

## The impact of training on teacher knowledge

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# The impact of training on teacher knowledge about children with a learning disability

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### **Abstract**

The present study examines the impact of a short training session about children with a learning disability on the knowledge of teaching staff in Scotland. Despite the majority of participants reporting that they had a child with a learning disability in their classroom, the level of knowledge with regards to the definition of learning disability was low. This may be due to terminology differences that exist between the health and education sectors and a lack of training specific to the needs of children with a learning disability. Training was shown to significantly improve this knowledge both immediately after training and at a one-month follow-up, although concerns exist about whether the knowledge gains will be sustained in the longer term.

**Key words:** learning disability; training; teacher knowledge

## **Introduction**

The present study examines the impact of training on the knowledge of teaching staff in Scotland about children with a learning disability. There are currently approximately 30,000 children with a learning disability in Scotland (NHS Quality Improvement Scotland, 2006). To have a learning disability, a person must meet the three criteria of: significant impairment of intellectual functioning (an IQ of less than 70); significant impairment in adaptive functioning in at least two areas e.g. communication, self-care, self-direction and onset prior to age 18 (British Psychological Society, 2000).

### ***The educational needs of children with a learning disability***

Children with a learning disability will have a variety of needs that are a direct result of impairments in their intellectual and adaptive functioning. The implications of having a learning disability will vary from individual to individual, according to factors such as specific cognitive profile, daily living skills, level of intellectual impairment and previous learning experiences. There are, however, common difficulties that have been found to exist for the majority of people with a learning disability (Emerson *et al.*, 1998). These include problems with attention, working memory, perception, expression, comprehension and perception of time (MacKinnon *et al.*, 2004; Owen & Wilson, 2006, Emerson *et al.*, 1998, Everington & Fulero, 1999).

These difficulties may be exacerbated in a busy classroom setting, where there may be a number of distractions which will interfere with the child's ability to concentrate, and complete tasks. Similarly, the reliance in many educational settings on verbal instructions

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means that children with language comprehension difficulties and memory problems may struggle to remember information and understand what is expected of them (McKenzie & Murray, 2002). Fortunately, there are a number of simple strategies that the teacher can adopt to help the child with a learning disability. These may include using short and simple sentences, repeating information, using concrete examples and visual supports (Williams *et al.*, 2009, MacKinnon *et al.*, 2004; McKenzie & Murray, 2002, Emerson *et al.*, 1998). Teachers working with children with a learning disability should be aware of these common difficulties and the basic strategies that address them, in order to meet the educational needs of the children (Ward, 1984). Unfortunately, however, research suggests that the needs of children with a learning disability are not always highlighted.

### ***Supporting children with a learning disability in the education system***

Children with a learning disability were not part of the mainstream education system until the publication of the Warnock report in 1978. This was pivotal in changing the way in which children with special educational needs (including children with a learning disability) were perceived. The report stated that as many children as possible should be educated in mainstream classrooms and introduced the term ‘special educational needs’. In 1980 the Education (Scotland) Act (amended by the Education (Scotland) Act 1981) placed a duty on educational authorities to meet the educational needs of all children, including those with a learning disability. Since this time the inclusion of children with special educational needs into mainstream classes has been one of the dominant features in educational legislation, the most recent of which is the Education (Additional Support for Learning) (Scotland) Act (Scottish Government, 2004). The main aim of the ASL Act

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is to consider all children who require additional support in order to gain maximum benefit from their educational experience. Children are considered to have benefited from education when they have access to a curriculum which supports their learning and development and where the teaching and support from others meets their needs. In order to meet the needs of a child with a learning disability teaching staff have to offer a suitable curriculum and to use appropriate teaching strategies, which, as discussed earlier, requires an understanding of the implications of having a learning disability.

Mainstream classroom teachers, who may not have received any training in relation to working with children with additional needs (Rose, 2001) and who under the ASL Act are now expected to work with children with a learning disability, have a legal and professional obligation to know about the characteristics and needs of the children they work with (Ward, 1984). There is, however, only one specific reference to children with a learning disability within the ASL Act, when noting those factors which may give rise to additional support needs.

“...factors may be diagnostic terms such as autistic spectrum disorder, learning disability or clinical depression.” (Scottish Executive Education Department, 2005; p.62).

### ***Knowledge of a learning disability***

With the increasing focus on social inclusion and its reflection in current legislation (e.g. Education (Additional Support for Learning) (Scotland) Act, 2004), children with a learning disability are increasingly being educated in mainstream classrooms. The research suggests, however, that not all educational staff, including teachers and teaching

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auxiliaries, have the knowledge, confidence or training (Rose, 2001) to provide an optimal educational experience to children with special educational needs (including children with a learning disability).

While research into knowledge about learning disability within the education sector is very limited, results from studies with the general population (Hames & Welsh, 2002), health professionals (McKenzie *et al.*, 1999) and social care staff (Williams *et al.*, 2009) suggest that overall knowledge about learning disability is low, with confusion between learning disability and a learning difficulty frequently occurring (Hames & Welsh, 2002). Differences in the terminology used to describe a learning disability both across different countries (Schalock *et al.*, 2007) and between different professional groups (Visser & Cole, 2003), has been suggested as one reason why so much confusion surrounds the concept of learning disability (McKenzie *et al.*, 1999).

The term 'learning disability' was made official by the Minister of Health in 1991 (Learning Disability Advisory group, 2001). This term, however, is often viewed as being synonymous with educational problems such as dyslexia (Hames & Welsh, 2002), which, by definition, is a learning difficulty. In the UK, the education sector tends to use terms which reflect the educational needs and/or difficulties of the child, such as special educational need or learning difficulties, rather than diagnostic terms such as learning disability. This means that a number of diagnostic terms may be encompassed within the one educational term, for example, the term 'additional needs' can refer to children with autistic spectrum disorder, attention deficit hyperactivity disorder or a learning disability.

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At the time of writing, there has been no research in the UK which looks specifically at teacher knowledge about learning disability. While it is not possible to extrapolate directly, research into the knowledge that teachers hold about other disorders, such as ADHD (Ghanizadeh *et al.*, 2006), speech and language difficulties in children with special educational needs (Sadler, 2005) and epilepsy (Bishop & Boag, 2006) indicates that levels are low.

### ***The impact of training on knowledge about learning disability***

Staff training with health and social care staff who support people with a learning disability has been shown to improve both knowledge and practice (McKenzie *et al.*, 1999, Williams *et al.*, 2009). There has been no equivalent research with teaching staff, despite the Warnock report recommending that teacher training covered children with special educational needs as early as 1978. More recently, teaching staff have expressed concern about their lack of professional experience of working with children with special educational needs and reported the need for additional training to address the gaps in their knowledge (Rose, 2001). Despite this, the opportunities for such training are limited and until recently there was no such compulsory training provided to mainstream teachers. There continues to be a lack of compulsory training on specific conditions, such as learning disability, which are encompassed by the umbrella term of special educational needs. Consequently teachers may be supporting children with a learning disability in their classroom with no additional or specialist training in this area.

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The aim of the current study is, therefore, to investigate the impact that a half-day training event has on the knowledge of teachers about learning disability. It is hypothesized that teaching staff knowledge about the defining criteria of learning disability will improve after training and that this improvement will be maintained at follow-up one month later.

### **Method**

#### *Design*

A within participant, questionnaire based design was used

#### *Power Calculation*

There is currently limited research considering teaching staff knowledge about working with children with a learning disability. Research in health and social care settings (e.g. McKenzie *et al.*, 1999) suggests mainly large effect sizes. Assuming a large effect size, power at 0.8 and alpha at 0.05, a one way related ANOVA would require 22 participants.

#### *Participants*

Forty people participated (32 teachers and 8 teaching auxiliaries). The age of participants ranged from 23-60 (mean = 43.98, sd = 8.36). A total of 39 females and 1 male participated. The number of years working as a teacher or auxiliary ranged from 1-38 (mean = 15.38, sd = 10.60) and all participants were working in a primary school setting at the time of the study. Thirty-nine (97.5%) worked in a mainstream classroom and one worked in a Learning Support Unit. Twenty-seven (67.5%) participants reported that they



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currently had a child with a learning disability in their class. The number of years experience that participants had of working with children with a learning disability ranged from 0-31 (mean = 9.03, sd = 7.72).

### *Ethical Approval*

Ethical approval was obtained from the Head of Schools for the geographical area in which the research was conducted, as well as consent being obtained from the head teachers in the participating schools.

### *Procedure*

Following approval from the Head of Schools, individual letters were written to the head teachers of all primary and secondary schools in the area. These provided details about the study and an overview of the free training that would be provided as part of the study. A total of 76 schools were approached (9 secondary schools and 67 primary schools). Fourteen primary schools declared an interest, reflecting a response rate of 21%. None of the 9 secondary schools participated.

### *Organisation of Training Events*

Training events were organised on four training dates across four different geographical areas. All training events took place in a school after school hours and took one and a half hours. All four training events were run by the first author and a Clinical Psychologist from the local child and adolescent mental health service and handouts were provided at the end of the training. The same training package was used for all four training events and was a well established package of training that has been evaluated with social care

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staff (McKenzie *et al.*, 2000) and health care staff (McKenzie & Paxton, 2002). The content was adapted in places to reflect the audience the training was aimed at, for example, additional information was provided about the development of educational services for children with a learning disability. The staff training covered the following areas:

- History of learning disability services in the context of health and educational sectors
- Implications of the principles of inclusion
- What is a learning disability? Diagnostic criteria
- Components of intelligence and the implications of having a learning disability on these.
- Assessing adaptive functioning
- Duty of care and legal/ethical considerations

Participants completed questionnaires on arrival at the training venue, immediately after the training and approximately 4 weeks after the training event took place (a stamped addressed envelope was provided to aid response). Participants were also asked to complete an evaluation sheet in relation to their assessment of the training event rate. Forty follow-up questionnaire packs were sent out and 19 were returned, giving a 47.5% response rate.

### *Questionnaire*

The study employed a questionnaire adapted from previous research where reliability and validity had been established (McKenzie *et al.*, 2000). This study found that the measures

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used had significant agreement between raters as shown by inter rater reliability Kappa values of 0.78 or above ( $p < 0.01$ ). The measures also had discriminative validity i.e. they could discriminate between those who had been trained and those who had not. Minor additions to the questionnaire included items relating to demographic information. This included age, gender, whether the participant was a teacher or auxiliary, number of years the participant had worked as a teacher, whether the participant worked in a mainstream classroom or an additional support unit and whether they currently supported a child with a learning disability in their class. The participants were also asked to rate the extent to which they felt their initial teacher training had prepared them to work with children with a learning disability (with 0 indicating ‘not prepared at all’ and 4 indicating ‘very prepared’)

The questionnaire asked participants about their understanding of the term learning disability. This was scored according to the three defining criteria for learning disability: impaired intellectual functioning, impaired adaptive functioning and age of onset prior to 18. A score of 1 point was given for each criteria successfully identified, resulting in a maximum score of three points. The defining criteria were adhered to strictly in the scoring of this question, due to the overlap between learning disability and other conditions that would be considered under the education term of ‘additional needs’ (e.g. learning difficulties, autism, dyslexia). Examples of correct responses for each criterion are given in Table 2.

### *Inter-Rater Reliability*

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Twelve questionnaires (12.4% of the 97 questionnaires returned in total from all three time points) were analysed by two raters to determine inter-rater reliability for the themes used to score the open-ended questions. The kappa value was  $K = 0.90$ ,  $p < 0.001$  with a corresponding level of agreement rating of 'excellent' (Fleiss, 1981).

### **Results**

Some participants did not answer every question and therefore numbers vary according to number of participants who responded. The mean rating by teachers of the extent to which they felt that their basic teacher training had prepared them for working with children with a learning disability was 1.17 (sd = 0.91), indicating that they felt quite unprepared.

#### ***The impact of training on participants' knowledge about learning disability.***

This was investigated on four levels;

- a. Whether participants' mean scores for identifying the defining criteria for learning disability improved after training.
- b. Whether the number of participants correctly identifying each of the three criteria for learning disability improved significantly after training.
- c. Whether any significant differences existed between the likelihood of participants identifying each of the three criteria at each time point.
- d. Whether participants were less likely to use incorrect terms as alternatives for learning disability after training.

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### *Mean scores for identifying the defining criteria for learning disability*

Table 1 illustrates the mean scores and standard deviations for total scores for the defining criteria for learning disability at each time point.

#### **INSERT TABLE 1 ABOUT HERE**

A one way repeated measures ANOVA illustrated a significant effect of training on the knowledge of the defining criteria for learning disability ( $F(2,30) = 27.41, p < 0.0005$ ) with scores being significantly higher immediately after training ( $m = 2.25, sd = 1.12$ ), compared with baseline ( $m = 0, sd = 0$ ) ( $p < 0.0005$ ) and follow-up ( $m = 1.1, sd = 1.13$ ) ( $p < 0.05$ ). Scores were also significantly higher at follow-up than at baseline ( $p < 0.01$ ). This indicates that participants' knowledge about the defining criteria for learning disability improved significantly after training and this difference remained significant at follow-up.

### *The number of participants correctly identifying each of the three criteria for learning disability*

Table 2 shows the percentage of participants that correctly identified each of the three criteria at the three different time points, with examples

#### **INSERT TABLE 2 ABOUT HERE**

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Cochran's Q tests were conducted to ascertain if training significantly improved participants' ability to identify each of the three criteria at different time points. A significant difference was found across time for the IQ criterion (N = 16) (Cochran's Q = 21.14, df = 2,  $p < 0.001$ ), the adaptive skills criterion (N = 16) (Cochran's Q = 18.17, df = 2,  $p = < 0.001$ ) and the age of onset criterion (N = 16) (Cochran's Q = 15.00,  $p = 0.001$ ). McNemar tests were subsequently conducted to establish between which time points the above significant differences occurred. A Bonferroni adjustment was applied to allow for multiple comparisons (3) and the p value was, therefore, set at 0.017. It was found that participants' ability to identify all three defining criteria for learning disability improved significantly after training ( $p < 0.001$ ). Participants' ability to identify the IQ criterion remained significantly better at follow-up than at pre-training ( $p < 0.016$ ), however, this difference was not maintained for the other two criteria. There was a significant decrease in participants' ability to identify the IQ ( $p < 0.004$ ) and adaptive functioning ( $p < 0.016$ ) criteria at follow-up in comparison to immediately after training

### *The identification each of the three criteria of learning disability pre-training, post – training and at follow-up*

Further analyses were conducted, using Cochran's Q tests, to investigate if there were any significant differences between how frequently each criterion was identified at each of the three different time points. No significant results were found for differences between criteria identified prior to training or at follow-up. A significant result was found between the criteria immediately after training (N = 38) (Cochran's Q = 10.364, df = 2,  $p = 0.006$ ). McNemar tests based on a p of 0.017 to allow for multiple comparisons found

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that participants were significantly more likely to identify the 'IQ' criterion, (identified by 89.5% of participants) than the adaptive skills criterion, identified by 71%, ( $p < 0.016$ ) and the age of onset criterion, identified by 68% ( $p < 0.008$ ) immediately after training.

### *Participants' use of incorrect terms as alternatives for learning disability.*

None of the participants were able to correctly identify all three defining criteria for learning disability prior to training. Thirty-seven participants (93%), however, provided an answer on the pre-training questionnaires that reflected their understanding of the term learning disability. The information provided was organised into themes. Inter-rater reliability for this question was conducted and was found to be excellent at kappa = 0.90 (Fleiss, 1981). The percentage of participants defining learning disability under these themes post-training and at follow-up is also shown in table 3.

INSERT TABLE 3 ABOUT HERE

This table shows that after training there was a fall in the number of participants who used inaccurate definitions of learning disability. There was a subsequent increase at follow-up, but this did not reach the levels obtained at pre-training.

Participants were also asked if they understood any other term to mean the same as learning disability. Twenty three participants provided an alternative term pre-training, none of which were correct. Fifteen participants provided alternatives immediately after training. Of these, 9 were correct (e.g. mental retardation, intellectual disability) and 6

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were incorrect (e.g. learning difficulty, complex needs). Eight respondents provided alternatives at follow-up, of which only one was correct.

### **Discussion**

This study examined whether staff training improved participants' knowledge about learning disability. It was found that participants' knowledge about the defining criteria for learning disability improved significantly after training. This was illustrated by the significant increase in participants' mean scores for identifying the defining criteria for learning disability after receiving training. This increase in knowledge remained significant at the one-month follow up. In addition, there was a significant increase in the number of participants identifying each of the criteria after training, a decrease in participants' use of incorrect terms for learning disability and an increase in the identification of correct alternative terms after training.

These results are consistent with previous research findings, which show that training improves knowledge about learning disability (McKenzie *et al.*, 2000). Participant knowledge at one-month follow-up was also significantly better than prior to training supporting the notion that training improves knowledge in the longer term (McKenzie *et al.*, 2000; Allen *et al.*, 1997), although these results may be affected by responder bias. It may be that those who had retained information were more likely to respond than those who had not, which would result in an unrepresentative picture at follow-up. In addition, participant knowledge at follow-up had dropped significantly compared to levels found



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immediately after training. This indicates a loss of knowledge over time, suggesting that the increases in knowledge due to training may only be temporary (Cullen, 2000).

None of the participants were able to identify all three criteria for learning disability prior to training, suggesting very limited baseline knowledge. This is despite the majority of participants reporting that they had a child with a learning disability in their class-room and the average amount of experience that the teaching staff had of working with children with a learning disability being over 9 years. This is consistent with research which has shown that teaching staff have limited knowledge about other disorders considered under the umbrella term of special educational needs (Ghanizadeh *et al.*, 2006; Sadler, 2005).

The results from the present study may reflect the extent to which teachers have received training relevant to working with children with a learning disability. Research by Rose (2001) suggests that teachers recognize and are concerned about the extent to which their training adequately prepares them to support children with special educational needs.

This was also the case in the present study, with the teaching staff indicating that their basic teacher training had left them feeling relatively unprepared to support children with a learning disability. This suggests that teachers be placed in a position where they are failing to adequately meet their professional obligation to be aware of the defining characteristics and needs of the children they teach (Ward, 1984).

Training also improved the ability of participants to identify the IQ and adaptive skills criteria for learning disability, with participants being most likely to identify IQ out of the three criteria. This is consistent with previous research which has found that the IQ

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criteria is most readily identified by health and social care staff (McKenzie *et al.*, 1999a). In the present study, this may be due to the fact that a greater amount of time was spent during the training on IQ related issues than on adaptive functioning. It is also likely that the age of onset criterion was less salient to the teachers as they were all working with children who were less than 18 years old.

There was some variance in the type and frequency of criteria identified, however the results overall showed a significant increase in participants' knowledge of the defining criteria for learning disability after training and at one month follow-up in comparison to their knowledge prior to training. This suggests that a relatively short and inexpensive training package can lead to improvements in teaching staff knowledge about learning disability and, in particular about the associated impaired levels of intellectual functioning.

Ninety-three percent of participants provided a definition for the term learning disability prior to training which could be summarized by 6 themes. Forty-nine percent of participants provided information in their definition of learning disability that referred to a need for additional support (the most common theme identified). While this is applicable to the learning disability population, it is also applicable to any child with special educational needs according to the Education (Additional Support for Learning) (Scotland) Act (2004). The identification of this theme cannot be taken, therefore, as evidence for specific knowledge about learning disability.

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Forty-one percent of participants made reference to children with a learning disability having difficulty learning or accessing the mainstream curriculum. The tendency was to associate this difficulty in learning to a specific aspect of cognitive functioning, such as attention or comprehension, rather than a global impairment in intellectual functioning. This theme is again applicable to children with a learning disability, but it is not exclusive to or defining of this group and, therefore, does not reflect a specific understanding of learning disability. Four participants used alternative, incorrect terms to describe learning disability such as additional needs or special educational needs. This suggests some confusion related to terminology which has also been found by previous researchers (Hames & Welsh, 2002). While the numbers of participants making reference to these incorrect concepts fell immediately after training, some teaching staff reverted back to using them at the one-month follow-up. This again suggests the need for ongoing input to ensure that knowledge gains due to training are not lost over time. Recent research has suggested that a combination of in-service training and coaching on the job is the most effective format (van Oorsouw *et al.* 2009)

The study had a number of methodological limitations. The questionnaire used was adapted from one used in previous research (McKenzie *et al.*, 2000) where it conformed to a number of psychometric standards (Dickens & Stallard, 1987). It was not, however, originally developed for use within the education sector. Similarly, the training package used in the present study was adapted from one which had previously been developed for use with health (McKenzie & Paxton, 2002) and social care staff (McKenzie *et al.*, 2000) and was, therefore, not designed specifically for use with teaching staff.

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Another limitation relates to the reduced response rate at follow-up (19/40) which, while greater than that typically found in postal surveys (Babbie, 1998), was relatively small. The numbers achieved at the pre and post training time points were sufficient to obtain statistical power, however, the loss of data at follow-up raises the question of how representative this data was in relation to the whole sample. Finally, it is unclear to what extent the results of the study can be generalized. All the participants worked in primary schools and so the results may not be applicable to secondary school staff.

In summary, the study aimed to investigate the impact that a half-day training event had on teaching staff knowledge about learning disability. Despite the majority of participants reporting that they had a child with a learning disability in their classroom, the level of knowledge with regards to the definition of learning disability was low. This may be due to terminology differences that exist between the health and education sectors and a lack of training specific to the needs of children with a learning disability. Training was shown to significantly improve this knowledge both immediately after training and at a one-month follow-up, although concerns exist about whether the knowledge gains will be sustained in the longer term.

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*Table 1: mean scores and standard deviations for total scores for the defining criteria for learning disability*

<b>Time point comparisons</b>	<b>Defining criteria for learning disability</b>		<b>Teacher confidence</b>	
	<b>Mean</b>	<b>Standard deviation</b>	<b>Mean</b>	<b>Standard deviation</b>
<b>Pre-training</b>	0.3	0.16	2.14	0.95
<b>Post -training</b>	2.29	1.04	2.32	0.78
<b>Follow-up</b>	1.05	1.22	2.32	0.82

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<b>Table 2: the percentage of participants that correctly identified each of the three criteria at the three different time points, with examples</b>				
<b>Defining criteria</b>	<b>Examples</b>	<b>Percentage (and number) correctly identified at each time point</b>		
		<b>Pre (N=37)</b>	<b>Post (N=38)</b>	<b>Follow-up (N=19)</b>
<b>IQ</b>	‘Measured low level of IQ’ ‘IQ less than 70’ ‘Significantly impaired IQ’	3% (N=1)	89.5% (N=34)	47% (N=9)
<b>Adaptive skills</b>	‘Impaired adaptive skills’ ‘Deficiency of skills in daily living’	0% (N=0)	71% (N=27)	26% (N=5)
<b>Childhood onset</b>	‘Onset prior to 18’ ‘Happens before brain is fully developed’	0% (N=0)	68% (N=26)	32% (N=6)

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<b>Table 3: Examples of the themes reflecting participants' understanding of the term learning disability with the number and percentages of participants referring to each theme</b>				
<b>Theme</b>	<b>Example</b>	<b>Percentage of participants including each theme in their definition of Learning Disability</b>		
		<b>Pre Training (N=37)</b>	<b>Post Training (N=36)</b>	<b>Follow-up (N=19)</b>
Reference to difficulty with specific aspect of cognitive functioning	'difficulty following classroom instructions', 'not able to understand instructions', 'difficulty reading text or numbers'	24% (N=9)	3% (N=1)	16% (N=3)
Difficulty learning or accessing mainstream curriculum	'children who have a barrier to their learning', 'children who have difficulty accessing part of the general curriculum'	41% (N=15)	3% (N=1)	37% (N=7)
Needs additional support in class	'require extra or additional help because of recognised needs or problems'	49% (N=18)	0% (N=0)	10.5% (N=2)
Emotional or behavioural problems	'...due to emotional difficulties or problems.'	16% (N=6)	3% (N=1)	0% (N=0)
Physical difficulty/disability	'physical problems'	16% (N=6)	0% (N=0)	5% (N=1)
Use of an alternative label	Autism, Aspergers, SEN, additional needs, dyslexia	11% (N=4)	0% (N=0)	10.5% (N=2)

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