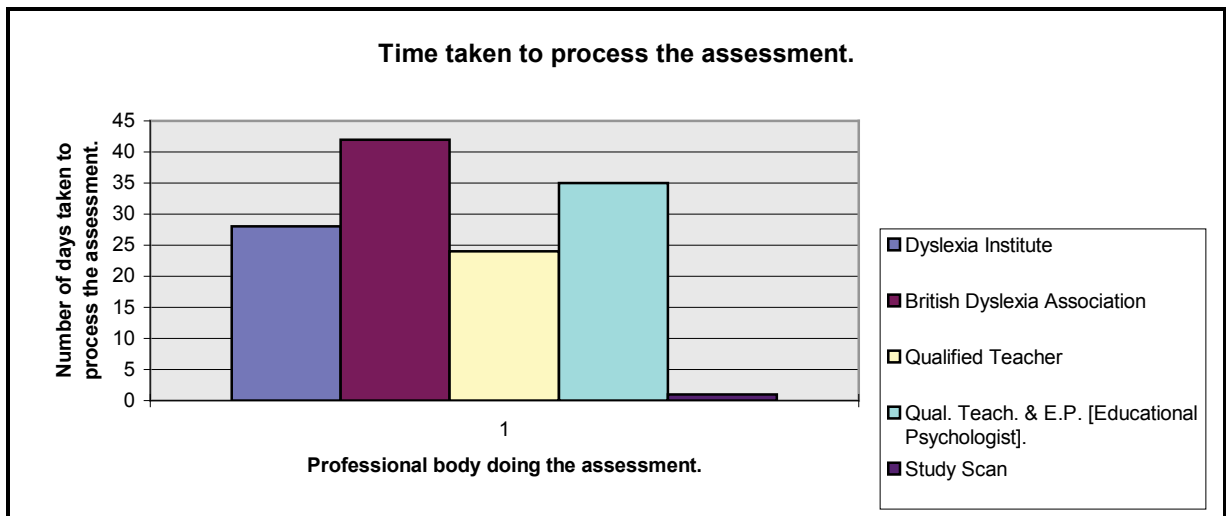
However, all the tests had to be marked by hand and written reports produced even when students were found not to be dyslexic. Clearly with the use of computer profiles, the time spent by 2 specialists one day a week could then be used more effectively.

'A computer generated report can be printed out immediately. This is a tremendous advantage primarily to the student who not only has immediate feedback, but also acquires his/her support much sooner.'

(Payne 1998)

The following graph table shows a time-cost comparison of different methods of report generation (see Table 5.xvi). The programme considered in the source of this data was StudyScan, and the time difference is remarkably clear.

Table 5.xv: Time taken to process the assessment



(Payne 1998)

In addition to this time saving, only students with a set of test results indicating dyslexia, would make an appointment for validation/covering letter from the educational psychologist. Students with other difficulties could also find appropriate support from the Health and Counselling Department.

As larger numbers of students now entering higher education have already been assessed whilst at school, it will increasingly become a matter of having an appropriate up-date of educational attainments (mainly for the purposes of grants and specific concessions) rather than a full initial assessment that students have traditionally currently required.

Efficiency

Timing elements of tests would be more precisely applied and more accurately recorded.

Memory tasks would be more appropriately dealt with.

A detailed, qualitative analysis of responses could be carried out which may reveal patterns of difficulties and strengths as a result of cross-referencing within and between sub-tests.

Reading speeds can be established.

Immediate scoring and production of profiles would save time otherwise spent in marking, scoring and presentation of results.

The number of students needing assessments would not be as high and waiting lists would be minimised.

Prompt assessments would mean that students would be screened at the earliest possible stage of their course.

There would be no unnecessary referrals.

Optional consultation facilities would be based upon profiles obtained and individual learning programmes would be designed, in collaboration with the students concerned, to meet their needs.

Objectivity

Students would not initially need to see an examiner but could work in their own time and in a familiar environment

Students could explore their own learning strengths and weaknesses, and discover more information about dyslexia in the relative anonymity of the library or computer room. They would have the choice of whether or not they want to declare their dyslexia. If they felt they could cope adequately they may decide to use the results for their own reference only.

The greater availability of such tests on the network would help to dispel some of the misconceptions about SpLD which still persist in some university departments.

Research

'Computer based assessment may generate a wealth of information which may not be easily available in a paper based system.....There is clearly a role which computer based assessment systems can play in the collection of assessment information.' (Bull 1996)

A national database could be set up for research purposes, which would provide a wide range of data covering background information on both dyslexic and non-dyslexic students' performance in higher education.

The Students Charter

According to the section on Right to Learner Agreements the key recommendations of the NUS Student Charter states that:

Students should be able to negotiate their own interim targets for learning through a learner agreement

Learner agreements give students some measure of *responsibility* and accountability for their own learning, but also a sense of choice and autonomy.

Students have a right of access to information about themselves, their courses, institutions and the education system as a whole.

Students are to receive a record of achievement.

This could be achieved if all institutions operated an initial screener such as QuickScan and made it available to all students on their network. Further information, advice and study support could be included and up-dated as required by the Study Support Tutor.

Concerns

There are however some concerns which need to be considered, such as the need to ensure a continuity of human contact as part of a computer-based test, some students may find this medium discouraging and prefer to be tested by a tutor. There are inherent aspects in a computer programme that are not as flexible as might be desired and which can on occasion be irritating, and there needs to be continuing research carried out to ensure reliability and validity of diagnosis.

‘There are issues concerning resources, not only in terms of hardware and software, but also space, maintenance and technical expertise which may need to be

addressed at a departmental and institutional level. Consideration must also be given to the security and reliability of the system, and the need for alternative methods of assessment should the worst occur.'

(Bull 1996)

Indeed, it cannot be assumed that either staff have the skills or resources to administer a computer based test, or that students themselves can necessarily cope with the potential stresses associated with computerised administration of an assessment programme without additional preparation, and hence a strain on resources.

In the short term the learning curve that needs to be completed by both staff, students and those concerned with interpreting and discussing the results of computer administered test with students can be seen as a disadvantage because of the inevitable cost in familiarisation time. In this sense the advantages are more likely to be evident in the longer term and it remains to be seen whether the effort will prove to be too great.

5.3.3 An Introduction to StudyScan

The exploratory assessment project presented in Section 4 provided the opportunity to explore the relevance of existing assessment procedures and to consider their usefulness as well as limitations when dealing with adults at degree level.

The same study helped to place in focus the complexities surrounding the issue of attempting to establish norms in a range of literacy and numeracy based activities for students who vary greatly in these abilities depending often on their choice of subject and extent of specialisation since the age of 16+.

The conclusion of the exploratory study was that whilst the SATA is a relevant, comprehensive and age-appropriate test battery, it is not actually designed to go beyond the assessment of general learning difficulties at adult level.

In compiling a new set of tests the question asked was, can a test be created which is more objective than a purely diagnostic literacy-based test (which in the hands of the experienced dyslexia practitioner carries as much weight with the Local Authorities as an educational psychologist's report, but which at other times can be a cause for concern), and which has the advantages (and not the limitations) of the standard educational psychologists report.

Given the complexities of a dyslexic student's learning difficulties at Higher Education level, where many areas of weakness will have been compensated to varying degrees and the overall performance may well be at a level which surpasses the ceiling on some of the traditional tests, the hypothesis for StudyScan was based on a range of discrepancies, fluctuations in performance, and individual background information.

The main areas to be encompassed are listed below:

- Significant fluctuations in performance within a wide range of ability and attainment tests
- A marked discrepancy between verbal and non-verbal reasoning
- Underachievement in timed reading comprehension compared with untimed listening comprehension
- Below average results on a test of spelling and punctuation
- Underachievement in tests of speed of processing information
- Underachievement in aspects of auditory or visual sequential short term memory and working memory
- Signs of particularly good visual or spatial skills

- Good results on a test of composition where marks are not taken off for weak spelling and punctuation
- A discrepancy between verbal reasoning and vocabulary (where the more straightforward test of word knowledge is more accessible to the student, than completing a verbal analogy which involves sequencing and organising of ideas)
- A discrepancy between maths calculation and maths application (given that dyslexic students tend to find extracting the information from text quite difficult to do)
- A generally lower attainment profile in relation to potential compared to other students, showing that dyslexics are very likely to underachieve in examinations compared to their peers.

5.3.4 Description of the StudyScan battery of tests

The following two pages are a description of the subtests included in the StudyScan battery of tests. This was produced by the researcher to outline and explain each of the subtests individually.

**‘StudyScan’ Diagnostic Dyslexia Assessment for students
in Higher Education (ref. ISL 1996)**

Description of the Cognitive Skills Subtests

NON-VERBAL REASONING

- Assesses the student’s ability to carry out an abstract reasoning task without specifically using words. The student is shown a set of 25 matrices of graded geometric forms. In each case a part of the matrix is missing, and the student has to select one from 6 possible response choices that best completes the pattern displayed in the matrix.

VERBAL REASONING

- Assesses the student’s ability to recognise relationships among words. The stimulus phrases provide a set of 30 unfinished analogies which are graded. Each one requires a one word response from a selection of 5 to complete the sentence.

CODING

- Assesses the student’s visual short term memory and sequencing abilities. Hand/eye co-ordination and kinesthetic memory are also involved in this mechanical task which requires the student to recognise and remember symbols, associate each one with the appropriate number, and key in the response.

SEQUENTIAL MEMORY

Digit Span

- Part one: Visual
This part of the test which is subdivided into two parts is a visual stimulus, keyboard response task which measures the student’s visual short term memory span. Increasing numbers of random digits are presented visually at one second intervals for the student to remember and key in. In the 1st part the student is required to key in the digits in the order in which they are presented. In the 2nd part, the student must key in the digits in reverse order.
- Part two: Auditory
A parallel test to the above but where there is an auditory stimulus and keyboard response. This part of the test is again subdivided into two parts - digits in order and digits in reverse.

Snowflakes - Visual Symbolic

- In this test the student is presented with random snowflake shapes at two-second intervals starting with one item and building up. This is a visual memory and sequencing task in which the student is asked to recognise each individual pattern from 9 snowflake patterns.

VOCABULARY

- * This test is only administered when the student has below average scores on the verbal reasoning, and has been designed to determine whether or not it is the vocabulary component which has presented difficulties rather than reasoning ability.

Description of the Educational Attainment subtests in StudyScan

AUDIO SPELLING

- This is a graded spelling test presented verbally for the student to write down onto a pro-forma and then type the words onto the screen.

READING AND LISTENING COMPREHENSION

- Assesses the student's ability to answer questions about passages that have been read silently or read out. There are 5 graded passages and 30 multiple choice questions in both the reading and listening sections. Each section measures the student's ability to select the key point, show knowledge of vocabulary, answer literal questions and infer from the text. There are both timed and untimed versions of both parts. The timed version of this test measures the speed and efficiency of the student's information processing at a professional level of competence when involved in a sustained reading task.

SPEED OF PROCESSING WRITTEN DATA

Speed of Reading

- Assesses the speed at which the student can read a piece of text. In the test the student is required to read a passage on screen and indicate when they are finished. This text is then followed by 10 True/False questions which the student must answer from memory.

Free Writing (Speed of Writing)

- In this test the student is required to choose one of 3 basic headings and write for 5 minutes on the subject onto their StudyScan pro-forma. This test assesses the student's speed of writing, while simultaneously providing the counsellor or administrator with an insight into the student's writing abilities and a sample of their hand-writing.

Speed of Copying

- Assesses the speed at which the student can copy a piece of text. Once again this is a pro-forma based written test.

SPELLING AND PUNCTUATION

- **Spelling Recognition:** A set of 20 words for spelling, graded from a 9 year starting point and reaching adult level. Spelling Recognition requires the student to select the correct spelling of a word from among 5 distractors and place it in a sentence. The results additionally offer an analysis of any spelling errors made.
Punctuation: A measure of knowledge and application of punctuation and capitalisation is included. Observations may also be made on the quality of spelling produced within a the 5 minute Free Writing exercise.

MATHEMATICS

- This is an optional section which comprises two subtests. The first subtest, Numerical Calculations, assesses the student's knowledge of numbers and basic arithmetic (such as addition, subtraction, division, multiplication, square roots, ratios, percentages and fractions). The second subtest, Application of Maths, assesses the ability to apply fundamental mathematical facts and rules for solving problems presented in sentences. Both of these are timed and untimed tests.

Some of the subtests which have so far proved to be the most relevant in the diagnosis of dyslexia are discussed below:

Subtests in StudyScan

- Verbal and non-verbal reasoning
- Spelling and punctuation
- Reading comprehension
- Memory
- Speed of processing

5.3.5 Verbal and non-verbal reasoning

Whilst recognising the various arguments for and against the notion of assessing ability, it was considered essential to include a measure of verbal and non-verbal reasoning in this programme. Whereas the discrepancy model for dyslexia is currently considered to be 'outmoded', it has, nevertheless, traditionally been the 'cornerstone' of dyslexia assessments, and is still required in order for a dyslexia report to be validated by examination boards. This is borne out in the findings of the exploratory study of assessment in Section 4. Results from the verbal and non verbal elements of the original SATA test were compared for dyslexics and non dyslexics. There were a number of characteristic performance features which differentiate the performance of dyslexics from non dyslexics. While dyslexics performed at a similar level to non dyslexics in the non-verbal reasoning tasks, their performance in verbal reasoning was significantly lower than their non-dyslexic peers. (See appendix 5J)

The StudyScan verbal and non-verbal reasoning tests have been created in the light experience with the SATA tests which have themselves been described as effective.

'One of the many strengths of the SATA is that it gives fairly efficiently a measure of verbal and non-verbal ability and thus provides some of the information for decision making provided by traditional psychometric assessment.' (Freeland 1995 - consultant educational psychologist to the researcher).

The verbal reasoning test in the StudyScan programme is not only scored but also qualitatively analysed and to that end specifically targeted items have been included among the distractors in multiple choice questions. An extract from the test is presented in illustration 5n.

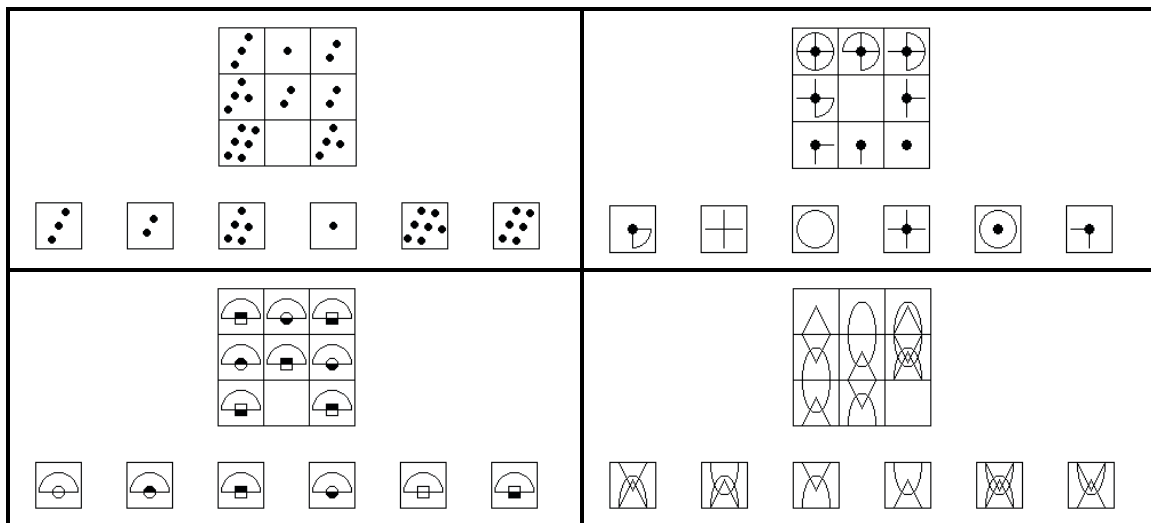
In addition to this test has been created a Vocabulary test, which is based on the words which occur in the verbal reasoning, so that a poor score on verbal reasoning can be further investigated by the administration of the Vocabulary test.

The non-verbal reasoning (see illustration 5o.) is also the subject of an error analysis which may provide some interesting data on any particular trends in the visual problem solving abilities of dyslexic and non-dyslexic students. The categories include holistic approaches, left to right sequencing, numerical or and multi-dimensional sequencing.

Illustration 5n: Extract from the StudyScan Verbal Reasoning Test

13. WRIGHT is to SHIP, as HAND is to (arm. car. farm. train. glove)
14. OCTOBER is to EIGHT, as DECEMBER is to (ten. twelve. winter. twelfth.
November.)
15. NOTE is to TONE, as ANT is to (tune. spider. tan. hill. uncle)
16. BLACK is to GREY, as RED is to (blue. orange. pink. charcoal. anger)
17. MONDAY is to SUNDAY, as FEBRUARY is to (Tuesday. March. Wednesday.
January. December)
18. PEAL is to LEAP, as PEAR is to (rip. bell. parachute. cry. reap)
19. SECRETARY is to OFFICE, as SURGEON is to (medicine. theatre. ward.
scalpel. patient)
20. FIRE is to ASH, as WATER is to (flood. tide. river. silt. ember)
21. IMPRISONMENT is to CURFEW, as BAN is to (censer. prosecute. sensor.
censor. prescribe)

Illustration 5o: Extract from the StudyScan Non Verbal Reasoning Test



5.3.6 Spelling

The exploratory study in Section 4 did highlight that spelling and punctuation were of particular significance in the diagnosis of dyslexia indicating that these would be important areas for inclusion in the StudyScan test battery.

The Writing Mechanics results from the SATA tests showed that compared to non-dyslexic students (who scored within the average range, scaled scores of 10 - 12) throughout a wide subject range, dyslexic students scored significantly less well (below average, scaled score of 7). Furthermore, with the introduction of a more thorough scoring system, quantitative evidence could also be provided regarding individual types of spelling errors.

In the SATA spelling subtest:

77% of dyslexic students scored between 0-5 out of 15 words
whereas only 23% of dyslexic students scored 6 and above.

Almost the reverse was true for non-dyslexics:-

26% of non-dyslexic students scored between 0-5 out of 15 words
whilst 74% of non-dyslexic students scored 6 and above.

The research into knowledge and application of capitalisation and punctuation showed that:

80% of dyslexic students scored between 0-5 out of 15
whilst 20% of dyslexic students scored 6 and above.

However, 42% of non-dyslexic students scored between 0-5 out of 15
whilst 58% of non-dyslexic students scored 6 and above.

'The writing mechanics scale gives a useful measure both of spelling skills and the ability to punctuate individual sentences from an existing text. Direct comparison of declarative knowledge of punctuation rules could easily be compared with procedural knowledge by comparison with the student's own free writing where several memory systems and processes have to be handled concurrently.' R.Freeland.

The new Spelling Recognition test (see illustration 5p.) utilises the same words as are given in the Spelling Audio test earlier on in the StudyScan programme. In this case, however, they are presented in the context of sentences and each correct word has to be selected from among 5 distractors. These have been carefully designed to span the range of errors made in spelling from reasonable phonic alternatives, to homonyms, misplacement of letters, and errors resulting from common mispronunciations.

Illustration 5p: Extract from the StudyScan Spelling Recognition Test

10. mozarts _____ in c major will be played at tonights concert at 8 p m
sontanar. sonatar. sonata. sinatar. sinatra. synartar.

11. have you seen the film version of _____ night
twelth. twelvth. twelfth. twefth. thwelf. twelft.

12. tim and jo went on a _____ expedition across the alps
trechrous. trecherus. treterous. treacherus. trecherous. treacherous.

13. anne christine and tony wrote a number of amusing _____ for
the poetry competition however they were hoping not to have to read them out
limerics.limericks.limerices.lymeriks.limmerics.limorices.

14. she was afraid that they may _____ her for late payment of fees
repremand.repremand.repermand.repromand.reprimand.reprimarnd.

The student has to identify the correct word from among 6 that are presented, and then the words are automatically deleted and the student has to type the correct spelling from memory.

The last five sentences are also presented to the student for punctuation and capitalisation.

The purpose of the Audio Spelling test is to verify the student's ability to write down a list of words for spelling, and since the computer programme is not yet ready to recognise handwriting (although this is only a matter of time) the student is asked to write them onto a proforma, and then to redo them via the keyboard.

The additional benefit of this system, however, which may appear to be repetitious, is that it is possible to compare the student's performance in spelling construction to his/her level of accuracy in spelling recognition.

The tutor input to this test occurs at the very end, where a grid appears on the screen and the tutor acknowledges whether the spelling on the proforma is the same or different to the spelling the student typed in the box (see illustration 5q.).

Illustration:5q: Audio Spelling - Tutor Input

Input Extra Test Information

Test 7 - Audio Spelling

1. surgeon	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	14. repromand	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. deceived	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	15. precipies	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
3. secretarial	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	16. acomerdating	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
4. recieved	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	17. hidrophobia	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. february	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	18. vetinery	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6. ferotious	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	19. ooo	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
7. necessary	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	20. oo	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
8. eclairs	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
9. perillous	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
10. surmounter	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
11. twelth	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
12. trecherous	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
13. limmeriks	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Free Writing

Speed of Copying

Audio Spelling

Cancel OK

5.3.7 Reading Comprehension

In the StudyScan programme there are two parallel tests of comprehension (see illustration 5r.), the first is timed reading comprehension and the second is untimed reading and listening comprehension (both consisting of five graded passages followed by sets of multiple choice questions).

The questions cover the expected range including the gist of the passage, factual, vocabulary, organisational, inferential and appreciative but excluding general knowledge which in some tests obscures true comprehension.

The answers given by the student are categorised so that the error analysis will reveal specific areas of strength and weakness, upon which support can be built.

Reading Comprehension proved to be of particular interest in the exploratory study:

'The reading comprehension scale samples in 15 minutes a fairly wide range of texts, many of which approximate the sorts of texts a higher education student might encounter. The speed factor is one which will emerge as a clear problem for many dyslexic students who find immense difficulty in processing text at speed.' Freeland (1995).

Indeed, the Reading Comprehension subtest became relevant for dyslexic students when a study was carried out to measure the difference in performance between timed and untimed versions of the test. (See appendix 5K for statistical analysis of results). The results showed that whilst being quite competent in a reading comprehension task of short duration (as was the case with the Quick Screener - in which dyslexic students actually did better than their peers) or in a longer reading task which was untimed, dyslexic students tended to do least well compared to their peers, in a sustained and timed reading comprehension task.

In fact the existence of both timed and untimed norms for all the SATA subtests allowed for an exploration into the issues of 'power' and 'level' which could ultimately become major issues.

'The research (see Section 4) has shown that dyslexic students do significantly less well than other students on timed reading comprehension, yet they score on average 1.25 times better on a similar untimed task.' (McCabe, Statistician See appendix 5K).

PASSAGE THREE

Turkey is a constitutional republic, straddling Asia and Europe, that was formed from the ancient territories of Anatolia and (the south eastern part of) Thrace. European Turkey is approximately the size of Belgium and borders Greece and Bulgaria to the north, the Black Sea to the north east, the Aegean to the west, and is separated from the much larger Asian part of the country to the south and south east by the Bosphorus Straits and the Sea of Marmara. Anatolia is approximately the size of Texas and possibly draws its traditional name from an even older part of the region - i.e. 'Anadolu' - which is a compound of two Turkish words 'ana' (mother) and 'dolu' (full) that taken together can be translated as 'fertile mother' or 'fecund earth' - and is bounded by the Black and Mediterranean Seas to the north and south respectively, and Georgia, Armenia, Iran, Iraq and Syria along its eastern and south eastern borders.

13. The traditional name for the entire Asian part of Turkey is:
a) Anatolia b) Anadolu c) Armenia d) Thrace
14. The Asian and European parts of Turkey are separated by:
a) The Black Sea b) Thrace c) The Sea of Marmara d) The Bosphorus Sea
15. Thrace is compatible in dimensions to:
a) Texas b) Anatolia c) Bulgaria d) Belgium
16. In this passage the word FECUND is a translation of:
a) fertile b) ana c) dolu d) anadolu
17. Which modern country, mentioned in the passage, is adjacent to Greece:
a) Thrace b) Anatolia c) Belgium d) Bulgaria
18. The most appropriate title for this passage is:
a) East meets West b) Anatolian Heritage c) A Foot in Each Camp d) United across Two Continents

5.3.8 Memory Tests

It was the conclusion of the exploratory study that one of the shortcomings of the SATA was that it did not include certain tests which are considered to be essential in an assessment of dyslexia. This clearly needed to be redressed in the StudyScan battery of tests. They are tests of auditory and visual sequential memory, and coding which form the most established and researched aspects of dyslexia assessments to date (WAIS-R - Wechsler Adult Intelligence Scale - revised, and BAS - British Ability Scale).

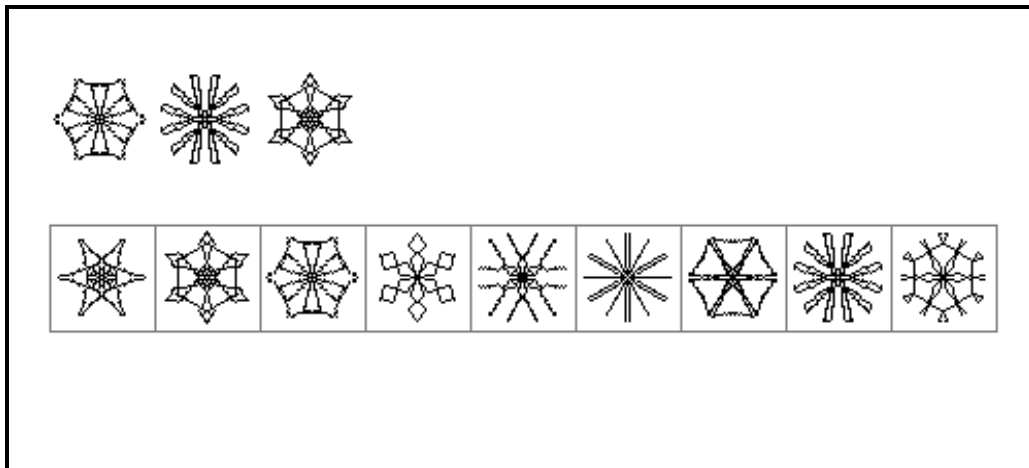
In the Dyslexia project the two most useful tests from the WAIS-R were digit symbol and digit span.

'In coding (Digit Symbol) 42% of the dyslexic students achieved scaled scores of 7 or less, and in digit span 32% scored 7 or less. Whereas in Arithmetic only 16% scored 7 or less and in Information only 4% scored 7 or less.' Walker - Educational Psychologist, consultant to the researcher. (See appendix 5L for an analysis of the 'ACID' Profile)

StudyScan includes tests of Coding and Digit-Span (forward and in reverse both as a visual and an auditory test) (See section 3.5)

The Snowflakes test (see illustration 5s.) is an attempt to produce a visual sequential memory test that, unlike the BAS test of immediate visual recall, cannot easily be verbalised. The student is shown gradually increasing numbers of snowflake patterns one at a time, and has to remember them and be able to identify them from a grid of 9 possible shapes. This grid is randomised so that it is not possible to learn the sequence. The test stops when the student makes two consecutive errors.

Illustration 5s: Extract from the StudyScan Snowflakes Test



5.3.9 Speed of processing

Finally, a key area of assessment which relates directly to providing evidence for the need for extra time in written examinations and extending handing in dates for course work, is one which currently is most open to criticism. Apart from a general guideline concerning the normal reading and writing speed to which students are compared, the method by which individual reading, writing and copying rates are established appear to be many and varied.

However, using some of these 'standard' procedures, a study was carried out to compare the reading and writing speed of dyslexic and non-dyslexic students.

The exploratory study (Section 4) showed that Reading speed - for dyslexic students is at around 130 wpm compared to the average of 300 wpm.'

The research showed that Writing speed - for dyslexic students is approximately 13 wpm compared to the average of 25-30 wpm.

A standardised and more objective way of determining reading and writing speeds has been pursued in StudyScan. A piece of text for reading is presented which is at an adult level and on a subject that could be described as one 'of general interest', followed by a 10 point true/false comprehension check (see illustration 5t.) Without such a cross check on comprehension it would be easy for a subject to claim they had read the passage quickly and there could be no way of proving or disproving their claim. This feature may as a by-product also provide interesting data for future analysis, on reading speeds and comprehension levels.

Illustration 5t: Extract from the StudyScan Reading Speed test

Born in Warsaw, chemist and physicist Marie Curie (born Sklodovska) was educated at the Lyceum of Warsaw and emigrated to France in 1891. She studied at the Sorbonne, in Paris, with Pierre Curie, whom she subsequently married. Marie's decision to discover the nature of uranium rays was influenced by the experiments of French physicist Antoine Becquerel, who discovered the first indications of radiation in uranium salts. In 1898, she reported the possible existence of a new, powerfully radioactive element in pitchblende ores, having noted that one particular uranium ore emitted an exceptionally large amount of radiation. Her husband abandoned his own experiments to join her in the quest to isolate this element. In the same year they announced the existence of polonium and radium. In 1902, they isolated one gramme of pure radium from 8 tons of the ore. The Curies, together with Becquerel, received the Nobel Prize for Physics, in 1903, for the discovery of radioactivity. After the death of her husband, in 1906, Marie succeeded to his chair, at the University of Sorbonne, as Professor of Physics and was the first woman professor to be appointed to that university. Marie took no precautions against radiation and died a victim of radiation poisoning. Even today her notebooks are too contaminated to handle.

Reading speed test 'true or false' questions based on the reading passage

Marie Curie was a chemist and physicist.

Marie Curie was born in Sorbonne in Paris.

Among other things, Marie Curie set out to discover the nature of uranium rays.

Marie Curie married Antoine Becquerel.

Antoine Becquerel discovered the first indications of radiation.

Pierre Curie discovered plutonium.

Marie and Pierre Curie, with Antoine Becquerel, received the Nobel Prize for Physics in 1903.

Marie Curie was the first woman to be appointed to the post of professor in the Sorbonne.

Marie Curie died as a result of her research.

Marie Curie's notebooks have been destroyed.

The writing speed is divided into copying of a 'standard' piece of text to determine speed of writing (the mechanics of handwriting) with a letter count. At the end of the test the tutor inserts the number of words written into a box, and indicates levels of spelling, punctuation, sentence structure and expression of ideas according to guidelines in the Instruction Manual (see illustration 5u.).

Illustration 5u: Free Writing - Tutor Input

Input Extra Test Information

Test 10 - Free Writing

Please select attainment levels from the following categories:

Spelling	Punctuation	Sentence Structure	Expression of ideas
<input checked="" type="radio"/> Weak	<input checked="" type="radio"/> Weak	<input checked="" type="radio"/> Weak	<input type="radio"/> Weak
<input type="radio"/> Below Average	<input type="radio"/> Below Average	<input type="radio"/> Below Average	<input checked="" type="radio"/> Below Average
<input type="radio"/> Average	<input type="radio"/> Average	<input type="radio"/> Average	<input type="radio"/> Average
<input type="radio"/> Above Average	<input type="radio"/> Above Average	<input type="radio"/> Above Average	<input type="radio"/> Above Average
<input type="radio"/> Strong	<input type="radio"/> Strong	<input type="radio"/> Strong	<input type="radio"/> Strong

Number of words written in composition:

Free Writing
Speed of Copying
Audio Spelling

Cancel OK

There is also a copying test which is timed and presented on screen.

Tests of Numerical Calculations and Application of Maths form the last two tests in the programme and are based on the tests presented in section 4.4.9.

5.3.10 First statistical analysis

The first statistical analysis of the StudyScan tests was carried out in 1996 with data from group of 60 students from the University of Ulster, half of whom had been assessed as known dyslexics. 75% of the test items used were newly created, and 25% of the items in the test battery were taken directly from the original SATA test. This was done to enable a Rasch analysis (Rasch 1966) to be performed in order to calibrate the new test items in terms of their reliability as a subtest. All the recommendations that resulted from this analysis were implemented. The reliability and item analysis data from the StudyScan statistical analysis has been archived by the researcher.

The following presentation (which was a parallel study carried out using the above data under the direction of the researcher) follows because it acts as the first statistical analysis of the tests intended for inclusion in a computer-based assessment.

1. Introduction

This brief report contains details of the results of a reliability study conducted with a battery of seven tests designed to identify learning difficulties in University level students. The tests were designed by Dorota Zdzienski (University of Leicester), and piloted in February 1996 at the University of Ulster. Data were collected and placed into ascii files by Steve Renow (IVCA International Visual Communications Association). This study was commissioned by Dorota Zdzienski with the sole purpose of investigating the reliability of the tests, but was also intended to highlight areas for further research.

The test battery consisted of the following subtests:

1. Verbal reasoning
2. Non-verbal reasoning
3. Coding (2 versions)
4. Reading comprehension (2 versions)
5. Spelling and punctuation (2 versions)
6. Application of Maths (2 versions)
7. Maths- Basic Arithmetic (2 versions)

2. Methodology

If reliability can be defined as *'the degree to which test scores are free from errors of measurement'* (APA, 19), then it is the duty of every test developer is obliged to present estimates of reliabilities for the test user to judge whether scores are sufficiently accurate for the intended use of the test" (APA, 20).

In this study it was not possible to give all, or even some, tests multiple times to the same participants. Further, there was a requirement that if the tests proved to be reliable, then a methodology which would allow item calibration in the construction of new forms should be used. It was therefore decided to use Rasch analysis (a one-parameter logistic model, as described in Crocker and Algina, 1986: 353 - 354).

This method allows the calculation of the Rasch equivalent of Cronbach's α , which is an estimation of internal consistency, together with:

- difficulty level of each item (in logits)
- the standard error of each item
- an assessment of the item fit to the Rasch (unidimensional) model, and
- information provided

In the case of two subtests (verbal reasoning and Spelling (I) and (II)), classical item

analysis was also conducted in order to highlight which items might benefit from distractor rewriting.

The number of subjects taking each subtest is not recorded, but in no case did this fall below 80, and in most cases was approximately 100. All subjects were university students, randomly drawn from departments and courses. There were a roughly equal balance of male and female subjects. A precise breakdown of the sample, if required, is available from Steve Renow.

3. Results and Discussion

3.1 Reliability

Reliabilities for the subtests are presented in table 1.

Table 1. Reliabilities for subtests in the battery

Name of Subtest	Reliability Coefficient
Verbal Reasoning	.795
Non-verbal Reasoning	.797
Coding (I)	.783
Coding (II)	.782
Reading and Comprehension (I)	.804
Reading and Comprehension (II)	.800
Spelling and Punctuation (I)	.678
Spelling and Punctuation (II)	.709
Application of Maths (I)	.657
Application of Maths (II)	.599
Maths - Basic arithmetic (I)	.636
Maths - Basic arithmetic (II)	.617

Given the short length of the subtests in use, reliabilities around the .8 level are encouraging, even though they would need to be higher if the instruments were to be used to make serious judgements. Spelling and punctuation (I) and (II), and all the maths subtests have lower coefficients, but this is mainly because each subtest only contains 15 items in spelling and 12 items in the maths subtests. It is clear that these tests need lengthening if reliability is to be increased to acceptable levels.

In most tests some items were (unsurprisingly) found to misfit the Rasch model. These items will need to be removed and new items written to take their place.

Only two of the subtests, Coding (I) and Coding (II), had many items which were deleted (the item was always answered correctly or incorrectly), and many items which did not fit the model. The main reason for this is that these two tests were speeded, on the basis that presence of dyslexia results in less ability to answer questions correctly when under pressure, and that scores can be a function of accuracy and speed. All methods for assessing reliability in educational and psychological testing *assume* that tests are not speeded, and when they *are*, reliability estimates and results from such investigations are suspect. Currently, the only method of estimating reliability in speeded tests is to correlate parallel tests, or use the test-retest method. However, there is a problem with the former, in that unless one can obtain adequate item statistics in the first place, judgement as to whether tests are parallel is likely to be extremely subjective.

These two tests must therefore be retrialled as non-speeded tests, or be piloted in a test-retest study, as the results of this study show that their reliability is still very much an unknown quantity.

3.2 Correlational evidence

Simple correlation studies can never be taken as evidence for or against the validity of a set of subtests, especially when many of the coefficients are based on samples as low as 12 cases. However, they do provide indications of appropriate further study. Table 2 provides the correlation matrix (lower left triangle), with the number of cases used to obtain those coefficients (using pairwise deletion) in the upper right triangle. The diagonal underlined entry is the reliability coefficient.

Table 2. Subtest correlations using pairwise deletion

	NVR	VR	COD (I)	COD (II)	SP (I)	SP (II)	RC (I)	RC (II)	APM (I)	APM (II)	M (I)	M (II)
NVR	<u>.795</u>	.22	.11	.11	.14	.13	.11	.11	.11	.12	.11	.16
VR	.27	<u>.797</u>	.11	.11	.11	.12	.12	.12	.11	.12	.11	.12
COD (I)	-.31	-.29	<u>.783</u>	.79	.11	.11	.40	.11	.14	.43	.11	.14
COD (II)	-.27	-.42	.68	<u>.782</u>	.11	.11	.40	.11	.14	.43	.11	.14
SP (I)	-.10	.34	.19	.05	<u>.804</u>	.12	.14	.11	.12	.14	.12	.22
SP (II)	.26	.59	-.06	-.26	.58	<u>.800</u>	.17	.12	.11	.11	.20	.32
RC (I)	.23	.65	.09	-.15	.29	.44	<u>.678</u>	.13	.11	.11	.14	.11
RC (II)	-.15	.32	.13	.14	.25	.14	.49	<u>.709</u>	.11	.12	.11	.11
APM (I)	.61	.31	.07	-.02	.05	.42	.19	-.41	<u>.657</u>	.11	.11	.11
APM (II)	.82	.26	.01	-.11	.03	.18	.11	-.01	.52	<u>.599</u>	.11	.11
M (I)	.16	.15	.17	.21	.58	.07	.25	-.36	.78	.17	<u>.636</u>	.13
M (II)	.50	.31	-.29	-.18	.49	.35	.05	-.36	.44	.13	.64	<u>.617</u>

The correlation coefficients in bold would be expected to be significant and higher than other coefficients in their column and row. For the most part, this holds true. Using such small numbers these results could be entirely spurious, but it may indicate that it would be beneficial to conduct a detailed validity study. (Note, as there is only one subtest of verbal reasoning and one of non-verbal reasoning, it is not possible to analyse these tests in this way; it is, however, worth noting that non-verbal reasoning correlates most highly with applied maths, and verbal reasoning with spelling and reading comprehension. This is at least intuitively satisfying, if nothing else.)

=> Some items need to be removed and/or rewritten in some of the subtests 2

=> Coding I and Coding II need to be rewritten (and retrialled) as non-speeded subtests, or as speeded subtests in a test-retest study

=> Some of the subtests need to be lengthened and retrialled if reliability is to be improved.

By using the Rasch model, it has been possible to obtain statistics which will allow

calibration of items in future forms of the tests. Items which are now operating well should be kept in an item bank, together with the information available for that item. In future forms "anchor" items can be used to calibrate the form and produce conversion tables between forms of the same test. It is therefore recommended that:

=> An item bank be developed for successful items, containing all available information on the item, and that

=> Development of more forms of the test use accepted calibration procedures.

This study, as emphasised above, has only been concerned with the reliability of subtests. The important subject of validity has not been addressed at all through this design. In particular, there is no evidence for convergent or divergent validity of any of the subtests. Although we know that each of the subtests is measuring something with an estimated degree of reliability, it has not been established what this is. It is therefore recommended that:

=> Appropriate validity studies be designed and conducted

In order to pursue this the validity studies should be designed carefully prior to any collection of data, so that the data is completely capable of being manipulated to provide answers to key validity questions.

A further key area of validity is whether, and to what extent, the test battery is capable of discriminating between students with learning difficulties and those without. It would therefore be appropriate to recommend that the test developers conduct a validity study to discover the discriminatory power of the subtests and the test battery as a whole.

From the generally encouraging results of this reliability study, it would seem appropriate to recommend that the researchers continue to try to improve the reliability of the subtests within acceptable budgets, and conduct a number of validity studies at the earliest possible opportunity. Whilst a positive start, it indicates the need for further statistical analysis with larger groups of students.

This analysis is currently under way with the collection of data from other sources.

5.3.11 The Diagnostic Mechanisms used for StudyScan

In its present format StudyScan makes its diagnosis on the basis of the following components:

- 1) The results from QuickScan (which offer relevant background information together with the students' self reported comments on their own learning experiences).
- 2) A comparison made between all the test scores with specific reference to pairs of tests between which dyslexic students have shown greater discrepancies than non-dyslexics.
- 3) A qualitative element in the analysis of error types partly derived from tutor input and partly from the potential for analysis of error types facilitated through the use of error type encoding which is a built-in feature of the programme and which is still under development.
- 4) The overall profile. A clear impression between a dyslexic student's profile in StudyScan and their non-dyslexic peer's result is shown in illustrations 5w and 5y which are typical examples of results profiles. The 'jagged' profile which has been seen in many of the dyslexics so far tested is clearly visible in the results graph shown in illustration 5.w.

Illustration 5w: Dyslexic student's StudyScan Profile

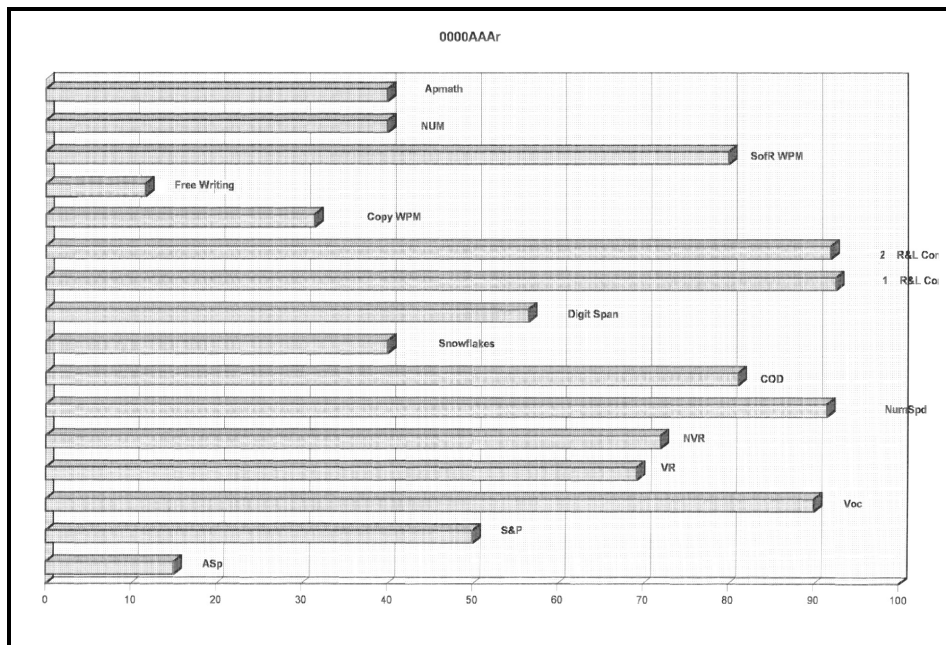
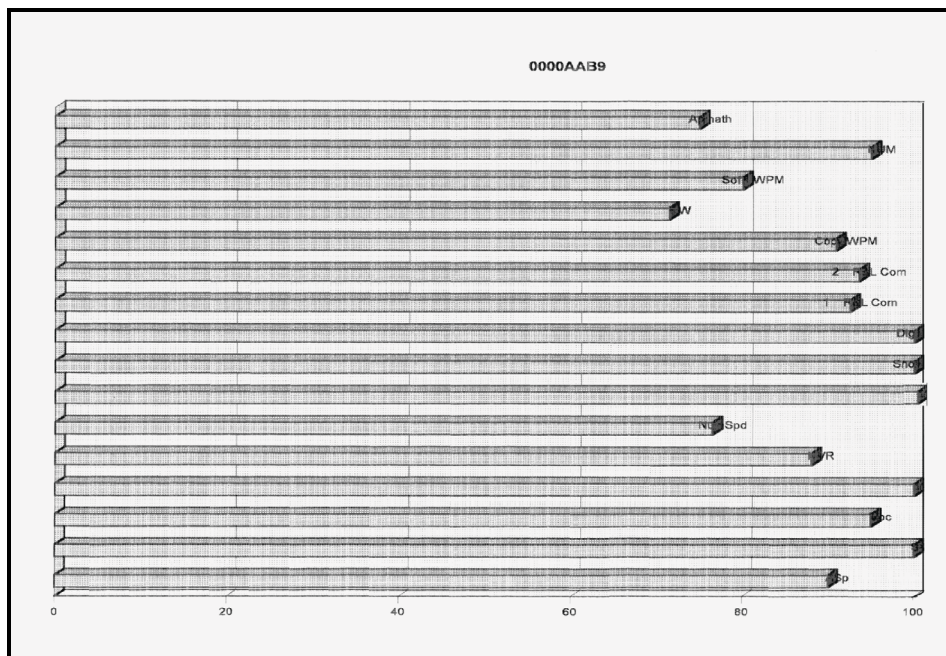


Illustration 5w: Non dyslexic student's StudyScan Profile



5.3.12 Summary

There have already been identified strengths in the application of the programme which need to be mentioned. Many students have reported that they consider the StudyScan programme to be user friendly, and state that they have enjoyed doing some of the tests. Some feel that working on a computer is less daunting and embarrassing than being tested by another person. Whereas students have occasionally commented that traditional assessments seemed more orientated towards child assessment, they actually found StudyScan quite challenging in parts. Tutors have found the learning styles profiles useful as a discussion document in subsequent sessions with their students, and have considered the content of the Analysis Report and the Dyslexia Report to be very detailed.

With the recent move to open up the assessment process to qualified Study Support Tutors, the StudyScan programme may be a useful aid to institutions to serve as

- a.) an effective and accessible large scale initial screener for dyslexia, and
- b.) a cognitive and attainment test battery with a comprehensive diagnostic report which can act as a basis for the construction of individual training programmes.

There has been an ongoing process of the collection of user feedback about various aspects of the programme and although early reactions have been very mixed, ranging from institutions which have embraced it fully and are using it for the screening and assessment of the whole student intake, to those which have found the learning curve involved in adopting such a new approach too great to cope with. The HEFCE project entitled Pre-assessment Screening for Dyslexia in Higher Education has been collating evaluations of computer programmes in use, including StudyScan and is due to be published in the near future.

Awareness of the existence of Computerised Diagnostic Assessment is beginning to be more widespread, and the researcher herself has made a number of presentations at a series of national conferences including The BETT Exhibition 1998, from which participants' feedback was positive. See appendix 5M for examples of this and other conferences at which papers were presented.

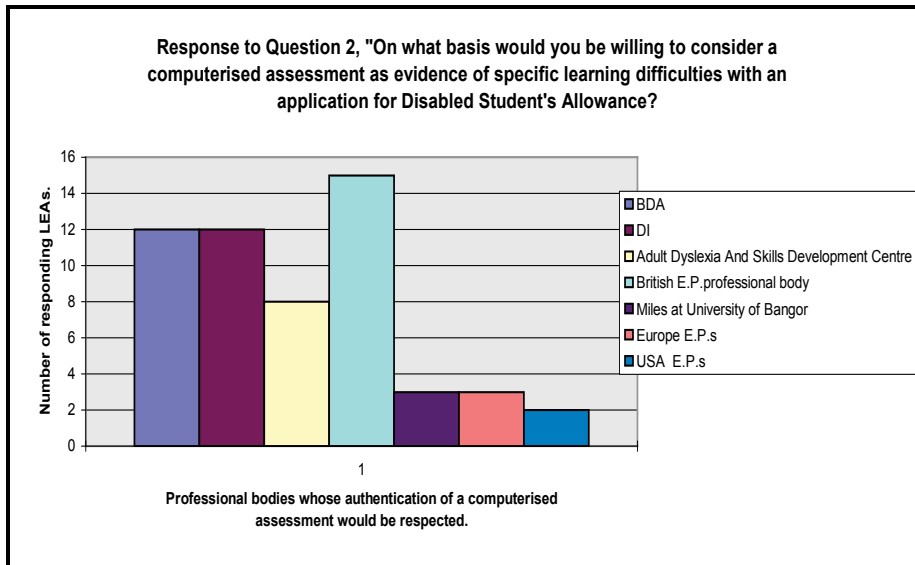
Admittedly it does require a great deal of commitment and effort on the part of any institution to make so radical a departure from established methods of approach to student assessment and until it is fully established its operation will inevitably need to be in parallel and in addition to existing methods and costs. However the potential is there for making screening and assessment by computer a simple and effective process in the future.

'Without institutional support, the rich potential of computer based assessment will not be realised.' (Bull 1996)

It is encouraging to note, even at this early stage, before full acceptance of the reports from such a programme has been established with students, study support tutors, Educational Psychologists and Local Authorities, that given suitable endorsement by appropriate professionals, Local Authorities could find such reports acceptable. It is also possible that other professional bodies will do the same.

The following graph table (see table 5.xvi) shows the responses in a survey of 16 Local Authorities to the question about who might endorse a computerised report: *'On what basis would you be willing to consider a computerised assessment as evidence of specific learning difficulties with an application for a Disabled Student's Allowance'*

Table 5.xvi: Responses in a survey of 16 Local Authorities



The tests in the programme have been described by the Educational Psychologist who acted as consultant to the StudyScan project as follows:

'The test procedures proposed are likely to be a valid method for the identification of students with learning difficulties both of a dyslexic and more general nature. A computer based assessment should enable group and individual assessments to be efficiently carried out in terms of cost and time allocations. The student profiles obtained would assist with subsequent consultations in the design of appropriate strategies in order to cope better with difficulties of a personal, intellectual or educational kind.' J.Walker

Section 6 Conclusions

Learning Support

This study has attempted to relate the characteristics of dyslexia in Higher Education to the wider context of the general characteristics of dyslexia, to examine the problems in defining the condition over the last thirty years and the fact that the literature has concentrated mainly on the dyslexic 'child' population.

During the five years that this study has taken to complete, the situation for the individual dyslexic student in H.E. has greatly improved as a result of legislation, government funding and generally increasing awareness among staff in Higher Education Institutions regarding dyslexia.

It was one of the aims of the study to explore and systematically record some of the learning experiences of dyslexic students in Higher Education and document some of the successful learning strategies that were used. Their accounts may contribute to future written publications in an area where little is as yet widely available, regarding individual learning support for this age-group and ability level.

In this study approaches to student support were presented in a series of case studies (section 2) followed by a section on useful learning strategies, some of which will already be in current use to varying degrees within study support departments across the UK (sections 5.1).

Most Universities now promote their commitment to study support for any student who might need it. From the very first point of contact, for example, via a simple search of any academic institution's Internet website for the term 'dyslexia' this commitment will become evident in the details of that institution's policies and provision.

The acceptance of dyslexia as a feature of the Higher Education environment was discussed in section (2.4.7.). The discussion was followed by further consideration of appropriate provision, together with issues of the individual rights of each dyslexic student to adequate provision. Examples were given of the conflicts that arise in an institution where students are not treated equally. These have provided insights into ways in which a combination of legislation, internal and external information networking and exchange has helped to clear a path for equal opportunities for dyslexic students.

In the light of the reality that little over half of the number of dyslexic students at Higher Education level have been identified prior to going to university, the further aim of this study was to devise a screening programme that could be accessed by large numbers of students and indicate to them if they are likely to be dyslexic.

Screening: QuickScan

The experimental QuickScan has been delivered on the institutional networks of some twenty Further and Higher Education Institutions and is already being used as a first filter for the identification of students who may be dyslexic. It will also be of use to non-dyslexic students, as it will present them with a summary of their learning style preferences together with some relevant tips on study and revision.

QuickScan was found to be reliable ($R=0.9$)(see section 5.2.12) and analysis confirmed that the questionnaire data is capable of discriminating between dyslexic and non-dyslexic students (Zdzienski, in press). Quickscan is currently proving to have a comparability with Educational Psychologists' conclusions of between 90-95%, allowing for a small number of apparent false positives (not as yet confirmed since the students concerned had not been previously assessed), and some false negatives, mainly in cases of students with a history of dyslexia but who no longer appeared to be experiencing too many practical difficulties (i.e. they were 'well compensated')

Beyond the original aims of the study it has further been found that QuickScan can also be used with equal success rates in a small number of secondary schools for the 15+ age group.

The QuickScan programme is capable of differentiating between students who show positive indicators of dyslexia and those who simply have study skills difficulties but are not dyslexic. It also includes indicators which identify students for whom English is not their most fluent language. With further development the programme could have a wider application than was originally envisaged. It appears to be able to differentiate between dyslexic students and those students with basic English language difficulties.

However, it is not suitable in its present format for use with students who have difficulties with basic adult literacy but its accessibility to this group could be made feasible through the use of audio technology in delivering the questionnaire. There are, however technical difficulties which could present themselves to this process, as audio delivery could restrict the programme's potential for delivery over institutional computer networks or the Internet. Given the present pace of technological advance, computer systems may yet soon deliver new methods of presenting text in audio form, which do not have the limitations of those which are currently available. This would avoid the present need for transferring pre-recorded human voice wavefiles across a network and improve operating speed in networked computer environments.

Tutors have found the learning styles profiles useful as discussion documents in subsequent individual and group tutorial sessions with their students. Some have commented that QuickScan fulfils some of the recommendations of the Tomlinson Report (1996 Report of the Further Education Funding Council Learning Difficulties and/or Disabilities Committee) by encouraging 'inclusive learning'. There is currently a new project in progress (at West Kent College) aimed at examining students' preferred learning styles and which employs QuickScan as the primary vehicle for the collection of data.

Since the experimental version of QuickScan was developed, other computer based screening programmes have been produced (e.g. The Dyslexia Test, McLean 1997 - under development).

Diagnostic Assessment: StudyScan

'StudyScan' is a battery of tests which includes tests of cognitive ability as well as a range of literacy and numeracy attainment tasks which have been researched and developed with non-dyslexic and dyslexic students in Higher Education.

The acknowledged lack of research and standardisation of assessment procedures for dyslexic adults in Higher Education, together with the findings of the National Working Party with regard to a lack of consistency in the assessment procedures, prompted the question: Can dyslexic students be assessed through the use of computer-based tests?

The computer programme developed in response to this question is an initial and, as yet, unrefined version. However some of the initial subtest results analyses yielded reliabilities of up to 0.8.

A number of phonological skills tests, (which do not currently feature in StudyScan except in an indirect way through the audio spelling test) that were not generally available at the time of the study should be considered as one of the priorities for inclusion in the future development of the StudyScan programme.

The National Working Party Report lists QuickScan and StudyScan under the title "New Approaches to Screening" stating that the advantages of computer-based assessment of dyslexia can be considerable - *'not only are there savings in cost and time, but also in the case of adults, assessments can be self-administered and therefore confidential'*.

Whilst this programme is currently being evaluated by an HEFCE funded project at Hull University (Singleton, Trotter and Smart 1998 - see appendix 6A for relevant extract from the Interim Report), a number of other evaluations are being carried out by universities (Ulster, Leicester, Open University), by a number of Further Education Colleges (West Kent, Croydon, Lewisham), by an LEA training centre (NE Lincs) and by a number of individuals in the context of M.Ed modules. The BDA computer committee carried out an initial evaluation and are awaiting feed-back from other institutions.

Some Colleges of Further Education have found the tests too difficult for their students, whilst others are reporting that they can see this will be a useful resource for their college.

Whilst it may be too early to draw conclusions regarding the efficiency, and more fundamentally, the actual desirability of a) computer-based screening and b) computer-based assessment, the implications are many and diverse, and there is much further research to be done in this area.

6.1 Findings and implications

Student Support

The major aim of this study has been to explore and systematically record some of the learning experiences of dyslexic students in Higher Education, with a view to presenting some of the successful learning strategies.

Case studies showed that specific intervention consisting of a combination of confidence building and introduction and rehearsal of study strategies made an impact on the success of their course to dyslexic students. One student (Steven), out of the sample 6 case study subjects stayed on his course rather than drop out of university because of the help he received in passing his examinations.

A second student (Anna) considered that the support she had been given had helped her to achieve a Lower Second Degree rather than a borderline pass. Two other students (Christina and Julie) stated that the additional individual learning support, together with, in Julie's case, additional funding, had helped them to build up their confidence and improve their results in coursework assignments. Several other students with whom work was done by the researcher are mentioned in section 5. This work included overcoming exam phobia, addressing the underlying reasons for failure (section 5.1.12), learning how to memorise for examinations (section 5.1.10), finding the courage to walk back into an examination hall (section 5.1.9) All of these students have found these sessions to be a turning point leading to coping more effectively with their coursework. Some of the minimal interventions, (in terms of time taken), but which targeted specific students' needs were found to be very beneficial. It is recognised by the researcher, however, that these benefits may not have occurred had the HEFCE project not been in place and had another tutor with different background skills been in post, or had these particular techniques not been employed.

Issues arising from these findings include:

- The need for Study Support to be offered on site
- The relevance of essential prerequisite qualifications and skills for a Study Support Tutor

In many institutions of Further and Higher Education the Study Support Co-ordinator's time is mostly taken up with administrative duties and sources outside of the institution are sought for assessments and individual tuition. This draws attention to a further dilemma, i.e. that for some thirty years the dyslexia field has been predominantly concerned with dyslexic children and teenagers. There is, however, a shortage of qualified and experienced psychologists for the Higher Education age and ability level. Students who receive funds for specialist tuition are left wondering whether to use the money to appoint private tutors with specialist knowledge of their academic subject area who will give them extra curriculum based coaching, or whether to appoint a dyslexia tutor from a list of tutors at one of the dyslexia centres who may have limited experience of working with students at the appropriate age level, and perhaps no specialist subject knowledge in their academic discipline, but with an understanding of dyslexia. Dyslexic students enrolled on degree courses may not be sufficiently well-equipped to make the best choices. From the researcher's contact with some colleges in and around London, she has learnt that there are hundreds of dyslexic students in this predicament. There appears to have been a lack of guidelines or regulations concerning what constitutes a qualified dyslexia tutor for Further and Higher Education. Currently, without being aware of it, students might use their allowances to pay for the fees of private tutors who may be either insufficiently experienced or inappropriately trained.

The effectiveness of a variety of study support methods, including Neuro-Linguistic Programming, memory strategy development and study skills techniques has been explored in sections 2 and 5.1 and the findings are presented for possible inclusion in Study Support. Strategies for dyslexic learners need to continue to be developed through further applied research projects and the findings disseminated among H.E. support tutors.

Section 2.2 makes a case for appropriate counselling and support for dyslexic students. Counselling is being offered in some universities in a combination of peer group support and individual guidance. Because so many different medical and academic disciplines have been involved over time in the identification and provision of support for students with dyslexia no one discipline has final responsibility. This may be one of the reasons why it has taken so long for dyslexia to become widely recognised (see Section 1.3.2). Because such a wide range a range of specialist knowledge is required to deal with the variety of needs of dyslexic students at this level, the skills required of a study support tutor often include those of educational psychologists, clinical psychologists, speech or language therapists , SpLD tutors and counsellors.

Whilst most SpLD tutors have some practical experience through their work, of giving personal support to dyslexic learners, they are not necessarily trained counsellors. Equally, whilst they may carry out initial interviews with self referred students, and are encouraged to do so as part of the support tutors' widening role which now includes screening they may not necessarily have the experience to identify dyslexic students when many may be well compensated and may not have been assessed previously.

These factors point to a need for appropriate training for Study Support tutors who deal with dyslexic students in Higher Education. Given the increasing numbers of dyslexic students enrolling on degree courses (see section 1.3.4), it is very likely that there will be a need for more than the single or part-time shared post that at present appears to be the total facility that some institutions are able to make available.

- To what extent is it feasible for individual learning support offered to dyslexic students in Higher Education be curriculum-based?

When evaluating the case studies presented in this study (section 2), the researcher is aware that her many years of teaching experience in the dyslexia field notwithstanding, the specific curriculum based support she was able to offer to the arts students (her own academic background being in languages) was more relevant than the support she was able to give to the science students.

In Steven's case the researcher found his poor handwriting difficult to decipher; this was partly due to her own lack of familiarity with his subject matter. He stated that his tutor and other technical specialists did not seem to find so much difficulty. What the researcher had encountered was the disadvantage of not being familiar with the specialised technical terms used for his subject area. Therefore the practical curriculum based support he could be given was less direct because it required additional effort on his part to transfer the skills or to extract the maximum benefit from it.

However the researcher would not have needed specialist subject knowledge for such aspects of study support for dyslexic learners in Higher Education as the teaching of learning strategies to students who have poor memory and sequencing skills. For example, she was able, without specialist academic subject knowledge, to provide Steven with the necessary memory techniques to ensure that he could remember a variety of electronics formulae more effectively. She could also give him exercises to help him read his examination question papers with greater accuracy. What she was not in a position to do, however, was to work with him through his questions to the point of checking his answers to them. Therefore, in Steven's case, he was encouraged to find one or two friends with whom he could discuss the solutions to coursework problems and who could help him find out where in the content he was going wrong.

The National Working Party Report on Dyslexia in Higher Education (Singleton in press) states: *'There is sometimes confusion as to what dyslexia*

support entails. This support is not subject specific. It is concerned with the development of skills necessary to manage dyslexic thinking styles and difficulties within an H.E. context. It is perhaps unfortunate that it is stated so definitively that dyslexia support is not subject specific, since in the recorded experience and observation of the researcher, study support appears to be considerably more effective when given by a tutor who does have a strong understanding of the student's specialised subject material.

Kelly (1991) also supports the view that study skills support is now generally accepted as being more effective when it is curriculum based and that dyslexia support at H/E level would also be more effective if each discipline had its own dyslexia support tutor. There would clearly be substantial financial implications in doing this.

Another area that has been highlighted by the case studies, as well as other contact time with a number of dyslexic students is the question of the way in which the Disabled Students' Allowances (DSAs) are distributed.

- The need for accountability regarding the proper use of DSA

During the reported period of this study (1993 -1998), any dyslexic student who had an assessment from an Educational Psychologist (i.e. some sort of official record of having had a history of learning difficulties), was able to make an appointment with the Study Support Tutor and, after an interview, receive a covering letter which would be enclosed with the student's own letter requesting a Disabled Students' Allowance and sent by the student to the appropriate LEA.

Although there appeared to be the intention of an equal provision for all, in reality not all LEAs were forthcoming with the necessary funds. Some resisted allocating DSAs by disputing with the psychologist over the details of an assessment (eg. *'this student does not have an 'acid' profile therefore they are not dyslexic'*).

As in the example given (section 2.5) it was not always the case that the dyslexic student who received assistance was the one who most needed it,

and at times students who, it later emerged, did not need allowances would be offered one without there being any further accountability.

Walker (1994), the psychologist working with the HEFCE team at Kingston University suggested that unused or no longer required technological equipment should be returned to the university for other students to use. The responding funding body (LEA) however considered that setting up such a system would be impractical, and that computers become dated too quickly for it to be worthwhile.

It has been the case that substantial funds have been made available to dyslexic students (up to £3,500) with no demand for accountability, in terms of the use of equipment, or regular attendance at learning support (section 2.5).

There was some local reaction among staff at Kingston University where lecturers personally disagreed with the policy of dyslexic students getting 'free' computers with expensive colour printers. This was not only because these were not considered essential for them to be able to carry out their assignments, but also because this placed them at what was considered to be an 'unfair' advantage over their peers.

During the period of this study (1993 - 1998) the issue of the fair allocation of DSAs was not a straightforward one because of the diverse responses from different LEAs which did not all appear to give dyslexia the same priority in their budgets. This resulted in inconsistent provision for dyslexic students depending on where they lived (see section 1.3.3).

It was the personal observation of the researcher during this same period (1993 - 1998) that a further point of difficulty was that dyslexic students' eligibility for DSAs appeared not to have been prioritised, for example, by level of severity, resulting in what appeared to many lecturers and students to be a 'blanket' provision made to those students who had documented evidence of dyslexia and who lived in the right borough regardless of their level of difficulty that they were experiencing in following their degree course.

- Should Disabled Students' Allowances (DSAs) be made available to any student who is dyslexic regardless of the degree severity of his/her dyslexia?

The above procedure of apparent 'blanket' distribution of DSAs did not appear to take into account the fact that not all confirmed dyslexic students have a similar degree of learning difficulty. Level of difficulty is now being categorised by some psychologists as mild, moderate or severe (Turner 1997). Clearly the cases of dyslexic students (section 3.2.4) with what could be described as mild learning difficulties ought not to be equated with more severe cases. (See, for example the illustration 3f of a student's handwriting who has severe learning difficulties compared to that of a student whose learning difficulties are mild, shown in illustration 3g). The level of individual support, and the type of technological aids that would be most appropriate are very different. This highlights the need for all those who are involved in student support to have guidelines relating not only to the different categories of severity of dyslexia but also to the subtypes of dyslexia and other, at times, overlapping specific learning difficulties (e.g: dyspraxia, dyscalculia, ADHD - see section 1.3.2). When attempting to provide support for all dyslexic students, these factors have wide ranging implications for assessment, screening and learning support and the appropriate use of DSA funds.

A further issue that emerged from the study support was that of unfair provision for dyslexic students, mainly caused by inconsistency between departments concerning their policies regarding examination concessions. This highlighted the question:

- The importance of a reasonable level of consistency between universities at a national level institutional policy regarding provision for dyslexic students.

The Disability Discrimination Act (1995) was passed requiring all Higher Education Institutions to set out their policy statement regarding provision for

disabled students (including a policy statement with regard to Specific Learning Difficulties (SpLD) / dyslexia). This has caused key members of staff not only to have to acknowledge the existence of dyslexia among students but also to accept the fact that dyslexic students have rights to equal educational opportunities, including being provided with appropriate support.

However, the setting out of a written policy statement and its fair implementation throughout an institution are two separate matters. The Act has not required universities to implement these provisions with immediate effect or to do so with consistency, and the gradual changes that are being made are often subordinate to both practical and financial considerations. Section 2.5. provided an example of a dyslexic student who was dismissed from the university because, being in the Science faculty which had different regulations from the rest of the University, she was not given extra time in the examination, and failed to achieve the required pass mark. This was the only faculty in the university to refuse giving extra time to dyslexic students. This situation was in fact due to practical considerations rather than for reasons of principle: since science was taught on a modular basis, the examinations were organised so closely together that it was not easy to change the system.

During the period of this study (1993 - 1998) a number of individual students attending the dyslexia unit complained of unfairness in the system in that there was not a whole-institution policy regarding the allocation of extra time. There were a number of students who had made enquiries prior to entering the university and who had been informed by the admissions staff that extra time would be given in examinations, but who then discovered once they had started their course that their particular faculty did not give time concessions.

If there had been a standardised and enforceable University policy regarding the allocation of extra time for dyslexic students these situations would never have arisen and the potential for conflict would have been eliminated.

A survey carried out by Gilroy in 1994 at the time of the HEFCE project showed that nearly 86% of the participating Universities allowed extra time

for dyslexic students in examinations. As was stated by a student at Kingston University in 1994: *'Dyslexic students should have rights and not just discretionary concessions, which are dependent on the attitudes of individual tutors and departments.'* By 1997 that figure had reached a reported 99%. (Singleton, in press). The National Working Party on Dyslexia in Higher Education has, in the last three years, been addressing many of these issues and its recommendations are shortly to be made available (Singleton in press).

- To what extent can allowances be made for dyslexic students without adversely affecting the standard of the degree qualification?

The Graduate Standards Programme instigated by the CVCP (Committee of Vice Chancellors and Principals) concluded in their paper on the concept of 'graduateness' (1996): *'There seem to be irresistible arguments that no one should graduate who lacks such ancillary skills'*
'These skills would include the ability to write grammatically acceptable and correctly spelt English (or Welsh), a certain level of numeracy, a range of general knowledge, a basic familiarity with IT etc.'

From the researcher's observation of the difficulties of some dyslexic students on degree courses, this raises concern (see illustration 3f) when a student has severe dyslexia and is struggling to cope with degree work, equipped with the reading and spelling level of a ten year old. Even given support and concessions throughout their course, one would be more concerned about their experiences afterwards when faced with trying to get work. A generous policy of support and allowances at college, is rarely, taken up by anybody once the student's course is finished. This situation could, therefore give rise to false hopes which cannot afterwards be fulfilled. The example provided in illustration 3f was certainly in the minority, and of some 200 dyslexic students with whom contact was made during this study, only a handful could have been described as having severe difficulties. The majority of the dyslexic students in this study,

whilst being mildly to moderately dyslexic, were at the same time able and highly motivated and made good use of the support they were offered.

The question of inadequate basic skills, from the experience of carrying out this study, is equally relevant to students who are not dyslexic, such as a.) overseas students who have adequate or good subject knowledge but weak English language skills, b.) mature students who are entered onto Combined degree courses which require no prerequisite qualifications but who may be finding difficulties with aspects of study, and c.) students following computer science and engineering courses who, (see section 3.3), may have weaker essay writing and spelling skills.

Joanne Rule, the Chief Executive of the BDA issued a press release (25.August 1998) entitled '*BDA Comments on the Faludy Case*' in which she states:

'The Government must signal its determination that schools have higher expectations of pupils with special educational needs, enabling them to reach their full potential, by setting ambitious targets for their performance.'

This statement could well be generalised to include all students, not just those with special needs, who might be expected to reach certain established basic levels of education, i.e. basic literacy, numeracy, and computer keyboard skills.

If it is the case that some H.E students' basic literacy skills need to be improved, this has implications for the teaching in primary and secondary school. Although it can be argued that these skills, together with basic study and arithmetical skills, should perhaps be mastered before entry into Higher Education, the simple reality is that there is currently a clear requirement for H.E. provision to take account of these needs.

- What is the price paid by society for not providing appropriate educational opportunities for dyslexics?

Research suggested that often, with lowered self esteem, some dyslexics accept a life of unfulfilling jobs and personal interactions, or worse still, may become involved in criminal activity and end up in prison. In a recent survey of 5 London Boroughs 52% of offenders of average intellectual ability showed indications of dyslexia (Morgan 1997). Similar trends have been observed in America (Antonoff 1997).

Whilst 30 years ago many dyslexic students would not have been able to meet the entrance requirements to go to university, today there is the opportunity for all students to develop their academic talents as far as they can, as a result of both the expansion in university places available and the learning support offered. Recently, however, the introduction of annual fees has somewhat compromised the spirit of the 1944 Education Act, which heralded a universal right to a university education. This may exclude many students.

Two of the case study subjects (Christina and Julie) stated that they would be unlikely to have enrolled if required to pay tuition fees. Christina, a mother of a dyslexic boy, herself also dyslexic, found the course a means of personal academic fulfilment which she had forgone at an earlier age because of a lack of necessary qualifications. The second, Julie, a lone parent who also lacked the qualifications to enter university after finishing school, found that following a degree course with the added help of financial allowances she received through the DSA, a way of entering into a career in teaching which would provide her not only with a source of income for the future, but also a way of making a contribution to society by doing a job for which she has the personal attributes but lacked formal qualifications.

For the researcher, the experience of having seen the rewards their university education gave them seemed to be sufficiently convincing evidence to suggest that every effort should be made to reasonably facilitate the fulfilment of student potential, in the knowledge that the majority of dyslexic students who are given the opportunities to be responsible, will take them and make good use of them. For many dyslexics this has sometimes been particularly

the case as a direct reaction to the fact that they have had to struggle so hard to be accepted throughout their early academic life.

The following extract taken from '*The pre-eminence of literacy*' by the Vice Chancellor of the University of East Anglia, expresses the essence of what can be achieved by dyslexics when those around them give them the opportunity.

'About ten years ago I assessed a young man of 21. He had a modest university degree, had been assessed as dyslexic some years before, and was working for the Inland Revenue. His task was to deal with paperwork, at which he was struggling, but not without some success. He was eligible for a promotion which would have put him in contact with the public, dealing with their problems face to face. The service was reluctant to promote him, querying whether 'he had the ability' on the basis of his literacy. Yet even a cursory investigation suggested that his literacy was very atypical, and not a good measure of his oral skills or his problem solving abilities. I am happy to say his employers accepted the argument and did eventually give him the promotion'. (Brown 1990)

Dyslexia: screening and diagnostic assessment

The picture of dyslexia that emerges from the review of the literature (see Section 1.2), the recorded learning experiences of a number of dyslexic students (see Section 2) and the learning profiles of dyslexic students who have been assessed (see Sections 2 & 4) is that of a '*discreet*' brain disorder (Frith 1997). It is a variable condition affecting different individuals in different ways and to varying levels of severity. This is summed up in the definition from Professor Miles: '*The key feature in dyslexia is an unusual balance of skills. The typical dyslexic may be very gifted in some areas, yet have totally incongruous difficulty in others.*' (Miles 1993)

Previously undiagnosed dyslexia at Higher Education level is probably dyslexia at its most complex and elusive. The challenge included that of

producing a test that will positively differentiate those with dyslexia from non dyslexics.

- To what extent can a performance based test that is self-administered be used to identify dyslexia in this population?

One of the acknowledged problems has been the lack of resources and appropriate testing materials for adults at this age and ability level. (Singleton in press) This study firstly examined the strengths and weaknesses in learning of dyslexic students in Higher Education and compared and contrasted them with their non-dyslexic peers. Secondly it undertook the challenge to produce some screening materials and appropriate assessment activities.

According to Turner (1993) one of the most consistent research findings is that dyslexics learners have other family members who are often similarly affected. The widespread use of QuickScan will provide further data in this area as well as on a range of other dyslexia related issues such as laterality, scotopic sensitivity, self-confidence, study habits and learning styles.

- Is uncertain laterality a symptom of dyslexia?

Although investigations of the role of dominance in handedness, eyedness and mixed laterality have produced no consistent conclusions (Harrie and Weller, 1984) more recent research by Garner & Rippon (1997) concluded that weaker readers and spellers were characterised by reduced dextrality (small left/right hand skill differences). Data on this subject, collected through the extensive use of QuickScan, may well make a contribution to research on this controversial issue. This data may confirm the practical observation of the researcher and many others working in the dyslexia field that dyslexics tend to experience a certain ambivalence of laterality functions even when they may be right handed and right eyed, and that they may additionally be prone to left/right confusion. (See Section 1.2.2) '*...most [dyslexic] students show some degree of ambidexterity*' (Loughborough University 1993).

- What is the relevance of learning style?

A follow-up study of the screening (QuickScan) and assessment (StudyScan) programmes presented in the sections 5.2. and 5.3 is designed to explore the influence of students' individual learning styles on their performance in a range of tests, and the implications of students having an awareness of their own learning styles is already reported to be beneficial by some users of the programme who then hold group sessions to discuss this with students.

The linking of data between QuickScan and StudyScan should provide interesting insights into, for example, the learning style of a visual learner and the skill with which the same learner tackles test items that have a strong visual component. For example: Digit Span (Visual), Snowflakes (Visual memory test) and Coding.

For this reason the study maintained a broad and thorough range of tests, in order not to pre-select only one specific type of dyslexia. It is possible that the benefit of this approach will be found in the data that emerges.

This data will facilitate further research to examine the nature of dyslexic students' learning styles and whether they favour any particular learning style compared to non-dyslexics.

- The importance of sub-types of dyslexia

In spite of the predominance of the 'Developmental Phonological Dyslexia' - the 'narrow' definition of dyslexia, states that there is now beginning to emerge more established evidence for the existence of sub-types of dyslexia (though strongly refuted by some [see section 4.4.13]), with differing but sometimes complex aetiologies involving interaction of genetic and birth factors. (Fleming & Singleton 1997) Through its diagnostic analysis of test results the StudyScan programme may contribute relevant data on the extent to which dyslexics' performance is affected differently depending on the particular subtype they experience.

- How can one distinguish the different learning needs of students in Higher Education?

The difficulties faced by the researcher include many controversial issues in the dyslexia field surrounding the trend away from testing intelligence (i.e. through verbal and non-verbal reasoning tests followed by a comparison between these results and attainment scores, known as the 'discrepancy model') and more towards looking for an 'unusual balance of skills' (Miles 1993). The decision in this study to maintain ability tests as part of the assessment may therefore be viewed less favourably by those in the dyslexia field who feel that they have adopted a newer model for assessment.

The problem however remains, that the move away from the 'discrepancy model' whilst being appropriate for children, with whom phonological testing is proving to be an equally successful means of assessment, as well as perhaps for adults at a basic level of literacy, may not provide a sufficient basis for assessment among academically bright and well compensated adult dyslexics (section 3.2.5). Existing phonological tests may not prove to have sufficient power of discrimination (Frith 1997) for this age and ability level. Further research in the dyslexia field needs to be carried out to determine whether phonological skills test of a more challenging nature than those used for children will prove to be relevant.

Without a comparison between cognitive ability and attainment the evidence may be lacking which would otherwise distinguish between a dyslexic student and a non-dyslexic student who is experiencing more general problems in their studies. Currently a cognitive assessment is part of a requirement by Local Authorities for a dyslexia assessment with the result that however well prepared a qualitative assessment may be, it is in danger of being rejected by the Local Authority for its subjectivity which could result in a student losing their DSA entitlement.

When comparing the newly designed assessment in this study with a standard educational psychologist's assessment battery, it was intended that StudyScan should resemble, as closely as possible, the range and types of

activities covered, with the main differences being that the literacy subtests should be produced for use at an adult professional literacy level.

While every effort has been made to retain this kind of consistency one criticism that psychologists may make of the programme is that it cannot, by definition, include the personal professional judgement of the Educational Psychologist while the tests are being carried out. This style of observation may be of particular relevance in the case of a dyslexic child who is engaged in a coding or digit span test since it provides additional information to the psychologist, often confirming the inefficiency of certain skills at work. However, this study would question whether observation of this ability group plays such an essential role in the diagnosis, and would put forward the suggestion that the student's individual range of skills will be manifested in the profile that emerges. Additionally the tutor's input will highlight any other areas of concern such as problems of manual dexterity when the tutor checks and inputs information concerning the length and presentation of the student's hand-written work. The provision of the facility for tutors' qualitative comments to be entered into the programme goes some way towards ensuring that the programme should not become either too impersonal or devoid of human contact in its administration.

Furthermore, a facility which is provided in StudyScan, which is not possible for an examiner to produce with the same ease, is that the programme itself automatically carries out both a qualitative as well as a quantitative analysis of the student's performance, and does so consistently for every student who undertakes the tests.

- Can the tests produced in this study provide further relevant information regarding dyslexia research?

Gardner (1983) stated that many individuals with unusually developed spatial intelligence have, perhaps not surprisingly, excelled in the professional spheres of science, engineering, architecture, computer graphics, painting and sculpture.

One of the future outcomes of this study may be to confirm or refute the assertion that dyslexics are more talented in non-verbal problem solving areas and that they have particularly good visuo-spatial skills.

Future Development of StudyScan

Currently, a database is operational and is being supplied with data from several colleges of Further and Higher Education. This will enable future development and a larger scale statistical analysis, in order to improve the reliability of individual sub tests and establish validity of the programme in the assessment of dyslexia.

The outcome from this analysis should make it possible for the individual subtests to be streamlined without reducing their discriminating power. Some of the tests which prove to be non-essential to the outcome may be made optional or eliminated altogether. This will help to resolve some of the early criticisms of the test which relate to the fact that although non-dyslexic students are completing the assessment in between two to two-and-a-half hours, it can take dyslexic students between two and four hours.

In addition, a StudyScan website has now been put in place and will offer a medium for communication regarding the programme (see appendix 6B for a copy of the most recent StudyScan website presentation).

The long term implications of this study are that eventually it may be possible for the computerised generation of study support programmes and even materials at the appropriate level to enhance existing provision in Higher Education.

'Computer based assessment can provide the opportunity for the integration of learning and assessment and making probable immediate and effective feedback to students. Computer based assessment has greater potential than paper based systems for access and flexibility for both students and tutors and for the effective management, collation and transfer of assessment information.' (Bull 1996)

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Appendix to Section 1

1A Details of DSAs and amounts allocated (Matty 1995)

Appendix to Section 2

- 2A The Students Charter (DfEE1993) (Selected pages)
- 2B Kingston University guidelines for staff on dyslexia
- 2C SKILL Guide to all staff
- 2D Extract from a Communications Engineering examination paper
- 2E Kingston University draft policy statement

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- 3A Dyslexia Screening Interview (ADO 1994)
- 3B A selection of examples of dyslexia checklists
- 3C An example of a mini checklist from Loughborough University, (1994)
- 3D A detailed breakdown of spelling results and accompanying comments
- 3E Handwriting Study (Sawyer, Francis & Knight 1993)
- 3F Statistical analysis to select the most appropriate reading passage
- 3G Analysis sheet for the Quick Screener
- 3H Spelling error rates by gender and ethnic background
- 3J Extract from list of the number of long words used, number of spelling errors made and estimated total number of words written by dyslexic and non-dyslexic students in the quick screener.
- 3K Classification tables on writing subtests for comparability study
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- 4A HEFCE Projects on Dyslexia including project outlines
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- 4C Summary statistics and percentiles for the study group results on the SATA
- 4D Subtypes of dyslexia (1995)

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- 5A Cloze procedure exercises devised by the researcher
- 5B Gill's Spelling Strategies
- 5C Problem-solving and relaxation exercises taken from manual on how to deal with stress
- 5D Examples of sequencing and memory exercises
- 5E Pages from NCET (Becta) Pamphlet
- 5F Spelling worksheets
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- 5J Statistical analysis of SATA verbal and non-verbal reasoning
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- 5M Examples of conferences at which papers were presented by the researcher

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- 6A Extract from 'Pre-Assessment Screening For Dyslexia In HE (1998)
- 6B The StudyScan Website