The effectiveness of teaching strategies for students with dyslexia based on their preferred learning styles

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Sioned Exley is the SENCo at Guilsborough School, a comprehensive school with 1,300 students in rural Northamptonshire. She undertook the research reported in this paper while working towards her MA at De Montfort University. The study reported here looked at whether teaching to the preferred learning styles of students with dylexia can improve their performance and attainment. Sioned Exley worked with a sample of seven students, four boys and three girls, in Years 7 and 8 in her school. Using both qualitative and quantitative methods, she indicates that five of the seven students made significant progress in both spelling and number work. All the students, in interviews, reported improved feelings about and attitudes towards their school work. While acknowledging that this is a small-scale study, Sioned Exley draws some positive conclusions.

Introduction

'If a child does not learn the way you teach then teach him the way he learns.'

(Chasty, cited in Chinn & Ashcroft, 1999, p.126)

In the past dyslexia has been described as a language-based disorder:

'Dyslexia is manifested by variable difficulty with different forms of language, often including, in addition to problems of reading, a conspicuous problem with acquiring proficiency in writing and spelling.'

(Orton Dyslexia Society, 1994, p.5)

The British Dyslexia Association (BDA), in elaborating upon the nature of dyslexia, included possible accompanying difficulties in number work, short-term memory, sequencing, auditory and/or visual perception and motor skills (Augur, 1993) and, in the first international conference of the British Dyslexia Association in 1989, Chasty (cited in Chinn and Ashcroft, 1999) defined specific learning difficulties as:

'Organising or learning difficulties, which restrict the student's competence in information processing, in fine motor skills and working memory, so causing limitations in some or all of the skills of speech, reading, spelling, writing, essay writing, numeracy and behaviour.'

(p.2)

Finding more effective teaching and learning strategies for students with dyslexia who experience such a range of difficulties presents a challenge to teachers. The multi-sensory approach to the teaching of literacy skills has been developed from the work of Orton (1989 cited in Miles & Miles, 1999) who was one of the first to postulate the neurobiological basis of dyslexia while McPhillips (2001), of the Dyslexia Project in Belfast, suggests that students with dyslexia can be helped by changing the way they move and exercise, with special routines tapping into reflexes left over from birth.

In more recent years, much has been written about teaching and learning styles (Chinn & Ashcroft 1999; Given & Reid, 1999; Hughes, 1999). Indeed, the idea of individual learning styles is not new, as Given and Reid (1999) make clear. They refer to Plato's belief that all persons differed because each constructed his or her knowledge through individual thought and reason; to Aristotle's writing about the mind as an instrument for the body; how Aristotle and Hippocrates grouped personality into four types; and how, by the early 1960s, there was an identification of the characteristics that affected how children learn. These came to be called 'cognitive styles' and led on to the concept of individual learning styles.

A definition of learning styles is provided by Mortimer (cited in Smythe, 2000), who draws upon research into learning behaviour in order to define cognitive style as an individual's characteristic and relatively consistent way of processing incoming information of all types from the environment. He goes on to suggest that learning style is the application of an individual's cognitive style to a learning situation.

As little research has been done on whether students with dyslexia could be helped to overcome the range of difficulties which characterise the condition by using their preferred learning styles, I decided to investigate whether teaching to students' preferred learning styles would improve their performance and attainment in both literacy and numeracy. While there is a strong theoretical basis for suggesting that teaching and learning styles influence the quality of learning, there has been little work on putting the ideas into practice. There is also a strong theoretical background to the hypothesis (Galaburda, 1993; Bakker, 1990) that students with dyslexia have different brain hemispheric processing patterns which might indicate a preference for visuospatial strategies (West, 1997; Everatt, Steffert & Smythe,

1999). The theories of Orton (1989 cited in Miles & Miles, 1999), West (1997), Stein (1995) and other researchers were investigated, therefore, alongside learning style proponents.

Sample

In order to research into whether teaching to students' preferred learning styles would improve their performance, a sample group of students with dyslexia was needed who would be willing to try different strategies and who fitted a dyslexic profile using Chasty's definition. It was decided to work with equal numbers of boys and girls, following the belief that both sexes can share similar difficulties resulting from their dyslexia, despite a common assertion that there are more males with dyslexia than females, with a suggested ratio of 4:1. There are probable reasons for this ratio, the main one being 'referral bias'. Everatt and Zabell (2000) suggest that teachers rate boys as more disruptive, and that this may represent a way of dealing with failure, while the girls would do their best to avoid bringing attention to their difficulties, preferring to get by as best they can.

Eight students with dyslexia were initially selected, four boys and four girls from Years 7 and 8, and the project was discussed with them and with their parents. The parents were very pleased that their children would be having special attention and, as those who know their children best, offered useful advice and information. There was a 12-week term in which to collect the data. This was divided into three weeks for the assessments, the reassessments and interviews and nine weeks for the actual teaching. It was important to explain the whole programme to the students themselves so that they were absolutely clear what was entailed and what their commitment would be. Seven of the eight students were enthusiastic, mainly because they were being allowed to drop one of their modern foreign languages, which gave two hours a week for small group work. It was at this point that the eighth member of the original cohort felt she would not like to be part of the study. This reduced the sample to seven students.

The small sample size can be attributed to three factors. Firstly, the decision had been made to work with equal numbers of male and female lower school students who had been diagnosed with dyslexia within a single school. This inevitably restricted the number of pupils from whom to choose. Secondly, there was only a very small room in which to carry out the programme and working with a greater number than four students at any one time would have inhibited movement and confidence in trying out new ideas. Thirdly, the students were being withdrawn from other lessons in order to carry out the research. It would be difficult to justify withdrawing larger numbers of students for a project that may not, in the end, benefit the students. The chief limitation of such a small sample is that what can be readily applied in a small group situation can not so easily be applied with a whole mixed-ability class group. However, the students, although all experiencing dyslexia, had sufficiently different strengths, needs and approaches to learning that recommendations based on the research could still be made. As Bassey (1995) states:

'Educational research aims critically to inform educational judgements and decisions in order to improve educational action.'

(p.39)

Assessments

Assessment, in order to determine strengths and weaknesses, is a prerequisite to teaching and the assessment methods to be deployed need to be carefully selected. Many tests were examined before deciding which were the more useful for the purposes of this research; more detailed discussion of the assessments used to determine the students' preferred learning styles as well as their ability in numeracy and spelling skills follows.

Spelling

Six of the students had been part of an intensive reading intervention programme at the beginning of Year 7 and had all maintained the improvement in reading they had made at that time. While the students had overcome their reading difficulties to a greater or lesser extent and could access most of the written curriculum, their spelling still presented a major challenge. As Pollock and Waller (1994) have indicated, 'Spelling in fact poses the greater problem for dyslexic children, and this difficulty can continue long after the reading difficulty has been improved. Poor spelling is usually a lifetime's embarrassment.'

To assess spelling, the Young's Parallel Spelling Tests (1998) were used. These have been standardised, provide a spelling age, can be used diagnostically and enable progress to be measured. The Parallel Spelling Tests provide a total of 12 matched tests without overlap which reflect the model of progression and the word types specified in the National Literacy Strategy (DfEE, 1998). These tests are also used with the whole school each September so it would be possible to assess a) if the students had improved since the previous September with different approaches to the teaching of spelling and b) if they would maintain an improvement until the following September. It is recognised that many students with dyslexia have poor short-term memory (Peer, 2001) and need constant reinforcement of new ideas until they are 'fixed' in the brain.

Numeracy

Each member of the sample had some difficulty with mathematics. As MacKenzie (1996) comments, 'Data collected over 22 years of psychological assessment at the Dyslexia Institute indicates that about 60% of identified dyslexics have specific learning difficulties with maths.' Although my school is a large rural comprehensive, I did not want to agree with the HMI who, in 1876, felt that mathematics was 'a subject … beyond the comprehension of the rural mind' (Weedon, 1996).

The aim was to improve the students' understanding and mastery of numeracy skills and, therefore, a mathematics test which could be used diagnostically would be of most benefit. It was also important for the test to be standardised, yet not take too long to administer, nor appear too daunting

for the students. The Graded Arithmetic-Mathematics Test (Vernon & Miller, 1998) met the criteria and in addition enabled the tester to read the questions to the students if necessary. It should be remembered, however, that it is not necessarily the decoding of words that is difficult in mathematics, rather the language of mathematics and the way problems are worded that can be confusing (Henderson, 1998).

An example of this difficulty is shown by the responses of one boy, Ben, during the mathematics tests. According to the mathematics results, he appeared to have regressed, yet the errors he made each time were different and he showed improvement in computational skills. When he was doing the second test, he had problems of concentration, he did not want to do it, therefore he raced through making 'careless' mistakes, for example, '$12 - 3 - 0 = 8$' and '$27 + 14 = 40$', both of which were right in the first test.

Each time he answered 9 to the question:

> 'Arrange these three numbers in any order so as to make the biggest number you can.
>
> 6   4   9
>
> The biggest number is …'

His answer of 9 was not surprising as 9 is the biggest number and that is the only part of the question he registered.

Another example of his literal understanding is:

> 'Write $^3/_4$ as a percentage.'

In the first test Ben wrote $^3/_4$%. In the second test he answered 40%, which, although still incorrect, shows a better understanding of what was required.

Chinn and Ashcroft (1999) detail many possible factors contributing to difficulties in mathematics including the following which applied to the sample in this study: directional confusion, sequencing problems, poor short-term and working memory, speed of working, cognitive style, anxiety, stress and self-image. Their book is invaluable in assessing and teaching students with dyslexia.

Learning styles
As the question at the heart of this research was whether teaching to the preferred learning style could improve attainment, a means of establishing which were the preferred learning styles of the seven students was clearly needed. There are a number of different methods that can be used to assess learning styles, including inventories, structured and unstructured interviews, observations and checklists.

A range of instruments designed to determine learning style preference was examined before deciding on the two used.

The first instrument was an informal 'Styles of Learning Quiz'. It bears similarity to the informal 'Teacher and Parent Learning Style Inventory' described by Given and Reid (1999) and was intended to provide a general idea of learning style. The quiz consists of 27 activities, including the provision of self-assessment statements such as 'I am good at solving puzzles and mazes' or 'I need to rewrite something several times in order to remember it', and in the next column to the activity, there is a V, a K or an A. For each activity the student was required to tick 'usually', 'sometimes' or 'rarely' and then to count the Vs, As, and Ks in the ticked columns. The intended result was to show whether the students were predominantly visual, auditory or kinaesthetic learners. There were drawbacks to this quiz as it was necessary to read most of the questions to the students and explain more than one. There were some that had little relevance to 12-year-olds, such as 'assembling flat pack furniture' about which there were two questions. However, it gave an initial finding and, after discussion, raised questions in the students' minds about how they might learn best.

The second instrument was an adaptation of Given and Reid's (1999) 'Interactive Observational Style Identification' (IOSI). Given and Reid put forward a number of arguments to justify observation as a means of collecting data on learning styles, including it being 'diagnostic, flexible and adaptable'. The observations were not intended to provide precise quantitative data on how students were performing in different classes, such as could be determined by a non-participant observer role. Rather, the learning support assistants, one of whom would be working on the project alongside the students, would make observations while in their support role in the classroom and also encourage the students to experiment with different styles of learning thus taking more responsibility for working out what would work best for them.

Given and Reid's IOSI (1999) was adapted as a ticklist to make it easier for learning support assistants to observe the students in a range of lessons and at different times of day. However, it was only used as a pilot as it became unmanageable; there were too many manifestations of style to observe at one time, especially as some classes contained three of the sample.

There were no further attempts at formal assessments, rather an informal observation approach was adopted. An advantage of a hybrid study is that a variety of techniques to gather data could be employed and, in this instance, allow greater flexibility. In observing how the students responded to a task, the author made field notes which, as Cohen, Manion and Morrison (2000) point out, can be made both in situ and away from the situation.

Through these varying approaches, the seven students' preferred learning styles were determined and the teaching of spelling and numeracy was planned to appeal to their strengths with the hope of moving them from 'learned helplessness to a position of control' (Morey, 2001).

Table 1 summarises the assessment methodology used.

Table 1: Assessment methods and their outcomes

Area for assessment	Method of assessment	Assessment provides
Mathematics	Vernon & Miller: Graded Arithmetic-Mathematics Test	Score out of 70 Mathematics age Diagnostic assessment Mathematics learning style Commonality of errors
Spelling	Young: Parallel Spelling Test	Score out of 50 Spelling age Diagnostic assessment Commonality of errors
Learning styles	Learning Style Quiz; Given & Reid: Interactive Observational Style Identification; Neurolinguistic programming; Observation	Profile of preferred learning styles
Sequencing	Verbal sequencing of: alphabet days of the week months of the year	Measure of ability to remember sequences
Student performance	Observation Interviews Field notes Teacher observation Parent observation	Profile of improvement in performance Student reflection and review

Teaching approach and learning styles

The students were taught in two single-sex groups for one or two lessons a week. There has been a great deal of research into learning styles in both the USA and Britain and, while much American research tends to include more social and emotional factors, Riding and Raynor (1998) focus on the different way in which the brain processes incoming information. They suggest that there are two fundamental types of contrasting learning style, verbal versus visual and holistic versus analytic, with each individual falling somewhere along the continuum. The discussion of the holistic thinker, who sees the whole picture, and the analytic thinker, who builds sequentially from smaller parts, bears similarities to the 'grasshopper' and 'inchworm' mathematical learning styles described by Bath, Chinn and Knox (1986). It also ties in to Sharma's (1989 cited in Chinn, 2001) 'qualitative' learners, who are intuitive, pattern-seeking mathematics learners, and his 'quantitative' group, who like to find formulae. In an educational environment, however, it is very unlikely that the social, emotional and physical states of the students can be divorced from the intellectual and teachers need to be aware of these factors as well as the individual differences in learning style. As Chinn (2001) points out, 'I always envisage learning style as encompassing the learning environment, the structure of a lesson time and the characteristics of the learner.'

While several instruments for establishing student learning style preference were used, with observation, discussion and reflection being the keys to providing a full picture of each student, this study focused on what might be considered the narrower aspects of learning style preference, such as visual, auditory and kinaesthetic tendencies. The metacognitive aspects of learning were not ignored, however, and the research included observation and reflective discussion on how the students learn best. The research purpose was to examine whether teaching to a preferred learning style would improve a student with dyslexia's performance and attainment. Each person is different and therefore the way he learns will also differ, to a greater or lesser extent. It cannot be assumed that the students in this study, because they have been diagnosed as dyslexic, would have greater visuospatial skills nor enhanced creative talents (West, 1997). However, it was interesting to note that five of the seven students preferred the visual learning style and that a sixth was strongly kinaesthetic with visual a close second (see Table 2).

Spelling

It has been found that when children are encouraged to find and be aware of their individual best way of learning, then their rates of learning spellings are increased (Brooks & Weeks, 1999). While the DfEE research examined how to improve the spelling of all children in mainstream schools, not only those with literacy difficulties, and studied only primary-aged children, it did indicate that 'Children with dyslexic features achieve when taught to their strengths.' Brooks and Weeks (1998), authors of the research for the DfEE, had carried out earlier work with older students which found that students with dyslexia learn more effectively if taught to their visual and semantic strengths. One aim of this research was to investigate whether this was true for the sample of students with dyslexia.

Ellis (1993) makes an interesting point which further indicates that each student with dyslexia should be taught in the way he or she learns best. He says that teaching methods are directed at what, for many students with dyslexia, is their greatest area of difficulty: phonics. While studies have shown that students with dyslexia can make progress when given systematic instruction, they are probably also engaging in other reading-related activities which would impinge on the validity of the research.

The spelling errors chosen to be taught to the students' preferred learning styles were the common errors made in the Young Spelling Test: double letters ('narow'); el/le confusion ('towle'); silent letters ('cemist') and the tch/ch/ture sound ('capter/punchual'). These were the main patterns addressed. The students also had difficulty with irregular phonological patterns ('pidgen', 'parliment') and tended to spell the words according to their sound ('responserbal' and 'doormatory').

In addition, the girls had been given words to learn for humanities and the boys had regular spelling tests in English; these words were also learnt. Although the learning profile of one boy, Sam, suggested that he was chiefly a kinaesthetic learner, he learnt unknown spellings through a combination of visual and auditory methods. For a spelling test in his English lesson, he learnt through visual patterns and sound. 'Embarrass' was written across the forehead of a face with two red cheeks to emphasise the double letters; 'apostrophe', 'atmosphere' and 'pamphlet'

were written underneath each other with the 'ph' highlighted; in 'miscellaneous' and 'muscle' the 'c' sound was exaggerated and he just needed the reminder that 'tactic' was like 'picnic'.

The seven students learnt to spell new words through their visual strength as long as this was combined with either the kinaesthetic and/or auditory channel. They needed to have a strong visual image of the word, because it was big and colourful, written across A3 paper, or the whiteboard, to utilise the kinaesthetic channel; or they vocalised elements of the word while creating a visual image of it. One girl, Alice, liked to be able to see patterns and/or rules to help her remember and another, Kate, chanted words with similar rhythmic patterns such as 'thermometer', 'hydrometer' and 'anemometer'.

Through trial and error, and by reflecting on what worked for them, the seven students developed an understanding of how they can best learn new spellings. As a result, they are beginning to take responsibility for their learning and not just 'doing what the teacher tells them', for example, copying words out three times.

Numeracy

Before discussing how learning styles have been interpreted for numeracy, it might be useful to examine how students with dyslexia can suffer as much from difficulties in number work as with gaining literacy skills. Weedon (1996) describes how difficulties with mathematics are not rare and can stem from a number of factors including an individual's cognitive performance, neurological make-up, personality and learning style, 'all interacting with each other and with factors intrinsic to the nature of the subject'. He also discusses how there is often a correlation between reading difficulties and arithmetic difficulties. While not dismissing dyscalculia as a disability primarily of mathematics, this was true for the students with dyslexia in this study. Joffe (1980), in her study of students with dyslexia's mathematics performance, found that calculation tended to be the major area of weakness, particularly multiplication and division, and this she attributed to the students with dyslexia difficulty with verbal labelling and short-term memory. She found that spatial skills, needed for understanding shape, size and relative size and quantity, were usually unimpaired. Whether this was due to the students with dyslexia having more developed visuospatial skills, or whether there was a difference between the boys and girls studied, was not discussed.

While it was relatively easy to find different ways of approaching the teaching and learning of spelling to suit the preferred learning styles of the seven students, the teaching of mathematics skills was more difficult as the needs of the students varied quite considerably. The final focus was on algorithms, as these play an essential part in mathematical problem solving. The formal routines depended upon, as Weedon (1996) describes them, 'the mathematician's tools, his way of compressing and finding a short cut.' It is frequently the lack of automaticity with algorithms, those

skills taught during the first stages of schooling, students with dyslexia experience. This develops into self-doubt and frustration, followed either by their learning their own methodology, as described by Henderson (1998), or switching off and deciding they cannot, and therefore will not, do it. By giving students strategies through their preferred learning style, and developing automaticity through overlearning, for example, number bonds to 20, then they might have more opportunities for success.

Riding and Raynor (1998) describe cognitive style as an individual's preferred and habitual approach to organising and representing information. However, many students with dyslexia have adopted habits that are opposed to their own preferred learning approaches, particularly in mathematics. They would rather try a method, safe and reliable, which they hope will give them the right answer, rather than experiment with a different one. They, therefore, need to be encouraged to break the habits that do not assist their learning. Two students in my sample provided particularly good examples of this limited flexibility in style.

Chinn's research (2001) showed that pupils with dyslexia take considerably longer to complete mathematics tests than non-dyslexic pupils. The students in this study followed this pattern except Edward and Ben, both of whom raced through because it was an onerous task and they pretended not to be interested in the result.

Lack of speed suggests a lack of automaticity in the computation skills. It is challenging to manipulate numbers while also having difficulty interpreting the meaning of the language used. As discussed, the girls were reintroduced to number bonds from one to 20, as a way to help them make quicker connections between numbers. They were provided with a way to draw out the table square quickly, which removed the worry about their not knowing or remembering their times tables and gave them visual reminders of mathematical terminology such as squared numbers, square roots and prime numbers. They were introduced to the 'gypsy' method of learning times tables (Henderson, 1989) where they can use their fingers to work out answers thus employing their kinaesthetic style. They were all encouraged to voice their own methods to reinforce their learning. Although this teaching has not yet enabled the students to work more quickly, it has made them more confident and more accurate.

Findings

The question being addressed in this study is whether teaching to students with dyslexia using preferred learning styles improves performance and attainment. As has been repeated throughout this report, even though the students happen all to experience dyslexia, it cannot be assumed that they will have the same strengths and weaknesses nor the same learning style preference, although they do appear to have very similar profiles. Table 2 shows the scores achieved before and after teaching to the students' learning styles and also what their preferred styles are. The names of the students have been changed to ensure confidentiality.

Table 2: The students, their learning styles and their scores

Student	Preferred learning styles		Spelling score			Mathematics score	
			April 01	July 01	Sept 01	April 01	July 01
Sam	Kinaesth	Visual	21	31	31	49	60
James	Visual	Kinaesth	16	17	18	35	38
Ben	Visual	Kinaesth	10	13	17	30	28
Edward	Visual	Kinaesth	15	14	15	38	34
Lucy	Visual	Kinaesth	17	23	22	31	38
Alice	Visual	Auditory	19	27	28	27	42
Kate	Kinaesth	Auditory	18	23	22	26	38

The results of the September 2001 spelling test have been included to show that the improvement was maintained over the summer break which suggests a longer-term retention.

Conclusion

This research was carried out in order to investigate whether teaching to students with dyslexia's preferred learning styles would improve their performance and attainment in both literacy and numeracy. A practical approach was chosen as, while there is a strong theoretical basis for suggesting that teaching and learning styles influence the quality of learning, there has been little work done on putting the ideas into practice.

Based on the findings of this research, there are clear conclusions to be drawn. All seven students improved their performance, once their preferred learning style had been established and had been used to teach them specific ways of learning. The majority favoured a visuospatial/kinaesthetic learning style, which supports the theories of Stein (1995) and West (1997). Five of them improved their attainment in the mathematics and spelling tests while the other two, although without quantifiable results in the tests, did gain a fuller understanding of spelling patterns and mathematical concepts. It is interesting to note that the two students who appeared to make the least progress also have emotional and/or behavioural difficulties. Nevertheless, all the students felt better about their learning and were beginning to transfer their new skills into the mainstream classroom. The students with dyslexia in this study found that employing their learning styles preferences enabled them to focus and use their differences not only in a withdrawal situation but also in mainstream lessons. As Chinn (2001) points out, adjustments made to help students with dyslexia will help other students too.

This study has limitations in that the sample of students is small and only covers two academic year groups. The students were taught in a small room with a maximum group size of four with, for most of the lessons, the undivided attention of the SENCo and a learning support assistant for up to two hours a week for 12 weeks. The students were also biased towards the project as it meant they were missing subjects they disliked. They enjoyed the special attention they received, including the laminated cards they carried around, and they believed they were gaining academically. This could make generalisability less secure although, as Stenhouse (1985) reiterates, 'The task of case study is to produce ordered reports of experience which invite judgement and offer evidence to which judgement can appeal.'

Recommendations

If, as Stenhouse (1985) wrote, educational researchers are concerned to enrich the 'thinking and discourse of educators either by the development of educational theory or by refinement of prudence through the systematic and reflective documentation of evidence', then it may be appropriate for me to make recommendations based on this case study research. Research has come a long way since Einstein was credited with saying: 'If I can't picture it, I can't understand it' (Smythe, 2000).

This study set out to build on the strengths of individual students; to empower them to take more responsibility for their learning by enabling them to articulate to themselves, and others, how they learn; and to give them strategies that they could use in the mainstream classroom. As Rogers, renowned dyslexic architect, commented in the *Dyslexia Handbook* (Smythe, 2000), 'Every individual has a right to the best education – to be taught in the way that they are best able to learn.'

Students with dyslexia can reach both academic and personal goals provided that their needs are recognised and they are appropriately supported. It is not the sole responsibility of the dyslexia specialist to teach these students; it should be the responsibility of the whole school. Arguably, all children learn best when their strengths and difficulties are recognised by their teachers, when they are taught to their preferred learning styles and when they have some control over their own learning. If we can give students more choice in the ways in which they learn and explore with them the reasons why they are learning, then, perhaps, we can improve their motivation and enable them to achieve greater success. As Hughes (1999) points out, 'People learn best when they want to learn. Motivation is therefore very important to effective learning.' Once students are achieving success, then they will begin to feel good about themselves (Hales, 2001).

As the younger students, in Years 7 and 8, tend to be more open to a range of teaching and learning styles, it might be useful to begin in these years to introduce ways of the students identifying and using their preferred learning styles. Tutors, who have a more global view of their tutor groups than subject teachers, and learning support assistants, who see the students in a variety of classes, could work with the students to investigate their preferred learning styles. Once the students have an understanding of their learning style preferences, then they could be empowered to learn to their strengths. When students are taught using their preferred learning styles, they not only increase academic attainment but also improve their attitudes to learning and behaviour (Given, 1996). Reid's

(1996) aims 'to recognise the value of observation and learning styles and to embrace a range of strategies to identify strengths and difficulties displayed by the child in addition to any discrepancies in performance which may be present' are valid to include as an integral part of any teaching programme.

The teaching and learning styles working group in the school in which this research took place already contains practitioners who have extended their role to include critical reflection upon their craft with the aim of improving it and there are several members of staff already proactive in using different teaching styles in order to address the learning styles of the students in their classes. We have begun to find effective teaching strategies matched to learning style preferences and to use these successfully to facilitate the learning of students with dyslexia in a small group situation. We have begun to establish a methodology that empowers the students in their own learning in mainstream classes. It will now be useful to build on the success of the members of the teaching and learning styles group, to share the findings of this study and build good practice across the curriculum in order to attempt to fill what Ellis (1993) refers to as 'lamentable gaps in our knowledge'.

This small-scale study has shown that students with dyslexia can improve their performance, attainment and the way they feel about themselves if they are encouraged to use their preferred learning styles. It also indicates that when students with dyslexia are taught to their strengths and given more ownership over their learning, then their whole school experience may be improved.

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