GL Assessment®

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TEACHER'S MANUAL

LASS

For ages 11 to 15 years

Fifth Edition
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Educational Consultant
Dr Joanna Horne

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1 Introduction

1.1 What is LASS 11-15?

LASS 11-15 is a fully computerised multifunctional assessment system for use with students in the age range 11 years 0 months to 15 years 11 months.

LASS 11-15 comprises the following eight assessment modules that can be used individually or in combination:

- single word reading
- sentence reading
- spelling
- reasoning
- auditory memory ('Mobile')
- visual memory ('Cave')
- phonic skills ('Nonwords')
- phonological processing ('Segments')

The full suite of eight computerised modules takes about 45 minutes, on average, to administer, but teachers may choose to administer only some of the tests if they wish. Some of the modules are adaptive tests — that is, the computer automatically adjusts the difficulty of the items to suit the ability level of the student. This means that assessment is faster and more efficient, and also prevents students becoming bored by items which are too easy or frustrated by items that are too difficult.

LASS 11-15 enables teachers to:

- obtain a reasonable estimate of the student's intelligence
- assess the student's attainments in reading and spelling and identify students who are under-performing in these areas
- measure discrepancies between actual literacy attainment and expected literacy attainment based on intelligence
- identify underlying problems in memory or phonological processing skills that could be the cause of under-performance in literacy
- identify students with dyslexia (specific learning difficulty)
- monitor development in reading and spelling on a regular basis
- assess improvements in memory, phonological and phonic decoding skills brought about by appropriate training or intervention

1.2 Development of LASS 11-15

1.2.1 Standardisation

The eight tests in LASS 11-15 have been standardised so teachers using the system can establish where any given student falls on any of the components of the suite, in relation to the population norms. This means that direct and meaningful comparisons can be made between the individual tests that a single student takes. In addition, direct and meaningful comparisons can be made between students as well as between the student and national norms. The initial standardisation of LASS 11-15 was carried out in 1998, using a representative sample of 505 students (300 boys and 205 girls) attending 14 schools in different parts of the UK. The age range was 11 years 0 months to 15 years 11 months. The mean age was 13 years 2 months (standard deviation 14.3 months). For full details of the standardisation process, see Horne (2002).

1.2.2 Validity

Validity of new psychological and educational tests is usually established by comparing them with equivalent established tests. This is usually called 'concurrent validity'. Some difficulties may arise in the case of computer-based tests, where the modes of response (typically using a mouse) are different to those used in conventional tests (typically either oral or written responses). Inevitably, this tends to result in somewhat lower correlation coefficients than those obtained when comparing two similar conventional tests (for a discussion of these issues, see Singleton, 2001).

Bearing this limitation in mind, Horne (2002) carried out a concurrent validity study of *LASS 11-15* using 75 students (47 boys and 28 girls), age range 11 years 6 months to 15 years 11 months (mean age 13 years 6 months; standard deviation 17.0 months). This sample had been randomly selected from Year 7 to Year 11 registers in five different secondary schools in different regions of England and Scotland, the schools having been chosen so that pupils from a broad range of socioeconomic backgrounds were adequately represented. (These were not the same schools in which the reliability study had been carried out.) The students were tested on *LASS 11-15* (all modules except the Single Word Reading Test) and also tested within four weeks using well-known published conventional tests of skills that, as far as possible, were equivalent or similar to those in *LASS 11-15*. The order of test administration was counter-balanced to account for order effects. The results, which are shown in Table 1, indicate significant correlations between the *LASS 11-15* tests and the comparison measures, with the highest correlation coefficients being obtained for the literacy measures (where there is the closest correspondence in the tasks involved). The somewhat lower correlation coefficients for the cognitive measures may be explained by differences in the modes of response (oral or motor in the conventional tests, via mouse input in LASS 11-15) and requirements of the tasks (e.g. in WMS-III spatial span, no semantic elements are included, whereas in the LASS 11-15 Cave test the student has to remember the object as well as its spatial position). Despite these inevitable limitations when comparing computer-based tests with conventional tests, it may be concluded that the results provide satisfactory concurrent validation for the tests in *LASS 11-15*.

Table 1. Correlation coefficients obtained between LASS 11-15 tests and equivalent or similar conventional tests (n=75).

LASS 11-15 test	Comparison test	Correlation coefficient (r)*
Sentence reading	NFER Sentence Completion Test	0.75
Spelling	British Spelling Test Series 3	0.88
Reasoning	Matrix Analogies Test	0.52
Cave (Visual memory)	Wechsler Memory Scales (WMS-III) Spatial Span (total score)	0.37
Mobile (Auditory memory)	Wechsler Memory Scales (WMS-III) Digit Span (total score)	0.55
Nonwords (Nonword reading)	Phonological Assessment Battery (PhAB) Nonword Reading	0.43
Segments (Syllable segmentation)	Phonological Assessment Battery (PhAB) Spoonerisms	0.45

** All correlations except Cave are significant at p<0.001; the correlation for Cave was significant at the p<0.01 level.*

Validity of assessment instruments may also be established by another method, in which the instrument is used to predict which individuals do, and which do not, fall into a given category. This is usually called 'predictive validity'. In the case of *LASS 11-15* the most obvious test of this would be to see how effective it was in identifying dyslexia in a group that contained students known to have dyslexia and known to not have dyslexia. Horne (2002) carried out such a study using 176 students (102 boys and 74 girls), age range 11 years 6 months to 15 years 11 months (mean age 13 years 7 months; standard deviation 17.4 months). This sample had been randomly selected from Year 7 to Year 11 registers in five different secondary schools in different regions of England and Scotland, the schools having been chosen so that pupils from a broad range of socioeconomic backgrounds were adequately represented. The sample was broken down into a group of 30 students (21 boys and 9 girls) who had been diagnosed by educational psychologists as having dyslexia, 17 students (11 boys and 6 girls) with other special educational needs ('other SEN group'), and 129 students (70 boys and 59 girls) without special educational needs ('non-SEN group'). The students with dyslexia scored significantly lower than the non-SEN group on five of the seven *LASS 11-15* tests (sentence reading, spelling, auditory memory, nonword reading and syllable segmentation). There were no significant differences between the group with dyslexia and the non-SEN group on *LASS 11-15* reasoning or visual memory. However, the other SEN group scored significantly lower than the non-SEN group on all seven of the *LASS 11-15* tests used in the study. Comparable results were found when the same groups were compared on several conventional tests (the tests used are listed in the column headed 'Comparison tests' in Table 1). These findings fit well with established views about dyslexia – i.e. that students with dyslexia are comparatively poor on measures of literacy, phonological skills and auditory memory and these weaknesses are not due to low intelligence (BDA, 2007) – and provide validation

for the use of *LASS 11-15* in the identification of dyslexia. When the overall profile of scores was examined, *LASS 11-15* was found to have correctly identified 79% of the dyslexic group as having dyslexia, compared with 63% success rate for the equivalent conventional tests and only 59% using the phonological measures alone. These results provide convincing predictive validity for the use of *LASS 11-15,* which had rather greater accuracy than a mixture of conventional tests.

1.2.3 Reliability

The term 'reliability', when applied to a psychometric test, usually refers to the extent to which it can be expected to yield similar results when administered to the same individual on different occasions. This is sometimes referred to as 'test-retest reliability'.

Horne (2002) investigated the test-retest reliability of *LASS 11-15* using 101 students (55 boys and 46 girls) aged between 11 years 6 months and 15 years 11 months (mean age 13 years 8 months; standard deviation 16.5 months). This sample had been randomly selected from Year 7 to Year 11 registers in seven different secondary schools in different regions of England and Scotland, the schools having been chosen so that pupils from a broad range of socioeconomic backgrounds were adequately represented. The students were tested on *LASS 11-15* (all modules except the Single Word Reading Test) and then retested four weeks later. The results (see Table 2) show that in all cases, significant test-retest correlations were obtained, indicating satisfactory test-retest reliability. Higher correlations were found for the literacy measures than for the cognitive measures. It appears most likely that the somewhat lower (but nevertheless significant) correlations for the memory measures is due to greater susceptibility of these task to practice effects arising from enhanced motivation and application of strategic thinking at the retest.

Table 2. Test-retest correlation coefficients for LASS 11-15 tests over a four week period (n=101).

LASS 11-15 test	Correlation coefficient (r)*
Sentence reading	0.85
Spelling	0.93
Reasoning	0.51
Cave (Visual memory)	0.53
Mobile (Auditory memory)	0.58
Nonwords (Nonword reading)	0.77
Segments (Syllable segmentation)	0.74

** All correlations are significant at p<0.001 or better.*

1.2.4 Gender differences

It is acknowledged that girls out-perform boys in educational attainment (DfE, 2021) and that boys are more likely to be referred for educational difficulties (see Vardill and Calvert, 2000; Arms et al., 2008; Smeets and Roeleveld, 2016). Nevertheless, it is generally held that psychological and educational tests should, as far as possible, be free of gender bias, so that when decisions about children's progress are being made (especially where special support may be required) this can be based on information derived from sources that favour neither girls nor boys. On the other hand, it has sometimes been suggested that computer-based tests may favour boys because of their supposed greater interest, enjoyment and self-confidence in computer use (Meelissen, 2008; Fraillon et al., 2014). If this is the case, it could distort results obtained using a computer-based assessment such as *LASS 11-15*.

Horne (2002) carried out a study to investigate possible gender bias in *LASS 11-15*, using 176 students (102 boys and 74 girls), age range 11 years 6 months to 15 years 11 months (mean age 13 years 7 months; standard deviation 16.7 months). This sample had been randomly selected from Year 7 to Year 11 registers in twelve different secondary schools in different regions of England and Scotland, the schools having been chosen so that pupils from a broad range of socioeconomic backgrounds were adequately represented. The results (see Table 3) showed that although girls scored consistently higher than boys in all except the Cave test (Visual memory), in no cases were these differences found to be statistically significant. When the same sample was examined for possible gender bias on equivalent conventional tests (the tests used are listed in the column headed 'Comparison tests' in Table 1 in the Validity section) the only significant difference to be found between boys and girls was on the British Spelling Test Series 3, where girls outperformed boys. With this one exception, therefore, there was no evidence that either the conventional or the *LASS 11-15* computer-based tests are biased in favour of boys or girls. For further information regarding gender differences on computerized and conventional tests, see Horne (2007).

Table 3. Gender comparisons on LASS 11-15 tests (mean z scores).

LASS 11-15 test	Female	Male
Sentence reading	0.87	0.71
Spelling	0.79	0.64
Reasoning	0.62	0.54
Cave (Visual memory)	0.27	0.33
Mobile (Auditory memory)	0.66	0.40
Nonwords (Nonword reading)	0.78	0.51
Segments (Syllable segmentation)	0.56	0.47

1.2.5 Student preferences

It is a fairly well-established finding that most students prefer computer-based tests to conventional tests (Pino-Silva, 2008). In the validity study carried out by Horne (2002) (see Section 1.2.2), the students were asked whether they preferred the computer-based tests or the conventional tests. The results were that 54 of the 75 pupils (72%) preferred the computer-based tests while only 17 preferred the conventional tests (23%). There were no significant gender differences in this preference pattern. These findings have implications for assessment, especially where disaffected pupils are concerned. If students enjoy doing computer-based tests, they are likely to be more motivated and stay on-task. This helps to produce results that teachers can be confident about.

1.3 Getting started with LASS 11-15

1.3.1 Installing LASS 11-15

Please see the LASS 11-15 Installation Guide for instructions.

1.3.2 Running LASS 11-15

The four main components of LASS are the Start-up Menu, Administration and Reports, the Assessments (Tests) module and the database.

Please see the LASS 11-15 Software Guide for full information.

1.3.3 Using the tests in LASS 11-15

Before administering any test in *LASS* please read Chapters 2 and 3. Together, these provide detailed guidance on how to select *LASS* tests and administer them. Although *LASS 11-15* is mostly used in schools, it may also be used in other settings, and by professionals other than teachers. Nevertheless, for convenience throughout this manual, the term 'teacher' is typically used to refer to the person supervising the test administration. Where appropriate, the terms 'test administrator' or 'supervisor' may be substituted for 'teacher'.

1.3.4 Interpreting LASS 11-15 results

Before attempting to interpret *LASS 11-15* results or considering educational provision for any student, teachers are strongly advised to consult Chapters 4 and 5. Chapter 7 provides case studies in interpreting *LASS* results, which teachers will find very helpful.

Results obtained from *LASS* are analysed in relation to norms in 12-month age bands, and are shown as centile scores (or standard deviations) on a graphical profile that can be printed out. In addition, detailed results from every item delivered to the student are accessible to the teacher.

The system is maintained under password security, so that the teacher is in complete control of what tests the students are permitted to do, and only the teacher has access to results.

Interpretation of results obtained from *LASS* is straightforward. It is easy to spot students who are under-performing in literacy in relation to their age and/or intellectual potential. It is also straightforward to verify if any difficulties are likely to be of a dyslexic nature — i.e. caused by underlying cognitive problems in phonology and/or memory. All this information is valuable when deliberating whether or not to request a formal assessment by an Educational Psychologist. *LASS 11-15* can also be used on a regular basis (e.g. every term) to monitor progress in reading and spelling, or check development in phonic skills.

1.3.5 Teaching activities and resources

Chapter 6 provides guidelines and suggestions regarding teaching activities and resources that may be adopted in cases where *LASS* results indicate a problem or potential problem in the student's learning. The case studies in Chapter 7 also include suggestions on learning and teaching.

Use of *LASS* does not imply any obligation to follow a particular line of teaching, and teachers, as professionals, will naturally wish to use their own judgement regarding what is, and is not, suitable for any given student. Nevertheless, it is strongly recommended that teachers read the teaching advice provided in this manual, as it is likely that they will find ideas and strategies that they had not previously considered. This is especially likely if the teacher is not very experienced in working with students who have specific learning difficulties.

2 Administering LASS 11-15 tests

2.1 Composition of LASS 11-15

2.1.1 Outline of tests

The LASS 11-15 suite comprises three **attainment** tests (single word reading, sentence reading and spelling), one **ability** test (reasoning) and four **diagnostic** tests (auditory memory, visual memory, phonic skills and phonological processing). An outline of each test is given in Table 4. Three of the eight tests (***Sentence Reading, Spelling*** and ***Reasoning***) are *adaptive*, i.e. the items delivered are based on the performance of the student. The remaining tests are *progressive* in format, i.e. they utilise a graded series of items of increasing difficulty for students of that age group. In some of the tests there is a discontinuation algorithm built in, whereby the test will automatically cease once the student's current attainment or ability level has been exceeded beyond reasonable statistical error; otherwise, the student must attempt all items in the test.

For each test, instructions are spoken by the computer, and practice items are given to familiarise the student with the test requirements. When the student has completed the practice items, the test phase begins.

Table 4. Composition of the LASS 11-15 suite of tests

TEST	CATEGORY	TYPE	DESCRIPTION
Sentence Reading	Attainment	Adaptive	Cloze reading — completing sentences by identifying the missing word from a choice of five alternatives. No spoken assistance is given.
Single Word Reading	Attainment	Progressive	Reading individual words out of context — identifying from a choice of five alternatives the printed word that corresponds to a spoken word.
Spelling	Attainment	Adaptive	Spelling individual real words that are spoken by the computer.
Reasoning	Ability	Adaptive	Non-verbal intelligence — analogical reasoning where the correct item from a choice of six alternatives has to be selected in order to complete a spatial matrix.
Mobile	Diagnostic	Progressive	Auditory sequential memory (digit span) — recall of between two and nine digits in correct (forwards) sequential order.
Cave	Diagnostic	Progressive	Visual memory — immediate recall of objects and their spatial positions, beginning with two items and progressing to seven items.

TEST	CATEGORY	TYPE	DESCRIPTION
Nonwords	Diagnostic	Progressive	Reading individual nonwords — a pure measure of phonic decoding skills. For each nonword there is a choice from four spoken alternatives.
Segments	Diagnostic	Progressive	Phonological processing ability — segmentation and deletion of syllables and phonemes in real words. For each item there is a choice from four spoken alternatives.

2.1.2 Adaptive assessment

The term 'adaptive testing' refers to any technique that modifies the nature of the test in response to the performance of the test-taker. Paper-based tests are *static* instruments, fixed in their item content, item order, and duration. By contrast, computer-based assessment can be *dynamic*. Since the computer can score performance at the same time as item presentation, it can modify the test accordingly, tailoring it to the capabilities of the individual taking the test much more effectively.

Conventional tests can be very crude instruments in which, much of the time, the individual's abilities are not being assessed with great precision because the items are either too difficult or too easy. In an adaptive test the individual can be moved swiftly to that zone of the test that will most efficiently discriminate his or her capabilities, thus making assessment shorter, more reliable, more efficient, and often more acceptable to the person being tested. Olsen (1990) compared paper-based and computer-administered school achievement and assessment tests with computerised adaptive tests. The computer-based non-adaptive version took 50–75% of the time taken to administer the conventional version, while the testing time for the adaptive version was only 25% of the time taken for the paper-based version. This finding is further supported by research by Carson, Gillon and Boustead (2011) and Senel and Kutlu (2018).

In each of the three adaptive tests in *LASS*, the program first gives the student a series of 'probe' items to determine the range of optimal item sensitivity for that student. These are followed by a series of test items starting in the range of optimal item sensitivity and increasing in difficulty until the student's current attainment or ability level has been exceeded beyond reasonable statistical error, whereupon the test ceases. The program incorporates a facility to regress to easier items should it transpire that, by chance, the result of the probe items has overestimated the student's approximate ability or current attainment level.

2.2 Summary details of each test

2.2.1 Sentence Reading

Sentence Reading is an adaptive test that involves finding the missing word in a sentence. Students are presented with a sentence that has one word missing and a picture to go with the sentence. Students select the correct word from five words at the bottom of the screen by

clicking on it and then clicking on the OK button to move on. The student starts by attempting some 'probe' items to determine the level at which they should start the test. Their progress through the test depends on their performance and the test is discontinued when the student fails a certain number of items within one level.

2.2.2 Single Word Reading

Students are presented with a picture of an object on the screen and hear the word spoken by the computer. Students select the correct word from five words at the bottom of the screen and then click on the OK button to move on. This test is not adaptive and the student must attempt all of the items.

Single Word Reading is the only test in the *LASS* suite for which scores are not distributed in a normal curve. In fact, there is a significant negative skew, indicating that most students will achieve a maximum or near-maximum performance (in statistical terms this is sometimes referred to as a *'ceiling effect'*). The ***Single Word Reading*** test does not have sufficient sensitivity to discriminate amongst students within the average range, and so its use should be confined to students who are *significantly behind* in reading development, either to determine their attainment level or evaluate progress.

2.2.3 Spelling

Spelling is an adaptive test that involves spelling single words. Students are presented with a picture on the screen and hear a word and a sentence putting the word into context. Students spell the word using keyboard entry and then click on the *Enter* key or *OK* button to move on. The student starts by attempting some 'probe' items to determine the level at which they should start the test. Their progress through the test depends on their performance and the test is discontinued when the student fails a certain number of items out of the last few attempted.

2.2.4 Reasoning

Reasoning is an adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies. Students are shown a 3 ´ 3 matrix with the bottom right hand square empty. Students choose which of six squares at the bottom of the screen complete the pattern. They then click on the OK button to move on. The student starts by attempting some 'probe' items to determine the level at which they should start the test. Their progress through the test depends on their performance and the test is discontinued when the student fails a certain number of items out of the last few attempted.

2.2.5 Cave

Cave is a visual spatial memory test set in a cave with eight hollows in the wall. Different pictures, called 'phantoms', appear in different hollows one at a time and then disappear. The student must remember which phantom went in which hollow. After the phantoms have disappeared

they are shown on the bottom of the screen along with two distractors. The student must select the phantoms that were presented, by clicking the mouse on them, dragging them to the correct hollow and dropping it. The student can put the phantoms back in any order as this is not a test of sequential memory. Each item has a (fairly generous) time limit in order to increase the challenge of the task: the instructions are that the phantoms must be put in their correct positions 'before the candle burns out'.

All students start with a presentation of two phantoms and complete twelve trials in total. When a student has correctly placed two phantoms they move on to three phantoms and so on until the twelve trials have been completed. The maximum number of phantoms that can be presented is eight. The number of distractors also increases as the test progresses, so increasing the overall difficulty of the task.

2.2.6 Mobile

This test is a measure of auditory sequential memory involving digit span. The student is given a telephone number to remember which they then enter onto a mobile phone using the mouse. The student then clicks on the green phone button when s/he has finished. Students must get both practice items (three digit numbers) correct before moving on to the test items. All students start with two trials of three digit numbers and if they answer one or both correctly then they move on to two trials of four digit numbers and so on up to nine digits. If a student fails both trials on a level then the test is automatically discontinued.

2.2.7 Nonwords

Nonwords is a test of phonic decoding skills, comprising 25 items, presented in order of difficulty. A nonword is presented visually on the screen, the sound system represented on screen will then play four different versions of the word. The student can hear these different versions as many times as they want to by hovering the mouse over the loudspeakers. When they hear the version of the word that they think is correct they click on that loudspeaker and then on the red button to move on to the next item. Students must attempt all 25 items in the test.

2.2.8 Segments

Segments is a test of syllable and phoneme deletion that identifies poor phonological processing ability. The test comprises 32 items, presented in order of difficulty. Students are presented with real words and asked what each word would sound like if part of the word was removed.

Students can hear the instructions for each item as many times as they want by clicking the question mark on the sound system represented on screen. The sound system plays four different answers which the student can hear as many times as they want to by hovering the mouse over the loudspeakers. When they hear the answer that they think is correct they click on that loudspeaker and then on the red button to move on. The student must attempt all the items in the test.

2.3 Guidelines for administering LASS 11-15 tests

2.3.1 Is the teacher familiar with the test being administered?

Assessing students with *LASS* is straightforward, but before you begin to test students you should first run through the complete suite of tests to familiarise yourself with them. To do this you should register yourself as a 'student'. If you wish to exit any test and return to the *tests menu* before the end, then press F4. This quick exit from a test is also useful when demonstrating the program to other teachers or for use in training sessions. However, they should not be used when testing a student unless absolutely necessary — see Section 2.3.11.

2.3.2 Is the testing environment satisfactory?

The ideal testing environment is one that is reasonably quiet, with minimal distractions. This could be a separate room, but *LASS* has been designed to use in the ordinary classroom, where distractions are often unavoidable. Visual and auditory distraction (both to the student being tested and to other students in the class) should be minimised. It is recommended that the computer and the student are positioned in such a way that the student is not looking directly at the rest of the class, nor should the rest of the class easily be able to see the screen. The best position for this is usually in the corner of the room. To minimise auditory distraction, headphones are recommended. Inexpensive lightweight headphones will be adequate (but not the type that are inserted into the ear).

The student should be sitting comfortably at a suitable level in front of the screen (not too high or low, in order for them to see the screen satisfactorily). It is not recommended that students attempt the tests standing up, as they are more likely to move about and alter the angle at which the screen is viewed – this can lead to failure to see everything that is happening on the screen, and can also disrupt the student's response accuracy and time. The supervisor should check for reflections on the screen from windows and lights that could impair the student's perception. To do this the supervisor should check by viewing the screen from the same position that the student will adopt.

It is not recommended that students attempt the tests when other students are standing or sitting in a position in which they can become involved in the task or act as a distraction. It will be hard for other students to inhibit their responses and their behaviour may influence the decisions of the student being tested.

It is usually not necessary for students of this age to be closely supervised while attempting the tests, unless the teacher has a particular reason to do so. The tests in *LASS* have been designed to be interesting and stimulating for students in this age group and the vast majority of students are highly motivated to do their best. Once the teacher is satisfied that the student understands the requirements of a test, has completed the practice items and has moved on to the test items, the teacher may leave the student to complete that test. However, where the teacher suspects that a student may not be well motivated to complete the test, or may be easily distracted, closer supervision is advisable. In particular, disaffected students, or those with very low ability, may need closer supervision in order to provide encouragement and ensure they remain on task.

2.3.3 Is the equipment functioning correctly?

The teacher or supervisor should check that (a) the screen is clear and its colours correct, (b) the sound (using speakers or headphones) is audible (not too loud or too soft, and without interference), and (c) if using a mouse, that it is functioning correctly and is positioned in front of the student on a suitable surface so that its movements are unimpeded.

2.3.4 Is the student prepared for the task?

It is important that the student *understands* the *nature* of the task, *how* to indicate responses, and *when* to respond (essentially when the tests will allow them to respond). Students should not be allowed to take the tests if they are unwell, as results are likely to be unreliable. In general, students will experience no difficulty in understanding the instructions spoken by the computer and in following the practice tasks. This should enable them to progress to the test phase without special attention from the teacher. However, if the student does not understand any instructions the supervisor may re-express them in a more suitable manner. Explaining and re-expressing the task requirements to the student may continue into the demonstration and practice stages of each test. This is particularly useful for any student who is experiencing problems in understanding the true nature of the task. It is often easier for the student to comprehend the task requirements by experience of the practice stages, than by more abstract oral explanation. Once the test items commence, there should be no further aid given to the student.

2.3.5 Choosing which tests to administer

LASS 11-15 is a *suite* of eight tests, each of which has a different function. Teachers can choose to give *all* or *some* of the tests. *LASS* is a complex assessment package and a great deal of research and careful thought has gone into its development — each and every test component is there for a specific purpose, and each test can give the teacher valuable information about the student.

Much will depend on the purposes of the assessment and the teacher's knowledge of the student's difficulties. If nothing is known about a student, it is strongly recommended that all of the tests should be administered except ***Single Word Reading***, thereby accessing the fullest information. (However, if the ***Sentence Reading*** result is low, then it would be appropriate to administer ***Single Word Reading*** also.) On average, this should take between 30 and 45 minutes to complete, in total. If the teacher already has useful information (e.g. about reading and spelling attainment) it should be adequate to concentrate on the other assessment components of the program.

Although it is desirable to give the full suite of tests to each student, it is not absolutely *essential.* If time is short, it is acceptable to administer a subset of the tests instead of the full suite, in which case the issue of choice of tests arises. In this situation, it is helpful to think of *LASS* as a *kit of tools*, with the teacher choosing one or more of those tools for specific purposes. There are instances in which a teacher requires information about a student's abilities in a particular aspect of attainment (e.g. reading or spelling) or particular cognitive domain (e.g. memory or phonological processing). In such circumstances it is perfectly acceptable for the teacher to carry out *only* the most appropriate *LASS* tests rather than administering all of them.

In order to make sensible choices about which tests to administer and which to leave out, teachers first need to understand what each of the tests is for. To develop an understanding of the tests, teachers are advised to study Chapters 4, 5 and 7. It should be noted that the ***Single Word Reading*** test is the only one in the *LASS* suite for which scores are not distributed in a normal curve. In fact, there is a significant negative skew, indicating that most students will achieve a maximum or near-maximum performance (in statistical terms this is sometimes referred to as a *'ceiling effect'*). The ***Single Word Reading*** test does not have sufficient sensitivity to discriminate amongst students within the average range, and so its use should be confined to students who are *significantly behind* in reading development, either to determine their attainment level or evaluate progress.

Whichever strategy teachers adopt for selecting *LASS* tests for administration to any given student, it is strongly recommended that first they should familiarise themselves thoroughly with *all* the tests, how they are delivered and what cognitive abilities they measure. In other words, to make the most effective use of *LASS*, teachers need to know about *all* the 'tools' in the *LASS* 'kit', what they are for and how they are used. This will require trying out the tests as well as consulting the relevant sections of this manual. Only then can teachers make an informed professional decision about how best to use *LASS* to meet their particular assessment needs.

2.3.6 Order in which tests are administered

The *order* in which *LASS* tests are attempted is not particularly important. As teachers become more experienced with the program, they will find that they develop their own views about what tests are most useful to begin with, or to use in certain cases.

2.3.7 Number of tests to be administered per session

A satisfactory test result cannot be obtained if students are not attending to the tasks and attempting to do their best. However, the *LASS* tests are mentally demanding and students can easily become mentally fatigued after a few tests. The effort that they apply can diminish significantly, although they may still enjoy the activity. Many teachers find that *three or four tests* per student are sufficient in any one continuous session. However, this may vary according to the concentration level of the student and other factors. Some students in this age range are quite capable of completing all tests in a single session.

2.3.8 Is the assessment being conducted fairly?

In order for the assessment to be 'fair' (i.e. to give a reasonably accurate representation of the student's abilities) it is essential for the supervisor to ensure that during the test:

- the student is paying attention, is 'on task' and is not distracted
- the student does not become unduly fatigued
- there is no teaching or helping with the task during the test items (whether from the supervisor or other students)
- there is no 'cheating' — this may take the form of the student placing his or her hands on the computer screen to circumvent the memory element of the test (e.g. in ***Cave***).
- feedback from the supervisor is minimised and encouragement consistent

2.3.9 Giving encouragement, prompts and feedback

As much as possible, *the supervisor should avoid giving specific feedback to students during a test*, because this may influence their behaviour in an undesirable fashion. There is a risk of feedback differentially affecting students, so that some are encouraged and others discouraged. *LASS* itself provides limited feedback (e.g. 'good') where appropriate. Nevertheless, some students will try to elicit additional feedback from the supervisor about their performance. This may take the form of both verbal and non-verbal behaviours. For example, the student may ask directly if they were correct. Many students will look for the supervisor's facial and bodily reactions to their responses. Some students may even try to evaluate the supervisor's reaction by observing the supervisor's reflection in the monitor screen. For these reasons it is usually preferable that the supervisor sits to the side and slightly behind the student to minimise any feedback to the students which may bias the results.

Rather than specific feedback, *general encouragement* should be given to the student. This encouragement should be referenced to task completion rather than task accuracy and ideally should be delivered equitably to all students. However, it is inevitable that some students will require more encouragement than others, and where this is the case the teacher should be mindful of the possibility of influencing results unduly. Differential encouragement between students is likely to have an influence on the results obtained, and therefore should be avoided where possible. Some key phrases and general incentive prompts which may be used to aid the administration of the tests include: "well done"; "you were good at that game (or level), now try the next one"; "you will like this game"; "now concentrate on this"; "try hard"; "listen very carefully"; "have a go at these ones"; "have a try"; "just do your best".

Unless it is felt absolutely necessary, *prompting during the actual test items should be kept to a minimum.* For the most part any necessary prompting should occur during the pauses between test levels and the tests themselves.

2.3.10 Keeping a Comments Record

It is recommended that the teacher keeps a brief written record of the student's behaviour at each time of *LASS* testing, particularly noting such factors as health, tiredness, attention, concentration, distractions, and general motivation. A template **Comments Sheet** is provided in the Appendices of this manual. This may be photocopied or printed freely and used for recording any observations during testing. This record can then be referred to when interpreting the student's *LASS* profile. The teacher should particularly be on the lookout for colds and coughs, which not only disturb concentration but which can also affect hearing.

The following are examples of suggestions regarding completion of the *LASS* Comments Sheet:

Testing Room: e.g. 'quiet room', 'classroom — noisy' (also mention any uncomfortable conditions)

Health: e.g. 'good', 'had bad cold', 'coughing' (also mention any other health factors)

Attention: e.g. 'good', 'fair', 'distracted', 'tired'

Other comments: e.g. 'over-confident', 'responded very quickly', 'nervous at first', 'did not understand instructions', 'could not hear computer properly', 'unconfident — kept asking "Is that right?"'

2.3.11 Abandoning a test prematurely

Very occasionally, an administrator will want to abandon a test before the student has completed it. This necessity may arise as a result of some unforeseen circumstances, which may interfere with the smooth progress of the assessment. You can quit from a test prematurely by waiting until the mouse pointer is visible and then press the **F4** key **once**. It may take a few seconds to respond before you are returned to the menu screen. The student cannot restart the test where they left off (a consequence of this would be to invalidate the results). It may be necessary for the student to attempt the test at a later date depending on the reason for premature abandonment.

Premature exiting from a test is generally used for demonstration purposes rather than in real testing situations. **Students should NOT be instructed or allowed to use the F4 key, which should only be used in extreme circumstances because all of the data for that partial attempt will be lost.**

2.3.12 Re-testing with LASS 11-15

Teachers often ask 'How soon can a student be re-tested with *LASS 11-15*?' The answer depends on why re-testing is being considered. If the teacher has good reason to believe that a given result is not truly indicative of a student's ability because of some hindrance factor, then re-testing can be as soon as is convenient (see Section 7.10 for an illustration of this). For example, this would be the case if a student had a cold and could not hear the words, was unwell and not able to concentrate, was excessively nervous, or because there were unexpected distractions in the room. Obviously efforts should be made to ensure that those hindrance factors have been resolved before re-testing. Retesting will overwrite the student's previous results.

If the teacher wishes to see if the student has improved as a result of some intervention, then a sensible interval should be allowed before re-testing. In general, three months would be recommended as the minimum interval, but this could be less if the teacher had good reason for doing so. Repeated re-testing at short intervals is not advisable, because under those circumstances any ability or attainment test is likely to show spurious improvements in performance by virtue of practice effects.

2.3.13 Problems of time-shortage for testing

In cases where teachers wish to administer all the tests in the *LASS* suite, but are prevented from doing so because of lack of time, useful strategies for solving time-shortage problems include:

- Ensuring that administration of *LASS* is part of *school policy* and that appropriate staff time is *allocated* for it on the timetable, rather than expecting teachers somehow to *create* the time on top of their other responsibilities. Giving *LASS* to students does take time, but the information gained is valuable in their education.
- Encouraging staff to recognise that *LASS* is a useful educational activity *in its own right*. The tests are mentally stimulating and involve use of concepts and skills which are vitally important in learning. Hence time spent by teachers and students on the tests has a wider educational value.

- Only minimal supervision is necessary, once a student is clear about what any given *LASS* test requires. It is not essential for the teacher to observe the whole test administration, and the student's performance can be inspected later via the Data Tables — see Section 2.4.3.
- Training non-teaching personnel to administer *LASS*. Although it is essential that interpretation of *LASS* results is carried out by an experienced teacher or other suitably qualified professional, administration of the tests can be done by any adult who understands the essentials of what the task involves. In particular, that they are *tests*, so the student needs to *understand* what is required, but the tester is not permitted to coach the student or give hints to the answers. In many schools *LASS* tests are being successfully and efficiently delivered by various non-teaching personnel, such as classroom assistants, parents, volunteers or school governors. However, it is not advisable to use older students to supervise testing.
- Registering all students in a block is more time-efficient than registering students singly at the time of testing. *LASS* can therefore import cohorts of new students using a comma-separated text file which may have originated as output from a schools management system.
- Giving all students in the class the same *LASS* test, before moving on to another test. That way, the tester can get into a 'rhythm' and does not have to re-adjust the delivery of each different test.
- Organising activities in order to use available time most effectively. Using breaks or lunchtime can work in some cases. Amalgamating classes for some activities can free up one teacher who can use that time to administer *LASS*.
- Operating an efficient 'queuing' system, so that the teacher does not have to waste time locating the next student and bringing that student to the computer for assessment.

2.3.14 Assessing students outside the age range for LASS 11-15

Like all good normative tests, *LASS 11-15* is not generally recommended for use outside its specified age range. Any test which meets basic psychometric criteria (which *LASS* does) must be standardised on a given population and this will determine the range of applicability of the test. *LASS 11-15* is designed for use with students aged 11 years 0 months to 15 years 11 months. Use with students outside this range can create difficulties for interpreting results. Tests appropriate to the students' chronological age should be used wherever possible, to avoid the dangers of inappropriate decisions being made – e.g. that a student is 'at risk' (or not 'at risk') when the evidence for this is unsound.

The preferred solution to the assessment of students older than 15 years 11 months is to use **LADS**, which is designed for ages 16:0 upwards), and for students younger than 11 years 0 months the solution is to use **LASS 8-11** (8:0–11:11).

2.3.15 Assessing students who have limited English

Assessment of any student who has limited proficiency in spoken English is often problematic (Cline and Shamsi, 2000). However, *LASS* is less problematic than many conventional methods of assessment, because of its strongly visual format and minimal reliance on spoken instructions. The practice items enable most students, even those with very little English, to understand the tasks, and where there is uncertainty a teacher or assistant who speaks the student's first

language can help with explaining instructions. Case studies of students for whom English is an additional language (EAL) are given in Section 7.9. Like most students with limited English, these students responded well to the assessment and extremely valuable information was obtained.

It is sometimes found that EAL students gain low scores on certain *LASS* tests (particularly those assessing literacy skills), which mainly reflects their lack of experience with English. When interpreting the results of these tests, teachers may find it more helpful to use age equivalents rather than centile scores. However, on the memory and reasoning tests in *LASS,* scores will normally reflect their true abilities, as these are largely unaffected by language factors (provided the student can cope with the digits 1–9 in spoken and written form in order to attempt ***Mobile***).

There is some evidence that phonological skills of bilingual students can be assessed in the majority language (in this case English) when no suitable test in the minority language (which would be these students' first language) is available. Miller Guron and Lundberg (2003) found that, given sufficient exposure to the majority language, bilingual students whose first language is a minority language may be expected to score comparably on tests of phonological ability and nonword reading in the majority language (in that particular study, Swedish), and thus poor scores on phonological and nonword tests can be taken as indicative of cognitive deficits due to dyslexia rather than necessarily being attributed to lack of experience in the majority language. This result is consistent with findings by Frederickson and Frith (1998) and Everatt et al (2000) that non-dyslexic bilingual students can show normal nonword reading and even enhanced rapid naming skills, possibly as a consequence of the additional demands placed on phonological systems when coping in a multilingual environment. This evidence is supported by later research (Goldstein et al., 2005; Martinelli & Brincat, 2020) and suggests that assessment of phonological ability (such as ***Segments***) and phonic skills (***Nonwords***) in English can reveal difficulties of a dyslexic nature even in students for whom English is an additional language, although obviously teachers have to use caution when interpreting the test results of such students.

For further information on assessment of learning difficulties in literacy (including dyslexia) in EAL students and other multilingual students, see Cline (2000), Cline and Frederickson (1999), Cline and Shamsi (2000), Durkin (2000), Mortimore et al. (2012), Peer and Reid (2016) and Tsagari and Spanoudis (2013).

2.3.16 Students with co-ordination difficulties

Students with co-ordination difficulties may experience problems in using a mouse. In some cases, an adapted mouse device may need to be used when assessing disabled students. However, slowness or difficulty in using the mouse should not make any significant difference to a student's performance on *LASS*. Thus, even if a student is totally inexperienced with using a mouse and is consequently very slow, the *LASS* scores will still be a valid measure of their performance. This is because the tests are not speeded (a 'speeded' test is one in which the individual can increase their score by working faster, although in practice there will always tend to be a speed-accuracy trade-off). Although the time taken is recorded and shown in the Data Tables (so that teachers can take this into account when interpreting tests if they wish), it is not scored, as such. In ***Cave*** there is a (fairly generous) time limit (the student has to put the phantoms in their correct positions before the candle burns out). If the teacher suspects that this will create significant problems for the student, or where extreme inefficiency with the

mouse is affecting the student's confidence, it is permissible for the teacher to use the mouse and move the phantoms on the student's behalf. In such situations, it will be necessary to decide beforehand on an agreed scheme of signals or verbal instructions to be given by the student (e.g. the student points at the target on the screen and the teacher uses the mouse to click on that target). Alternatively, a touch screen, which plugs into the mouse port, may be used instead of the mouse.

Sometimes the distinction between students who are slow in using the mouse (perhaps because of inexperience or lack of confidence) and those with more serious motor co-ordination difficulties may be tricky for the teacher. Students with motor co-ordination problems are described as having dyspraxia, or 'Developmental Co-ordination Disorder' (DCD) (American Psychiatric Association, 2013). They are students with significantly poor motor performance which may manifest as coordination problems, poor balance, clumsiness, dropping or bumping into things, delays in achieving developmental motor milestones or the acquisition of basic motor skills. These symptoms interfere with daily life, onset in the early developmental period and are not explained by intellectual disability, visual impairment or a neurological condition.

Assessment of dyspraxia can cover a very wide range of tasks, including manipulation of small objects, shape copying by drawing, imitating and repetition of actions and postures, ability to co-ordinate arms and legs together, throwing, catching, jumping and skipping. Both large and small muscles may be involved, as well as fast and slow actions. Tests of motor co-ordination include the Movement ABC-2 (Barnett, Henderson and Sugden, 2007) and the Developmental Test of Visual-Motor Integration-6 (Beery, Beery and Buktemika, 2010). Scores are sometimes averaged to give a 'motor age' but this is not usually very useful, because it is possible for a student to have a co-ordination difficulty in one area and not another. Thus, a limited range of tasks may fail to identify a real difficulty and an overall measure may be misleading (Anderson and Fairgrieve, 1996; Beardsworth and Harding, 1996).

The incidence of DCD is difficult to establish with any certainty, and is dependent on the selection criteria used. However, Zwicker et al. (2012) suggest that approximately 5-9% of school-aged children have DCD, although the figure is considerably lower for severe DCD, and their motor difficulties persist into adolescence and adulthood.

For an overview of developmental co-ordination disorder, see Zwicker et al., 2012. Guidance on assessing dyspraxia / DCD is given by SASC (2020). General advice for teachers and parents is provided by Ripley, Daines and Barrett (1997) and Boon (2010).

2.3.17 Students with Attention Deficit Hyperactivity Disorder (ADHD)

The *Diagnostic and Statistical Manual of Mental Disorders* — DSM–V (American Psychiatric Association, 2013) distinguishes three presentations of ADHD:

- Inattentive: the student with ADHD who is predominantly inattentive
- Hyperactive / impulsive: the student with ADHD who is predominantly hyperactive and impulsive
- Combined: the student with ADHD who is *both* inattentive *and* hyperactive/impulsive

In the World Health Organisation's *International Classification of Diseases* — ICD–10 (WHO, 2016), the term 'Hyperkinetic Disorder' corresponds to DSM-V combined type. It can be seen that the symptoms of ADHD do not just concern hyperactivity — i.e. restlessness, difficulty with sitting still, excessive movement or fidgeting. Rather, such students are equally, or even more, likely to have problems in sustaining attention on the task in hand, inhibiting impulsive responding, and generally in regulating and controlling behaviour. There are strong indications of genetic factors causing ADHD, although peri-natal complications have also been associated with it (Amor et al., 2005). Current estimates suggest that the incidence of ADHD in school-aged students is between 5.9 and 7.1% (Willcutt, 2012). Between 18% and 45% of individuals with diagnosed ADHD also have dyslexia (Germano, Gagliano & Curatolo, 2010). Obviously, these reading difficulties could be the result of poor attention and concentration in the learning situation (i.e. an *indirect* effect of ADHD). In addition, it has been suggested that students with ADHD have problems with working memory (Holmes et al., 2014), which affects learning *directly*, because information is not stored properly nor is it retrieved fluently and reliably. Treatment for ADHD usually involves a combination of psychological methods (e.g. behaviour modification) and pharmacological methods (e.g. use of the drug *Ritalin*), but good educational management and committed parent involvement is crucial (Goldstein and Goldstein, 1993, 1998).

Students with ADHD are liable to experience difficulty with many types of assessment (not just computerised assessment) because of inattention and impulsiveness in responding. In cases of students with ADHD, teachers should therefore be prepared to take such factors into consideration when interpreting the results of *LASS* tests. On the other hand, *LASS* tests are typically found to be more stimulating than conventional tests, so students with ADHD will generally remain engaged and attentive for longer than might be expected. To maintain engagement and interest, however, and ensure that results are as reliable as possible, it is recommended that only one test per session should be administered to students with ADHD.

For practical guidance on identifying and teaching students with ADHD, the book by Cooper and Bilton (2002) is recommended.

2.4 The Report Generator

2.4.1 How the results are displayed

All scores are saved automatically to a single database file on completion of each test. The data saved also includes the date and time the test was completed. **If a test has been abandoned before completion, then no results will be saved for that test.**

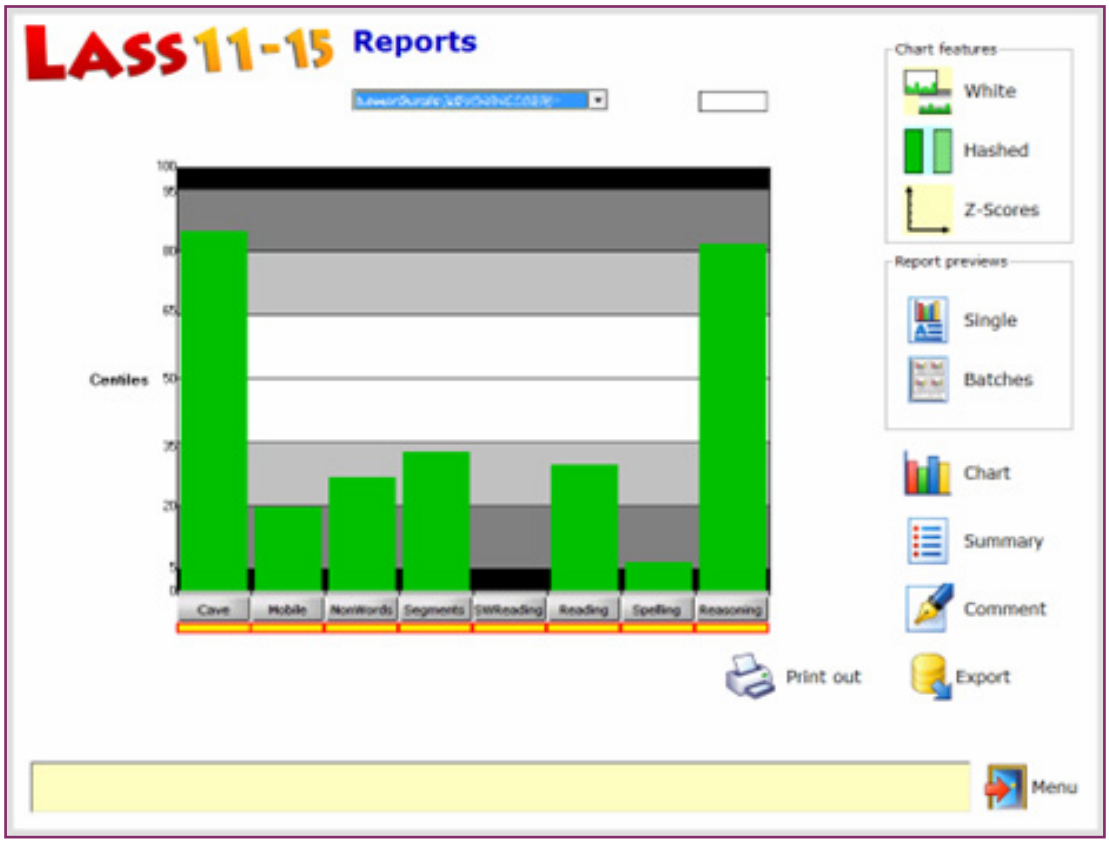
The *Report Generator* can be entered by clicking on the **Report** button from the *Main menu*. Select the appropriate student from the pull down list.

Performance of each test can be viewed in a variety of ways. Results are indicated in the *Summary Table*, the *Data Tables*, or the *Graphical Profile.*

2.4.2 The Graphical Profile

The *Graphical Profile* (see Figure 1) automatically charts the individual student's performance against those of the norm referenced group, which is based on the student's age in the following bands: 11:0–11:11; 12:0–12:11; 13:0–13:11; 14:0–14:11; 15:0–15:11.

Figure 1. Graphical Profile.



The *Graphical Profile* can be viewed in either centile scores or z-scores (standard deviation units), with the former being the default. If bars are missing from any of the tests represented on the bar chart then the student either didn't attempt or didn't complete that test. The appearance of the graphical profile can be altered by clicking on various *Chart features* icons.

2.4.2.1 Centile scores

Here the student's score is shown with reference to the population norms in centile units (sometimes referred to as 'percentile' scores), which range from 1 to 99. A centile score of 63, for example, means that the student's score lay at the point where 63% of the population scored less, and 37% scored more. A centile score of 50 indicates that the student's score lay exactly on the median of the distribution, with half the age group scoring higher and half lower.

2.4.2.2 Standard deviation units (z–scores)

These can be viewed by clicking on the **Z-Scores** option. The score is shown with reference to the population norms in standard deviation units. The z-scores are converted directly from the centile scores maintaining a normal distribution. Positive z-scores lie above the mean of the

distribution and negative z scores lie below it. A z-score of 0 indicates that the student's score lies exactly on the mean (average) of the distribution. A z-score of +1.0 signifies that the student's score was one standard deviation above the mean of the statistical population.

2.4.3 Data tables

Tables are split into the Summary Table of results and the individual Data Tables for each test.

2.4.3.1 Summary Table

The Summary Table (see Figure 2) is viewed by clicking on the **Summary** button and will show the scores (raw scores or adaptive scores) obtained for each test completed, including centile scores, z-scores and age equivalents (for explanation of what these scores mean see Section 4.1.1). The Summary Table also shows whether any of the test results are significantly different in statistical terms from what would be expected on the basis of the student's Reasoning test score. This is known as the 'Discrepancy' and is shown as a probability value (e.g. p<0.001).

Negative discrepancies (marked with a minus sign on the table) indicate a significant area of weakness for the student. Positive discrepancies (marked with a plus sign on the table) indicate a significant area of strength. For further explanation of discrepancy scores, see Section 4.3.3).

To return to the Graphical Profile, click on the **Chart** option button.

Figure 2. Summary Table.

Test Summary for [redacted]

A	B	C	D	E	F	G	H	I
Test name	Score	Centile	Z Score	ZScore diff	discrepancy	Test date	Age at test	Age equiv. range
Cave	32	67	0.44	0.39	Not significant	28/01/2008	11 y 8 m	14y 0m - 14y 05m
Mobile	4	20	-0.842	0.89	- (p < 0.05)	28/01/2008	11 y 8 m	10y 0m - 10y 11m
NonWords	15	69	0.496	0.45	Not significant	28/01/2008	11 y 8 m	14y 0m - 14y 5m
Segments	23	74	0.643	0.59	Not significant	11/02/2008	11 y 9 m	14y 6m - 14y 11m
SWReading	30	99	2.324	2.27	Not significant	11/02/2008	11 y 9 m	Not applicable
Reading	0.5245	84	0.995	0.95	Not significant	11/02/2008	11 y 9 m	15y 0m - 15y 5m
Spelling	0.3047	95	1.644	1.59	Not significant	11/02/2008	11 y 9 m	16y +
Reasoning	0.7192	52	0.05			25/02/2008	11 y 9 m	12y 0m - 12y 5m

2.4.3.2 Data Tables

Individual responses to each item are recorded and can be viewed in the Data Tables, which provide much more detailed analyses of the student's responses. These are accessed by clicking on the grey test name button at the bottom of the bar as shown on the Graphical Profile.

For example, in order to view the Data Table for Reading, click on the grey button with the appropriate test name on the Graphical profile screen (see the illustration on the right).

An example Data Table for the Reading test is shown in Figure 3. The column widths may be altered by hovering the mouse pointer over the column border, waiting for the mouse pointer to change to the appropriate indicator, then clicking and dragging the column width to the desired place. To return to the Graphical Profile click on the **Bar chart** button.

A Data Table is available for each of the eight tests (if attempted) and can be printed out. The Data Tables include *Raw Scores*, which in the case of the progressive tests, represent the number of items correct in each test. In the case of the adaptive tests in the suite (i.e. ***Sentence Reading, Spelling,*** and ***Reasoning***) the *Pass Rate* is equivalent to a Raw Score. The Pass Rate is a measure of the difficulty of each item, i.e. it tells you how many students in that age band attempted that item successfully. Pass Rates are expressed as a decimal: 1.0 would mean that all students in the age band passed the item correctly, 0.0 would mean that no students in the age band passed the item correctly, and 0.5 would mean that 50% of the students in the age band passed the item correctly. The most important score to note in such cases is the *Adaptive Score*, which represents the highest level of attainment of the student in that test (i.e. the final Pass Rate achieved).

The Data Table also shows the age equivalent score (for further information on using age equivalent scores, see Section 4.1.3). Note that if using the table of age equivalents (see Appendix, Section 8.3), Adaptive Scores rates have already been converted to percentages for convenience

Figure 3. Example Data Table for Reading test.

LASS 11-15 Reports

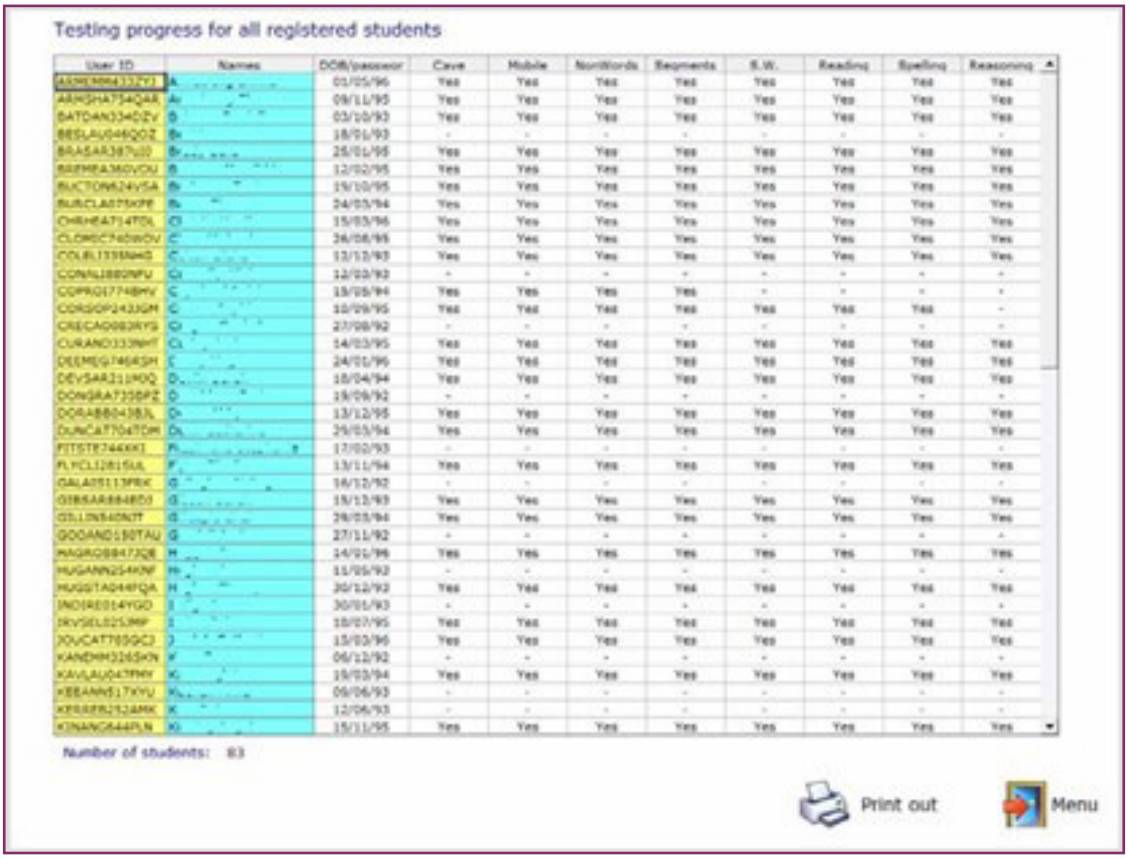
A	B	C	D	E
Probes	Correct word	Word chosen	Performance	Pass rate
1	warning	warning	1	0.9472
2	edition	edition	1	0.8859
3	nourishment	abolishment	0	0.8286
Test item				
31	alphabetically	alphabetically	1	0.8514
32	negative	negative	1	0.8509
33	occupation	occupation	1	0.8393
36	temperature	temperature	1	0.825
37	journalist	journalist	1	0.8214
38	pharmacist	pharmacist	1	0.8165
41	economical	economical	1	0.8035
42	autobiography	autobiography	1	0.7932
43	foundation	foundation	1	0.7905
46	accompany	accompany	1	0.7681
47	vacancy	vacancy	1	0.7677
48	sensational	sensational	1	0.7645
51	illuminate	illuminate	1	0.7386
52	longitude	longitude	1	0.731
53	prescription	prescription	1	0.7149
56	mythological	mythological	1	0.6831
57	inconspicuous	inconspicuous	1	0.6804
58	agricultural	agricultural	1	0.6571
61	complication	complication	1	0.6329
62	classification	classification	1	0.62

Cave | Mobile | NonWords | Segments | SWReading | Reading | Spelling | Reasoning

2.4.4 Monitoring the testing progress of the class

It is possible to display the testing progress of all registered students in the *LASS 11-15* database by clicking on the **Testing progress** button. This opens a *Testing Progress Table* (see Figure 4 below). The students' names are shown down the table with the tests across the top. 'Yes' indicates that the student has completed the test and a dash indicates that the test has not been completed. To return to the previous screen click on **Menu**.

Figure 4. Testing Progress screen



2.4.5 Printing out results

Graphical profiles can be viewed and then printed out via the *Print Preview* screen by choosing the item ***Single*** (for one report) or ***Batches*** (for up to 8 thumbnail reports) in the *Report previews* panel (Figure 1). Raw Data tables or Summary tables which are displayed on the Report screen can be printed out directly by clicking on the ***Print out*** icon.

2.4.6 Copying LASS 11-15 results to another application

LASS 11-15 Data Tables, Summary Tables and Testing Progress Tables may be copied to other applications such as word processors, spreadsheets etc. The user must first make the selection of the information they wish to copy. This is done by clicking and holding down the mouse button on the first cell of the selection. Whilst still holding down the mouse button drag the mouse pointer to the last cell of the selection which you wish to copy. Once this is done you will see the block of text is highlighted. Press the **Ctrl** and **C** keys together to copy this selection. Start the other Windows application (e.g. word processor or spreadsheet program) and go to the place where you wish to "paste" the selection. Press the **Ctrl** and **V** keys together to paste the selection.

3 Principal applications of LASS 11-15

3.1 Introduction

LASS 11-15 is a *multifunctional* assessment instrument with the following principal applications:

- routine profiling of students' abilities, either on entry to secondary education or at any time between the ages of 11 and 15 years
- screening for special educational needs
- assessment of dyslexia
- monitoring of literacy progress for all students
- evaluation of response to intervention

The following subsections outline the suggested ways in which *LASS* can be used for these applications.

3.2 Routine profiling

Many secondary schools routinely assess the general abilities of all students — especially in verbal and non-verbal abilities — but sometimes in literacy attainment as well as mathematics and quantitative reasoning skills. In many cases, this is carried out at the point of entry to secondary education. *LASS* can fulfil several of these functions, including the non-verbal ability and literacy attainment components. When used for this purpose, it would not normally be necessary to administer the modules assessing memory (***Cave*** and ***Mobile***) or phonological skills (***Nonwords*** and ***Segments***), because these are essentially diagnostic tests.

3.3 Special educational needs screening

LASS 11-15 also provides schools with a straightforward screening system for special educational needs, which can be an adjunct to routine assessment or used at any time between the ages of 11:0 and 15:11. When used for this purpose, students who gain low scores on any of the routine profiling modules (***Reasoning, Single Word Reading, Sentence Reading*** and ***Spelling***) or who display a significant discrepancy between their scores on ***Reasoning*** compared with their score(s) on ***Single Word Reading, Sentence Reading*** or ***Spelling,*** would automatically be administered the diagnostic modules. The procedure then becomes the same as for the assessment of dyslexia (see below).

3.4 Identifying dyslexia (specific learning difficulties)

3.4.1 What is dyslexia?

It is not possible here to give a detailed account of the nature of dyslexia. Readers are recommended to consult Reid (2016).

In 2007, the British Dyslexia Association adopted the following definition of dyslexia:

> *"Dyslexia is a specific learning difficulty that mainly affects the development of literacy and language related skills. It is likely to be present at birth and to be life-long in its effects. It is characterised by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual's other cognitive abilities. It tends to be resistant to conventional teaching methods, but its effect can be mitigated by appropriately specific intervention, including the application of information technology and supportive counselling."*

3.4.2 Characteristics of dyslexia

Dyslexia is a variable condition and not all people with dyslexia will display the same range of difficulties or characteristics. Nevertheless, the following characteristics have been the most widely noted in connection with dyslexia.

- A marked inefficiency in the *working or short-term memory system* (Beech, 1997; Gathercole et al., 2006; Jeffries and Everatt, 2004; McLoughlin, Fitzgibbon and Young 1994; Rack, 1997; Thomson, 2001). Memory difficulties may result in problems of retaining the meaning of text (especially when reading at speed), failure to marshal learned facts effectively in examinations, disjointed written work or an omission of words and phrases in written examinations, because pupils have lost track of what they are trying to express.
- Inadequate *phonological processing abilities*, which affects the acquisition of phonic skills in reading and spelling so that unfamiliar words are frequently misread, which may in turn affect comprehension. Not only has it been clearly established that phonological processing difficulties are seen in the majority of children with dyslexia (Snowling, 2000; Catts et al., 2005), but research has also indicated that this occurs in many adults with dyslexia (Beaton, McDougall and Singleton, 1997a; Ramus et al., 2003).

3.4.3 LASS 11-15 profiles and dyslexia

The chapters that follow show how *LASS* profiles can be used to identify dyslexia. *LASS* will be at its most effective in identifying students with the 'classic' form of dyslexia — which includes by far the majority of the group — characterised by cognitive difficulties that most notably affect the mapping of graphemes onto phonemes. However, as LASS includes a measure of visual memory, it is also adept at picking up 'atypical' cases of dyslexia where, instead of phonological deficits predominating, the chief problem concerns visual memory.

3.5 Monitoring of literacy progress

The two main literacy modules in LASS (***Sentence Reading*** and ***Spelling***) are both adaptive tests that can be used at regular intervals to monitor progress. The minimum interval between administration of the same module on a second or subsequent occasion should be about 4 months (i.e. other than in exceptional circumstances, *LASS* should not be given more than once in a school term).

3.6 Evaluation of response to intervention

When a particular problem (e.g. dyslexia) has been identified and an intervention, such as specialist teaching, has been implemented, teachers will naturally wish to evaluate the student's response to that intervention. *LASS* can be used for this evaluation, again bearing in mind that the minimum interval between administrations of any given *LASS* module should be about 4 months (i.e. other than in exceptional circumstances, *LASS* should not be given more than once in a school term).

The literacy attainment modules (especially ***Sentence Reading*** and ***Spelling***) are obvious candidates for use in this process, but ***Nonwords*** may also be used to monitor development of phonics skills. It is unlikely that the ***Reasoning*** module would need to be repeated (little change would be expected on this module) unless there were suspicions that the first assessment using ***Reasoning*** had given an unreliable result (e.g. because the student was unwell or was greatly lacking in confidence, or misunderstood the requirements of the task). The memory modules (***Cave*** and ***Mobile***) would be useful for evaluating growth in memorisation ability, especially where a memory training programme has been used.

4 Guidelines on interpretation of results

4.1 Introduction

4.1.1 The nature of LASS 11-15 scores

LASS 11-15 results on each individual test are available in these forms:

- Raw scores (progressive tests)
- Pass rates (adaptive tests)
- Centile scores
- Z-scores (standard deviation units)
- Age equivalent scores

Raw scores, pass rates and age equivalents are accessed via the on-screen *Data Tables* for every *LASS* test, which also show the means and standard deviations for the population norms of each test.

A *Summary Table* shows mean scores for all tests taken (see Section 2.4.3.1). Centile and standard deviation scores are shown in graphical form as bar charts on-screen and both these and the data pages can be printed out if desired. The *Graphical Profile* automatically charts the individual student's performance against those of the norm referenced group, which is based on the student's age in the following bands: 11:0–11:11; 12:0–12:11; 13:0–13:11; 14:0–14:11; 15:0–15:11.

In the case of the progressive tests in *LASS*, raw scores represent the number of items correct in each test. In the case of the adaptive tests in the suite (i.e. ***Sentence Reading, Spelling,*** and ***Reasoning***) the *Pass Rate* is equivalent to a Raw Score. The Pass Rate is a measure of the difficulty of each item, i.e. it tells you how many students in that age band attempted that item successfully. Pass Rates are expressed as a decimal: 1.0 would mean that all students in the age band passed the item correctly, 0.0 would mean that no students in the age band passed the item correctly, and 0.5 would mean that 50% of the students in the age band passed the item correctly. The final Pass rate achieved by the student is referred to as the *Adaptive Score,* and it is this that should be used if converting to an age equivalent score.

Raw scores are not corrected for age, but centile scores, z-scores, pass rates and adaptive scores all take account of the student's age. Of the different types of scores, centile scores will generally be most useful for teachers, although educational and clinical psychologists may prefer to work with z-scores.

4.1.1.1 Centile scores

A centile score (sometimes referred to as a 'percentile score') should not be confused with percent correct. It reflects a student's ability on any given test on a scale of 1 to 99 in comparison with other students in the reference group (i.e. the norm group or the same age group). Hence the average student will obtain centile scores in the middle range (e.g. in the range 35–65),

whilst an above-average student will have centile scores higher than this, and the below-average student will have centile scores lower than this. For example, a student with a centile score of 5 will be just inside the bottom 5% of students for that particular ability, and a student with a centile score of 95 will be just inside the top 5% of students for that particular ability.

4.1.1.2 Z-scores

It is not essential for users to understand the statistical principles behind z-scores, and readers who do not have a particular interest in this may wish to skip this section.

A z-score (also known as a standard deviation unit) is a statistic based on a normal distribution of scores. Most human characteristics are distributed in a normal[1] (or approximately normal) fashion (i.e. a bell shaped curve), in which individuals cluster towards the mean (or average) and become less common as one approaches the extremes (or 'tails') of the distribution. The proportion of individuals that will fall in any given portion of a normal distribution can be calculated. For example, two-thirds (66%) of individuals will lie between + or – one standard deviation of the mean, while slightly less than 3% will fall below 2 standard deviations of the mean.

An advantage of z-scores is that they facilitate analysis of the *extremeness* of individual scores or of differences between scores, which are not apparent when using the centile score format. For example, consider the following results:

Centile scores	**Reasoning**	**Sentence Reading**	**Difference**
Student 1	60	40	20
Student 2	90	70	20

In both cases, the students' sentence reading performance is 20 centile points below their reasoning scores. Which (if any) of these is a significant difference, i.e. one that we should take notice of when interpreting results? On centile score difference, both appear to be identical, so this format does not help us. The same results in equivalent z-score format reveal a different story:

z-scores	**Reasoning**	**Sentence Reading**	**Difference**
Student 1	0.25	– 0.25	0.5
Student 2	1.6	0.6	1.0

Now it is apparent that the difference between the two scores for Student 2 is *twice* the magnitude of the difference between the same scores for Student 1. In fact, the former would not be regarded as significant, but the latter certainly would. In practice, scores at the tails of the distribution are much rarer than scores in the middle of the distribution, so differences between them will tend to assume greater significance. The z-score format allows us to determine that significance.

[1] The term 'normal' here is being used in its statistical sense.

4.1.1.3 Relationship between centile scores and z-scores

In a normal distribution of scores, centile scores and z-scores have a consistent relationship to each other and also to standard scores, (the latter, like IQ, being most usually expressed with a mean of 100 and a standard deviation of 15). This relationship is depicted in Table 5.

Table 5. Relationship between centile scores, z-scores and standard scores.

centile score	3	5	17	20	25	50	75	83	97
z-score	–2.0	–1.75	–1.0	–0.85	–0.66	0	+0.66	+1.0	+2.0
standard score	70	76	85	87	90	100	110	115	130

4.1.2 Interpreting LASS 11-15 scores

How low must a *LASS* individual test result be before the teacher should be concerned about the student's performance? Put another way: what is the critical cut-off point or threshold that can be used when deciding whether or not a given student is 'at risk'? Unfortunately, this is not a question that can be answered in a straightforward fashion, because much depends on other factors. These include: (a) the particular *LASS* test undertaken, (b) whether the results of other individual *LASS* tests confirm or disconfirm the result being examined, and (c) the age of the student being tested.

Conventional SEN thresholds are: below 20th centile (i.e. the '1 student in 5' category) and below the 5th centile (the '1 in 20' category). At one time, it was maintained that Statements of Special Educational Needs under the *1981 Education Act* would be appropriate for only about 2% of students. Experience has shown that this, in general, is far too restrictive and that concentrating just on the lowest 2% will result in many students with special educational needs being overlooked.

Any individual *LASS* module result which falls *below the 20th centile* (i.e. near or below *one* standard deviation below the mean) is by definition significantly below average and thus indicates an area of *weakness*. This is a fairly conventional cut-off point in identifying special needs or moderate educational weaknesses. A student who falls below this threshold should always be *considered* for intervention of some kind, depending on other factors (see below). Sometimes a weakness is identified which can be remedied by appropriate training. In some cases the problem is more pervasive and requires a differentiated approach to teaching in basic skills. Where there is strong confirmation (e.g. a *number of related tests* at or below the 20th centile) then the assessor can be convinced that concern is appropriate.

Where a student is scoring *below the 5th centile* on any particular module (near or below *two* standard deviations below the mean), this generally indicates a *serious difficulty* and should always be treated as diagnostically significant, and usually this will be a strong indication that a student requires intervention. Again, where there is strong confirmation (e.g. a *number of related tests* at or below the 5th centile) then the assessor can be even more confident about the diagnosis.

However, it should not be forgotten that *LASS 11-15* is also a *profiling* system, so when making interpretations of results it is important to consider the student's *overall profile.* For example, a centile score of 30 for reading or spelling would not normally give particular cause for concern because it does not fall below the 20th centile threshold. But if the student in question had a centile score of 85+ on the reasoning module, there would be a significant discrepancy between ability and attainment, which *would* give cause for concern.

It should also be noted that the ***Single Word Reading*** test is the only test in the *LASS* suite for which scores are not distributed in a normal curve. In fact, there is a significant negative skew, indicating that most students will achieve a maximum or near-maximum performance (in statistical terms this is sometimes referred to as a *'ceiling effect'*). The ***Single Word Reading*** test does not have sufficient sensitivity to discriminate amongst students within the average range, and so it should be confined to use with students who are *significantly behind* in reading development, either to determine their attainment level or evaluate progress.

4.1.3 Age equivalents

An age equivalent is defined as the chronological age range of students that would be expected to achieve a given raw score (or, in the case of adaptive tests, adaptive score). *LASS* provides age equivalent scores for each module – they can be found in the Summary Table (see Section 2.4.3.1) and in the Data Table for each module (see Section 2.4.3.2). In addition, a table of age equivalents for *LASS 11-15* scores has been provided in the Appendix (Section 8.3). For various statistical reasons, age equivalent scores cannot be as accurate as centile scores or standard scores (e.g. z scores), so teachers should use these with care.

4.2 General issues in interpretation

4.2.1 Taking all factors into account

Consistent with sound educational practice, teachers should not regard assessment as a single event, but rather as a continuing process. *LASS* results should be considered together with other information about the student, including formal data from sources such as SATs, and informal observations made by the teacher. Strategies for intervention should not be regarded as set in stone, but should be flexible and responsive to a student's progress (or lack of progress). When reviewing a student's Progress, it may be helpful to reassess them using appropriate tests from *LASS*.

4.2.2 Must students be labelled?

Labels for different special educational needs (especially the label 'dyslexia') have been controversial for some years. The *1981 Education Act*, which encouraged a non-labelling approach to special educational needs, was superseded by the *1993 Education Act* and the *Code of Practice for the Identification and Assessment of Special Educational Needs (DfE, 1994).* The latter embodied a fairly broad labelling of special educational needs categories, including the category 'Specific Learning Difficulties (Dyslexia)' [Code of Practice, 3:60]. The *1996 Education Act*

consolidated the provisions of previous Acts, in particular the 1993 Act. However, the 1994 Code of Practice was superseded by the 2001 SEN Code of Practice, which again moved away from use of labels and focused instead on areas of need and their impact on learning (DfES, 2001). The latest *SEND Code of Practice* (DfE, 2014) reiterates that "The purpose of identification is to work out what action the school needs to take, not to fit a pupil into a category... The support provided to an individual should always be based on a full understanding of their particular strengths and needs and seek to address them all using well-evidenced interventions targeted at their areas of difficulty" [SEND Code of Practice, 2014, Section 6.27].

Many teachers are justifiably worried that labelling a student — especially at an early age — is dangerous, and can become a 'self-fulfilling prophecy'. Fortunately, the *LASS* approach does *not* demand that students be labelled — instead it promotes the awareness of students' individual learning abilities and encourages taking these into account when teaching. Since the *LASS* graphical profile indicates a student's cognitive *strengths* as well as *limitations*, it gives the teacher important essential pointers for curriculum development, for differentiation within the classroom, and for more appropriate teaching techniques. Hence it is not necessary to use labels such as 'dyslexic' when describing a student assessed with *LASS 11-15*, even though parents may press for such labels.

By identifying cognitive strengths and weaknesses, it is easier for the teacher to differentiate and structure the student's learning experience in order to maximise success and avoid failure. By appropriate early screening (e.g. with **CoPS**, or **LASS 8-11**) the hope is that students who are likely to fail and who might subsequently be labelled 'dyslexic', never reach that stage because their problems are identified and tackled sufficiently early. (This is not to suggest that dyslexia can be 'cured', only that early identification facilitates a much more effective educational response to the condition.)

4.3 Essential factors to take into account when interpreting results

4.3.1 LASS 11-15 is not one test, but several

When considering *LASS 11-15* results, it is important to bear in mind that it is not one test that is being interpreted, but the performance of a student on *a number of related tests*. This is bound to be a more complex matter than single test interpretation. Hence the normative information (about how a student is performing relative to other students of that age) must be considered together with the ipsative information (about how that student is performing in certain areas relative to that same student's performance in other areas). The pattern or profile of strengths and weaknesses is crucial. It is *not* legitimate to average a student's performance across all tests in order to obtain a single overall measure of ability. This is because the modules in *LASS* are measuring very different areas of cognitive skill and attainment.

However, where scores in *conceptually similar areas* are *numerically similar*, it is sometimes useful to average them. For example, if scores on the two memory modules (***Cave*** and ***Mobile***) were similar, it would be acceptable to refer to the student's memory skills *overall*, rather than distinguishing between the two types of memory being assessed in *LASS* (i.e. visual memory and auditory-verbal memory). Similarly, if scores on the two phonological modules (***Nonwords***

and ***Segments***) were similar, it would be acceptable to refer to the student's phonological skills *overall.* Note that this applies only to conceptually similar areas and where scores are numerically similar (within about 10 centile points of each other). It would not be legitimate to average scores across conceptually dissimilar modules (e.g. ***Reasoning*** and ***Nonwords***). When scores are dissimilar, this indicates a differential pattern of strengths and/or weaknesses, which will be important in interpretation. In such cases it will be essential to consider the scores separately rather than averaging them. For example, if ***Cave*** and ***Mobile*** produce *different* results, this will usually indicate that one type of memory is stronger or better developed (or perhaps weaker or less well developed) than the other. This information will have implications for both interpretation and teaching.

For further information on interpreting strengths and weaknesses see Section 4.3.3.

4.3.2 Things which the computer cannot know

The computer is not all-seeing, all-knowing — nor is it infallible. For example, the computer cannot be aware of the demeanour and state of the student at the time of testing. Most students find *LASS* tests interesting and show a high level of involvement in the tasks. In such cases the teacher can have confidence in the results produced. Occasionally, however, a few students do not show such interest or engagement and in these cases the results must be interpreted with more caution. This is particularly the case where a student was unwell at the time of assessment or had some anxieties about the assessment. Teachers should therefore be alert to these possibilities, especially when results run counter to expectations.

4.3.3 Strengths and weaknesses

In considering a student's profile it is important to consider strengths as well as weaknesses. Absolute strengths will appear as centile scores in the range 80+, while absolute weaknesses will appear as centile scores in the range below 20 (see Section 4.1.2 for an explanation of thresholds for interpreting absolute weaknesses). *Relative* strengths and weaknesses, however, are shown in terms of *discrepancies* between scores – usually between the Reasoning score and the other individual scores.

Generally, the teacher is most interested in discrepancies that occur when a student's literacy skills are significantly *below* expected levels — i.e. scores that are much lower than the Reasoning score. Occasionally, however, a student will have scores that are much *higher* than the Reasoning score. Discounting Single Word Reading (for reasons that are explained elsewhere: see Sections 2.2.2 and 5.3), the area in which this is most likely to be encountered is in visual memory (and sometimes auditory memory). Some students have visual memory skills that are surprisingly good and higher than would be predicted from their Reasoning score. This can still show up as a significant discrepancy — if the difference between the scores is statistically significant — but obviously such results need to be treated differently as what is revealed is a particular and significant *strength* rather than a weakness. This strength can be utilised effectively in teaching and learning (see Chapter 6), but teachers should also be aware that strengths can sometimes cause problems. For example, students with very good visual memory skills sometimes fail to acquire satisfactory phonic skills in the primary stage because they find they can quite easily

read words by remembering their visual patterns as whole units (rather than having to break the words down into component letters and using rules about letter-sound correspondences to decode the text). A student such as this will not necessarily have dyslexia — this will depend on the overall pattern of their *LASS* scores — but they will need help to enable them to improve their phonic skills.

4.4 Unusual profiles

Most *LASS* profiles display a 'logic' that teachers will be able to 'read', especially when they have become reasonably experienced in using the program. Occasionally, however, you may encounter profiles that show a very complex pattern of 'highs' and 'lows' and at first sight appear quite puzzling. For example, a student might have very poor phonological skills ('Segments') but very good phonic skills ('Nonwords'). Although this could be a genuine result (e.g. if the student had received and absorbed a lot of exceptionally good phonics tuition), it is sufficiently unusual to ring warning bells and cause the teacher to enquire more closely into the case.

When tackling such profiles it is particularly important to bear in mind any extraneous factors that might have affected the student's performance. Examine the data to see on what days and times different tests were done. Motivation, ill heath (actual or imminent) and impatience are often causes of a student under-performing. Or the student may simply have 'got the wrong end of the stick' (e.g. assuming that they have to do a test as quickly as possible when in fact it is accuracy which is most important). Exceptionally, students may be in an uncooperative mood in some (or all) of the tests, and so their results do not bear any relationship to what the teacher knows are their true abilities. If the teacher is not confident about any particular result, then the safest course of action is first, to speak to the student to see if any reason for the unexpected result can be discovered, and second, to repeat the test(s) in question, taking appropriate steps to ensure that any problems have been resolved.

4.5 LASS 11-15 profiles and the SEND Code of Practice

4.5.1 The SEND Code of Practice

The current *Special Educational Needs and Disability Code of Practice* (DfE, 2014), which came into force in September 2014, replaced the previous Code (published in 2001). Under the provisions of the *Children and Families Act 2014*, Part III, all schools, academies and Local Education Authorities (LEAs) in England must have regard to the SEND Code of Practice when dealing with pupils with special educational needs or disabilities. It is assumed that most teachers in England will be familiar with the SEND Code of Practice, especially if they are Special Educational Needs and Disabilities Coordinators (SENDCo), and so only a brief outline will be given here.

The SEND Code of Practice (2014) provides guidance for education settings on taking a graduated approach to identifying and supporting students with SEN, which replaces the stages of School Action and School Action Plus from the previous code, and with Education and Health Care Plans (EHCPs) replacing statements of SEN. The SEND Code of Practice states that schools should assess students' skills and attainment on entry and make regular assessments of progress.

Where students are making less than expected progress, the first response should be high quality teaching targeting their areas of weakness. If progress continues to be less than expected then schools should assess whether the student has SEN, whilst continuing to provide extra teaching or interventions. When a student is identified as having SEN, schools should put in place a four-part cycle of Assess, Plan, Do and Review, which may involve outside specialists. Where, despite the school having taken action to assess and meet the SEN of the student, they have not made expected progress, the school or parents should consider requesting an Education, Health and Care needs assessment.

The Children and Families Act 2014, Part III, Chapter 6 places upon LEAs in England, the responsibility for identifying all students with special educational needs. The SEND Code states that "The benefits of early identification are widely recognised – identifying need at the earliest point and then making effective provision improves long-term outcomes for the child or young person" [SEND Code, Section 6.14].

LASS 11-15 can play a significant role in helping schools and teachers meet their obligations under the Children and Families Act and the SEND Code of Practice.

LASS results should not be considered in a 'vacuum'. Hence, other relevant factors should be taken fully into account, including academic progress across the curriculum, the length of time that a student has been experiencing difficulties, the extent to which the student has developed strategies which enable him or her to compensate for difficulties, and the emotional impact of any difficulties. Writing skills are not assessed by *LASS* but when considering results and deciding appropriate courses of action it is important that writing skills are factored in. Consistent with the SEND Code, it should also be remembered that assessment is not a one-off but rather a continuing process in which educational history should be considered and regular reviews undertaken.

5 Interpreting results from individual tests

5.1 Reasoning

The purpose of the ***Reasoning*** module is to give the assessor a reasonable estimate of the student's general intellectual ability or intelligence. ***Reasoning*** is an adaptive test, which makes assessment swift and efficient. This is a matrix test, in which both visual and verbal reasoning strategies may be employed. There is good evidence that such matrix reasoning tests correlate well with more extensive measures of intelligence and therefore provide a good overall indicator of general intellectual ability. Nevertheless, assessors should be aware that a *small proportion* of students may experience difficulties with this task, even though in other respects their intelligence levels are at least average. Hence in cases of low scoring where the assessor is puzzled by the result because it does not seem to accord with expectations, it would be wise to check the student's intelligence using an alternative measure, such as the *CAT4 Verbal test*, or the *British Picture Vocabulary Scale (BPVS).*

The ***Reasoning*** module in *LASS 11-15* is not intended to be a speeded test (i.e. performed against the clock), but in the interests of avoiding excessively lengthy assessment sessions, a (fairly generous) time limit of 60 seconds has been allowed for each item. For most students, this should allow sufficient time for a reasonable attempt at each item. To allow greater time would not increase the validity or reliability of the test, so if students run out of time, then this must be accepted as part of the exigencies of the task.

5.2 Sentence Reading

Sentence Reading will often be the first test to be administered. Like the reasoning module, it is also an adaptive test, which makes assessment swift and efficient. ***Sentence Reading*** involves both *reading accuracy* (i.e. word recognition using phonological decoding skills and/or whole-word visual strategies) and *reading comprehension* (because in order to decide which of the words offered is the correct word to fit into the sentence, the student has to have some understanding of the meaning of the sentence). Hence it gives a good general estimate of the overall reading skills of students in this age range.

In cases where the student scores at least within the average range on the ***Sentence Reading*** module, and there is no significant discrepancy between this result and the score on the ***Reasoning*** module, there is usually no need to administer the other two reading-related modules (***Single Word Reading*** and ***Nonwords***). This is because the student's performance in reading will not give undue cause for concern. However, if the score of this module falls below centile 20, or there is a significant discrepancy between this result and the score on the ***Reasoning*** module, then there will be cause for concern. In this event it is recommended that both the ***Single Word Reading*** and ***Nonwords*** tests also be administered.

If the ***Sentence Reading*** result is found to be low this may be because the student has dyslexia (e.g. case study 7.2) or because they have low general ability (e.g. case study 7.5). Or it could

be because they lack experience of reading texts at an age-appropriate level and simply need to develop their comprehension skills. They would benefit from a variety of activities designed to stimulate reading comprehension skills but if the student has problems of a dyslexic nature, it may be necessary to tackle word recognition and phonic skills before launching too vigorously into more ambitious work on reading for meaning.

5.3 Single Word Reading

This is a test of word recognition out-of-context: i.e. reading accuracy. ***Single Word Reading*** is the only test in the *LASS* suite for which scores are not distributed in a normal curve. In fact, there is a significant negative skew, indicating that most students will achieve a maximum or near-maximum performance (in statistical terms this is sometimes referred to as a *'ceiling effect'*). The ***Single Word Reading*** test does not have sufficient sensitivity to discriminate amongst students within the average range, and so its use should be confined to students who are *significantly behind* in reading development, either to determine their attainment level or evaluate progress.

Hence there is generally little point in administering ***Single Word Reading*** unless the teacher suspects that the student is a poor reader, because:

- the student has scored below the threshold of concern (less than centile 20) on the sentence reading module; or
- a significant discrepancy between the score for the sentence reading module and the score on the reasoning module has already been detected; or
- there is other evidence to suggest deficient reading skills.

In such cases, the purpose of administering this test is to ascertain whether there is a serious deficiency in word recognition as well as reading comprehension (the latter being judged on the basis of the student's performance on the ***Sentence Reading*** test or some other reading comprehension test).

5.4 Nonwords

This is a test of nonword reading. Nonwords (sometimes called 'pseudowords') are letter strings that are not recognised words in a given language (in this case English), but could be – i.e. they conform to orthographic rules of the language. For example, 'gade' or 'tiphalune' are not English words but are nevertheless pronounceable as though they were words, using phonological decoding skills (and, possibly, analogy processes, e.g. 'gade' might be rhymed with 'fade' or 'glade'). If a student pronounced 'gade' as 'gad´ee' (instead of applying the silent 'e' rule which changed the short 'a' to a long 'a'), or 'tiphalune' as 'tip´hall´unee' (instead of 'tif´aloon' or 'ti´farloon'), we would have good evidence that the student does not possess the appropriate phonological decoding rules (often referred to by teachers simply as 'phonics'). In some cases there may be other phonological problems, such as difficulties in sequencing phonemes or syllables (e.g. the student may pronounce 'tiphalune' as 'till´a´foon'), additional to – or instead of – failure to apply rules of phonics.

Students with dyslexia typically experience difficulties in reading nonwords (Snowling and Hulme, 1994; Griffiths and Snowling, 2002; Verhoeven and Keuning, 2018). Indeed, there is evidence from a wide range of different tasks (not just nonwords) that individuals with dyslexia of all ages generally find phonological activities difficult (Bruck, 1992; Snowling et al., 1997; Snowling, 2000; Suarez-Coalla and Cuetos, 2015; Cavalli et al., 2018) and there is a school of scientific thought that regards dyslexia as essentially a phonological processing difficulty (Rack, 1994; Snowling, 1995, 2000; Griffiths and Snowling, 2002; Ramus, 2003; Lindgren and Laine, 2011; Saksida et al., 2016). Hence a low score on the *LASS* ***Nonwords*** test is usually a good indication of dyslexia. However, teachers should be aware that there are other possible explanations for a low score on ***Nonwords***, including:

- the student has never been taught phonics properly
- the student has insufficient experience of English
- the student has hearing problems.

In order to resolve these possibilities, the teacher will need to consider other relevant evidence (such as medical history or information about the student's primary or elementary schooling) but must also take into account the student's performance on the other *LASS* tests. For example, if the student also performs poorly on ***Segments***, then this would support conclusions of a phonological processing difficulty. However, although it is true that *most* students with dyslexia have phonological processing difficulties, there are some cases of dyslexia that do not display such difficulties (Beaton, McDougall and Singleton, 1997b; Rack, 1997; Turner, 1997; Joanisse et al., 2000). Hence teachers should be aware of assuming that because a student does not have a low score on ***Nonwords*** he or she cannot therefore have dyslexia.

By inspecting the data pages for ***Nonwords***, the assessor can examine the student's results in detail. This will help to determine whether the problem is mainly one of hearing – in which case errors will usually be scattered throughout the test – rather than poor phonics skills, in which case errors will tend to increase as the test gets more difficult.

Lack of experience with English can limit awareness of pronunciation rules. For example, in one of the more difficult items in ***Nonwords***: 'troughilicancy' (pronounced 'troff´ill´ick´an´see'), in order to select the correct answer a student needs to know that '–ough' is pronounced '–off' and that 'c' followed by a vowel is usually pronounced 'k' but when followed by a 'y' is pronounced 's'). Inspection of the data pages for ***Nonwords*** will enable the assessor to determine the nature of the student's difficulties in these respects. Further guidelines on interpreting results obtained by students for whom English is an additional language may be found in Section 7.9.

5.5 Segments

Segments is a test of general phonological processing abilities requiring deletion of segments of words. For example, 'butterfly' without the syllable 'ter' would be pronounced 'buh´fly' (strictly: not 'but´fly', unless one was using knowledge that the word was spelt with a double 't', rather than relying on the sounds of the syllables).

As children learn to talk, they develop increasingly sophisticated cognitive representations for phonological aspects of speech. They become aware that words can be *segmented* into syllables

(e.g. that 'wigwam' is composed of 'wig' and 'wam'), and that different words can contain similar elements (i.e. similar *onsets* like **w**-ig and **w**-am, or similar *rimes* like w-**ig** and d- **ig**). The importance of this phonological awareness for early literacy development has been very well demonstrated in research (Snowling, 1995; Goswami, 1994, 1999, 2001; Goswami and Bryant, 1990; Rack, 1994; Savage, 2001; Ziegler and Goswami, 2005). Phonological awareness in very young students is often assessed by means of an 'oddity task' in which the student has to pick out the one which is different from of list of similar sounding words, e.g. *'mop, hop, tap, lop'; 'ham, tap, had, hat'* (Bradley and Bryant, 1983; Bradley, 1980; Goswami, 2012). However, phonological deletion tasks, such as ***Segments***, have been found to be more sensitive measures for use with older students (Snowling, 2000; Landerl et al., 2013).

Dyslexic students are known generally to have poor phonological skills (Rack, Snowling and Olson, 1992; Holligan and Johnston, 1988). In the *phonological deficit model of dyslexia* (Hulme and Snowling, 1991; Snowling, 1995, 2000) it has been hypothesised that the status of students' underlying phonological representations determines the ease with which they learn to read, and that the poorly developed phonological representations of dyslexic students are the fundamental cause of their literacy difficulties. In the CoPS research the *Rhymes* test was found to be a highly significant predictor of later literacy skill (Singleton, Thomas and Horne, 2000).

There is good evidence that individuals of all ages with dyslexia have persistent difficulties with phonological deletion tasks (Bruck, 1990, 1992; Gottardo, Siegel and Stanovich, 1997; Snowling, 2000; Jimenez, et al., 2010). Low performance on ***Segments*** is therefore a good indication of dyslexia. However, like ***Nonwords***, teachers should be aware that students with hearing problems may also have low scores on ***Segments***. By inspecting the data pages for the module, the assessor can examine the student's results in detail. This will help to determine whether the problem is mainly one of hearing – in which case errors will usually be scattered throughout the test – rather than phonological processing, in which case errors will tend to increase as the test gets more difficult.

5.6 Spelling

Many students with dyslexia – especially if they have had a lot of support or special tuition during primary education – may have improved reading skills to the extent that a significant discrepancy between their ***Reasoning*** and reading ability is no longer apparent. In most cases, however, spelling is much more difficult to remediate, and so it is important to assess this aspect of literacy because it can shed light on underlying problems that teachers might remain unaware of. Poor spelling (especially in students who are bright and have otherwise satisfactory reading skills) often signals deeper cognitive difficulties (e.g. in memory) that can create problems in many aspects of educational performance, ranging from modern languages to mathematics.

Students with spelling problems tend to experience difficulties with writing generally (Moseley, 1997; Abbott, Berninger and Fayol, 2010; Aram, 2005). This is not only because they have anxieties about not being able to spell words, but also because they are so focused on the *mechanics* of the writing process (spelling, grammar, punctuation) that they have little cognitive capacity left over to monitor the meaning of the text they are producing. They easily lose track of what they want to say, miss words out and leave sentences incomplete. To resolve these difficulties, students may resort to a 'dumbing down' strategy: i.e. writing in a very immature

fashion, using easy-to-spell words and simple sentence structures. The resultant written work may not actually contain very many errors but is far below the standard that the students should be capable of, given their levels of understanding. Ideally, spelling – like the other mechanical processes of writing – should be automatised, i.e. be so well practised that they operate largely at a subconscious level, which frees up conscious processes to concentrate on the meaning of what is being written.

It should be noted that poor spelling does not inevitably indicate dyslexia, in which one would normally expect to see evidence of cognitive difficulties (e.g. in memory or phonological skills) that are consistent with, and underpin the spelling problems. When students with poor spelling have no underlying cognitive difficulties that would be indicative of dyslexia, it is usually the case that they have never been taught to spell properly or have had insufficient practice in using their spelling skills so that these skills become automatised (see Section 6.2.5.2 for teaching suggestions on this).

5.7 Cave

Cave is a test of visual memory, involving spatial and temporal sequences. However, since the stimulus items for ***Cave*** can be encoded by use of verbal labels, the part played by verbal memory skills in this task is potentially as great as that played by visual memory. Although auditory-verbal memory is usually regarded as being of greatest significance where literacy skills are concerned (see next section), there is good evidence that visual memory tasks can also give good indications of dyslexia and literacy difficulties (Awaida and Beech, 1995; Beech, 1997; Singleton, Thomas and Leedale, 1996; Singleton, Thomas and Horne, 2000; Bogon et al., 2014). Hence in cases of literacy difficulties it is important for the teacher to know whether the student's visual memory skills are weak or strong, as these will not only affect the diagnosis but also have implications for subsequent teaching recommendations.

Although working memory is typically conceptualised as being a phonological system subserving speech, a visual equivalent known as the 'visuo-spatial scratch pad' has been hypothesised (Baddeley, 1986). This is believed to enable us to keep small amounts of visual information in short-term memory. Stuart, Masterson and Dixon (2000) found that visual memory influences the acquisition of sight vocabulary in students aged 5 who displayed poor graphophonic skills (i.e. those who had not yet acquired the ability to segment words on the basis of their sounds and who displayed little or no knowledge of sound-to-letter mappings). For students with good graphophonic skills, however, no association between visual memory and word learning was found. Visual memory is also essential in rapid retrieval of visual whole-word representations from the mental lexicon by older and more fluent readers when reading text (particularly of irregular words for which a phonic strategy would not be appropriate). Visual memory also comes into play when retrieving visual sequences of letters in the correct order for spelling (again, particularly where irregular words are concerned). Hence visual memory is a key component of literacy development.

A study by Palmer (2000) found that students who maintained a visual representation of words alongside a phonological representation after age 7, were significantly worse readers than those for whom the ability to switch strategies by inhibiting the visual representation had fully developed. Students with good visual memory but poor auditory-verbal memory would not only

be expected to find acquisition of an effective phonological decoding strategy in reading rather difficult, but also be inclined to rely for a longer period on visual strategies. This approach is liable to run into trouble as the student's education progresses and the number of new words with which the student is confronted steadily increases.

Cave also requires careful concentration and good visual attentiveness, since the stimulus items are only displayed for very brief periods of time. Therefore, it is possible for a student to perform poorly on ***Cave*** not because of inherent memory difficulties, but because of difficulties with attention. Where this appears to be a serious possibility, teachers should refer to other information about a student in order to resolve the issue, or refer the student to an educational psychologist for further investigation. Students with ADHD who have hyperactive patterns of behaviour may also experience difficulties with ***Cave*** because of high impulsivity, which can disrupt the processes of memorisation and recall.

When interpreting the results from ***Cave***, as well as determining whether scores fall below the critical thresholds (see Section 4.1.2), significant discrepancies between the scores on this module and that on the ***Reasoning*** module can also be taken into account. Teachers should be aware that students with very good scores on ***Cave*** (or who show marked discrepancies between scores on this test and ***Mobile***) may develop over-reliance on visual strategies in reading, with a consequent neglect of phonic strategies.

5.8 Mobile

Mobile is a test of auditory-verbal sequential short-term memory, based on recall of digits. It is a well-established fact that individuals with dyslexia typically experience problems with recall of digits (Beech, 1997; Thomson, 1993; Turner, 1997), and digit span is a feature of the vast majority of assessment batteries used for diagnosis of dyslexia (Reason, 1998). Although digit span is normally a spoken test, there is good evidence that the form of the test used in *LASS* correlates highly with traditional forms, such as those used in the Wechsler Intelligence Tests and the British Ability Scales, and is therefore a valid measure of auditory-verbal memory.

Auditory-verbal short-term memory is critical for literacy development, especially for the acquisition of phonic skills, i.e. mapping of letters (graphemes) on to sounds (phonemes), and for the storage of phonological codes in short-term memory during word recognition and processing of text. There is also a well-established connection between reading and memory (Baddeley, 1986; Beech, 1997; Brady, 1986; Jorm, 1983; Wagner and Torgesen, 1987). The predominant view in the research literature is that phonological processes underpin the development of a phonological recoding strategy in reading, and that working memory plays a significant role in this strategy, enabling constituent sounds and/or phonological codes to be held in the short-term store until these can be recognised as a word and its meaning accessed in long-term memory (Gathercole and Baddeley, 1993a; Wagner et al, 1993).

Short-term auditory-verbal memory is sometimes called *'working memory'* because it is the system which we use when we have to hold information for a brief period of time while we process it. Working memory is a limited-capacity system, and unless rehearsed or transferred to longer-term storage, information in working memory is only retained for a few seconds (Baddeley, 1986). For example, in order to understand what a person is saying to us we have

to hold their words in working memory until they get to the end of a sentence (or equivalent break), then we can process those words for their meaning. We cannot process each individual word for meaning as we hear it because by themselves words do not convey sufficient meaning. Furthermore, words heard later in an utterance can substantially alter the meaning of words heard earlier (e.g. "The man opened the magazine — then he carefully extracted the remaining bullets it contained").

In the same way that it is necessary to hold spoken words in memory in conversation, the student must hold *letters and syllables* in memory when decoding words. This is very important in the development of phonic skills. The majority of students with dyslexia have problems in this area of cognitive processing (Thomson, 1982). Awaida and Beech (1995) found that phonological memory at age 5 predicted nonword reading (i.e. phonics skills) at 6 years. When reading continuous text for meaning the student must also hold *words* in memory until the end of the phrase or sentence. Poor working memory will thus affect reading comprehension. Of course, *visual* memory skills will be involved in much of this cognitive activity, especially for more competent readers whose capacity for rapid visual recognition of words steadily increases with age. Nevertheless, auditory-verbal working memory remains a significant factor in reading development and in writing as well.

Students with weaknesses in auditory-verbal working memory also tend to have difficulty in *monitoring* their written output, and are inclined to miss letters, syllables and/or words out when they are writing (Baddeley, 1986; Brady, 1986; Jorm; 1983; Wagner and Torgeson, 1987).

Further research has suggested a very close connection between auditory memory span and articulation (speech) rate (Avons and Hanna, 1995; McDougall and Hulme, 1994). It could well be that articulation rate is an index of the efficiency with which phonological representations of words can be located in memory and activated (i.e. spoken). In turn, this could be closely related to how quickly cognitive representations of words being read can be located in the orthographic and semantic lexicons and activated (i.e. recognised and understood). The three lexicons (phonological, orthographic and semantic) are all believed to be closely related (Rayner and Polatsek, 1989).

When interpreting the results from ***Mobile***, as well as determining whether scores fall below the critical thresholds (see Section 4.1.2), significant discrepancies between the scores on this module and that on the ***Reasoning*** module may also be taken into account.

Like the other auditory tasks in *LASS*, ***Mobile*** requires adequate hearing ability. Where a teacher suspects that a low score on ***Mobile*** could be due to poor hearing, inspection of the data pages should help to resolve the question. If the problem is mainly one of hearing, errors will usually be found to be scattered throughout the test results. If it is due to poor memory, errors will tend to increase as the test progresses and the memorisation load steadily increases.

6 Teaching recommendations

6.1 General principles

6.1.1 Addressing learning problems

As a teacher, once the *LASS* tests have been used, you will want to know how to use your student's strengths to develop the identified areas of weakness. Looking at the whole profile will provide you with evidence of the areas that need attention and at the same time indicate where the strengths are, so that you can use those strengths to mitigate or remediate the problem learning areas. Analysis of the problem areas may provide you with insight into the nature of the problem.

When specific areas of learning difficulty have been identified by *LASS*, there are a wide range of teaching strategies that can be used to build on the student's strengths to mitigate or remediate the weaknesses. Most schools will already have a range of reading and spelling activities, worksheets, prompt cards, teaching schemes and devices, which can now be selected and used in a more focused way. Suggestions are made in this chapter on how such materials can be put to most effective use. To supplement and extend existing support materials, there are equally — or, sometimes, more — effective ICT solutions that can be introduced to extend the range of strategies at a teacher's disposal.

In some cases you may have some awareness of a student's difficulties before you use *LASS*. Concern about a student's progress will often be the stimulus to carry out an assessment. A student with dyslexic tendencies will typically present with problems in all or most of these characteristic areas:

- short-term memory (auditory-verbal or visual)
- phonological processing skills
- phonic decoding skills
- poor presentation of written work
- low self-esteem
- disorganised work and life.

It is very likely that a student with dyslexia will have a mismatch between high level oral skills in class discussions and the quantity and quality of any written work that is produced.

Possibly, reading skills may be underdeveloped, with a lack of fluency, frequent decoding errors and poor comprehension of text. Spelling may be minimal, phonetic or bizarre and only simple words written, when much more complex words are used orally. Especially where there is some element of dyspraxia, the student's handwriting may be erratic, spidery, very small, very large or deeply indented into the page. These are all indicators that a great deal of physical effort is required to write by hand, which puts increased stress on a brain that is struggling to cope with sequencing and orientation difficulties. Great difficulty or inability to organise the content of

written work or set a priority on tasks can manifest itself as work not completed in class in the set time, or homework not handed in. There may also be problems of staying on-task due to memory problems, where the student with dyslexia loses track of the content of a long sentence and keeps asking the teacher or other students for prompts.

Some students will have developed advanced strategies for avoiding stressful work, which may be manifested as:

- lost writing equipment/books
- regular and prolonged visits to the toilet
- acting the class clown
- distracting other students
- provoking dismissal from the room
- truanting
- school phobia.

None of these behaviours are likely to produce a good learning environment and if they become conduct problems, it is unlikely that the student will get the sympathetic support from the class teacher that is needed to address the learning difficulties.

6.1.2 Support versus remediation?

In general, strategies for addressing the learning problems of students in this age range will focus more on *support* than on *remediation*. The latter, particularly if it involves withdrawal from ordinary classes can often be embarrassing and stigmatising for an older student. The most important thing for students with dyslexia and related problems at the secondary education stage is to be enabled to access the curriculum, despite their difficulties. This can be achieved by various strategies, including use of assistive technology and support assistants. However, some students may still need to improve their basic skills, particularly in phonic decoding, word recognition and spelling. In such cases, suitable computer software designed to provide stimulating practice in the appropriate areas, can often be the most acceptable and effective solution.

Throughout this chapter, teachers will find recommendations regarding software and other resources. Teaching strategies and suggested software for students with dyslexia and other literacy difficulties have been reviewed by Crivelli (2013) Keates (2002), Stansfield (2012), Reid (2016, and Shaywitz, Morris and Shaywitz (2008). The Rose report (Rose, 2009) also gives an overview of strategies for supporting students with dyslexia.

6.2 Strategies for specific problem areas

6.2.1 Poor phonological processing ability

The evidence that training in phonological skills facilitates literacy development is extremely strong (Bryant and Bradley, 1985; Goswami and Bryant, 1990; and Rack, 1994). In the Cumbria study, Hatcher, Hulme, and Ellis (1994) found that integrated sound- categorisation and letter-knowledge training produced the largest improvements in reading and spelling of a group of seven-year-olds who were failing in reading. However, at secondary age, the need for basic teaching on phonological skills is much less likely than at the primary stage. Only in the most severe cases are you likely to find that the student still requires work of this nature, and in such cases care must be taken to ensure that the student does not perceive such activities to be babyish and therefore demeaning.

Phonological awareness can be developed by a variety of methods. For example:

- **Rhyming** and **alliteration** — suitable techniques include playing rhyming snap or 'odd-one-out' games with pictures and objects; using plastic letters to discover and create rhyming word families
- **Deletion** of the first sound (e.g. '*near–ear*') or of the last sound (e.g. *'party–part'*), or of whole syllables (e.g. saying '*alligator*' without the '*all*')
- **Elision** of the middle sound (e.g. snail–sail) or syllable ('*alligator*' without the '*ga*').
- **Correspondence** — e.g. tapping out the number of syllables in a word.

Many phonological discrimination activities are also useful for phonological training. For ideas on phonological awareness activities see Goswami and Bryant (1990); Layton and Upton (1992); Layton, Deeney, Tall and Upton (1996); James, Kerr and Tyler (1994); Yopp (1992). ***Sound Linkage*** (Hatcher, Duff and Hulme, 2014) is based on the Cumbria project on phonological awareness (Hatcher, Hulme and Ellis, 1994) and includes materials for testing and training. Snowling and Stackhouse (2006) provide a useful compendium of recommendations on teaching dyslexic students with speech and language difficulties.

Unfortunately, most computer-based activities for practising phonological skills are more suitable for younger children (e.g. ***Tizzy's Toybox*** and ***Talking Animated Alphabet*** , ***Letterland***), so these must be used with caution.

Students with dyslexia who continue to experience persistent phonological difficulties into secondary age are likely to require particularly careful literacy teaching. In such cases, a well-structured multisensory approach incorporating plenty of practice in phonic skills (over-learning) is strongly recommended. Without adequate training in applying phonics, students with such weaknesses are liable to develop an over-reliance on visual (whole word) and contextual strategies in reading (especially if they are bright). This, in turn, will have a deleterious effect on their text comprehension, especially in dealing with more complex curriculum-related material.

6.2.2 Poor phonic decoding skills

For the reasons explained above, the student who displays major difficulties in *auditory-verbal* memory is likely to have problems in acquiring effective phonic skills. The recommendations here would be for a highly-structured *multisensory phonic approach* to literacy learning. This should not only provide ample practice to compensate for memory weakness, but should also make use of the student's strong visual skills in order to reinforce learning and help to maintain confidence.

Examples of well-structured phonics schemes suitable for students with dyslexic difficulties include ***Alpha to Omega***, ***Toe by Toe***, ***The Bangor Dyslexia Teaching System***, ***Sound Linkage***, ***Spelling Made Easy***, ***The Hickey Multisensory Language Course***, ***Star Track Reading and Spelling*** and ***Sound Discovery***.

Additionally, ***Wordshark*** offers 60 different computer games which use sound, graphics and text to teach and reinforce word recognition and spelling. The program includes phonics, onset and rime, homophones, spelling rules, common letter patterns, visual and auditory patterns, prefixes, suffixes, roots, word division, high frequency words, use of words in context, alphabet and dictionary skills and more. In an evaluation of *Wordshark* in 403 schools (Singleton and Simmons, 2001), teachers reported significant benefits to reading, spelling and confidence in using the program.

Use of a talking word processor is beneficial because it gives the student auditory feedback and encourages them to pay attention to the phonic components of words when writing. For example: ***Clicker 7, DocsPlus, SymWriter 2*** **and** ***Texthelp Read and Write.***

In addition, ***AcceleRead, AcceleWrite*** is a structured scheme for basic literacy learning that can be used with any good talking word processor.

Further information on techniques for teaching students with dyslexia can be found in Augur (1996); Cooke (2002); Crombie (2018); Hornsby (1995); Pollock, Waller and Politt (2004); Reid (2016); Thomson and Watkins (2007).

6.2.3 Poor auditory-verbal working memory

It is commonly found that memory limitations are more difficult to improve by direct training, especially with younger children, than weaknesses in either phonological awareness or auditory discrimination. On the other hand, older students can respond well to *metacognitive* approaches to memory improvement, i.e. techniques designed to promote understanding of their own memory limitations and to develop appropriate compensatory strategies (Buzan, 2003; Reid, 2016). The emphasis should be on variety and on stretching the student steadily with each training session. The tasks should not be too easy for the student (which would be boring) nor much too difficult (which would be discouraging), but give just the right amount of *challenge* to motivate the student to maximum effort. Use of prizes, star charts for improvement, etc., should all be used if these will help motivation. Activities can usually be carried out at home as well as in school. Competition can be motivating for some students, but it can also be discouraging for the student with severe difficulties, because they will easily perceive and be embarrassed by the discrepancy between their performance and that of other students.

Auditory-verbal memory training activities include:

- **I went to the supermarket** — teacher says to the student sentences of increasing length and complexity and the student has to repeat these back verbatim (e.g. *"I went to the supermarket and bought three tins of beans, one loaf of bread, a carton of milk, a packet of sweets, two bars of chocolate "* etc.)
- **Find the changed (or missing) word** — teacher says a sequence of words to the student (e.g. *dog, cat, fish, monkey, spider*) and then repeats it changing one (or missing one out altogether), either slightly or more obviously (e.g. *dog, cat, fox, monkey, spider*) and the student has to identify the change.
- **What's their job?** — teacher says to the student a list of name-occupation associations (e.g. *"Mr Pearce the painter, Mrs Jolly the teacher, Mr Fish the hairdresser, Miss Brown the electrician"*) and then asks for recall of one (e.g. *"Who was the teacher?"* or *"What is Miss Brown's job?"*).
- **Word repetition** — teacher says sequences of unrelated words to the student (e.g. *hat, mouse, box, cup, ladder, tree, biscuit, car, fork, carpet*) and the student has to repeat them in the correct order. The length of the list can be gradually extended. If the words are semantically related it is more difficult, and if they are phonologically related (e.g. *fish, film, fog, fun, phone, finger*) it is more difficult still.
- **Phoneme repetition** — as word repetition, but with phonemes (*"oo, v, s, er, d"*). Note that phonologically similar lists will be much more difficult (e.g. *"p, b, k, d, t"*)
- **Letter name repetition** — as word repetition, but with letter names.
- **Digit repetition** — as word repetition, but with digits. About one per second is the maximum difficulty for short sequences. Slightly faster or slower rates are both, generally, easier to remember, but individuals with dyslexia tend to find a slower sequence harder (because their rehearsal processes in working memory are deficient).

The computer program ***Mastering Memory*** (CALSC) is most appropriate for developing memory skills. This program, however, requires close supervision by the teacher, applying the memory training techniques explained in the manual. Use of the system ***AcceleRead, AcceleWrite*** has also been found to improve working memory ability while students are learning phonic rules (Miles, 2000).

Students who have poor memory skills may find learning and revision for examinations very difficult. Their revision tends to be badly organised and because they are conscious of the fact that their memory generally lets them down they may become discouraged and feel that there is no point in revising for examinations. The solution is to help the student to revise more efficiently. ***Timely Reminders*** (CALSC) is computer program designed to achieve this. This is a content-free program into which the student (or the teacher) enters material to be learned, and the program will test the student on that material in a structured and progressive fashion over a period of time so as to maximise recall. Many books about developing study skills have advice on how to improve memory skills (see Section 6.2.7).

6.2.4 Poor visual memory

It is widely acknowledged that the *predominant* problems found in students with dyslexia are phonological rather than visual (Pumfrey and Reason, 1991; Snowling and Thomson, 1991; Snowling, 2000). Indeed, individuals with dyslexia often have excellent visual skills (West, 2020). Nevertheless, teachers and educational psychologists are not infrequently confronted by cases of students who appear to have inordinate difficulties in remembering various types of information presented visually.

The most effective solution is to use a rigorous multisensory approach to word recognition and spelling, building on any auditory and kinaesthetic strengths. By ensuring that phonic skills are thoroughly learned, well practised and applied fluently, there is less vulnerability to visual inadequacies. A list of suitable phonics programmes and associated activities is given in Section 6.2.2.

The following are suggested training activities for students with poor visual memory:

- **What's wrong here** — use pictures of everyday things with parts of the pictures wrong (e.g. house with the door halfway up the wall; person with feet pointing backwards instead of forwards) and ask the student to identify what is wrong. To do this the student has to recall visual images of the relevant objects.
- **Kim's game** — an array of familiar objects on a tray (or picture of an array of objects). The student scans this for two minutes (or whatever period of time is appropriate) and then has to remember as many as possible.
- **Symbols** — show the student a sequence of symbols, letters or shapes of increasing length, and then jumble them up and the student has to rearrange them in the correct order. Remember that this can become more of a verbal task than a visual task — if you want to practice *visual* skills then it is best to have stimuli which are not easily verbally coded.
- **Who lives here?** — make a set of pictures of people (these may be cut from magazines) and a set of houses of different colours, or different appearance in some way. The people are matched with the houses, and then jumbled up. The student has to rearrange them in the correct relationship. If the people are given names, then the task becomes more verbal.
- **Pelmanism** — remembering matching pairs of cards from a set, when cards are individually turned over and then turned back. The student has to remember where the other one of the pair is, and if both are located these are removed from the set, and so on.
- **Card games** — e.g. Snap, Happy Families.

Mastering Memory (CALSC) is a very suitable program for developing visual memory skills. This program, however, requires close supervision by the teacher, applying the memory training techniques explained in the manual.

Students who have poor visual memory skills may also find learning and revision for examinations very difficult. See Section 6.2.3 for possible solutions.

6.2.5 Writing skills

6.2.5.1 Word processing

Writing is one of the most demanding intellectual activities faced by all students. For students with dyslexia or other learning problems, writing is typically the area that presents the greatest difficulties and is the hardest to deal with. The reason for this is that when writing the student is forced to do many things at once — deciding what to say, what words to use, how to spell those words, making sure that letters are legible, remembering to keep writing aligned on the page with appropriate gaps between words, putting punctuation in the right places, etc., etc. — and still keep track of what message s/he is trying to convey. Often, some aspects — such as spelling and punctuation — have to be abandoned altogether in order to bring the cognitive load to within manageable proportions.

A talking word processor is probably the single most effective support for writing and this can be provided in a specially designed program such as ***Clicker 7, DocsPlus, SymWriter 2*** **and** ***Texthelp Read & Write.***

Many students with dyslexia have strong visualisation skills and are helped by the speech plus symbol word processing in ***SymWriter***, where symbols and images can be seen below the text. Younger, less confident readers can have a symbol for every correctly spelt word; as their skills and confidence increase, the use of symbol support can be decreased, until it is only used to check the odd word. At any time, the symbols can be removed from the final printing, so it looks like any other piece of word processed work.

Some students with dyspraxia, who have ill-formed handwriting, lose many of their spelling errors once they see the words clearly displayed in word processed text. Others who have neat, clear handwriting may use excessive pressure, shown by marked indentations through several pages. Students with dyspraxia can be liberated by using a word processor to create work more suited to their apparent ability.

AcceleRead, AcceleWrite is a structured teaching programme which uses sentences related to a spelling pattern, in conjunction with a talking word processor. The student is required to type in the sentence from memory and use the speech in the word processor to help identify errors. This activity is undertaken, preferably daily, for a period of at least 20 sessions. This programme has proved helpful in developing spelling, typing and reading skills, but especially in improving short-term memory and the ability to stay on task, including work away from the computer.

6.2.5.2 Spelling

Computer spell checkers are a mixed blessing for students with spelling difficulties, as the list of suggestions can be daunting, when the original word was already a problem, and completely misleading, if the wrong initial letter was chosen. The algorithms for computer spellcheckers are mainly based on likely typing, rather than conventional spelling errors, but they do indicate to the writer that there is a problem with a word.

When someone finds it hard to remember how to spell words, it is usually easier to recognise a specific word than recall its spelling. Specialised word processing software (such as Clicker

7, Co:Writer 6, Texthelp Read & Write) provide access to word banks and allow the words to be spoken before selection. This is a more positive approach to spelling than spell checking for a weak speller, as correctly spelt words will be seen more regularly, which helps the brain to remember them.

The best simple support for a poor speller is a word processor that provides speech feedback and an error indicator (highlighting or underlining) to indicate inappropriate spellings. However, especially as they get older, students with dyslexia may feel the need to try and improve their spelling skills. There are many titles of spelling software, which address spelling in different ways. In a school, it is a good idea to have several programs, partly to provide a variety of approaches to cater for different learners, but also to enable the student to tackle the tedious activity of learning spelling rules, in as many ways as possible.

Most spelling programs can be customised to cater for the word/phonic patterns that are being currently taught; all have some files that come with the programs and many have word lists from recognised teaching schemes like ***Alpha to Omega*** and ***THRASS***. Regular, daily access to a customised spelling program (e.g. ***Wordshark, Starspell***) does build confidence and spelling skills. In an evaluation of ***Wordshark*** by Singleton and Simmons (2001) in 403 schools, teachers reported significant benefits to reading, spelling and confidence in using the program.

6.2.5.3 Predictive typing

Most poor spellers can recognise more words than they can recall, so predictive typing can be much more helpful. Choosing the first letter of the proposed word generates a list of possible words in the prediction window; if one of those words is the correct one, then that word can be selected; if not, typing in a second letter produces a new list of possibilities and so on; the more frequently a word is used, the more likely it is to come up in the first window. Where the prediction program has speech, the word can be heard before selection, there is an even greater chance of prediction succeeding. Recommended programs include ***Texthelp Read&Write, Clicker7*** and ***Co:Writer6***.

6.2.5.4 Touch typing

If students are going to do most of their writing using a word processor then it is usually a good idea for them to learn to touch type. Although many students become competent typists with regular use of a computer, unless they can touch type, a considerable number of mistakes will be inevitable when they attempt to type with any great speed. If the student has spatial awareness or dyspraxic difficulties, it is usually essential for them to use a keyboard training program to avoid frustration later on.

Learning to touch type is an activity that should be undertaken for short, daily sessions, so is ideal for doing at home or during lunchtime or in after-school sessions. It is purely a function of practice so there is no point undertaking it unless the student is prepared to do their daily practice until the required level of proficiency is reached, which can be surprisingly quick with many students. Recommended computer programs for developing touch typing skills include ***Typequick; Kaz; Typing Instructor Deluxe.***

6.2.6 Reading comprehension difficulties

Many students have difficulties understanding what they read. Although sometimes this may be due to an underlying cognitive problem such as dyslexia or a general limitation in intelligence, more often it will be due to lack of practice in reading more complex texts. Reading is a skill (actually a composite of several skills) and so unless students engage in reading, they won't get any better at it. Many students do little, if any, reading outside school, and often the reading they are required to do when in school is of insufficient length to challenge and develop their comprehension skills. So, the first recommendation for any student who is suspected of having poor reading comprehension is to *'read more'*. It doesn't particularly matter whether the texts are fiction or non-fiction, as long as they meet the student's interest and provide sufficient challenge. But beware texts that are *far too* difficult — these are likely to cause frustration and be counterproductive. However, the mere act of reading — in the sense of passing one's eye over the print or vocalizing the words — does not guarantee good understanding. Students have to learn the trick of reading the words whilst simultaneously registering (and remembering) the meaning. This is partly achieved by ensuring that the processes of word recognition and phonic decoding are sufficiently well-practised so have become automatic (so that the student does not have to think about them), and partly by an active focus on the meaning of the text. When word recognition and phonic decoding are *not* automatic, these activities take up a lot of conscious cognitive processing capacity, leaving little capacity for processing meaning.

There are various ways in which the student can learn to focus his or her mind on the text being read, but basically these all involve making reading an *active* rather than a passive process. One way is to take notes while reading — not simply copying down the text that is read, but paraphrasing and summarising it. Another active method is to frame questions about the text before reading so that the task, in effect, becomes one of searching the text for answers to these questions. This, in essence, is the principle underlying the well-known 'SQ3R' (survey – question – read – recall – review) technique. These approaches, used alone, or in combination, are very suitable for what might be called 'reading for study', in which the important thing is to grasp the essential concepts in the text and recall the key facts. But students benefit from reading for pleasure as well, and these techniques may not be so well suited to this type of reading.

In story reading the anticipation of 'what might happen next' is an important factor in maintaining good understanding. This may be broken down into four key strategies:

- **Summarizing** — i.e. identifying the main events in the story so far
- **Questioning** — i.e. generating questions about what might happen next
- **Predicting** — i.e. describing what is most likely to happen next
- **Clarifying** — i.e. identifying difficult or unusual words and ideas in the text

For information on teaching reading skills in secondary schools, see Guy (2015).

6.2.7 Study skills

The term 'study skills' covers an enormous compendium of skills that students need if they are to be effective, independent learners. Such skills include being able to:

- locate information as and when required
- read and assimilate such information
- combine information with existing knowledge
- apply information to answering questions and resolving issues
- analyse and think about questions and issues
- write coherent reports
- learn and prepare for examinations
- recall facts and ideas in examinations and demonstrate understanding by written answers.

This is not an exclusive list, but it covers some of the main tasks that confront the learner. *LASS* provides clues to teachers about which of these skills certain students may find difficult. In the case of students who have dyslexia or other types of literacy difficulties, the chief stumbling blocks are likely to be reading and writing, although many students with dyslexia are also very disorganised, so that they do not use their study time as effectively as they could. If a student has memory weaknesses (which is also the case in dyslexia), it is probably examinations that will be the principal problem, both in learning/preparation and recall/execution. If a student has low reasoning ability, then analyzing questions and thinking through issues are likely to be problematic.

There is insufficient space here to provide a comprehensive discussion of techniques for addressing all these various difficulties, although in this chapter, as a whole, there are many suggested solutions to some of them. Teachers are recommended to consult the following books for practical suggestions on how they can help their students to develop better study skills:

Study skills and dyslexia in the secondary school: a practical approach by Marion Griffiths (2002). This is a practical guide for classroom teachers that includes many photocopiable resources.

The Study Skills Handbook by Stella Cottrell (5th edition; 2019). This is a very comprehensive guide to studying, designed for students in, or about to enter, higher education.

6.2.8 Maths difficulties

Students with dyslexia or other specific learning difficulties often experience problems with maths, not necessarily because they cannot understand the concepts or grasp the principles, but because their cognitive or literacy weaknesses (e.g. in memory, visual perception, attention, reading or writing) interfere with the *application* of their understanding. The following examples illustrate these difficulties.

1. The student can understand and do the maths, but makes errors from misreading the problem, misreading mathematical symbols (e.g. reading ´ as +), reversing numbers or mis-sequencing digits. Such errors then make nonsense of the calculations. Such students will need to be trained to check their work carefully.

2. Students who cannot read the maths problems, or do not read sufficiently accurately, will be unable to work to their mathematical ability level. Audio versions of the maths book can often solve this problem, especially when headphones are used for privacy. A talking word processor can help with 'wordy' problem worksheets, but not when formulae are involved (see above).
3. The student understands the maths at a conceptual level, but has memory difficulties that interfere with the application of that understanding, e.g. failure to remember multiplication tables, or to recall the correct sequence of procedures required when carrying out a particular calculation. Often, the problem lies in the student having *insufficient practice* in doing calculations, so that the rules and operations have not become automatised (e.g. in carrying digits in arithmetic). Students with memory weaknesses will require additional practice, and one of the most efficient ways of gaining that practice is by use of appropriate computer programs, such as ***NumberShark***, ***Maths Circus***, and ***123Maths***.

For further information on supporting students with maths difficulties see: *The dyscalculia toolkit: Supporting learning difficulties in maths* by Ronit Bird (2021); and *Maths learning difficulties, dyslexia and dyscalculia: Second Edition* by Steve Chinn (2018).

7 Case studies

7.1 Introduction

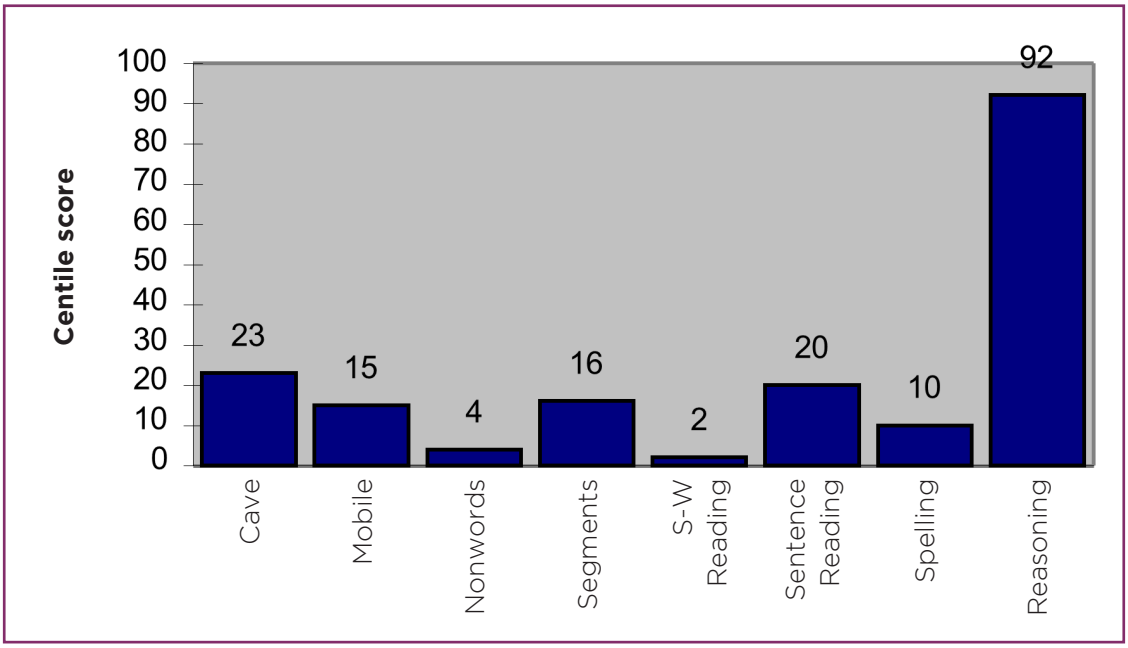
The following case studies provide an illustrative range of profiles obtained from *LASS 11-15*. Many other types of profile are possible, of course, but by studying these particular case studies, teachers should gain insights into interpreting *LASS* results and deciding on appropriate strategies for learning and teaching. For further details regarding any specific resources suggested, please see Chapter 6.

7.2 Classic dyslexia

Background

Alwyn, a boy aged 13 years 10 months, was assessed on LASS because his teachers felt that he was not performing up to standard. He was regarded as average in general ability, but his written work was very poor. Alwyn also had a tendency to be disruptive in the classroom and was frequently on report for misbehaviour, failure to complete work or to hand in homework. He was clumsy, forgetful and slightly hyperactive.

Figure 5. Alwyn – a case of classic dyslexia.



Interpretation of LASS 11-15 results

The *LASS* results show that Alwyn is clearly a very bright student (***Reasoning***: centile 92), with poor reading (***Sentence Reading***: centile 20; ***Single Word Reading***: centile 2) and very poor ***Spelling*** (centile 10). There is a highly significant discrepancy between his literacy skills and his intellectual ability. It is likely that teachers have underestimated his intelligence because of his poor literacy skills and failure to display his talents in writing.

Alwyn has virtually no phonic decoding skills (***Nonwords***: centile 4), and so he is obviously relying on visual strategies to recognise words. Because he is bright, he is able to apply intelligent guessing and use of context when reading for meaning, which is why his ***Sentence Reading*** module result (centile 20) is rather better than might be expected from his ***Single Word Reading*** score (centile 2).

Alwyn also displays a clear cognitive weakness in auditory memory (***Mobile***: centile 15) and his visual memory is also low in comparison with his intellectual ability (***Cave***: centile 23). Phonological abilities are also relatively low (***Segments***: centile 16). These findings of cognitive impairment are consistent with definitions of dyslexia. In fact, his difficulties are fairly severe.

Educational recommendations
Alwyn's dyslexia was subsequently confirmed by full psychological assessment. It then transpired that his father also had literacy difficulties and only a few months later (triggered by these revelations) his younger brother (age $9\frac{1}{2}$) was also identified as having dyslexia. His parents reported that Alwyn had a very unhappy time at primary school, but it is not entirely clear why his difficulties were not picked up earlier in his education. In retrospect, it appears that his disruptive behaviour may have been an effect of his undiagnosed learning difficulties. The school arranged for him to receive specialist tuition for his dyslexia twice a week using the scheme ***Alpha to Omega***, backed up by daily computer practice using ***Wordshark***.

As Alwyn is bright but has poor reading skills, a short but intensive programme of activities using ***Clicker7*** would develop his confidence and skills. He could progress to ***DocsPlus*** and ***Co:Writer6***, which would use his visual strengths to develop reading and spelling skills.

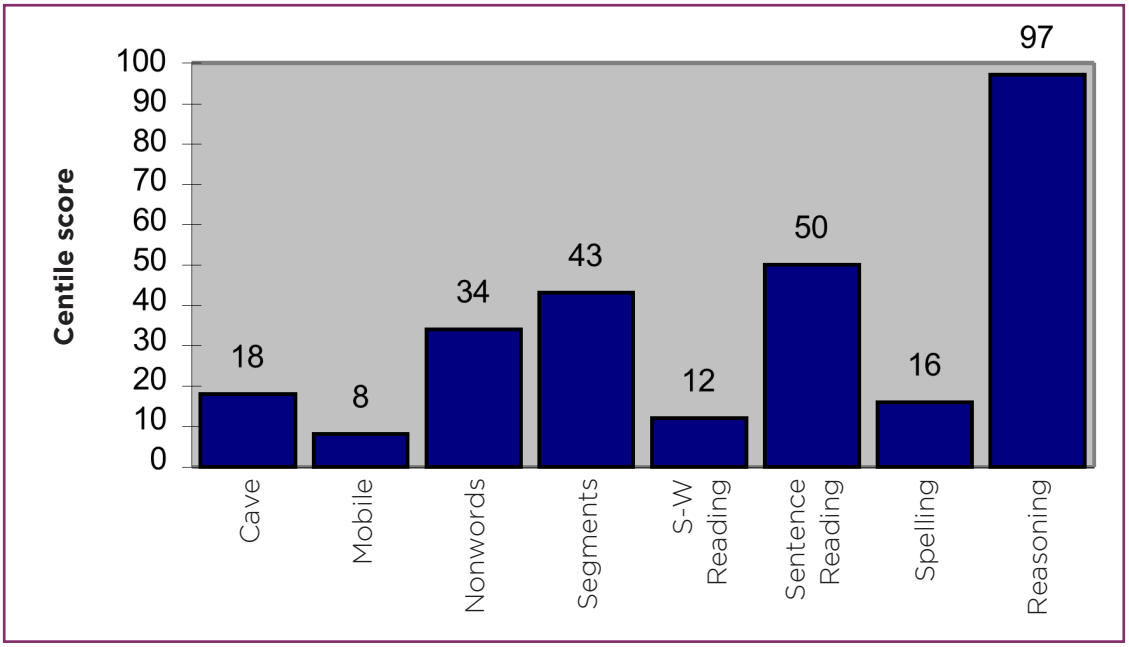
Alternatively, ***Texthelp Read & Write*** would provide him with speech feedback to assist the development of his writing.

7.3 Partially compensated dyslexia

Background

Colm is a boy of 12 years 5 months, who was referred for assessment with *LASS 11-15* because of persistent spelling difficulties.

Figure 6. Colm – a case of partially compensated dyslexia.



Interpretation of LASS 11-15 results

Colm is obviously very bright (***Reasoning***: centile 97), with average reading skills in context (***Sentence Reading***: centile 50) but poor ***Single Word Reading*** (centile 12) and ***Spelling*** (centile 16). His phonological skills are satisfactory (***Segments***: centile 43) and he can cope fairly well with ***Nonwords*** (centile 34), suggesting that he has absorbed some phonics knowledge. Nevertheless, the clear evidence of memory weaknesses (***Cave***: centile 18; ***Mobile***: centile 8) strongly suggests quite serious dyslexia. His high intelligence enables him to compensate for his difficulties to a certain extent (e.g. in prose reading) but he will definitely require further support otherwise he is likely to underperform in many areas of the curriculum.

Debriefing

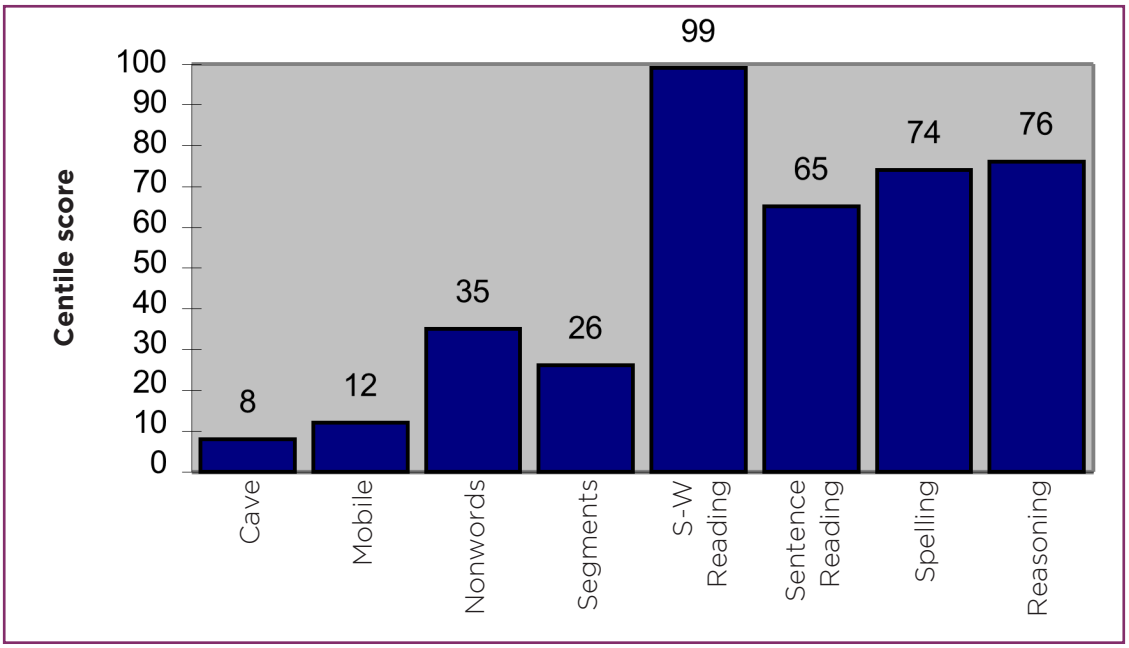
Subsequent enquiries with Colm's parents revealed that Colm had received some specialist tuition, focusing on phonic skills, when he was at primary school. However, since this was from a private tutor, it had not appeared on his school records. It was decided by the school's SENCo that because of Colm's memory difficulties he needed tuition in study skills, especially organisation of work and essays. There were worries that unless he was prepared well in advance for GCSE examinations, his attainment would fall far short of his potential. He was given help to develop mind-mapping techniques and a range of IT support strategies was implemented, including use of a talking word processor, word prediction and good spell-checking facilities ***(Texthelp Read&Write, CoWriter6)***.

7.4 Well-compensated dyslexia

Background

Duncan is a boy aged 15 years 3 months. He was regarded by his teachers as a bright and very well-motivated student, but of late there had been serious concern about his failure to live up to expectations in examinations. There was a suspicion that perhaps he had lost interest in his school work and was devoting rather too much time to sporting activities. He was assessed on LASS 11-15, and the results are shown in Figure 7.

Figure 7. Duncan – a case of well-compensated dyslexia.



Interpretation of LASS 11-15 results

The results of *LASS* confirmed the teachers' view that Duncan is bright, and his literacy skills are commensurate with expectations. However, a surprising discovery was that his memory skills were very poor (***Cave:*** centile 8, and ***Mobile:*** centile 12), which put his difficulties with examinations in a new light. Clearly, Duncan was having problems in recalling material in examinations, and was getting low marks as a result. A further discovery was that his phonic skills were below expected levels (***Nonwords:*** centile 35), and he also showed rather poor phonological processing ability (***Segments:*** centile 26). The SENDCo thought that Duncan's profile looked like dyslexia, and his parents had him assessed by an educational psychologist. A diagnosis of dyslexia was confirmed, with the comment that Duncan was 'extremely well-compensated'. It transpired that Duncan's grandmother had been a primary school teacher and she had taught him to read as well as supporting him in his literacy development throughout the primary stage. Consequently, Duncan's dyslexic difficulties had been masked, firstly by having received exceptionally good one-to-one tuition in literacy, and secondly, by his very good work habits and personal application.

Educational recommendations

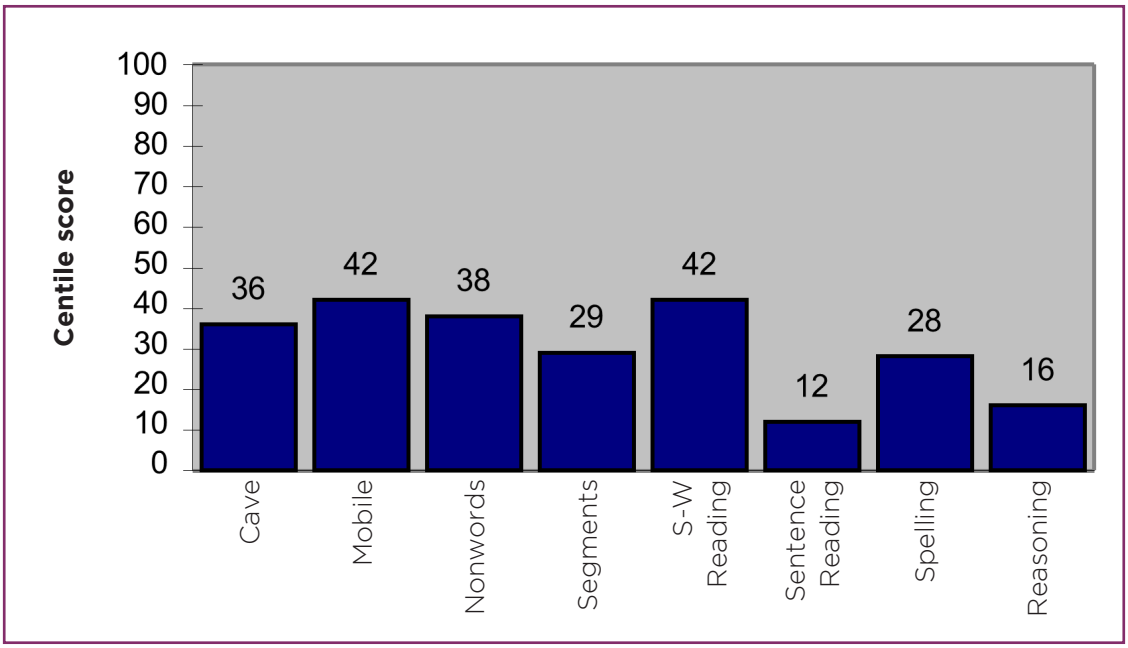
Because of his dyslexia, Duncan was granted additional time in examinations, which helped him somewhat. The most significant strategy, however, was to teach him to convert his revision notes and other material to be learned for examinations into mind maps, using the program ***Inspiration***.

This enabled him to develop a clear and logical visual structure for each topic, which he could review frequently and test himself on. As a result, his performance in examinations improved significantly.

7.5 Low general ability

Background
Eva is a girl aged 12 years 2 months. Her teachers have regarded her as a student of somewhat below average general ability, and in particular it had been noted that she had immature language skills. Her parents have raised the question of whether Eva has dyslexia, and so *LASS* was administered by her class teacher. The results are shown in Figure 8.

Figure 8. Eva – a case of low general ability.



Interpretation of LASS 11-15 results
With the score on ***Reasoning*** at the 16th centile it is clear that Eva is rather below average, although it should be remembered that this only assesses non-verbal intelligence. To check Eva's verbal intelligence, a test such as the British Picture Vocabulary Scale (BPVS) could be given.

It is notable that Eva appears to be holding her own in some areas, such as reading accuracy (***Single Word Reading***: centile 42) and ***Spelling*** (centile 28), since these are higher than might have been predicted from her intelligence. Her phonic skills (***Nonwords***) are also in the average range (centile 38), suggesting that decoding has been well taught. Her main problem is with ***Sentence Reading*** (centile 12), which suggests problems of comprehending text. It is also likely that her poor vocabulary knowledge is affecting her text reading ability. However, Eva's diagnostic test results are all in the low-average range (rather than being well below average), so it is unlikely that she has dyslexia (***Cave***: centile 36; ***Mobile***: centile 42; ***Segments***: centile 29).

Educational recommendations
The SENDCo felt that the level of Eva's difficulties, when considered in the context of her intellectual ability, did not justify a significant amount of additional support. However, arrangements were made for her to participate in regular shared reading work with students from the local college who visited the school to support literacy work every week as part of their community education programme, with the objective of developing her text comprehension ability.

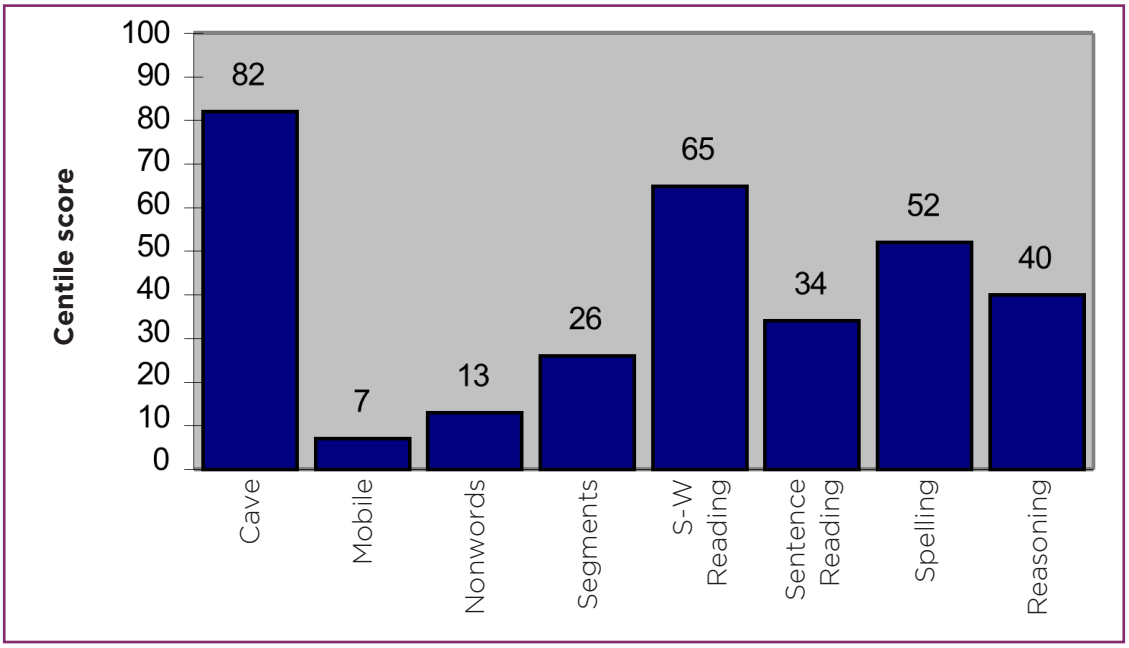
Although Eva is of low intelligence, she has learned to read words, but she has problems with sentences and a limited vocabulary. If she used ***Clicker7*** as her writing tool, she could have grids of words supplemented by pictures, if needed, for new curriculum words. She could have her own talking wordbook and banks of phrases to stimulate better sentence construction.

7.6 Poor auditory-verbal memory

Background
Ffyon is a girl aged 11 years 7 months who was tested with *LASS* on entry to secondary school, as part of the school's routine assessment programme for the new intake, the results being shown in Figure 9. Her primary school record showed no evidence of difficulties.

Interpretation of LASS 11-15 results
The scores show that Ffyon is of average ability and is in the average range for reading and spelling. However, what is really striking about her profile is her very good visual memory (***Cave***; centile 82) and very poor auditory-verbal memory (***Mobile***; centile 7). Not surprisingly, she has had difficulty in acquiring phonic skills, which shows in her poor ***Nonwords*** score of centile 13. In fact, her profile is consistent with a diagnosis of dyslexia. Her visual memory strengths have obviously been compensating for lack of phonic skills, and she has tended to use whole-word visual strategies when reading. Until recently, that approach has obviously been adequate to her needs, but a decline in reading ability and school performance would be predicted unless specific help is provided to enable Ffyon to develop better phonic skills.

Figure 9. Ffyon – a case of poor auditory-verbal memory.



Educational recommendations

Based on the *LASS* results, the school instigated a programme of phonics training twice each week in a small group of students with SEN. During her lunch break each day, Ffyon attended a computer club at which she could practice her phonic skills using ***AcceleRead, AcceleWrite*** and ***Wordshark***. One of the learning support teachers provides weekly activities using ***Mastering Memory***, to help Ffyon improve her weak auditory memory.

7.7 Poor fluency in reading and spelling

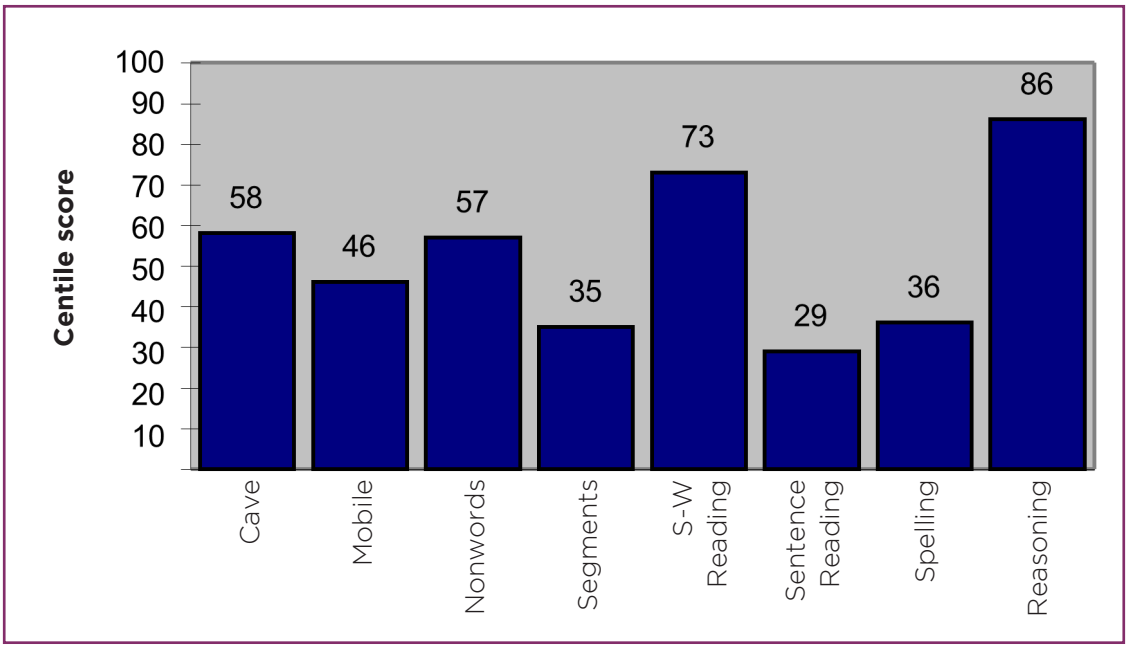
Background

Gavin was assessed on *LASS 11-15* at age 13 years 5 months because of underperformance in school. His teachers felt that he was a bright boy who had a good grasp of concepts but was weak at using text-based resource materials and in his written work did not come up to expected standards. A query had been made regarding whether Gavin might be dyslexic. His results are shown in Figure 10.

Interpretation of LASS 11-15 results

Gavin's results reveal no evidence of dyslexia, but ***Segments***, ***Sentence Reading*** and ***Spelling*** are below expected levels for such a bright boy. Further investigation suggested that the most probable cause was lack of reading and writing experience, resulting in poor fluency and lack of automaticity of literacy skills. His parents reported that Gavin 'Hates reading and writing and never reads unless forced to'. He was obsessed with sports and computer games.

Figure 10. Gavin – a case of poor fluency in reading and spelling.



Educational recommendations

Clearly, Gavin requires more practice in both reading and writing. His parents were keen to participate in this, so they were encouraged to read with him every evening (something they had not done since he was seven), and also to support him in regular writing activities at home

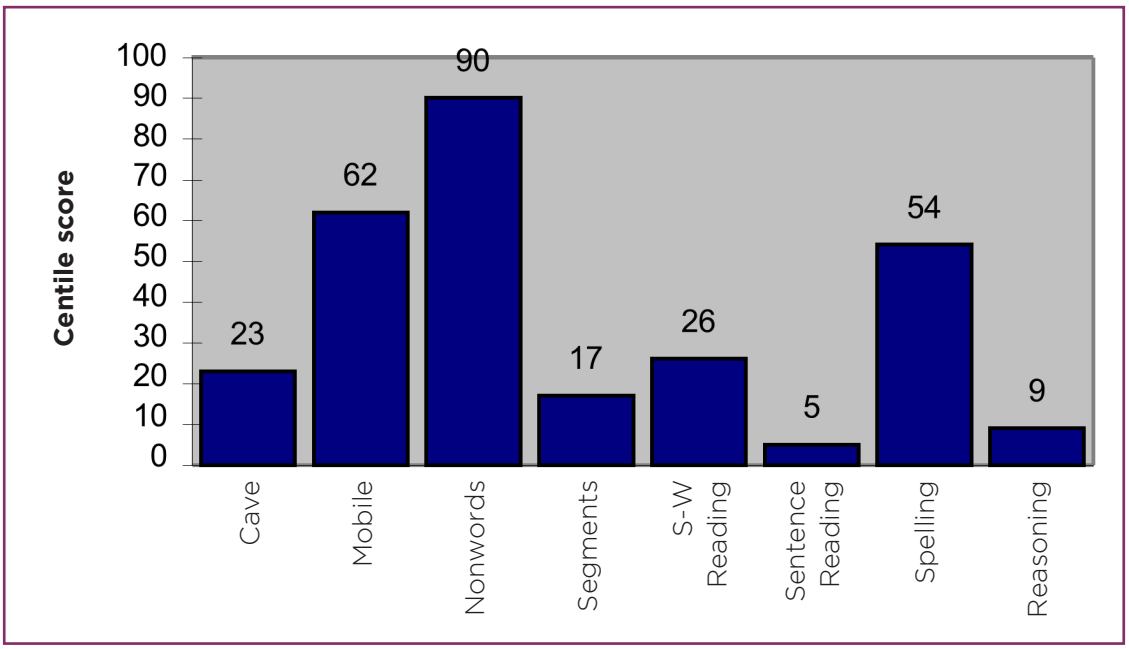
using a computer. Gavin likes computers, so using ***DocsPlus*** could motivate him to write more; the words, phrases and sentence starters would reduce the 'blank page phobia', so that he gets started and experiences some success. A talking word processor or screen reader (such as ***Texthelp Read&Write or Clicker7***) would enable him to hear his work for reviewing, editing and organising his ideas.

7.8 Hyperlexia

Background
Hugo is a 14-year-old boy with high functioning autistic spectrum disorder (Asperger's syndrome), who attends a Special School. The Local Education Authority are in discussion with his teachers and his parents about whether he should be moved to a mainstream school. To assist in these deliberations, Hugo was assessed on *LASS*.

The results are shown in Figure 11.

Figure 11. Hugo – a case of hyperlexia.



Interpretation of LASS 11-15 results
Hugo is clearly of low ability (***Reasoning***; centile 9) but his rote memory (***Mobile***) is good (centile 62) and his ability to read nonwords is quite astounding (***Nonwords***; centile 90).

However, his profile conforms to that of a hyperlexic reader, i.e. Hugo can decode text, read aloud superficially well and can recognise words within his rather limited vocabulary, but he understands very little of what he is reading. This is shown by the very poor ***Sentence Reading*** score (centile 5). Hugo's good rote memory also helps him to spell fairly well, but he cannot use those words in a meaningful context when writing.

Educational recommendations

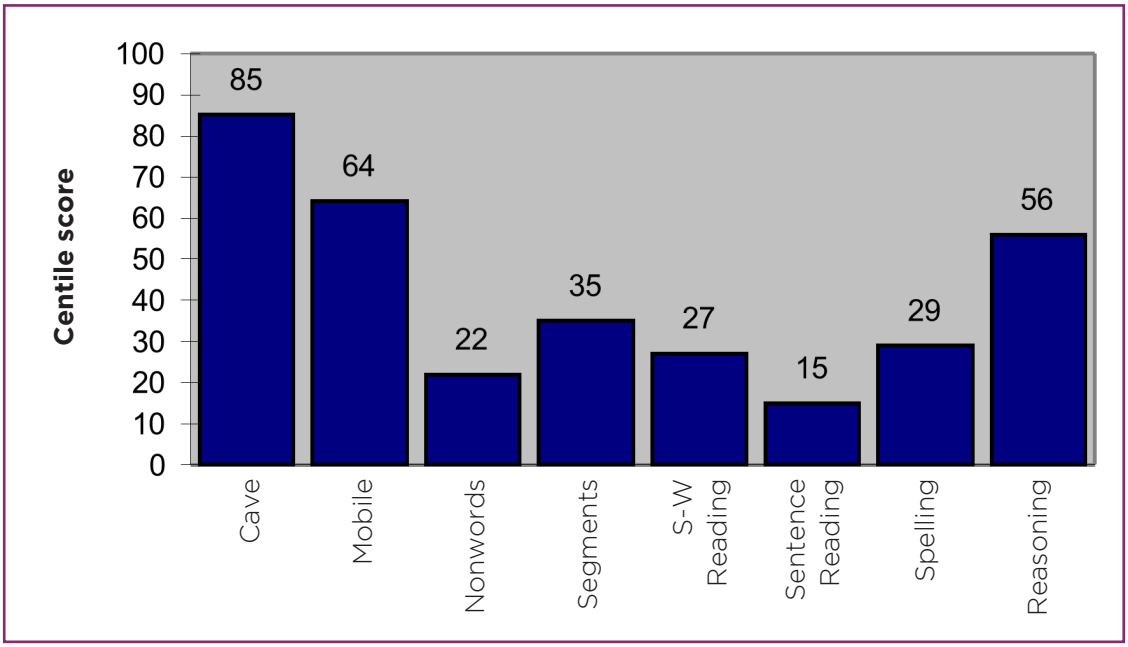
It was decided to try Hugo in a mainstream secondary school, providing him with a support assistant in the classroom to help him deal with the work, and a number of computer support techniques were also put in place. The symbols and speech in ***CoWriter6*** could help to keep Hugo's mind on track, especially if linked with prompt grids.

7.9 English as an additional language

Background

Jamira, a girl aged 12 years 2 months, and Kopur, a boy aged 13 years 1 month, are both students for whom English is an additional language. Despite several years in school, neither had acquired a particularly good standard of spoken English and their literacy skills were poor. The teachers are divided regarding the likely cause of their problems. Some believe that their difficulties were those of the typical student for whom English is an additional language, and that a greater amount of language stimulation was needed. Other teachers wondered whether Jamira and Kopur were perhaps not as bright as they had first imagined, and that consequently educational expectations were being set too high. Finally, some thought that there might be more serious underlying problems that were impeding these students' progress. To help understand these cases, *LASS* was administered to both students and the results are shown in Figure 12 and Figure 13.

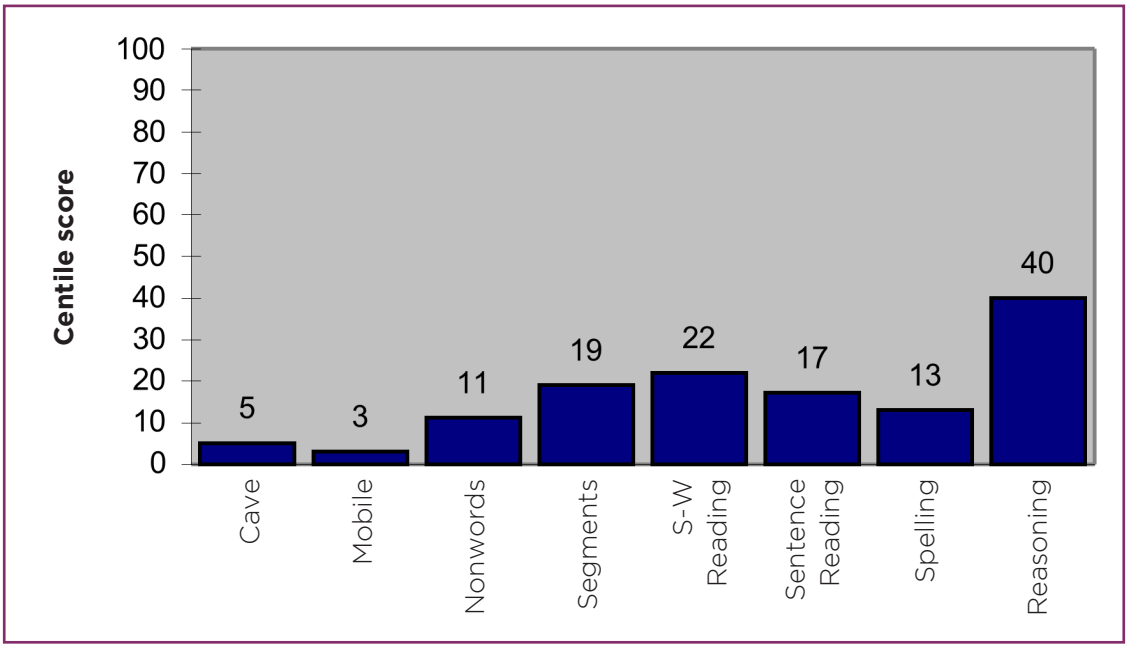
Figure 12. Jamira – a girl with limited English.



Interpretation of LASS 11-15 results

Of the two, Jamira is clearly the brighter (at least as far as non-verbal reasoning is concerned) and in neither case could low ability be taken to be the cause of their problems. But they differ markedly in their diagnostic test results. Jamira has good memory skills while Kopur has poor memory skills — in fact, his profile is that of dyslexia. Jamira, on the other hand, appears to be making some progress in reading and spelling, suggesting that the teaching methods that had been adopted were working, albeit rather more slowly than her teachers would have expected.

Figure 13. Kopur – a boy with limited English.



Educational recommendations

Both of these students require continuing support in English, but Kopur needs a more highly structured multisensory programme directed at his dyslexic difficulties (see Section 6.2.2), together with daily practice using a program such as ***Wordshark***. Jamira, on the other hand, should be able to cope with ordinary classroom literacy activities supplemented by some additional practice to help her increase her fluency.

7.10 Test anxiety

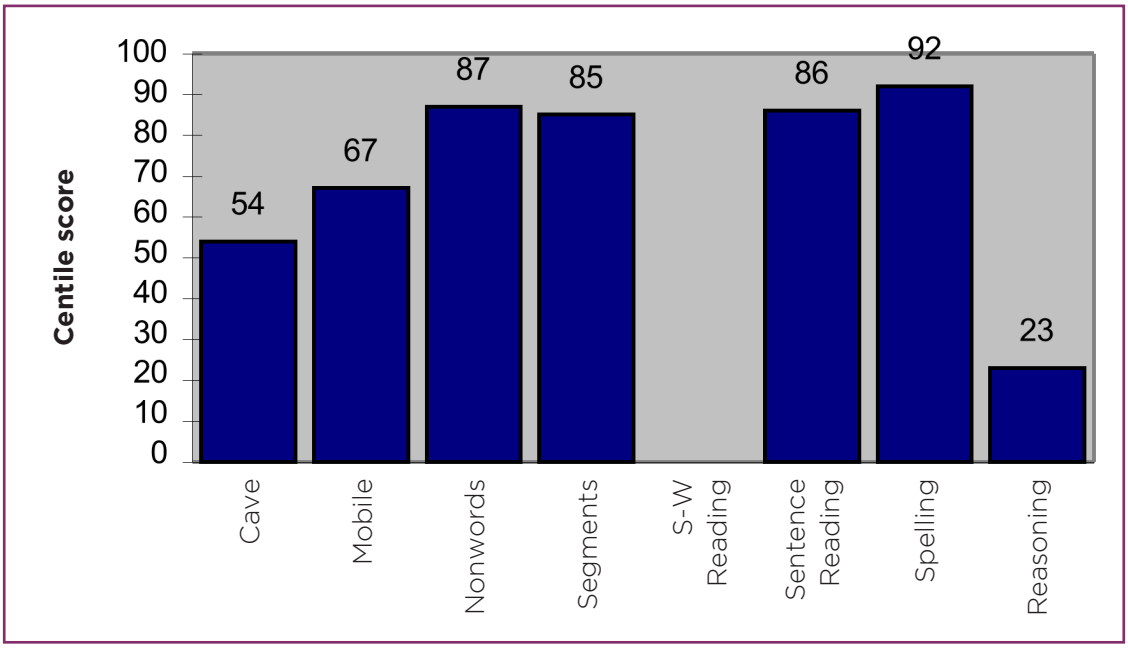
Background

Laura, aged 11 years 7 months, was assessed on *LASS 11-15* as part of the school's routine screening programme. Her results are shown in Figure 14. Her educational performance had never given cause for concern in the past: indeed, her primary school records suggested that she was a bright and conscientious student.

Interpretation of LASS 11-15 results

The school's policy was to screen all students on entry using the ***Sentence Reading, Spelling*** and ***Reasoning*** modules only, and then to administer further tests if these revealed any problems. In Laura's case, although her literacy skills were clearly very good, the ***Reasoning*** module produced an unexpected low score (centile 23). It was therefore decided as a precaution to administer the diagnostic tests in the *LASS* suite. However, none of these showed any difficulties. The poor ***Reasoning*** test result, however, remained a puzzle.

Figure 14. Laura – a case of test anxiety and panic.



The teacher supervising the screening decided to interview Laura to try to get to the bottom of the problem. It turned out that ***Reasoning*** had been the first of the tests that Laura had attempted, and she had panicked. She explained that she had desperately wanted to do well but was nervous. She had never done a test like this before, and thought that unless she answered very quickly, she would be marked down. As a result, she had guessed much of the time, rather than working out the answers, and so had done badly. After reassuring Laura, the teacher asked her to attempt the *LASS* ***Reasoning*** test once again, and this time she obtained a centile score of 78. To make absolutely sure, the teacher also administered a test of verbal intelligence (the ***British Picture Vocabulary Scale***) on which she obtained a standard score of 120 (centile 83).

8 Appendices

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8.2 LASS 11-15 Comments Sheet

Name of student ..... Date of Birth .....

Class ..... Supervisor .....

School or Centre .....

Test	Date	Testing room	Health	Attention	Other comments	Initials of tester
Cave						
Mobile						
Nonwords						
Segments						
Single Word Reading						
Sentence Reading						
Spelling						
Reasoning						

General comments .....

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This sheet may be freely photocopied for use in conjunction with LASS 11-15 testing.

8.3 Age Equivalents

Table 8. Table of Age Equivalents for LASS 11-15 Tests.

Age equivalent range	Cave RS	Mobile RS	Non-words RS	Segments RS	Sentence Reading AS%	Spelling AS%	Reasoning AS%
< 11y 0m	< 18	< 5	< 7	< 11	> 95	> 96	> 90
11y 0m – 11y 5m	18 – 26	5	7 – 9	11 – 15	82 – 95	84 – 96	80 – 89
11y 6m – 11y 11m	27		10	16 – 17	74 – 81	81 – 83	73 – 79
12y 0m – 12y 5m	28	6	11	18	70 – 73	78 – 80	70 – 72
12y 6m – 12y 11m	29		12	19	68 – 70	76 – 77	68 – 69
13y 0m – 13y 5m	30	7	13	20	65 – 67	74 – 75	66 – 67
13y 6m – 13y 11m	31		14	21	62 – 64	66 – 74	63 – 65
14y 0m – 14y 5m	32	8	15	22	59 – 61	60 – 65	60 – 62
14y 6m – 14 y 11m	33 – 34		16	23	55 – 58	55 – 59	57 – 59
15y 0m – 15y 5m	35 – 36	9	17	24	51 – 54	52 – 54	48 – 56
15y 6m – 15 y 11m	37 – 40		18 – 19	25 – 27	37 – 50	48 – 51	38 – 47
> 15 y 11m	> 40	> 9	> 19	> 27	< 37	< 48	< 38

RS = Raw Score (i.e. number correct on the test) [Progressive Tests]

AS = Adaptive Score expressed as a percentage (e.g. 0.5792 rounded to 0.58 = 58%) [Adaptive Tests]