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The Children's Low Vision Project in Wales: Evaluation of a multi-disciplinary training programme & The provision of eye care services in special schools in Wales

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Abstract

This thesis reports two research projects undertaken between 2009 and 2011. The thesis is split into two distinct sections:

Section A: Evaluation of a multi-disciplinary training programme using the Kirkpatrick four-level approach

Purpose

Ten multi-disciplinary training days took place throughout Wales as part of the Welsh Low Vision Service and Children's Low Vision Project. This study evaluated the training using the Kirkpatrick four-level approach to identify participants' reactions to the training (level 1), learning (2), behavioural change (3) and the impact on referral processes and multi-disciplinary working (4). It also aimed to identify whether causal relationships existed between these levels.

Methods

A 27-item questionnaire was administered to all participants at each training day to collect level 1 reaction data and level 2 data about learning. One year after the training, profession-specific postal questionnaires were administered to evaluate the impact of the training on behavioural change (level 3), referral processes and multi-disciplinary working (level 4). Data about referrals, provided by the Welsh Low Vision Service, were also analysed.

Results

Positive evaluations at each of the four levels showed that the training achieved its objectives. Reported 'relevance' of the training (level 1) was more indicative of whether learning took place than 'enjoyment'. Lack of opportunity to use new skills in the workplace was the major barrier to level 3 behavioural change (training transfer). The study found limited causality between the four levels.

Conclusions

Although the Kirkpatrick four-level approach provided a useful evaluation framework, modifications to it enabled a more robust evaluation to be carried out.

Section B: Sight problems among children and young people with special educational needs and a survey of special schools in Wales

Purpose

Children and young people with special educational needs (SEN) are more likely to have sight problems than children and young people without SEN. This study collected data about the prevalence of sight problems among pupils in special schools in Wales and the provision of eye care services such as vision screening.

Methods

A literature review about sight problems among children and young people with SEN was conducted.

A 21-item postal questionnaire was sent to the 44 maintained special schools in Wales to collect data about sight problems among the pupils and information about the provision of eye care services.

Results

A response rate of 88.6% (n=39) was achieved. Just over half the schools (52.6%, n=20) reported that vision screening took place and almost half (47.4%, n=9) reported that vision screening was carried out by orthoptists. The prevalence of identified and corrected refractive error among pupils was 22.45%. The prevalence of known visual impairment (as a special educational need) was 6.1%. There was limited use of low vision aids by pupils. The study showed that inter-disciplinary communication could be improved.

Conclusions

The provision of eye care services for pupils in special schools in Wales was patchy and inconsistent. The survey indicated that there were likely to be pupils in special schools with uncorrected refractive error and undiagnosed sight problems. This provided the evidence base for a pilot ‘vision care programme’ for pupils in special schools. The pilot model is being currently being modified by a planning group with the aim of delivering an eye care service in every special school in Wales.

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1.1 Introduction to low vision, the Welsh Low Vision Service and the Children's Low Vision Project in Wales

1.1.1 Describing and defining sight problems and visual difficulties

Many different terms are used to describe and define sight problems and visual difficulties, including blind, severely sight impaired, partially sighted, sight impaired, visually impaired and low vision. These terms are described and defined below.

Blind/ severely sight impaired

The terms blind and severely sight impaired are synonymous with each other. They are legally defined in the UK (El-khayat 2012) as:

'Blind person' means a person so blind as to be unable to perform any work for which eyesight is essential.

This definition refers to any work for which sight is essential rather than the person's usual or particular occupation.

Blindness (or severe sight impairment) is usually based on the clinical measures of visual acuity ('sharpness' of vision) and visual fields. Generally, a person's sight must fall into one of the following three categories for them to be certified as blind or severely sight impaired by an ophthalmologist:

- Visual acuity of less than 3 / 60 with a full visual field.
- Visual acuity between 3 / 60 and 6 / 60 with a severe reduction of field of vision such as tunnel vision.
- Visual acuity of 6 / 60 or above but with a very reduced field of vision, especially if a lot of sight is missing in the lower part of the field.

www.rnib.org.uk/livingwithsightloss/registeringsightloss/Pages/vision_criteria.aspx
(Accessed March 2012)

If an ophthalmologist considers a patient to be blind (or severely sight impaired), they issue a Certificate of Visual Impairment (CVI). Patients with a CVI can be eligible for a wide range of services and support.

Partially sighted/ sight impaired

The terms partially sighted and sight impaired are often used interchangeably. The statutory definition for partial sight (or sight impaired) is:

Those who are substantially and permanently disabled by defective vision caused by congenital defect, illness or injury.
(NHS 2003)

A patient's sight (while wearing their glasses or contact lenses) has to fall into one of the following three categories for them to be certified as partially sighted or sight impaired by an ophthalmologist:

- Visual acuity of 3 / 60 to 6 / 60 with a full field of vision.
- Visual acuity of up to 6 / 24 with a moderate reduction of field of vision or with a central part of vision that is cloudy or blurry.
- Visual acuity of up to 6 / 18 if a large part of the field of vision, for example a whole half of the vision, is missing or a lot of peripheral vision is missing.

www.rnib.org.uk/livingwithsightloss/registeringsightloss/Pages/vision_criteria.aspx
(Accessed March 2012)

Visually impaired

Although there is no agreed definition for the term visually impaired, it has been suggested that it was used in the past to refer to people who are now said to be partially sighted or sight impaired (European Blind Union 2003).

The term visually impaired has also been used in a legal context, e.g. the Copyright (Visually Impaired Persons) Act 2002. This law used a functional definition of visual impairment and defined a visually impaired person as one:

(a) who is blind.
(b) who has an impairment of visual function which cannot be improved, by the use of corrective lenses, to a level that would normally be acceptable for reading without a special level or kind of light.
(c) who is unable, through physical disability, to hold or manipulate a book.
(d) who is unable, through physical disability, to focus or move his eyes to the extent that would normally be acceptable for reading.
(Her Majesty's Stationery Office 2002)

Visually impaired is also often used in educational contexts, e.g. specialist teachers of pupils who are blind or partially sighted are referred to in Wales as Qualified Teachers of pupils who are Visually Impaired (QTVIs).

Low Vision

The term 'low vision' is not legally defined and there are many different definitions and descriptions of low vision. The World Health Organisation defines low vision as:

- *Low vision is visual acuity less than 6/18 and equal to or better than 3/60 in the better eye with best correction.*
- *A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction and has a visual acuity of less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential.*

www.who.int/blindness/causes/priority/en/index5.html
(Accessed 5th July 2010)

It is essential for epidemiological studies to define low vision using clinical measures, such as visual acuity. Other factors that contribute to an individual's visual functional ability include their psychological state (Wolffsohn and Cochrane 2000), light levels and the level of glare (Brabyn, Schnect et al. 2001).

The term 'low vision' has not been defined in UK legislation. However, a definition of low vision was proposed by the Low Vision Services Consensus Group (1999):

> *…Impairment of visual function for which full remediation is not possible by conventional spectacles, contact lenses or medical intervention and which causes restriction in everyday life. This definition includes, but is not limited to, those who are registered as blind and partially sighted.*
> (LVSCG 1999)

1.1.2 Children and young people who are severely sight impaired (blind) or sight impaired (partially sighted)

In the UK, registration as severely sight impaired (blind) or sight impaired (partially sighted) is initiated by certification from a consultant ophthalmologist (Bunce and Wormald 2006). However, it is widely accepted that registration data do not accurately represent the actual number of people, including children, with sight problems or visual difficulties. The reasons for this include:

- Registration is voluntary and not all children eligible for registration are registered.
- Some children may have low vision, which affects their functional ability, but do not have clinical visual ability within the registration parameters.

Surveys have been carried out to identify the prevalence of sight problems among children and young people. Blindness or severe visual impairment is relatively uncommon among children. Approximately 4 in every 10,000 children born in the UK will be diagnosed as blind or severely visually impaired by their first birthday and nearly 6 in every 10,000 by the age of 16 (Rahi and Cable 2003). Low birth-weight children and those from ethnic minorities have the highest prevalence of sight problems and children from the most deprived socio-economic groups are over-represented. Over 75% of children have other, non-ophthalmologic disorders or impairments, which result in the death of about 10% within one year of sight loss (Rahi and Cable 2003).

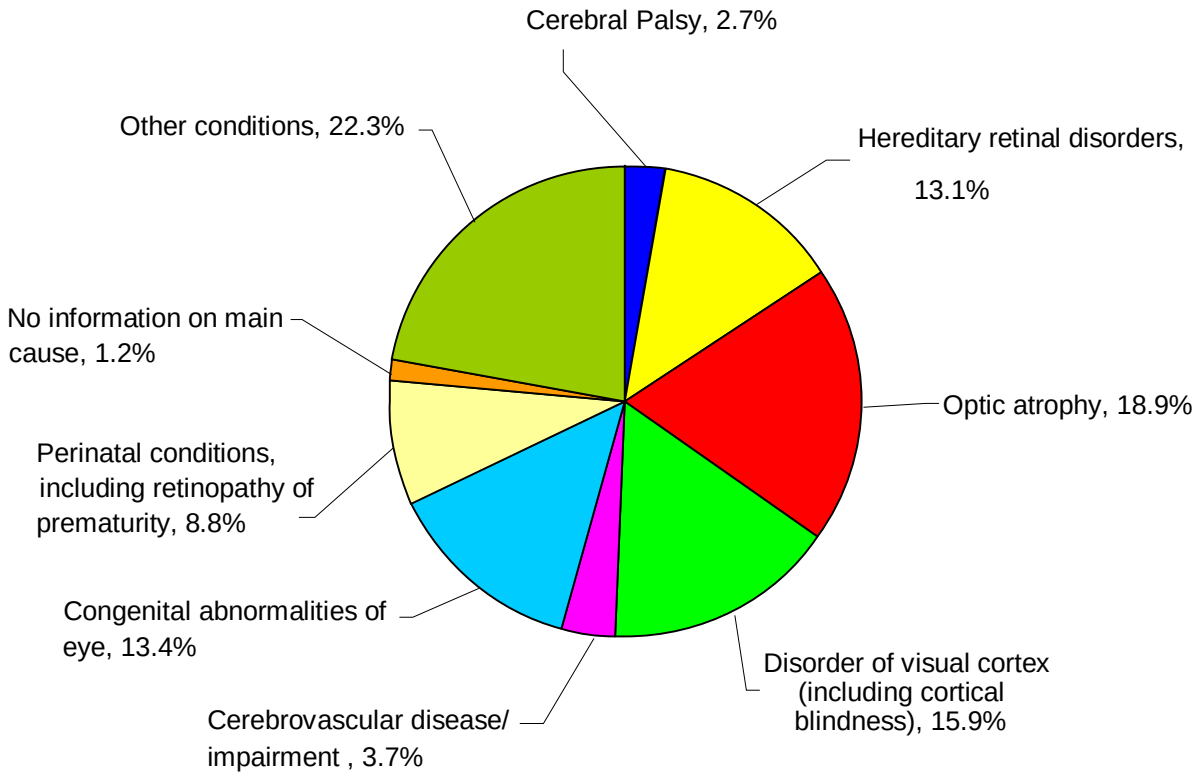
In 2002, a survey carried out by the Royal National Institute of Blind people (RNIB) found a prevalence rate of 2 blind and partially sighted children per 1,000 children and young people up to and including the age of 16 (RNIB 2003). This estimate suggests that just over 1,300 blind and partially sighted children and young people (up to and including the age of 16) were known to Visual Impairment (VI) Services in Local Education Authorities in Wales in 2002 (Greenacre 2004).

1.1.3 Causes of blindness and visual difficulties among children and young people

The causes of blindness and visual difficulties among children and young people are different from those affecting the adult population. For adults, age-related macular degeneration, glaucoma and diabetic retinopathy are reported to be the major causes of registration (Bunce and Wormald 2006). However, the leading cause of blindness and visual difficulties for children and young people is cerebral visual impairment (CVI) and disorders of the optic nerve, notably optic atrophy (Bunce and Wormald 2007). Hereditary retinal disorders, congenital abnormalities of the eye and perinatal conditions are also important causes of blindness and visual difficulties, as shown in Figure 1.1.

Figure 1.1

Causes of blindness and visual difficulties in England and Wales: Children aged 0-15 years (Certifications April 1999- March 2000)



(Bunce and Wormald 2007)

In a study involving children who had been newly-diagnosed with sight problems, at least 75% had disorders that were neither potentially treatable nor preventable with knowledge at the time (Rahi and Cable 2003).

1.1.4 The Welsh Low Vision Service (WLVS)

In 1997, Moorfields Eye Hospital and the Royal National Institute of Blind People (RNIB) carried out a joint research project to determine the number, type and distribution of low vision services in the UK (Ryan and Culham 1999; Culham, Ryan et al. 2002). This highlighted to the Welsh Assembly Government (WAG) that access to low vision services in Wales was difficult for some people and that waiting times for services could result in avoidable sight loss and subsequent loss of independence. In order to address this, WAG chose to

extend low vision services into primary care settings throughout Wales and the Welsh Low Vision Service (WLVS) was launched in 2004 as part of the Welsh Eye Care Initiative (WECI) (Margrain, Ryan et al. 2005).

The Welsh Low Vision Service operates in community-based optometry practices and exists alongside established, hospital-based low vision services. The service is delivered by about 170 accredited low vision practitioners (Court, Ryan et al. 2010), most of whom are optometrists. In the Welsh Low Vision Service, patients have a free low vision assessment with a low vision practitioner. Low vision aids, including optical and non-optical devices, are prescribed free of charge and are collected by the patient within two weeks of their low vision assessment. Referrals into the service can be made by ophthalmologists, GPs, social care services, optometrists and patients themselves. Teachers can refer children into the Children's Low Vision Project (Charlton, Jenkins et al. 2011).

1.1.5 The Children's Low Vision Project (CLVP) in Wales and the role of the Children's Low Vision Advocate (CLVA)

The Children's Low Vision Project (CLVP) in Wales started in 2004 and was set up to meet the needs of children and young people with low vision (www.eyecarewales.nhs.uk). The project runs alongside the Welsh Low Vision Service. One aim of the project is to encourage and enable multi-disciplinary working, including timely and effective referrals between services. This is achieved by the organisation of regional 'Discussion Group' meetings and the provision of standardised referral forms.

The studies reported in this dissertation form part of the ongoing work of the Children's Low Vision Project and were conducted by the author, the Children's Low Vision Advocate for Wales. The role of the Children's Low Vision Advocate is to contribute to the health, development and well-being of children and young people who have low vision and to maintain and contribute to the integrated low vision service. This is achieved by supporting children, young people and their families and working with professionals from health, education, social care and Third Sector organisations.

1.1.6 Training, accreditation and re-accreditation for the Welsh Low Vision Service and Children's Low Vision Project

When the Welsh Low Vision Service was set up, all 500 or so optometrists, ophthalmic medical practitioners and dispensing opticians with a diploma in low vision, registered with the General Optical Council, who were practicing in an optometry practice in Wales, were invited to provide the Welsh Low Vision Service (Ryan, White et al. 2010). The School of Optometry and Vision Sciences at Cardiff University provided the training and accreditation (Margrain, Ryan et al. 2005). This consisted of five (online) theoretical modules assessed by Multiple Choice Questions and two days of practical training, which was delivered throughout Wales (Ryan, White et al. 2010). The practical training included understanding the roles of (and developing links with) professionals from education, social care and the Third Sector and vice-versa.

Candidates intending to provide the Welsh Low Vision Service were examined while carrying out a low vision assessment. Set criteria were used to determine whether a practitioner became accredited. Approximately 85% of candidates passed the first time and practitioners from 168 practices were accredited within the first six months (Ryan, White et al. 2010).

Clinical and service audits showed that the Welsh Low Vision Service was effective and that it improved access to low vision and rehabilitation services in Wales (Ryan, White et al. 2010). However, the need for even better links between low vision practitioners, education, social care and Third Sector (or voluntary) organisations was identified. In addition, low vision practitioners who had been initially accredited, needed to undertake further training in order to continue to provide the Welsh Low Vision Service, e.g. training about prescribing more complex devices and improving links with social care (Charlton, Jenkins et al. 2011). For these reasons, multi-disciplinary training days, which focused on Continuing Professional Development (CPD) and which formed part of the re-accreditation process for low vision practitioners, took place in 2009/2010.

1.2 Continuing Professional Development (CPD)

1.2.1 What is Continuing Professional Development (CPD)?

Continuing Professional Development (CPD) refers to the acquisition of new knowledge, skills and attitudes, which enable competent practice (Peck, McCall et al. 2000). CPD, which can refer to both formal and informal learning events, is an ongoing process rather than the outcome of isolated training opportunities. (Varga-Atkins, O'Brien et al. 2009).

Historically, CPD was provided and accessed through formal training courses. However, a shift has taken place in the delivery, presentation and accessibility of CPD opportunities: CPD can now be presented and accessed in a number of different ways, including:

- Work-based learning
- Distance learning (including web-based learning)
- Private study
- Preparation and delivery of lectures or presentations
- In-house courses
- External courses
- Attending lectures, seminars or conferences
- Tutoring, coaching, mentoring or teaching
- Secondment opportunities
- Carrying out voluntary work

(Egan and Simmonds 2002)

The overall aims of CPD are to prepare and enable individuals to carry out functions that are valued socially and by the marketplace (Omar, Gerein et al. 2009) and to strengthen the knowledge and skills of individuals throughout their careers (Egan and Simmonds 2002).

1.2.2 The importance of CPD

CPD is important for all professionals because it enables individuals to maintain and develop competencies (Muijs and Lindsay 2008) and to improve current (and learn new) skills (Mathieu, Tannenbaum et al. 1992).

In addition to meeting the needs of individuals, CPD must also be planned, delivered and undertaken to benefit others. In the case of health professionals, the CPD process ultimately benefits patients and the local health service (Peck, McCall et al. 2000). For teachers and other education professionals, CPD is important for the overall well-being of schooling (Knight 2002) and for school development (Muijs and Lindsay 2008).

For some professions, CPD is mandatory and is required for registration or accreditation. Similarly, some professionals are required to undertake and successfully complete CPD in order to continue practicing in the field (Muijs and Lindsay 2008). For example, it is mandatory for optometrists to maintain their professional knowledge and skills in order to continue practicing:
(GOC 2008):

> *The GOC (General Optical Council) Scheme is statutory and each registrant's continued right to practise is dependent on the achievement of a certain number of approved points in a three-year period.*

Optometrists obtain Continuing Education and Training (CET) points by successfully completing training programmes, attending conferences, carrying out self-directed learning and through other forms of professional development. Similarly, accreditation and re-accreditation, achieved through successful completion of CPD opportunities, is mandatory for low vision practitioners under the Welsh Low Vision Service (Ryan 2005; Charlton, Jenkins et al. 2011). Professionals in many other disciplines and sectors also need to undertake CPD in order to remain registered or maintain a professional licence, e.g. teachers in Further Education colleges must complete and record at least 30 hours of CPD each year to maintain their licence to practice (Orr 2009). Similarly, the introduction of the General Dental Council's (GDC) 'Lifelong Learning' scheme means that all dentists must undertake CPD to ensure that they regularly update their skills and knowledge (Firmstone, Bullock et al. 2004). In the field of pharmacy, practicing pharmacists and registered technicians are required to make a minimum of nine CPD records per year, as outlined in the General Pharmaceutical Council's Standards for Continuing Professional Development (GPC 2010).

CPD is often provided, accessed and achieved by the provision of a training programme or course, irrespective of whether a training programme is the appropriate intervention (Berge 2008). Training programmes can be provided for many reasons, including:

- Promoting change
- Reducing risk
- Communicating and disseminating knowledge
- Developing skills
- Building teams

1.2.3 Reasons to evaluate training programmes

Ten multi-disciplinary training days were delivered between October 2009 and February 2010 as part of the Welsh Low Vision Service and Children's Low Vision Project. Low vision practitioners, qualified teachers of pupils with visual impairment (QTVIs) and professionals from social care, such as mobility specialists, attended the training days. This study reports an evaluation of the training programme.

Evaluation is an important part of the cycle of education (Cantillon and Jones 1999) and there is agreement about the importance of evaluating training programmes (Holton 1996; Alliger, Tannenbaum et al. 1997). There are many reasons to carry out robust evaluations of training programmes, including, but not limited to:

1. To aid decision making
Evaluation can indicate participant satisfaction with the training programme, which may influence or determine the future provision of certain training programmes (Kraiger 2002). Evaluation can be used as part of an overall needs analysis.

2. To give feedback (formative/ summative assessment)
Evaluation can give course leaders (and organisers) important diagnostic feedback, which can be used to help aid delivery or modify the course in the future (Brown 2005).

3. To help marketing or promotion
The results of evaluations can be used to help market or promote a training programme. For example, positive reactions to a training programme may increase enrolment rates or influence the pre-training motivation of future trainees.

4. To determine the acquisition of knowledge or skills and the extent to which learning objectives have been achieved.

5. To determine the extent to which learners transfer and apply skills and knowledge from the training to work-based situations.

6. To determine the impact or benefits of the training for the organisation as a whole.

7. To justify the financial investment in training programmes
The perceived and actual importance of CPD can be shown by the financial investment in staff training and development. In the National Employer Skills Survey 2007 (NESS07) carried out by the Learning and Skills Council (LSC), companies were found to have spent £38.6 billion on training, a 16% increase since 2005 (LSC 2007). The survey, which involved 79,000 employers, also found that, on average, employers spent £1,725 on training per employee.

8. To determine the impact or benefits of the training on society as a whole, including customers, clients and the community (Aguinis and Kraiger 2009).

With such commitment to and investment in staff training and development, it is unsurprising that CPD interventions, including training programmes and courses, have been scrutinised. Organisations or companies, investing in CPD for their employees, need to determine whether the investment is beneficial to (and has the desired impact on) the individual, the organisation and, in cases, society as a whole. For this reason, the evaluation of training programmes is increasingly considered to be one of the most critical issues faced by the field of Human Resource Development (Holton 1996).

However, evaluations of training programmes are rarely undertaken in a focused or systematic manner (Muijs and Lindsay 2008) and 'most people cringe when a conversation shifts to evaluation' (Kaufman, Keller et al. 1995). This may be because evaluation should be a multi-dimensional process (Trapnell 1984) with a sound theoretical and conceptual basis.

1.3 Kirkpatrick taxonomy to evaluate training programmes

1.3.1 Overview of the Kirkpatrick taxonomy to evaluate training programmes

The evaluation of training programmes has been guided over the last fifty years or so by the simple yet systematic four-level taxonomy proposed by Donald Kirkpatrick. Kirkpatrick first published his four-level approach to evaluate training programmes in 1959 in a series of articles in the US Training and Development Journal (Kirkpatrick 1959 (a); Kirkpatrick 1959 (b) ; Kirkpatrick 1960 (b) ; Kirkpatrick 1960(a)). The Kirkpatrick framework identified four levels at which training programmes should be evaluated. These are summarised as:

Level 1: Reactions
How do the participants feel about the programme they attended?
To what extent are they 'satisfied customers'?

Level 2: Learning
To what extent have the trainees learned the information and skills?
To what extent have their attitudes been changed?

Level 3: Behaviour
To what extent has their job behaviour changed as a result of attending the training programme?

Level 4: Results
To what extent have results been affected by the training programme? Results include factors such as profits, return on investment, sales, production quality and quantity, schedules being met, costs, safety records, absenteeism, turnover, grievances, morale and improved patient care.

The Kirkpatrick approach is hierarchal with the assumption that each level has a knock-on or causal effect on the next. For example, the satisfaction of the trainees (level 1) influences their desire, willingness and propensity to study. If this study results in real learning (level 2), modified behaviour may arise (level

3), which can lead to improved individual and organisational outcomes or results (level 4) (Giangreco, Sebastiano et al. 2009).

The Kirkpatrick taxonomy assumes that data at each of the levels become increasingly important in the evaluation process. Although level 1 data can give an indication about how the training programme could be improved, level 4 data, relating to subsequent organisational change, are much more valuable. It is acknowledged, however, that collecting data through the levels becomes increasingly more complex and, in many cases, costly (Shelton and Alliger 1993).

1.3.2 Popularity of the Kirkpatrick taxonomy

The Kirkpatrick approach remains popular as a method to evaluate training programmes. There are several reasons for this:

1. The approach addresses the need for training professionals, including course deliverers and training managers, to understand and carry out evaluation in a systematic way (Shelton and Alliger 1993).

2. Kirkpatrick acknowledged that level 4 data provide the most valuable or descriptive information that can be obtained about the effects of training. This fits in well with organisations or companies striving to make a profit and allows the results of training to be represented in financial or business terms.

3. The Kirkpatrick framework simplifies the process of evaluating training (Bates 2004). It achieves this by:

- Providing a straightforward guide about the types of questions that can be asked at each level of evaluation.
- Reducing measurement demands.
- Basing conclusions about training effectiveness solely on measurable outcomes.

The popularity of Kirkpatrick's goal-based approach to evaluate training programmes is evident in its continued widespread promotion and application. For example,

"…the theory has now become arguably the most widely used and popular model for the evaluation of training and learning. Kirkpatrick's four-level model is now considered an industry standard across the HR and training communities."

www.businessballs.com/kirkpatricklearningevaluationmodel.htm
(Accessed 17th May 2010)

1.3.3 Level 1 evaluations: Reactions

In the original approach proposed by Kirkpatrick (Kirkpatrick 1959 (a)), reaction was defined as how much the trainees liked a particular training programme. Kirkpatrick acknowledged that level 1 data did not include any measure of learning. It was also acknowledged that nearly all training providers collect level 1 reaction data because they are easy and inexpensive to collect. For example, a survey by the American Society of Training and Development found that 91% of Benchmarking Forum organisations (n=18) measured reactions at the end of training programmes (Sugrue 2005). Level 1 reaction data are often collected through the use of questionnaires or 'smile-sheets' at the end of a training programme.

Kirkpatrick proposed that certain 'standards' should be met when designing or using tools to collect level 1 reaction data (Kirkpatrick 1979):

a) Determine what needs to be found out, e.g. facilities, leaders, schedule, meals.
b) Use a written comment sheet covering the items determined in (a).
c) Design the form so that the reactions can be tabulated and quantified.
d) Make the forms anonymous so that honest reactions are given. Kirkpatrick also acknowledged that the way the forms were collected should ensure anonymity for the respondents.
e) Encourage and enable additional comments to be recorded on the form.

Kirkpatrick recognised, however, that many attempts to collect level 1 data did not adhere to these 'standards'.

1.3.4 The evolution of level 1 evaluation methods

In the original Kirkpatrick framework, level 1 referred to satisfaction or enjoyment. However, as the importance of evaluating training became more widely accepted, the methods to evaluate it evolved. In order to augment level 1 evaluations, a tripartite division of reaction measures was proposed (Warr and Bunce 1995):

1. Enjoyment of the training
2. Usefulness of the training
3. Difficulty of the training

Another model, which augmented Kirkpatrick's approach at all levels, including level 1, was proposed by Alliger, Tannenbaum et al in 1997 (Alliger, Tannenbaum et al. 1997). They highlighted that evaluators asked a range of questions at level 1 to collect reactive or 'immediate' responses, which were emotionally-based. The expanded approach termed the enjoyment of the training as 'affective reactions' and the usefulness as 'utility reactions'. These are summarised as:

Affective reactions:
The extent to which trainees like or enjoy training is the easiest evaluation data to collect (Haccound 1998). It is important to collect this information because an assessment of the satisfaction of trainees is generally in keeping with the provision of services at an organisational level. In addition, the extent to which the training is enjoyed may influence future funding opportunities.

Utility reactions:
Utility reaction data can ascertain the (perceived) utility value or usefulness of the training for future on-the-job performance.

It has been recognised that many reaction measures, historically used to collect level 1 data, have been poorly designed, unreliable and one-dimensional.

Understanding the multi-dimensionality of reactions is a necessary pre-cursor to understand if and how reactions influence the effectiveness of the training (Morgan and Casper 2000).

Although level 1 reactions are commonly measured, it is necessary to understand their factor structure and nomological network in order to appreciate reaction as a construct (Brown 2005). The concept of nomological network, translated as 'lawful network', was developed by Cronbach and Meehl in 1955 (Cronbach and Meehl 1955). A nomological network needs to include a theoretical framework for what is being measured, an empirical framework for how this is going to be measured and identification of the links between these two frameworks.

A better understanding of level 1 reactions would help with the revision and marketing of training programmes.

Level 1 evaluations provide an insight into the overall affective experiences (positive or negative) that occur during training programmes. Subjective learner evaluations about their training experiences are one of the dominant methods to assess the effectiveness of training and development opportunities (Dysvik and Martinsen 2008).

1.3.5 Limitations of level 1 evaluations

Tello, Moscoso et al (2006) claimed that semi-standard instruments, such as ratings scales in questionnaires, are often used to evaluate trainee satisfaction at level 1. The design of such scales is often based on the nature of the training context and the specific characteristics of the organisation. For this reason, traditional (Kirkpatrick-style) data analysis at level 1 presents a low degree of sensitivity in detecting specific differences between obtained responses. In many such ratings scales, respondents are assigned the same response category despite being at different points, individually, on the assessment criteria (Tello, Moscoso et al. 2006).

Darby (Darby 2008) examined whether there was a tendency to respond 'favourably' on Likert scales, which use wording such as 'extremely good' or

'extremely bad'. Trainees responded favourably to courses because of a 'response bias'. The implications of this could indicate that favourable level 1 evaluations do not necessarily mean that the training is good or effective. More likely, favourable evaluations could reflect the tendency to respond at the more favourable end of Likert scales. Darby also acknowledged that reactions are often influenced by a desire to be seen by others in a 'good light' or 'fitting in' (Darby 2006). Learners may be uncomfortable or unwilling to be negative about the course presenter or the training as a whole, even if the measurement tool assures confidentiality. Darby found that respondents commented favourably about 'human-related' factors (e.g. course presenters) in open-ended questions but were less favourable about 'hygiene-related' factors such as the venue. Therefore, open-ended questions must be considered with caution because false conclusions about either the merits of the presenters or the limitations of the venue (for example) may be drawn.

It is also acknowledged that other factors can also influence learners' responses to measurement tools used to collect level 1 data. For example, one study found that the size of the class influenced the way in which learners rated a course (Kuo 2007). The study concluded that course ratings were higher for classes of 20 people or less and course ratings decreased when the class size increased in this small group size.

Similarly, the course presenter themselves can have a significant impact on the way in which course participants rate the effectiveness of teaching A study involving 213 undergraduate students at a University in the Midlands found that the perceived charisma of a lecturer is a significant predictor of perceived teaching effectiveness (Shevlin, Banyard et al. 2000).

Although the merits of level 1 evaluations have been disputed, evaluating at this level has remained popular and commonplace. However, as there is now more emphasis on a better understanding of reaction measures, it is helpful to put (and keep) them in their place (Ruona, Leimbach et al. 2002).

1.3.6 Level 2 evaluations: Learning

In the original taxonomy, Kirkpatrick acknowledged that there are several different ways to define learning (Kirkpatrick 1979). However, learning was defined in a rather limited way as, "What principles, facts and techniques were understood and absorbed by the conferees?" Kirkpatrick recognised the importance of determining, objectively, the amount of learning that takes place during a training programme and included guidelines to measure learning:

a) The learning of each conferee should be measured so that quantitative results can be determined.
b) A before-and-after approach should be used so that any learning can be related to the programme.
c) The learning should be measured, as far as practical, on an objective basis.
d) When possible, a control group (not receiving training) should be used to compare against the experimental group, which receives training.
e) When practical, the evaluation results should be statistically analysed so that learning can be measured in terms of correlation or levels of confidence.

Kirkpatrick acknowledged that level 2 evaluations are more difficult than level 1 evaluations. For example, a statistician may be needed to plan, collect, analyse and present level 2 evaluation data (Kirkpatrick 1979). Kirkpatrick also recognised that it is relatively easy to obtain *evidence* of learning but more difficult to obtain *proof* that learning has taken place (Kirkpatrick 1977). In order to obtain these data, before (pre-test) and after (post-test) assessments need to be carried out.

Kirkpatrick suggested that measuring the learning that takes place during a skills-based training programme is relatively easy. For example, in-class demonstrations, individual performance of the skills being taught, role-plays and discussions can all be used. This type of evaluation can usually be built into the training programme itself and can be carried out by the course presenter in an objective and systematic way.

In more fact-based training programmes, Kirkpatrick suggested that evaluating learning is more difficult. The most common method to evaluate learning is the

paper-and-pencil test (Kirkpatrick 1979), which can be administered before and after the training to both the training cohort and control group. Although standardised, generic assessment materials are available, Kirkpatrick acknowledged that trainers may also need to develop their own evaluation tools to reflect the individuality of the training programme.

Although level 2 evaluations are vital to determine whether the learning objectives for the training are met, they are generally carried out less often than level 1 evaluations. For example, a survey by the American Society of Training and Development found that 54% of Benchmarking Forum organisations (n=18) measured learning at the end of training programmes, compared with 91% measuring reactions (Sugrue 2005).

1.3.7 Limitations of level 2 evaluations

One characteristic of historical models to evaluate learning is the absence of a conceptual basis (Kraiger, Ford et al. 1993). In the Kirkpatrick approach, learning is measured by the extent to which course participants have acquired facts, skills or principles and is assessed by traditional, pencil-and-paper tests. Learning is considered to be a causal result of a positive reaction to training ('happy learners') and a determinant of changes in behaviour and on-the-job performance (Alliger and Janak 1989).

One limitation of the Kirkpatrick level 2 approach is that it remains unclear whether learning facts, skills or principles are synonymous and whether they can be evaluated using the same instrument or tool. For example, multiple-choice tests may not be appropriate measures for training programmes, which set higher-order learning objectives (Kraiger and Cannon-Bowers 1995).

Kirkpatrick's one-dimensional approach to learning simplifies the learning process and does not take into account the complexities and intricacies of learning or different types of knowledge, concentrating only on lower-order learning at a cognitive level.

One of the most widely known models to represent different types of learning is *Bloom's Taxonomy of Learning* (Bloom 1956). Bloom's classification system has

been widely accepted and applied in educational research (Valcke, De Wever et al. 2009). Bloom proposed that there are different types of learning and that learning exists in three different domains:

1. Cognitive (knowledge)
2. Affective (attitude)
3. Psychomotor (skills)

Each major domain has categories of increasing levels of difficulty where different tasks can be accomplished (Harker 2009). The taxonomy can be considered as the goals or objectives of the learning process and good objectives should be a combination of each domain. Objectives set for a training session should range from being simplistic, which are at the bottom levels in each of the three domains, to more complex, which are at the higher levels in each domain. The higher levels require more thought, analysis and evaluation. The simplest level in the cognitive domain is knowledge (recall data or information); the highest level is evaluation (make judgements, critique, justify and conclude).

Another limitation of the Kirkpatrick approach at level 2 is that it does not take into account informal, work-based learning. It has been estimated that 70% of workplace learning occurs through informal events in daily settings (Pfeffer and Sutton 2000).

1.3.8 Level 3 evaluations: Behaviour

Kirkpatrick recognised that there is a difference between knowing principles and techniques and using them 'on the job' (Kirkpatrick 1960(a)). Level 3 evaluation is concerned with determining whether learners apply and use newly acquired knowledge and skills 'on the job' or in the workplace. Kirkpatrick acknowledged that evaluating at this level is more difficult than evaluating reactions and learning
(Kirkpatrick 1979).

Kirkpatrick proposed that the following guidelines should be followed when evaluating training programmes in terms of behavioural change:

1. A systematic appraisal of on-the-job performance should be made before and after the training intervention.

2. The appraisal of performance should be made by one or more of the following groups (the more the better):

a) the trainees themselves
b) the trainees' supervisors or superiors
c) the trainees' subordinates
d) the trainees' peers or other people familiar with their performance

3. A statistical analysis should be carried out to compare performance before and after and relate any changes to the training programme.

4. The post-training appraisal should be made three months or more after the training so that the trainees have the chance to put new skills or knowledge into practice. Subsequent, longer-term appraisals, may also add validity to the evaluation.

5. A control group, which does not receive the training, should be used.

Kirkpatrick (Kirkpatrick 1977) highlighted the need to attribute any changes to on-the-job behaviour or performance to the training programme itself rather than on other contributing factors, e.g. salary changes, instruction from management, reading articles or books or personal experience.

Kirkpatrick acknowledged that level 3 evaluations can become complicated, time consuming and expensive. For example, a survey by the American Society of Training and Development found that 23% of Benchmarking Forum organisations (n=18) measured 'transfer' at the end of training programmes (Sugrue 2005).

1.3.9 Limitations of level 3 evaluations

Kirkpatrick used the term 'behaviour' to refer to any behavioural changes, which occur as a result of training (Alliger, Tannenbaum et al. 1997). However, Kirkpatrick did not distinguish between behavioural changes shown in the

training context (e.g. role-play situations at the end of a training programme) and behavioural changes 'on-the-job' itself. For that reason, the term 'transfer' was introduced as a specified measure of job performance. Transfer can be evaluated some time after the training programme has taken place (Alliger, Tannenbaum et al. 1997).

Level 3 evaluations are perhaps one of the most difficult (and costly) to carry out because of the range of influencing factors. However, it is important to evaluate at this level because the results not only reflect the training programme itself but also act as a pre-cursor to assessing the impact of the training at an organisational level (level 4).

1.3.10 Level 4 evaluations: Results

In the original framework, Kirkpatrick outlined that the objectives of most training programmes can be stated in terms of desired results (Kirkpatrick 1960 (b)). Results could be classified in a number of ways, such as reduction of costs, reduction of turnover and absenteeism, reduction of grievances, increase in quality or quantity of production or improved morale, which in turn may result in some or all of the above 'results'. In 1977, Kirkpatrick expanded on the original definition of 'results' by including return on investment, schedules being met and safety records (Kirkpatrick 1977).

Kirkpatrick acknowledged that it would be best to evaluate training programmes in terms of results. However, he also recognised that, for most training programmes, there are so many complicating factors that it is extremely difficult, if not impossible, to evaluate in terms of results. Obtaining actual proof of the impact of the training would mean eliminating all other factors, for example, a change in management or improved working conditions. Evidence of changes in results is much easier to obtain than proof (Kirkpatrick 1977).

In addition to evaluating training to assess the impact on organisational outcomes, such as increased productivity or profitability, improved quality and quantity of production or reduced staff absenteeism, evaluating at this level can be useful for a number of other reasons, e.g. (Aguinis and Kraiger 2009):

1. To retain business
2. To reduce, limit or prevent staff turnover
3. To maintain or promote reputation: One study found that the reputation of an organisation can be affected by its training practices. The reputation of an organisation or business can have significant financial implications because it affects the ways in which clients, customers, staff and competitors interact with the organisation or business (Clardy 2005).
4. To develop, promote or maintain social capital, e.g. relationship building or institutional trust. Training (and its evaluation) can affect important social factors, which in turn are likely to affect organisational outcomes.

In the case of the Welsh Low Vision Service training, level 4 evaluation could refer to improved links between professionals from different disciplines with subsequent benefits to patients and service users.

1.3.11 Limitations of level 4 evaluations

Level 4 evaluations can be considered the most valuable for organisations and companies. Training programmes are often scrutinised and examined to determine the value that they bring to the overall strategy of an organisation and the extent to which they contribute to the strategic direction (Phillips and Phillips 2001). However, evaluating at this level can be difficult, time consuming and costly because of the intricacies involved (Shelton and Alliger 1993). A survey by the American Society of Training and Development found that just 8% of Benchmarking Forum organisations (n=18) measured level 4 results (Sugrue 2005).

Level 4 evaluations are difficult because controlling for past performance (pre-training) can be difficult (Dysvik 2007). It can also be complicated to control for non-participation in the training programme. It has been proposed that one way to overcome this can be to use control and experimental groups, selected by randomised assignment or randomised trials (Ashenfelter 1987). A simple comparison of outcomes (such as earnings) between the control and experimental groups before and after the training will result in a simple but credible estimate of the success or failure of that training programme. However, as many training programmes are delivered to prevent or limit mistakes, errors,

defects and waste (as opposed to correcting them), it can be difficult to show the impact of training with a control group that does not receive the training. This is because the only feasible way of controlling for the impact of the training would be to not deliver it, which is unadvisable (or unethical) in most situations (Berge 2008).

Another reason why organisations may avoid carrying out level 4 evaluations is that they may expose the failings of investment in a training programme. For example, a training programme, designed to increase productivity by 20%, may be seen to have failed if productivity after the training programme does not increase by 20%. Similarly, a negative level 4 evaluation may imply or confirm culpability in the trainer or the training department.

Some organisations may attempt to carry out level 4 evaluations when impact assessment is neither required nor appropriate. For example, if the aim of a training programme is to change attitudes, which are non-observable, it is unlikely to result in a change in organisational output (Shelton and Alliger 1993).

It is generally accepted that organisational level evaluations can not and should not be carried out in isolation. Any evaluation of training at an organisational level should be part of a wider evaluation, which puts each set of data in perspective (Trapnell 1984).

1.3.12 Critique of Kirkpatrick taxonomy

The significant conceptual flaws of the Kirkpatrick model, proposed by some commentators, are summarised in this section.

1. The taxonomical approach proposed by Kirkpatrick classifies rather than defines causal constructs

Holton (1996) highlighted that the Kirkpatrick approach is a simple, yet elegant, taxonomy or classification scheme but that it does not meet the requirements of a theory or model. In response, Kirkpatrick (Kirkpatrick 1996) noted that it is more important that the approach clarifies the evaluation process than whether it is a taxonomy, model or theory. Kirkpatrick also noted that the term model is easier to understand than taxonomy. Holton responds to this by noting that if

the four-level approach is a model, then it is underspecified; If it is a taxonomy, then a true model is needed (Holton 1996).

2. The assumption of causal linkages between levels

The Kirkpatrick approach assumes that there are causal linkages between the levels, e.g. positive reactions lead to increased learning (Bates 2004). However, various studies have failed to confirm causal linkages between levels. Two meta-analyses in particular (Alliger and Janak 1989), (Alliger, Tannenbaum et al. 1997) found little evidence of causal linkages or significant correlations between measures at the different levels. The strongest (though still modest) correlations were between criteria within the same levels, e.g. affective and utility reactions correlated more significantly with each other than with outcome measures in different levels. Utility reactions were found to correlate more strongly than affective reactions to changes in job behaviour, indicating that it may be more beneficial to collect utility (e.g. 'relevance'), rather than affective (e.g. enjoyment) data during level 1 evaluations.

Another study of a two-day training course attended by technicians at motor-vehicle dealerships concluded that reactions (level 1) were generally unrelated to subsequent job behaviour (level 3). Changes to job behaviour were shown to be predicted by other variables, including the transfer climate and learner confidence (Warr, Allan et al. 1999).

3. Incremental importance of information through the levels

The Kirkpatrick approach assumes that each level of evaluation will produce data that are more useful than the previous levels (Bates 2004). However, if the causal linkages between levels are considered flawed, this assumption cannot be maintained.

4. The four-level approach is incomplete

It has been proposed that the evaluation process should begin with level 0. This may include data about the number of people who attended a training programme and how many completed it (Wilson 2004).

The societal impact of training is also missing from the original Kirkpatrick model (Kaufman, Keller et al. 1995). Organisations increasingly need to

demonstrate their impact on societies and communities and the need to evaluate at this level has become increasingly important. As Schmalenbach asks,

"Will this organisation, through the people in it, make a net contribution to our community?"
(Schmalenbach 2006)

An expanded evaluation framework, the *Kirkpatrick Plus* model, which refers to evaluating the impacts of training at a societal level, has also been developed (Kaufman and Keller 1994). The benefits of training activities for society as a whole have led to a widespread adoption (in many places) of national policies to encourage the design and delivery of training programmes at a national level (Aguinis and Kraiger 2009).

5. The role of technology and changing learning environments

Training programmes have traditionally been delivered in classroom-style settings, including in the workplace. However, technology is playing an increasingly important role in training and development. Training programmes delivered using current technology, e.g. internet-based learning, reduce the need for the learner to be in the 'classroom' at the same time as the instructor (Rossett 2007). As technology reduces the gap between learning and work, traditional evaluation models are becoming less relevant. Learning, support and information are delivered when, where and how they are needed (Rossett 2007). In addition, the evaluation needs of e-training programmes are likely to be different from more traditional classroom-style interventions. The 'Seven Principles of Good Practice' were used to assess the effectiveness of an online-based educational statistics course (Bangert 2004). In addition to evaluating traditional elements such as learner interest and understanding, elements of online-specific learning were also evaluated, e.g. accompanying face-to-face meetings and study groups.

6. 'Soft' outcomes' or 'soft' indicators

Soft outcomes from training cannot be measured directly or tangibly and differ from 'hard outcomes' such as qualifications (Dewson, Eccles et al. 2000). Soft outcomes may include interpersonal, organisational, analytical and personal

skills. Although soft outcomes can provide useful additional information about the impact and effectiveness of training programmes, they are not referred to in the Kirkpatrick approach.

7. Return on Investment (ROI)

Kirkpatrick acknowledged the need to evaluate training at the organisational level because of the financial implications of the training process. However, the Kirkpatrick approach did not clearly define the financial implications of training in terms of the cost of training or the possible financial gains that could be made by providing training opportunities.

One way to evaluate the impact of training in financial terms and monetary value is Jack Phillips' Return on Investment (ROI) methodology, which was developed in the 1970s. Return on Investment has been a widely used concept in business as a measure for value-added benefits. It refers to the ratio of earnings (net benefits) to investments (costs) (Phillips and Phillips 2001).

Calculating the ROI associated with training is a complex process. However, in summary, the ROI of training can be considered as (Wilson 2004):

$$\text{Return on Investment} = \frac{\text{Net benefits of training}}{\text{Total costs (to plan, deliver, and evaluate training)}}$$

Although Phillips' ROI (5th level) is considered a useful addition to Kirkpatrick's approach, it has itself received criticism. For example, the data used to calculate ROI can vary between evaluations and the lack of standardisations makes ROI comparisons difficult, if not impossible, e.g. one ROI calculation may include the cost of the learner's time, another may not.

1.3.13 Modifications to the Kirkpatrick taxonomy

Several Kirkpatrick 'off-spring' models have been developed, which retain much of the original approach and extend it at the front or back end. Models that extend the Kirkpatrick taxonomy at the front end propose that a training design or needs analysis should be carried out as part of the evaluation process (Tampkin, Yarnall et al. 2002). Models that extend the Kirkpatrick approach at

the back end, e.g. Phillips' ROI, usually refer to the financial impacts or the effects of training at a societal or community level.

It has been proposed that the four-level approach, originally designed as an evaluation tool, may be better used as a planning tool by 'turning it on its head'. As Kirkpatrick notes, the 'end is the beginning' because the new way of using the approach is to work from level 4 to level 1 (Kirkpatrick and Kirkpatrick 2009). It is first necessary to determine what success (at an organisational level) actually means (level 4). This can be compared to a training needs analysis. For the Welsh Low Vision Service training, success could be considered as more children and young people using the service, better links between professionals from different disciplines and low vision practitioners prescribing the new equipment available under the scheme, e.g. Compact Plus electronic magnifier.

Once success has been identified, it is possible to determine the types of behaviours that will bring about that change (level 3). Following this, the competencies, skills and knowledge required by learners or employees to bring about those changes can be identified (level 2). Finally, it is possible to determine and provide the opportunities, conditions and learning environments that will enable the learners or employees to participate in, interact with and enjoy the training intervention (level 1).

This approach, based on the original taxonomy and principles, clarifies the process and is called the Kirkpatrick Model.

1.3.14 Alternatives to the Kirkpatrick taxonomy

There are countless other models to evaluate training programmes, which are unrelated to the Kirkpatrick approach. Three alternatives are summarised below:

i) Daniel Stufflebeam's CIPP model (Stufflebeam 1983)
The core concepts evaluated in this model are context, inputs, processes and products (CIPP). The model helps decision-making and guides the planning and implementation of training and development interventions (Stufflebeam 2003). The CIPP model is useful to evaluate complex systems (Muijs and Lindsay 2008).

ii) Robert Stake's Countenance Model (Stake 1967)

The Countenance Model, proposed by Robert Stake in 1967, was originally developed for curriculum studies with the aim of capturing the complexity of innovation or change by comparing intended and observed outcomes at various levels (Deepwell 2002). The link between intended and observed outcomes can be used to judge success or failure.

iii) Goldstein's System's Approach (Goldstein 1993)

In Goldstein's 'systems approach', training begins with an assessment of needs at organisational, task and personal levels. Data collected from the needs assessment are used to determine and plan the training programme. The next stage in the process is to deliver the training programme. Finally, both formative and summative evaluations are carried out (Marth 1994).

1.4 Conclusion

Although the Kirkpatrick approach to evaluate training programmes is fifty years old, it remains popular because it is systematic, relatively simple to implement and flexible enough to be applied to a range of training programmes.

The Kirkpatrick approach has been used in this study to evaluate the multi-disciplinary training programme delivered as part of the Welsh Low Vision Service and Children's Low Vision Project. Chapter 2 reports level 1 (reactions) and level 2 (learning) evaluations. Chapter 3 reports evaluation at level 3 (behaviour) and level 4 (in this case, the impact of the training on multi-disciplinary working).

Chapter 2 Immediate evaluation of multi-disciplinary training days

2.1 Introduction

This chapter describes the evaluation of ten multi-disciplinary training days, which took place in Wales between October 2009 and February 2010. It starts with an overview of the training days and reports an evaluation of them in line with levels 1 and 2 of the Kirkpatrick approach.

2.1.1 The training days

The Welsh Assembly Government provided funding for ten multi-disciplinary training days to take place throughout Wales between October 2009 and February 2010. The training was provided by Cardiff University, in conjunction with RNIB Cymru, as part of the Welsh Low Vision Service and Children's Low Vision Project.

2.1.2 Why was the training provided?

The training was provided with a number of aims:

1. To improve referral processes for children and young people with low vision in Wales

In September 2008, the author carried out an audit of the referral pathways of 23 children and young people referred from a hospital-based ophthalmology clinic to the community-based low vision service. The audit, which was not part of the current study, showed that just 11 of the 23 children referred for a low vision assessment actually had an assessment with a low vision practitioner. The audit also showed that there was limited communication between professionals from different disciplines: Only one report following a low vision assessment was sent back to the ophthalmology clinic.

2. To improve the uptake of the Welsh Low Vision Service by children and young people

Data provided by the Welsh Low Vision Service showed that 119 children and young people had a low vision assessment between April 2009 and April 2010. However, as there are an estimated 1,300 children and young people in Wales

who are blind or partially sighted, the number of children who would benefit from accessing the service could be considerably more.

3. To improve links between the Welsh Low Vision Service and social services

It had already been established that there were good links between the WLVS and social services in some areas but poorer links in others. The training days provided an opportunity for professionals from different disciplines, including the Welsh Low Vision Service and social services, to network, share information and develop links at a local level.

4. To encourage specialist teachers to use the Low Vision Toolkit

Education professionals received training to accompany the Low Vision Toolkit. The Toolkit is a structured, modular training programme for education professionals to use to teach children with low vision when and how to use their low vision aids. A summary of the Low Vision Toolkit is provided in Appendix 1.

5. To improve understanding of and compliance with the protocols of the Welsh Low Vision Service and Children's Low Vision Project

The training days provided information and updates relating to the protocols and processes of the Welsh Low Vision Service and Children's Low Vision Project, e.g. how to return redundant low vision aids.

6. To encourage prescribing of new equipment available under the scheme

The training days included sessions about the newly introduced equipment available under the scheme, including an electronic hand-held magnifier (Compact Plus), the Norville spectacle-mounted magnifier and the Keeler telescopic devices.

7. To re-accredit low vision practitioners

The training days formed part of the re-accreditation process for low vision practitioners, who wished to continue practising under the Welsh Low Vision Service.

2.1.3 Organisation and promotion of the training

A promotional flyer, programme (Appendix 2) and booking form were developed and distributed by post to low vision practitioners, specialist teachers, rehabilitation officers, mobility specialists, social workers and representatives from Third Sector organisations. As the Welsh Assembly Government funded the training days in full, there was no charge for attendance.

The training days took place in ten locations throughout Wales between October 2009 and February 2010:

October 2009	Carmarthen
October 2009	Lampeter
October 2009	Cwmbran
November 2009	Swansea
November 2009	Wrexham
January 2010	Cardiff
January 2010	Bridgend
February 2010	Llantrisant
February 2010	Bangor
February 2010	St. Asaph

2.1.4 Aims of the study

The aims of this study were to:

1. Evaluate the training days in terms of learner reactions (level 1).
2. Evaluate the factors that enabled or prevented learning from taking place (level 2).
3. Evaluate the relationships between reactions (level 1) and learning (level 2).

2.2 Methods

2.2.1 Advisory Group

An Advisory Group was set up to develop a questionnaire to evaluate the training days in line with Kirkpatrick's levels 1 and 2. The Advisory Group comprised:

Nathan Davies, Children's Low Vision Advocate for Wales, RNIB Cymru (funded by the Welsh Government)

Professor Alison Bullock, Professor and Director of the Cardiff Unit for Research and Evaluation in Medical and Dental Education (CUREMeDE), Cardiff University

Dr Barbara Ryan, Clinical Lead, Welsh Low Vision Service and Co-Director, Wales Optometry Postgraduate Education Centre, School of Optometry and Vision Sciences, Cardiff University

Dr Maggie Woodhouse, Senior Lecturer, School of Optometry and Vision Sciences, Cardiff University

Ms Nicola Crews, Manager, Education, children and families team, RNIB Cymru

Mrs Sue Keil, Research Officer, RNIB

2.2.2 Evaluation questionnaire design

In September 2009, the author developed a draft questionnaire, based on the Kirkpatrick approach, to evaluate the training days at levels 1 and 2. Members of the Advisory Group were sent the draft questionnaire to check for clarity, robustness and ease of use and to ensure that it met the needs of the evaluation process. Minor modifications were made until all members of the Advisory Group agreed the final content of the questionnaire.

The 27-item questionnaire used to evaluate the training days was designed so that members of all professional groups attending the training days could complete it. It was divided into five sections to capture data such as the participants' pre-training perceptions, expectations and levels of motivation, reactions to the training, learning and the future impact of the training. A section to enable open responses was also included. The questionnaire used to evaluate the training days is shown in Appendix 3.

The optimum number of response categories used in paper-based surveys remains ambiguous and widely discussed (Preston and Colman 2000). The reason for and context of using a rating scale, time pressures and possible frustration or boredom among responders, among other factors, must all be considered when deciding the number of response categories. In this study, rating scales of six responses were used. This was considered appropriate for the needs of the questionnaire and the context within which it would be completed. The questionnaire was designed so that participants could complete and submit it anonymously, as outlined in the Kirkpatrick approach.

2.2.3 Questionnaire administration

A printed copy of the evaluation questionnaire was included in the packs given to participants at each of the ten training days. The questionnaires were colour-coded (with stickers) for professionals from health (low vision practitioners), education (specialist teachers for pupils with visual impairment) and social care (social workers, mobility and rehabilitation officers). Colour coding the questionnaires enabled evaluations to be carried out for each of the three disciplines separately. The number of representatives attending from Third Sector organisations was considered too low to warrant separate evaluation. The evaluation process was verbally described during the introductory session at each training day and participants were asked to complete Section A (pre-training expectations) of the questionnaire. Participants retained the questionnaire and completed the remainder of it during or immediately after the training. Completed questionnaires were collected anonymously at the end of each training day.

2.2.4 Data input and analysis

The questionnaire was coded and a corresponding data file set up using the commercially available software, SPSS 16.0. The author input the data from the 238 completed questionnaires into the SPSS file. Chi-squared and Pearson's correlation were used to evaluate the data. A confidence level of significance of $p<0.05$ has been used throughout.

Many of the questions in the questionnaire had six-point Likert-style response categories. The Advisory Group agreed that it would be appropriate to combine the six response categories into three pairs for the purpose of evaluation. For some questions, only the most positive and most negative pairs of responses (e.g. very good/ very poor) are reported. This is because, traditionally, the mid-point responses in Likert-type items have been considered to represent 'neutral', e.g. neither agree nor disagree. However, it is also acknowledged that the mid-point in Likert scales can indicate other intended responses such as 'don't know', 'never thought about it', 'undecided' or 'no opinion' (Raaijmakers, Van Hoof et al. 2000).

2.3 Results

2.3.1 Response rate

In total, 238 professionals completed an evaluation questionnaire, comprising:

142 low vision practitioners	(59.7% of total responses)
37 specialist teachers	(15.5% of total responses)
59 social care professionals	(24.8% of total responses)

2.3.2 Enrolment process and pre-course information

In total, 80.9% (n=186) of respondents rated the enrolment process as very good or good and 1.3% (n=3) rated it as very poor or poor.

In comparison, 71.6% (n=166) of respondents rated the pre-course information as very good or good and 3.0% (n=7) rated it as very poor or poor.

2.3.3 Reasons for attending

Of the 142 low vision practitioners who responded, 116 (81.7%) reported that they attended the training because they had to for re-accreditation, 25 (17.6%) attended out of their own choice and 1 (0.7%) attended for another reason.

The majority of specialist teachers (79.4%, n=27) and social care professionals (70.7%, n=41) attended the training out of their own choice. 17.6% (n=6) of specialist teachers and 24.1% (n=14) of social care professionals attended because they were advised to by their manager.

2.3.4 Pre-training expectations

Expected enjoyment

In total, 233 professionals answered the question about how enjoyable they were expecting the training to be.

Specialist teachers were expecting to enjoy the training more than low vision practitioners and professionals from social care. Overall, 77.1% (n=27) of specialist teachers were expecting the training to be extremely enjoyable compared with 64.9% (n=37) of social care professionals and 51.8% (n=73) of low vision practitioners. However, the relationship between expected enjoyment and professional group was not significant (Chi ^{2}=13.156, p=0.107).

Expected relevance

In total, 235 professionals answered the question about how relevant they were expecting the training to be.

Although low vision practitioners were expecting to enjoy the training less than colleagues in other disciplines, they were expecting it to be extremely relevant. Of the 142 low vision practitioners who responded, 93.0% (n=132) were expecting the training to be extremely relevant compared with 88.6% (n=31) of specialist teachers and 82.8% (n=48) of social care professionals. However, the relationship between expected relevance and professional group was not significant (Chi ^{2}=9.479, p=0.148).

Expected ease

In total, 232 professionals answered the question about how easy they were expecting the training to be.

Low vision practitioners were expecting the training to be easier than colleagues from education and social care. Of the 142 low vision practitioners who responded, 27.5% (n=39) were expecting the training to be very easy compared with 26.8% (n=15) of social care professionals and 23.5% (n=8) of specialist teachers. However, the relationship between expected ease and professional group was not significant (Chi ^{2}=13.117, p=0.108).

Only four respondents (all low vision practitioners) were expecting the training to be very difficult.

Motivation

In total, 235 professionals answered the question about how motivated they felt.

Of the 35 specialist teachers who responded, 88.6% (n=31) reported that they felt very motivated compared with 79.3% (n=46) of social care professionals and 69.7% (n=99) of low vision practitioners.

The relationship between motivation and professional group was significant (Chi ^{2}=16.312, p< 0.05).

2.3.5 Relationships between pre-training expectations

Table 2.1 shows the results of Pearson's bi-variate two-tailed correlations between expected enjoyment, relevance and ease of the training and levels of motivation.

Table 2.1

Pearson's correlations between expected enjoyment, relevance, ease and motivation

		How enjoyable will the training be?	How relevant will the training be?	How easy will the training be?	How motivated do you feel?
How enjoyable will the training be?	Pearson correlation	1.000	.511 *	.217 *	.664 *
	Sig. (2-tailed)		<.0001	.001	<.0001
	N	233	233	230	233
How relevant will the training be?	Pearson correlation		1.000	.064	.510 *
	Sig. (2-tailed)			.330	<.0001
	N		235	232	235
How easy will the training be?	Pearson correlation			1.000	.149 *
	Sig. (2-tailed)				.023
	N			232	232
How motivated do you feel?	Pearson correlation				1.000
	Sig. (2-tailed)				
	N				235

*correlation is significant at p<0.05

There were strong, significant positive correlations between how motivated participants felt and expected enjoyment (0.664, $p<0.05$) and expected relevance (0.510, $p<0.05$). A weaker, though significant, positive correlation existed between motivation and expected ease (0.149, $p<0.05$).

A strong significant positive correlation also existed between expected enjoyment and expected relevance (0.511, $p<0.05$). There was also a positive correlation between expected enjoyment and expected ease (0.217, $p<0.05$). The weak positive correlation between expected relevance and expected ease was not significant (0.064, $p=0.330$).

2.3.6 Relationships between pre-training expectations and reasons for attending

In total, 70.7% (n=65) of professionals who attended the training out of their own choice were expecting the training to be extremely enjoyable. This compared with 55.0% (n=11) of professionals who attended because their manager advised them to and 47.8% (n=55) who attended for re-accreditation. Expected enjoyment was significantly related to the reason for attending (Chi $^2=24.040$, $p<0.05$).

Of the 116 low vision practitioners who reported that they attended the training for re-accreditation, 91.4% (n=106) were expecting the training to be extremely relevant. In comparison, 90.3% (n=84) of all professionals who attended out of their own choice and 75.0% (n=15) of all professionals who attended because their manager had advised them to were expecting the training to be extremely relevant. Expected relevance was not significantly related to the reason for attending (Chi $^2=11.058$, $p=0.272$).

Of the 116 low vision practitioners who attended the training for re-accreditation, 27.6% (n=32) were expecting the training to be very easy. In comparison, 26.7% (n=24) of all professionals who attended out of their own choice and 15.0% (n=3) who attended on the advice of their manager were expecting the training to be very easy. Expected ease was significantly related to the reason for attending (Chi $^2=23.906$, $p<0.05$).

In total, 88.2% (n=82) of all professionals who attended out of their own choice felt very motivated. This compared with 70.0% (n=14) of professionals who attended because their manager had advised them to and 63.8% (n=74) who attended for re-accreditation. Motivation was significantly related to the reason for attending (Chi ^{2}=26.909, $p<0.05$).

2.3.7 Teaching and learning approaches

Different teaching and learning approaches were used during the training days, including individual tasks, whole group discussions and hands-on or practical activities. Respondents recorded the usefulness of each approach on a 6-point Likert scale where 1 was 'not useful at all' and 6 was 'very useful.'

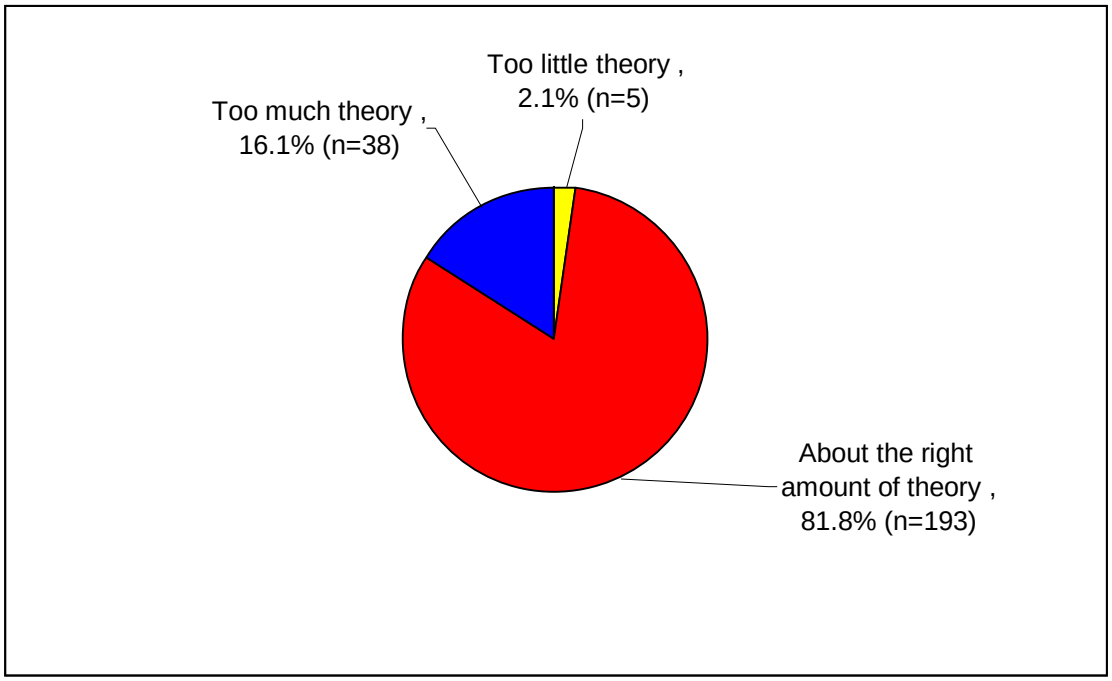
All the teaching and learning approaches were considered very useful by the majority of respondents.

Multi-disciplinary sessions were reported to be the most useful approach (mean 5.38, 95% CI 5.26-5.49) followed by whole group discussions (mean 5.35, 95% CI= 5.23-5.47) and hands-on/ practical activities (mean 5.35, 95% CI=5.23-5.47). Small group work (mean 5.33, 95% CI=5.21-5.46), Q&A sessions (mean 5.24, 95% CI=5.10-5.38) and individual tasks (mean 5.22, 95% CI=5.07-5.37) were also useful. The least useful approach reported was pair work (mean 5.17, 95% CI=5.03-5.31).

The training days combined theoretical sessions with practical sessions and 236 professionals reported how they felt about the amount of theory covered during the training. Figure 2.1 shows how respondents felt about the amount of theory covered during the training.

Figure 2.1

How respondents felt about the amount of theory covered during training (n=236)

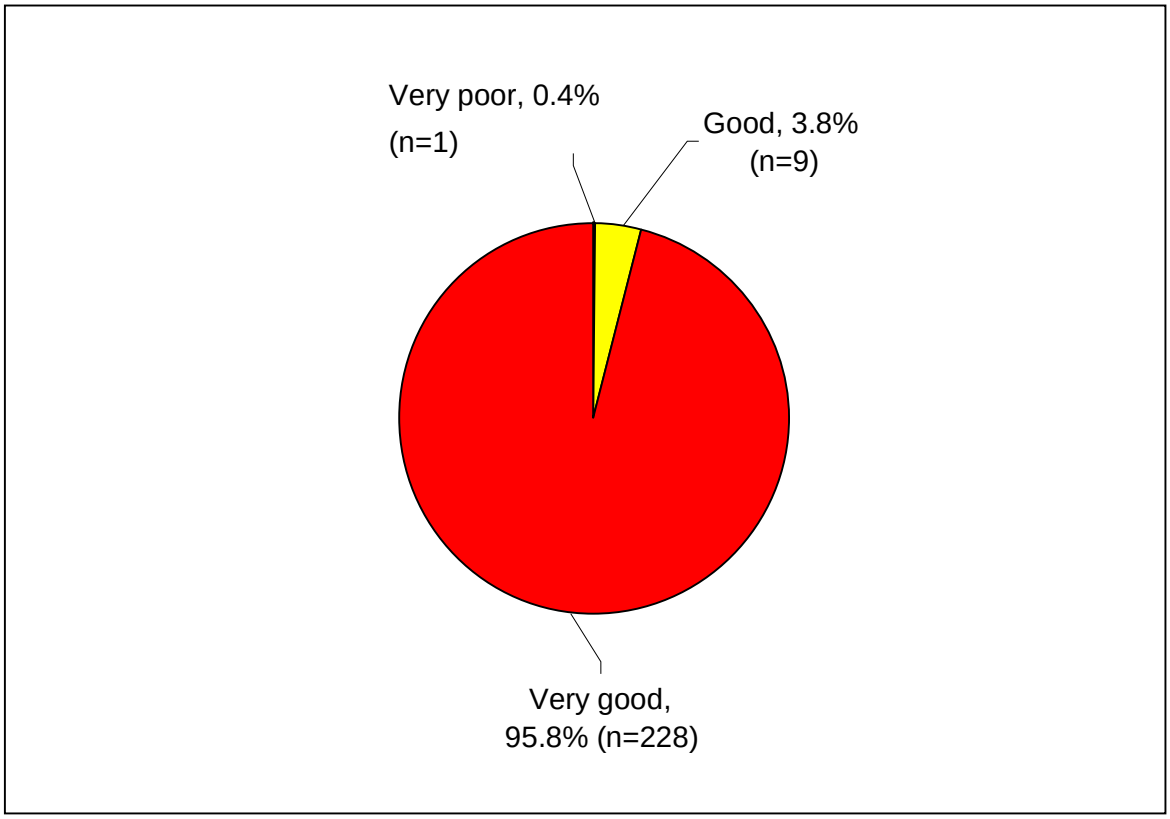


2.3.8 Skills, qualities and attributes of the training team

Respondents were asked to report the skills, qualities and attributes of the training team on a 6-point Likert scale, where 1 was very poor and 6 was very good. The results are shown in Figure 2.2.

Figure 2.2

Reported skills, qualities and attributes of the training team (n=238)



2.3.9 Venues used for the training

Participants at each of the ten training events across Wales were invited to evaluate the venues. Overall, 84.7% (n=199) of respondents rated the venues as very good and the remaining 15.3% (n=36) rated the venues as good.

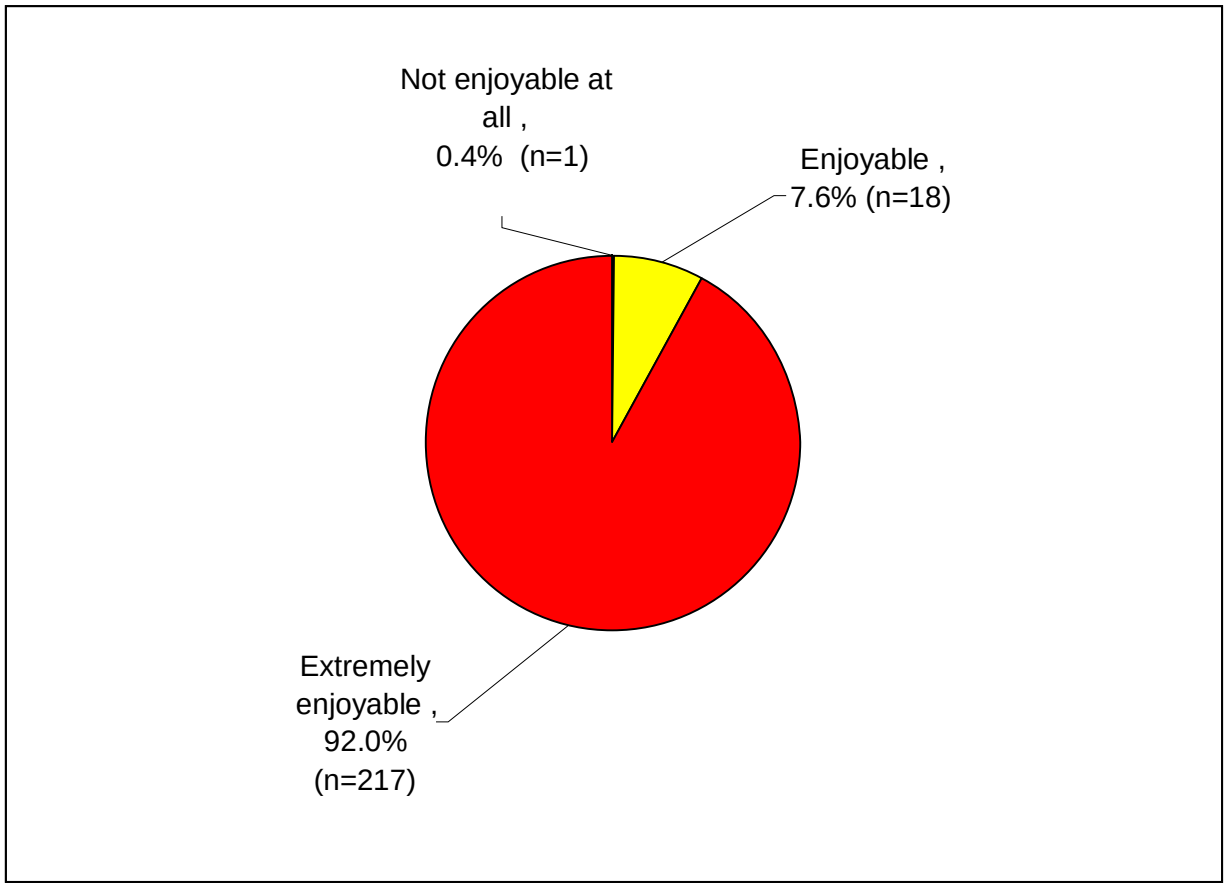
The venues were rated as very good by 91.9% (n=34) of education professionals compared with 84.7% (n=50) of social care professionals and 81.6% (n=115) of low vision practitioners. There was a significant relationship between professional group and how the venues were rated (Chi ^{2}=13.204, $p<0.05$).

2.3.10 Enjoyment and relevance of the training

The vast majority of respondents (92.0%, n=217) reported that they had found the training extremely enjoyable. Figure 2.3 shows the overall reported enjoyment of the training. The sole professional who did not enjoy the training at all was a low vision practitioner.

Figure 2.3

Reported enjoyment of the training by all professional groups (n=236)



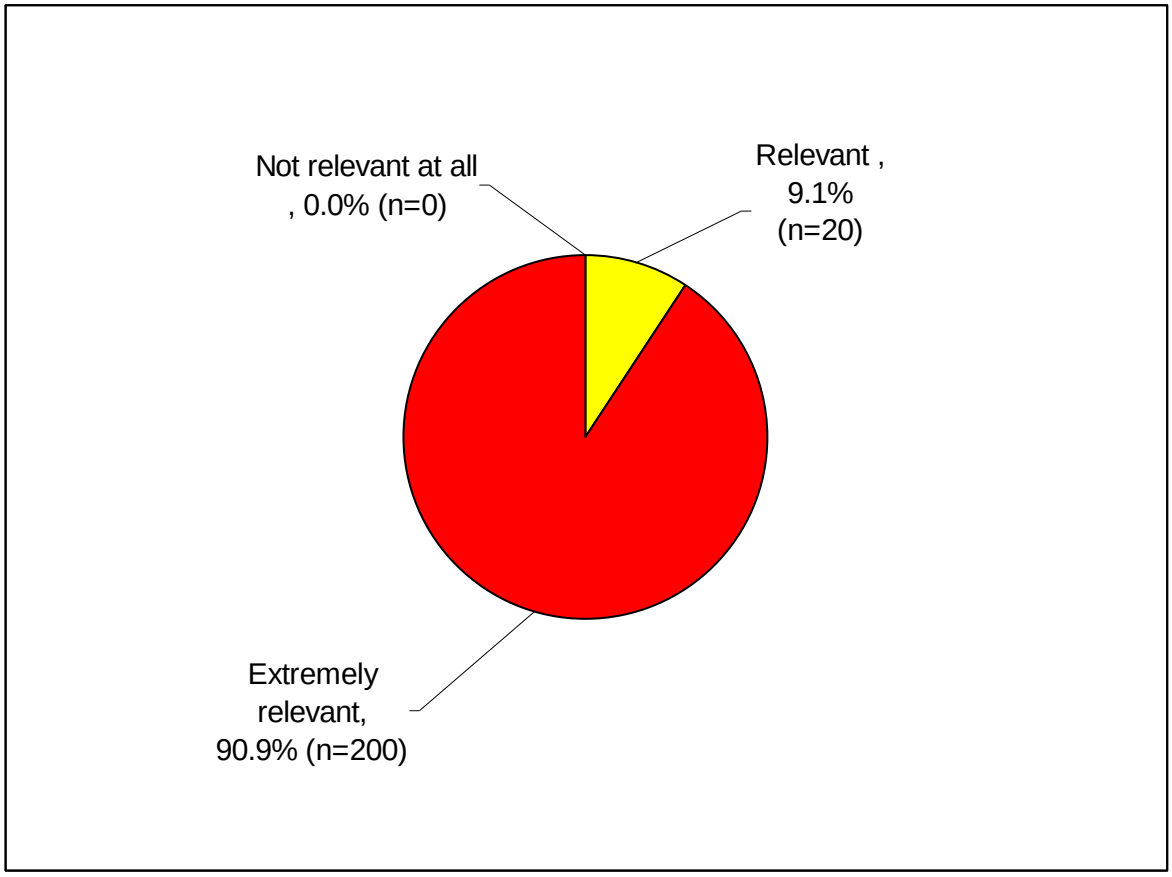
Specialist teachers enjoyed the training most with 97.2% (n=35) reporting that the training had been extremely enjoyable. In comparison, 92.2% (n=130) of low vision practitioners and 88.1% (n=52) of social care professionals reported that the training had been extremely enjoyable.

There was a significant relationship between professional group and actual enjoyment of the training (Chi ^{2}=18.070, $p<0.05$).

The vast majority of respondents also found the training extremely relevant (90.9%, n=200). Figure 2.4 shows the overall reported relevance of the training.

Figure 2.4

Reported relevance of the training by all professional groups (n=220)



Low vision practitioners found the training the most relevant with 92.4% (n=121) reporting that the training had been extremely relevant compared with 91.4% (n=32) of education professionals and 87.0% (n=47) of social care professionals.

The relationship between professional group and actual relevance of the training was not significant (Chi ^{2}=7.199, p=0.303).

Pearson's bi-variate two-tailed correlations were carried out to ascertain the relationships between the reported enjoyment and relevance of the training and the other evaluation criteria. The results are shown in Table 2.2.

Table 2.2

Pearson's correlations between reported enjoyment and relevance and other evaluation criteria

	Enjoyment		**Relevance**	
Evaluation criteria	Pearson correlation (r)	p	Pearson correlation (r)	p
Pre-course information	0.145*	0.028	0.132	0.053
Enrolment process	0.228*	0.001	0.226*	0.001
Expected enjoyment	0.446*	<0.0001	0.268*	<0.0001
Expected relevance	0.359*	<0.0001	0.401*	<0.0001
Expected ease	0.049	0.462	-0.015	0.824
Motivation	0.456*	<0.0001	0.293*	<0.0001
Individual tasks	0.390*	<0.0001	0.466*	<0.0001
Pair work	0.397*	<0.0001	0.466*	<0.0001
Small group work	0.450*	<0.0001	**0.517***	<0.0001
Whole group work	0.422*	<0.0001	0.359*	<0.0001
Q&A sessions	0.465*	<0.0001	0.433*	<0.0001
Multi-disciplinary sessions	0.410*	<0.0001	0.429*	<0.0001
Hands-on/ practical	0.346*	<0.0001	0.475*	<0.0001
Theoretical information	0.126	0.055	0.020	0.766
Trainers' skills/ qualities	0.463*	<0.0001	0.499*	<0.0001
Venue	0.351*	<0.0001	0.142*	0.037
Actual enjoyment	1.000	*N/A*	0.507*	<0.0001
Actual relevance	**0.507***	<0.0001	1.000	*N/A*
Actual ease	-0.052	0.432	-0.110	0.106

* Correlation is significant at p<0.05

(Bold indicates strongest positive correlation)

The attribute that was most strongly associated with how enjoyable participants found the training was the actual relevance of the training (r=0.507, p<0.05, n=218).

The skills, qualities and attributes of the trainers, all of the teaching and learning approaches, the venue, motivation and expected enjoyment and relevance all had strong, significant correlations with reported enjoyment.

The pre-course information and enrolment process had weaker, significant positive correlations with actual enjoyment.

Correlations between enjoyment and expected ease ($r=0.049$, $p>0.05$), enjoyment and actual ease ($r= -0.052$, $p>0.05$) and enjoyment and the amount of theory ($r=0.126$, $p>0.05$) were not significant.

The attribute that correlated most strongly with how relevant participants had found the training was small group work ($r=0.517$, $p<0.05$, $n=206$).

Actual enjoyment, all the teaching and learning approaches, the skills, qualities and attributes of the trainers and expected relevance all had strong, positive significant correlations with reported relevance.

The enrolment process, expected enjoyment, motivation and the venue had weaker, significant positive correlations with relevance.

Correlations between relevance and the pre-course information ($r=0.132$, $p>0.05$), relevance and expected ease ($r= -0.015$, $p>0.05$), relevance and actual ease ($r= -0.110$, $p>0.05$) and relevance and the amount of theory ($r=0.020$, $p>0.05$) were not significant.

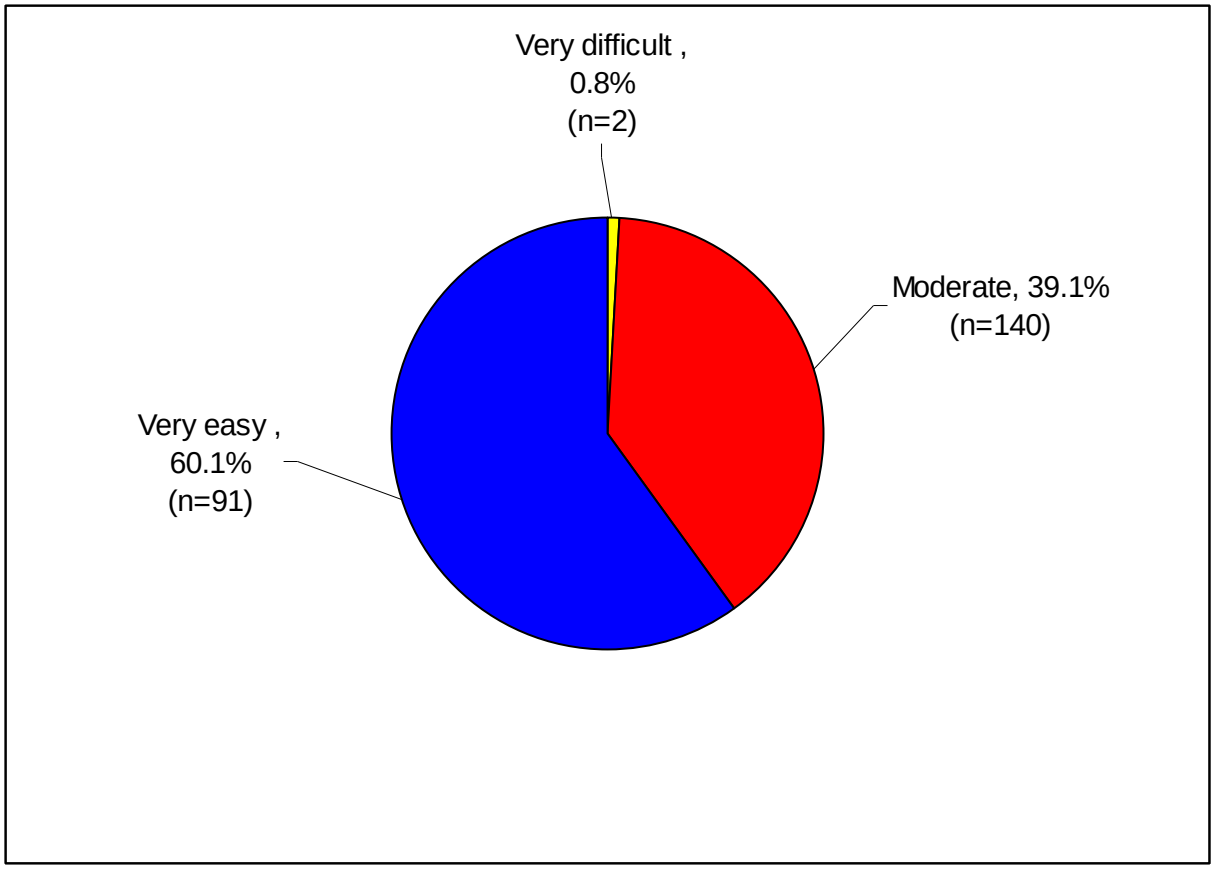
Both enjoyment and relevance correlated negatively, though not significantly, with the actual ease of the training ($r= -0.052$, $p=0.432$ and $r= -0.110$, $p=0.106$ respectively).

2.3.11 Ease of the training

Figure 2.5 below shows the reported ease/ difficulty of the content of the training by all professional groups.

Figure 2.5

Reported ease/ difficulty of the training content by all professional groups (n=233)



Social care professionals found the training the easiest: 44.8% (n=26) reported that the training was very easy compared with 40.0% (n=14) of education professionals and 36.4% (n=51) of low vision practitioners. However, the relationship between reported ease and professional group was not significant (Chi ^{2}=3.679, p=0.885).

Pearson's bi-variate two-tailed correlations were carried out between the actual ease of the training and the other evaluation criteria. The results are shown in Table 2.3.

Table 2.3

Pearson's correlations between actual ease and the other evaluation criteria

	Ease of the training	
Evaluation criteria	Pearson correlation (r)	p
Pre-course information	-0.089	0.181
Enrolment process	0.026	0.702
Expected enjoyment	-0.041	0.534
Expected relevance	-0.084	0.205
Expected ease	**0.315***	<0.0001
Motivation	0.037	0.576
Individual tasks	-0.010	0.896
Pair work	-0.023	0.772
Small group work	-0.001	0.988
Whole group work	-0.036	0.589
Q&A sessions	0.013	0.860
Multi-disciplinary sessions	0.005	0.947
Hands-on/ practical activities	0.036	0.617
Theoretical information	-0.005	0.937
Skills, qualities, attributes of trainers	0.025	0.705
Actual enjoyment	-0.052	0.432
Actual relevance	-0.110	0.106

* Correlation is significant at $p<0.05$

The only attribute that significantly correlated with ease was expected ease ($r=0.315$, $p<0.05$, $n=228$).

2.3.12 Self-reported learning of information and skills

Of the 221 respondents, 99.5% (n=220) reported that they had learned information during the training. Just 0.5% (n=1) of respondents, a social care professional, did not learn any information.

In total, 118 respondents (66 low vision practitioners, 18 specialist teachers, 34 social care professionals) provided details in open-ended questions about the information that they had learned. The responses included:

Low vision practitioners:

- *Availability of new equipment*
- *Referral processes/ social services requirements and referral processes*
- *Inter-disciplinary communication*
- *Better contact with social services/ putting faces to names*
- *How social services and education services operate*
- *Children's attitudes towards low vision aids*
- *Keeler telescopes and how to dispense them*
- *Norville kit and how to dispense hyper-oculars*

Specialist teachers:

- *Use of Toolkit*
- *Updates on equipment*
- *Lighting, lux levels*
- *Binoculars*
- *Ways to link with ophthalmologists*
- *Information about magnification*
- *Roles of other professionals*
- *Referral processes*

Social care professionals:

- *Eccentric viewing*
- *Task lighting*

- *Processes and protocols of the Welsh Low Vision Service, including how to return low vision aids/ how to read a low vision assessment record chart*
- *Equipment available under Welsh Low Vision Service*
- *Referrals from optometrists/ referrals for low vision assessments*
- *How low vision assessments are carried out and who does what*

Overall, 87.4% (n=173) of professionals reported that they had learned skills during the training and 12.6% (n=25) had not learned skills. While 92.6% (n=25) of specialist teachers learned skills, 87.6% (n=113) of low vision practitioners and 83.3% (n=35) of social care professionals reported that they had learned skills during the training.

In total, 85 respondents (54 low vision practitioners, 14 specialist teachers, 17 social care professionals) provided details in open-ended questions about the skills that they had learned. The responses included:

Low vision practitioners:

- *How to mount telescopic aids into spectacle frames*
- *Making hyper-oculars (Norville kit)*
- *Using CCTV (Compact Plus electronic hand-held magnifier)*
- *Working with children*

Specialist teachers:

- *Using low vision aids more effectively*
- *Ways of introducing low vision aids to children*
- *Working out desired magnification*
- *How to use greater range of low vision aids*

Social care professionals:

- *Eccentric fixation/ viewing*
- *How to read a low vision assessment record chart*
- *Task lighting*
- *Magnification*

2.3.13 Relationships between enjoyment and learning information and skills

In total, 92.7% (n=204) of professionals who learned information, reported that the training had been extremely enjoyable. There was a significant relationship for all professionals between enjoyment and learning information (Chi ^{2}=14.853, p<0.05).

Overall, 93.1% (n=161) of professionals who learned skills, reported that the training had been extremely enjoyable. In contrast, 84.0% (n=21) of professionals who did not learn skills, had found the training extremely enjoyable. There was a significant relationship for all professionals between enjoyment and learning skills (Chi ^{2}=15.400, p<0.05).

2.3.14 Relationships between relevance and learning information and skills

In total, 91.6% (n=186) of professionals who learned information, reported that the training had been extremely relevant. The relationship for all professionals between relevance and learning information was not significant (Chi ^{2}=1.623, p=0.654).

Overall, 93.8% (n=151) of professionals who learned skills, reported that the training had been extremely relevant. In comparison, 73.9% (n=17) of all professionals who did not learn skills, had found the training extremely relevant. The relationship for all professionals between relevance and learning skills was significant (Chi ^{2}=24.623, p<0.05).

2.3.15 Relationships between ease and learning information and skills

In total, 37.2% (n=80) of professionals who learned information, reported that the training had been very easy. The relationship for all professionals between reported ease and learning information was not significant (Chi ^{2}=2.140, p=0.710).

Overall, 36.8% (n=63) of professionals who learned skills, reported that the training had been very easy. In contrast, 44.0% (n=11) of professionals who did not learn skills, reported that the training had been very easy. The relationship for all professionals between reported ease and learning skills was significant (Chi ^{2}=10.709, $p<0.05$).

2.3.16 Relationships between the other evaluation criteria and learning information and skills

Table 2.4 shows the relationships between learning information and skills and the other evaluation criteria:

Table 2.4

Relationships between learning information and skills and the other evaluation criteria

Evaluation criteria	Learning information		Learning skills	
	Chi² value	p	Chi² value	p
Pre-course information	1.072	0.899	3.568	0.468
Enrolment process	1.179	0.882	20.337*	<0.0001
Reason for coming	1.542	0.673	2.288	0.515
Expected enjoyment	1.851	0.763	2.749	0.601
Expected relevance	1.301	0.729	7.167	0.067
Expected ease	0.723	0.948	2.707	0.608
Motivation	2.080	0.721	4.359	0.360
Individual tasks	***	***	18.960*	0.002
Pair work	***	***	24.861*	<0.0001
Small group work	***	***	10.305*	0.016
Whole group work	10.940*	0.012	6.452	0.092
Q&A sessions	1.558	0.669	9.867*	0.020
Multi-disciplinary session	1.653	0.647	4.406	0.221
Hands-on/ practical	***	***	12.897*	0.005
Theoretical information	0.370	0.996	7.645	0.177
Trainers' skills/ qualities	3.107	0.375	22.477*	<0.0001
Learn skills	6.755*	0.009	*N/A*	*N/A*
Learn information	*N/A*	*N/A*	6.755*	0.009
Venue	43.196*	<0.0001	5.883	0.117
Enjoyment	14.853*	0.005	15.400*	0.004
Relevance	1.623	0.654	24.623*	<0.0001
Ease	2.140	0.710	10.709*	0.030
Expectations met	9.329	0.053	13.647*	0.009

* Correlation is significant at p<0.05

*** The relationship could not be identified because 'learned information' was a constant, i.e. everyone who responded learned information.

The only criteria that were significantly associated with learning information were:

- Whole group work (Chi^2=10.940, p<0.05)
- Learning skills (Chi^2=6.755, p<0.05)
- Reported ‘venue’ (Chi^2=43.196, p<0.05)
- Reported actual enjoyment (Chi^2=14.853,p<0.05)

In comparison, the criteria significantly related to learning skills were:

- Enrolment process (Chi^2=20.337, p<0.05)
- Individual tasks (Chi^2=18.960, p<0.05)
- Pair work (Chi^2=24.861, p<0.05)
- Small group work (Chi^2=10.305, p<0.05)
- Q&A sessions (Chi^2=9.867, p<0.05)
- Hands-on/ practical activities (Chi^2=12.897, p<0.05)
- Skills, qualities and attributes of the trainers (Chi^2=22.477, p<0.05)
- Learning information (Chi^2=6.755, p<0.05)
- Actual enjoyment (Chi^2=15.400, p<0.05)
- Actual relevance (Chi^2=24.623, p<0.05)
- Actual ease (Chi^2=10.709, p<0.05)
- Expectations met (Chi^2=13.647, p<0.05)

Actual enjoyment of the training was the only criterion significantly related to learning both information and skills.

Pearson bi-variate correlations were carried out between learning information and the other evaluation criteria. Learning information correlated positively and significantly with only two criteria: The venue (r= 0.200, p<0.05) and learning skills (r=0.187, p<0.05).

Pearson bi-variate correlations were also carried out between learning skills and the other evaluation criteria. The correlations that were significant (p<0.05), ordered by strength of correlation, are shown in Table 2.5.

Table 2.5

Significant correlations between learning skills and the other evaluation criteria

Criteria	r
Actual relevance of training	0.359
Pair work	0.323
Skills, qualities, attributes of trainers	0.299
Hands-on/ practical activities	0.242
Small group work	0.223
Individual tasks	0.217
Enrolment process	0.194
Learning information	0.187
Actual enjoyment	0.184
Q&A sessions	0.171
Amount of theoretical information	0.153
Multi-disciplinary sessions	0.146

Learning skills correlated most strongly with how relevant the training had been (0.359, $p<0.05$).

2.3.17 Meeting expectations

Overall, 88.0% (205) of all professionals reported that the training had met their expectations in full; 90.6% (n=126) of low vision practitioners, 86.5% (n=32) of specialist teachers and 82.4% (n=47) of social care professionals.

Just 1.3% (n=3) of respondents (one from each discipline) reported that the training had not met their expectations at all.

In total, 98.3% (n=231) of all professionals reported that the training had been a good use of their time. Just 1.7% (n=4) of respondents (low vision practitioners) reported that the training had not been a good use of their time.

2.3.18 Recommending the training

Of the 233 respondents, 84.5% (n=197) reported that they would be very likely to recommend the training and just 2.6% (n=6) would be very unlikely to recommend it. The remaining 12.9% (n=30) were neither very likely nor very unlikely to recommend it.

There were significant positive correlations between the likelihood of recommending the training and enjoyment ($r= 0.479$, $p<0.05$) and between the likelihood of recommending the training and relevance ($r= 0.486$, $p<0.05$). The skills, qualities and attributes of the trainers also correlated positively and significantly with the likelihood of recommending the training ($r= 0.416$, $p<0.05$).

2.3.19 Improving the training and other comments

Participants at the training days suggested ways that the training could be improved in the future. These included:

Venue/ environmental considerations:

- *Coffee at lunch*
- *Bar at lunchtime*
- *Biscuits with coffee*
- *Venue that was easier to find*
- *Better facilities for coats*
- *Better car-parking*

Teaching and learning approaches:

- *Case studies with other professionals*
- *Actual service users and their experience and opinions*
- *More hands-on with (low vision) aids*
- *More practical workshops/ patient-based*
- *Written copies of lecture materials*
- *Bit higher level*
- *Clearer objectives for some sessions*
- *Longer for hands-on sessions*
- *More time covering eccentric viewing*

- *Training on items not included in the low vision kit*

Multi-disciplinary working:

- *Provide copies of ready-made contact details (of professionals in social services)*
- *More seating during breaks to be able to chat with others*
- *Professionals working in more than one area don't get to meet all the relevant agencies*

Amount and timing of training:

- *Consolidate into two evening sessions or a Sunday*
- *More frequent training*
- *Slightly shorter or perhaps more frequent*
- *Follow-up in a few months*
- *Hold course on annual basis*
- *More than one day*

Participants also praised the training team and gave gratitude for the training. For example,

- *Excellent all-round*
- *Great to see enthusiasm about scheme and such support from leaders/organisers of the scheme*
- *Thank you for all your hard work*
- *Many thanks to all the team, excellent day!*
- *Excellent and very useful*
- *Nicely delivered by friendly people*
- *Very relaxed and easy to engage in conversation and ask questions*

2.4 Discussion

2.4.1 Reasons for attending, motivation and expectations

Andragogy is the art and science of teaching adults or helping adults to learn (Forrest iii and Peterson 2006). Andragogy assumes that adults have a wealth of experience and that they are self-directed learners (Knowles 1977; Knowles 1980; Knowles 1984). It also assumes that over time, adults' orientation to learning shifts from subject-centeredness to problem-centeredness and that their readiness to learn becomes increasingly oriented to their social roles. Another important assumption of andragogy is that adults are motivated to learn by internal rather than external factors (Merriam 2001). Motivation is an important element of adult learning (Abela 2009).

In this study, the majority of professionals who attended the training felt very motivated and there was a significant relationship between motivation and the reason for attending the training. Professionals who attended out of their own choice felt more motivated than colleagues who attended for re-accreditation or because their manager had advised them to. Specialist teachers were the most motivated group followed by professionals from social care and low vision practitioners. This may reflect the fact that the majority of specialist teachers and social care professionals attended out of their own choice whereas the vast majority of low vision practitioners attended for mandatory re-accreditation.

Hopstock (2008) reported a study involving 361 hospital personnel who attended a CPR training programme. The study found that motivation correlated with 'readiness to learn', 'orientation to learning', 'the learner's need to know' and the 'self-concept of the learner' (Hopstock 2008). The results of the CPR study and the present study highlight the importance of motivation for adult learners and support the theory of andragogy.

In line with the andragogical approach to adult learning, adult learners need to know why they need to learn something before they actually learn it (Holton, Swanson et al. 2001). In the present study, 71.6% (n=166) of respondents reported that the pre-course information, which detailed the content and objectives of the training, had been very good. Although this represents over

two-thirds of attendees, it is suggested that there is room for improvement in the pre-course information distributed before any similar future training programmes.

Specialist teachers were expecting the training to be more enjoyable than professionals from social care and low vision practitioners. However, low vision practitioners were expecting the training to be more relevant to their low vision work than specialist teachers and colleagues from social care. This may reflect the fact that the training formed part of the mandatory re-accreditation process for low vision practitioners, who were therefore expecting it to meet their CPD needs in full.

In the present study, there were strong positive correlations between levels of motivation and expected enjoyment ($r=0.664$, $p<0.05$) and expected relevance ($r=0.510$, $p<0.05$). However, the correlation between motivation and expected ease was weak ($r=0.149$, $p<0.05$). This suggests that although motivation was important in determining the expected enjoyment and relevance of the training, it did not affect how easy or difficult participants were expecting it to be. The majority of professionals in each discipline were expecting the training to be pitched at an appropriate level, which was neither very easy nor very difficult. This supports the notion that the training was planned within an andragogical framework: Adult learners perceive learning as a process to develop increased competency to achieve their full potential (Holton, Swanson et al. 2001). The participants, motivated and expecting the training to be enjoyable, relevant and achievable, were ready to learn.

2.4.2 Teaching and learning approaches and skills, qualities and attributes of the trainers

Multi-disciplinary sessions and whole group discussions were reported to be the most useful teaching and learning approaches during the training sessions. This suggests that one of the objectives for the training, to improve links between professionals from different disciplines, was met.

Discussions, which are considered an active learning technique, promote critical thinking and higher-order learning. They also help co-operative learning, which

enables learners to understand material better and develop new perspectives (Garside 1996). In addition, mutual respect between learners and trainers is an important element of the adult learning environment (Abela 2009) and discussions can enhance learning (Pollock, Hamann et al. 2009). The results of this study support this.

In the current study, pair-work was considered to be the least useful teaching and learning approach used during the training sessions. This supports the results of another study in which learners reported pair-work as a low priority. The same study also found a mismatch between learner and teacher priorities: Teachers reported that pair-work was very high in priority (Nunan 1995).

The majority of professionals (81.8%, n=193) reported that the training days contained an appropriate (not too much, not too little) amount of theoretical information. This suggests that the training was delivered with a learner-centred, andragogical approach and recognised that learners already had a wealth of experience and knowledge (Forrest iii and Peterson 2006).

It has been suggested that one of the easiest ways to evaluate training is to evaluate the teacher (Harker 2009). Harker suggests that this is often carried out in two ways. Either the teachers evaluate themselves through self-reflection or the learners evaluate the teacher through evaluation forms. In this study, learners were invited to evaluate the training team in terms of their skills, qualities and attributes. The vast majority of respondents rated the training team as very good. This reflects the training team as a whole because individual members of the team shared responsibility of delivering different elements of the training.

As outlined in Chapter 1 (1.3.5), there can be tendency for learners to respond favourably on Likert-style questions, such as those used in this study, and that respondents may be unwilling or uncomfortable with negatively evaluating the course presenters (Darby 2006; Darby 2008). In an attempt to avoid this in the current study, respondents were assured that their evaluation questionnaires would remain anonymous throughout the evaluation process. Respondents completed the evaluation questionnaires anonymously and the questionnaires

were collected in anonymity. This reflects the guidelines set out in the original Kirkpatrick approach (Kirkpatrick 1979).

2.4.3 Level 1: Enjoyment and relevance of the training

2.4.3.1 Level 1 evaluation: Enjoyment and relevance

The training was evaluated at level 1 in terms of participants' affective (enjoyment) and utility (relevance) reactions. The vast majority of learners found the training extremely enjoyable and extremely relevant, indicating that the training was successful at level 1.

Overall, the results showed that the learners found the training slightly more enjoyable than relevant. Specialist teachers and professionals from social care found the training slightly more enjoyable than relevant and there was a significant relationship between enjoyment and professional group. Conversely, low vision practitioners found the training slightly more relevant than enjoyable but the relationship between relevance and professional group was not significant. This may be attributable to the fact that the training was a mandatory component of the re-accreditation process for low vision practitioners whereas the majority of specialist teachers and social care professionals attended out of their own choice.

In the original Kirkpatrick approach, a causal effect between levels is implied in that positive level 1 reactions yield positive level 2 (learning) results. The positive level 1 reactions in this study therefore suggest that learning took place.

2.4.3.2 Level 1 evaluation: Factors influencing affective and utility reactions

In this study, the results of Pearson's correlations showed that enjoyment of the training correlated most strongly with how relevant it had been ($r=0.507$, $p<0.05$). This supports the results of a meta-analysis of 34 studies (Alliger, Tannenbaum et al. 1997). In the meta-analysis, Alliger et al found that the strongest correlations were between different criteria in the same level: Enjoyment (affective reactions) and relevance (utility reactions) correlated more

strongly with each other than with other measures. This means that professionals who enjoyed the training also found it relevant and vice-versa. However, the nature of correlations means that it is impossible to identify the direction of the relationship.

The relatively strong, positive correlation in this study (r=0.507) between enjoyment and relevance, similar to that found in the Alliger et al meta-analysis, may indicate convergent validity. Convergent validity can be described as

> *Measures of constructs that theoretically should be related to each other are, in fact, observed to be related to each other.*
> www.socialresearchmethods.net/kb/convdisc.php
> (Accessed 30th July 2010)

All the teaching and learning approaches used during the training had strong, significant positive correlations with enjoyment. Of these, Question and Answer sessions correlated most strongly with enjoyment (0.465, $p<0.05$). However, multi-disciplinary sessions, whole-group sessions, practical activities and small group work were all reported as being more relevant than Q&A sessions. This suggests that although participants enjoyed the Q&A sessions, they did not necessarily find them as useful as the other teaching strategies.

There were also strong significant positive correlations between actual enjoyment and expected enjoyment ($r=0.446$, $p<0.05$) and actual enjoyment and motivation ($r=0.456$, $p<0.05$). The fact that both expected enjoyment and motivation both correlated positively with actual enjoyment supports the concept of andragogy in that adult learners are self-directed and are motivated to learn by internal (personal motivation), rather than external, factors (Knowles 1984). However, Abela (2009) points out that Knowles did not mention extrinsic motivation in the original andragogical framework, e.g. the role of the trainer as a major source of motivation (Abela 2009). Indeed, it has been suggested that most adult learners need the motivation provided by teachers in order for effective learning to take place (Abela 2009). With this in mind, the positive evaluation of the training team becomes even more significant. It also highlights the need for the training team to have the skills, qualities and attributes to motivate the learners.

The relevance of the training correlated most strongly with small group work ($r=5.17$, $p<0.05$), indicating that participants found the small group sessions the most relevant. Small group sessions, especially those about abstract or difficult concepts, can be an important tool to engage and involve adult learners (Abela 2009). During the training days, learners were split into their respective professional groups and role-specific small group sessions took place. For example, specialist teachers were given the opportunity to try some of the activities outlined in the Low Vision Toolkit and low vision practitioners were introduced to the new equipment available under the Welsh Low Vision Service. In addition to correlating strongly with actual relevance, small group work also had a relatively strong, positive significant correlation ($r=0.450$, $p<0.05$) with how enjoyable attendees had found the training. This suggests that a focus on the provision of small group work during the design and delivery of any future training would contribute to positive level 1 affective (enjoyment) and utility (relevance) reactions. Similarly, the skills, qualities and attributes of the training team also correlated strongly and positively with both enjoyment ($r=0.463$, $p<0.05$) and relevance ($r=0.499$, $p<0.05$), indicating the importance of the training team in achieving positive level 1 reactions.

2.4.4 Level 2: Learning information and skills

The vast majority of respondents (99.5%, n=220) reported that they learned new information during the training and more than half of these recorded examples of the information that they had learned. The majority of respondents (87.4%, n=173) also reported that they learned new skills during the training and about half of these recorded examples of the skills that they had learned. It is encouraging that the majority of professionals learned new information and new skills.

One of the objectives of the training days for low vision practitioners was to introduce and encourage the prescription of new equipment available under the Welsh Low Vision Service and Children's Low Vision Project. Comments made by low vision practitioners about the information and skills that they learned, as reported in section 2.3.12, show that this objective was met.

Medical education can be considered to consist of three inter-related domains: Knowledge, skills and attitudes (Abela 2009). Various teaching and learning strategies can be employed to address any lack of knowledge. When considering teaching (clinical) skills, a five-step model has been proposed (George and Doto 2001). The five-step model is shown below along with how the training days adhered to it:

1. Overview: introduction to why the skill is needed and its relevance in the area of practice of the learner. Basic concepts on the skill.

- Before the training days took place, distance-learning lectures were distributed to low vision practitioners to give them an overview.

2. Demonstration without comment: allows the learner to observe a whole picture of required skill.

- During the training, case studies were presented and discussed.

3. Demonstration with comment: allows fragmentation of the skill into more manageable portions.

- The training team delivered practical sessions during the training during which low vision practitioners had the opportunity to replicate the skills being covered.

4. Verbalisation: learner talks through the skill.

- During the training, case-studies were discussed, enabling low vision practitioners to discuss the application of new skills.

5. Practice: the learner executes the skill

- During the training, practical sessions took place during which low vision practitioners had the opportunity to execute and practice the skills.

One of the aims of the training days was to encourage and enable specialist teachers to use the Low Vision Toolkit. The Toolkit is a training programme that specialist teachers can use to teach pupils how to use their low vision aids. Comments made by specialist teachers about the information and skills that they learned, as reported in section 2.3.12, indicate that this objective was met.

The training days also aimed to improve links between the Welsh Low Vision Service and other services, notably social care services. Comments made by professionals from social care about the information and skills that they learned, as reported in 2.3.12, indicate that this objective was met. Comments made by low vision practitioners (2.3.12) also show that the training days helped to improve links with colleagues in social services.

The high proportion of professionals who reported that they learned information and skills, along with the specific comments about the information and skills learned, indicate a positive level 2 evaluation.

2.4.5 Relationships between level 1 (reactions) and level 2 (learning)

The Kirkpatrick approach implies causality between levels in that positive (level 1) reactions lead to greater learning (level 2), which in turn leads to transfer and behavioural changes (level 3), resulting in positive organisational change (level 4). Although the Kirkpatrick approach provides little detail about the causal linkages between the levels, a causal relationship is implied (Bates 2004). For example,

If training is going to be effective, it is important that trainees react favourably. (Kirkpatrick 1994)

However, several studies have failed to confirm the implied causal relationships between levels. For example, one study found that trainee satisfaction was not related to learning and that learning was unrelated to behavioural change (Noe and Schmitt 1986). This study involved the evaluation of a training programme designed to improve the inter-personal and administrative skills of 60 educators.

Similarly, another study showed that there was no relationship between enjoyment and learning (Warr and Bunce 1995). In this study, 106 trainees, who were junior managers, undertook a four-month open learning programme, which was a new initiative to provide wide-ranging training for all line managers in an organisation. The training comprised structured group sessions as well as self-directed learning.

Two meta-analytical studies corroborated the findings of other studies (Alliger and Janak 1989; Alliger, Tannenbaum et al. 1997). In their meta-analyses, Alliger et al reported that the overall average correlation between reactions of any type and immediate learning was only 0.07. Affective reactions (enjoyment) alone did not correlate (on average, the correlation was just about zero) with immediate learning. However, there were indications that utility reactions (relevance) correlated somewhat with immediate learning but again, the correlation was weak.

It has been proposed that learning may only take place when the trainees are challenged to the point that the training becomes 'unpleasant'. If this is the case, negative correlations would be expected between reactions and learning. Indeed, negative correlations between level 1 reaction and level 2 learning measures have been found in some educational classroom research (Alliger and Janak 1989).

The Aliger et al. meta-analyses questioned whether level 1 reaction measures should be considered separately from the other levels. They also suggested that reactions should not be used as a surrogate for the assessment of learning.

In this study, level 2 evaluations were carried out by asking the trainees to record (at the end of the training days) whether they had learned new information and new skills.

In the present study, learning information only correlated significantly with the venue and with learning skills. The correlations between learning information and enjoyment and between learning information and relevance were not significant. These results indicate that both affective (enjoyment) and utility (relevance) reactions did not lead to participants learning information. This

finding does not support the causal relationship between levels, which is implied in the Kirkpatrick approach. Rather, it corroborates the findings of the two meta-analyses outlined above (Alliger and Janak 1989; Alliger, Tannenbaum et al. 1997).

Learning skills correlated most strongly (and significantly) with relevance and with, among other criteria, enjoyment. In addition, the relationships between learning skills and relevance and learning skills and enjoyment were both significant. In contrast to learning information, these findings support the causal relationship implied in the Kirkpatrick approach: Participants who found the training enjoyable and relevant also learned new skills and vice-versa. As learning skills correlated most strongly with relevance, the results also corroborate the Alliger et al. meta-analyses in that utility (relevance) reactions correlate more strongly with learning than affective (enjoyment) reactions.

There was a weak positive correlation between learning information and learning skills. This suggests that participants who learned new information did not necessarily learn new skills and vice-versa. This supports Bloom's Taxonomy of Learning in that there are different types of learning (Bloom 1956). Some participants learned in the cognitive and affective domains only, some in the psychomotor domain only and others learned in all domains.

In the present study, the relationship between learning information and reported ease was not significant. However, there was a significant relationship between learning skills and reported ease. A higher proportion of professionals, who did not learn skills than did learn skills, reported that the training had been very easy. This suggests that professionals who found the training very easy did not necessarily learn new skills. This is corroborated in part by the results of Pearson's correlations. There were negative, although not significant, correlations between ease and both learning information and skills. This indicates that professionals who found the training very easy, were less likely to learn new information or new skills.

The results of this study question the causal relationships between levels 1 and 2, as implied in the Kirkpatrick approach, e.g. positive 'reactions' at level 1 lead to increased learning at level 2 (Bates 2004). Although there was a relationship

between enjoyment and learning skills, there were stronger links between the relevance of the training and learning both information and skills. This suggests that the relevance of the training is more reliable than enjoyment to determine whether learning takes place.

It is suggested that it is beneficial to evaluate at level 1 in terms of affective reactions (enjoyment), as initially proposed by Kirkpatrick. However, utility (relevance) reactions need to be the focus of evaluations if they are to be robust and in order to determine whether learning has taken place.

2.5 Strengths and limitations

One of the main strengths of the study was that professionals from different disciplines attended the training days, resulting in a multi-disciplinary evaluation. In addition, the large number of professionals who completed an evaluation questionnaire meant that a thorough evaluation of the training was carried out in terms of reactions and learning.

Although the evaluation questionnaire attempted to determine whether learning had taken place, it relied on a relatively simple (yes/no) self-reporting measure. For a more robust evaluation, pre-training and immediate post-training knowledge needs to be assessed in order to evaluate the nature and extent of any learning that takes place. In future evaluations, pre-training assessments could be carried out to provide baseline data against which post-training assessment results could be compared.
It would also be useful to include questions about the intention to transfer skills and knowledge in future evaluations. This would enable a subsequent comparison of intention to transfer and actual transfer to be carried out, thereby contributing to the level 3 evaluation.

Chapter 3 Post-training evaluation (one year after the training)

3.1 Introduction

This chapter describes a study to evaluate the impact of the training on professionals' low vision work approximately one year after the training took place. This represents a level 3 evaluation. It also reports the impact of the training on referral pathways and multi-disciplinary working, which represents a level 4 evaluation.

3.1.1 The importance of evaluating post-training behaviour and practices

In the Kirkpatrick approach, level 3 evaluations are concerned with assessing changes in behaviour or work practices, which occur as a direct result of training interventions. Since Kirkpatrick first outlined his approach, it has become important for researchers and practitioners to make sure that skills from training are transferred and used in the workplace (Burke and Hutchins 2008). As Kirkpatrick's son, Jim, asks:

"After all, what good is training and learning unless it is applied?"
(Kirkpatrick 2007):

For example, the impact of continuing medical education on doctors' clinical behaviour has become more scrutinized as re-accreditation and quality assurance programmes have become more widespread (Cantillon and Jones 1999). Similarly, it is acknowledged that global health funding agencies increasingly rely on the effectiveness of training programmes to determine future funding priorities (Ridde, Fournier et al. 2009).

However, despite recognition that it is critical to evaluate post-training behaviour and practices, level 3 evaluations can be considered the 'hidden level' (Kirkpatrick 2007). Level 3 evaluations are generally carried out less frequently than level 1 and 2 evaluations, which can result in an 'evaluation vacuum' between the actual learning event and a realization of the resultant benefits

(Short 2009). Dysvik reported a study of US companies, which showed that just 9% evaluated changes in work-related behaviour (level 3) compared with 78% evaluating 'reactions' (level 1) and 32% evaluating 'learning' (level 2) (Dysvik and Martinsen 2008).

3.1.2 The difficulties of evaluating behavioural change

Evaluating behavioural change as a direct result of training can be difficult because of a number of factors, including:
(Horton 2007; Ostapchuk, Patel et al. 2010)

- It is difficult, if not impossible, to isolate behavioural change as a result of training from other contributory factors such as pay increases (Ostapchuk, Patel et al. 2010).
- Some behaviour, such as 'soft skills', can be difficult to measure.
- The cost of the evaluation can outweigh the benefits.
- Evaluation of behavioural change is sometimes considered unnecessary because of the possible resultant culpability if the training has 'failed'.
- Evaluating at this level can be too time-consuming.
- Managers may show little interest in evaluation data or results.

3.1.3 Training transfer

It is recognised that, from a managerial viewpoint, investment in training is not worthwhile unless trainees subsequently translate and apply training contents, e.g. skills and techniques, in the workplace (Liebermann and Hoffmann 2008). This is often known as 'transfer'. However, defining 'transfer' in terms of post-training application is problematic and raises many questions (Foxon 1993). The processes and factors influencing or preventing transfer have been debated over several decades.

Before evaluating the transfer of training or the impact of training on behavioural change, it is necessary to define the term 'transfer'. Swinney referred to 'transfer' as:

"That almost magical link between classroom performance and something which is supposed to happen in the real world."
(Swinney 1989)

In their Transfer Process Model, Baldwin and Ford (Baldwin and Ford 1988) described transfer in terms of:

1. Training-input factors
Split into training design, trainee characteristics and work environment characteristics.

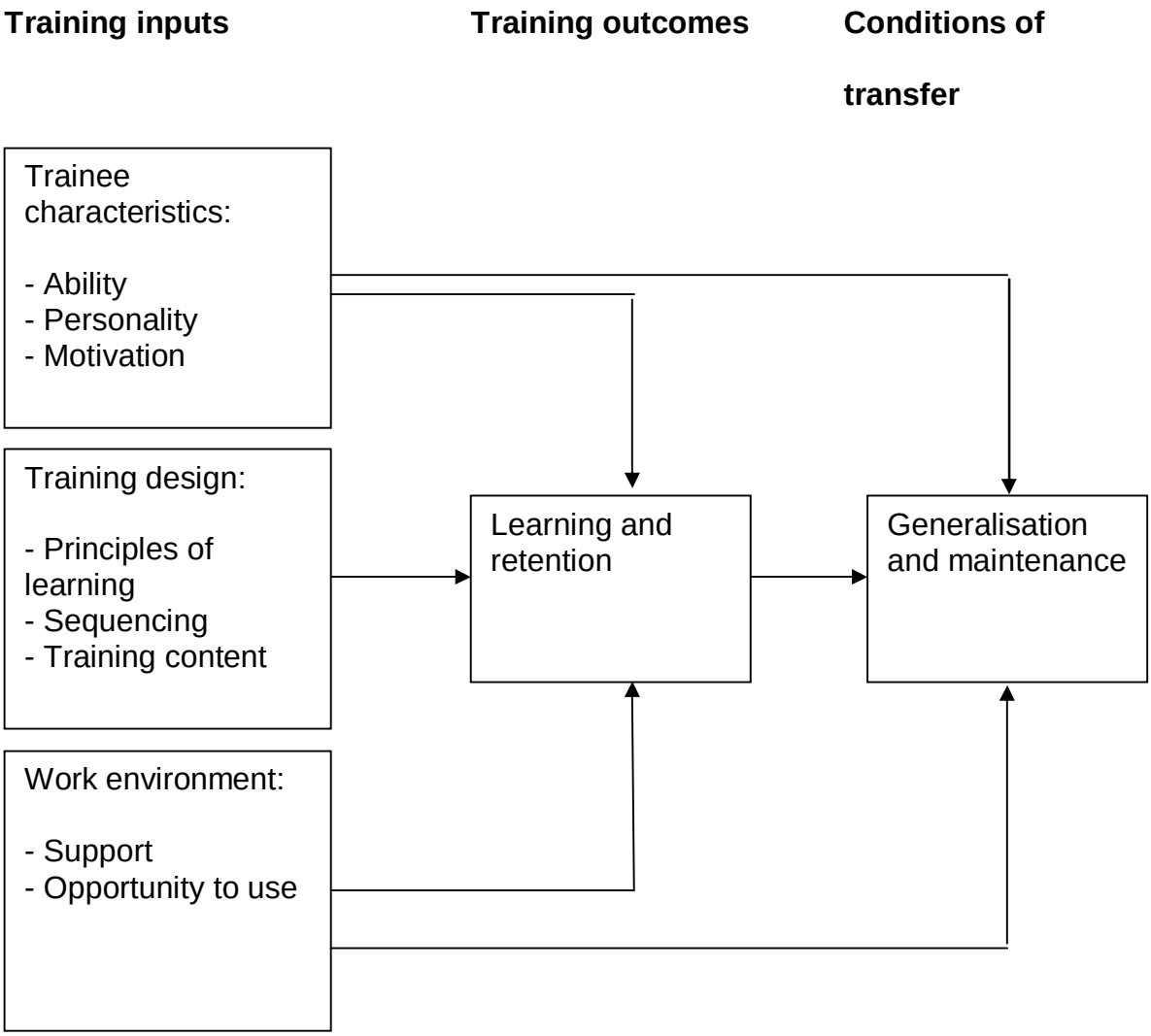
2. Training outcomes
The amount of learning that takes place during training and its retention after the programme.

3. Conditions of transfer
Including the generalisation of material learned in training in relation to the job context and the maintenance of the learned material over time.

Figure 3.1 shows the relationships in the Transfer Process Model.

Figure 3.1

The Transfer Process Model (Baldwin and Ford 1988)



The model shows that training input factors and training outcomes have direct and indirect impacts on the conditions of transfer. The model also shows that trainee characteristics (such as motivation and personality) and the work environment (such as managerial support) have direct impacts on the transfer process, regardless of learning itself or the retention of new information, knowledge and skills.

Since Baldwin and Ford developed their model of training transfer, considerable progress has been made in identifying the factors that affect the transfer of knowledge and skills to the workplace. However, there is not a clear consensus about the network of factors that affect transfer (Ruona, Leimbach et al. 2002). In addition, it is difficult, if not impossible, to measure when transfer actually takes place and if and how it is maintained (Foxon 1993). In their study, Buckley et al (2003) used a tool to evaluate change (transfer) along a continuum. The

tool measured changes in participants' intentions and attitudes (Buckley, Goering et al. 2003)

The complexities of identifying the factors that enable or limit transfer to the workplace have been reported in many studies (Brethower 1967; Alawneh 2008; Burke and Hutchins 2008). For example, one study reported that personal motivation, the intention and ability to transfer and the learners' attitudes (among other criteria) affect transfer (Alawneh 2008). Other factors that can affect transfer include trainer characteristics, supportive managers or peers or expectations and opportunities to transfer (Foxon 1993). The transfer climate, e.g. a supportive organisation, can also inhibit, prevent, support or enable the application of new skills in the workplace (Roullier and Goldstein 1993).

Enabling and promoting behavioural change or transfer is a complex process, which involves trainees themselves (e.g. motivation), a supportive organisation, (e.g. managers willing to co-operate with change) and the co-operation of others, including political leaders (Horton 2007). Strengthening factors that encourage or enable transfer and reducing or eliminating factors that prevent training transfer will enhance the transfer process (Foxon 1993).

3.1.4 When to measure behavioural change or transfer

The transfer of knowledge, skills or techniques from a training programme to the workplace is a process through which the act of transfer can be followed. The transfer process can be defined as the intention to transfer, initiation of transfer, partial transfer, conscious maintenance and unconscious maintenance (Foxon 1993). As transfer is a process rather than an isolated outcome of training, determining when and how to measure it as part of an evaluation can be problematic.

The amount of time between the training intervention taking place and measuring transfer varies between studies, e.g. from two months (Sears, Cohen et al. 2008), to twelve weeks (Liebermann and Hoffmann 2008) to one year (Haller, Garnerin et al. 2008; Hertogh, Vergouwe et al. 2010).

3.1.5 Aims of the study

The aims of this study were to:

1. Evaluate the extent to which professionals had applied skills and knowledge from the training days to their low vision work (level 3).

2. Evaluate the extent to which the training days improved referral processes and multi-disciplinary working (level 4).

3.2 Methods

3.2.1 Advisory Group

Members of the Advisory Group (see 2.2.1) helped to develop a questionnaire to evaluate the impact of the training on professionals' low vision work (level 3) and on referral pathways and multi-disciplinary working (level 4).

The Advisory Group, with experience of planning and delivering training and knowledge of the literature about evaluating training, was considered well-placed to design the questionnaire.

3.2.2 Post-training (one year later) evaluation questionnaire design

It was decided that a postal questionnaire would be the most appropriate method to collect the post-training data one year after the training because of the large geographical spread of the respondents (Wales-wide). The questionnaire would be used to evaluate the impact of the training on professionals' low vision work (level 3) and on referral processes and multi-disciplinary working (level 4).

The author initially developed a single draft questionnaire, which consisted of generic questions for all professionals as well as specific questions for low vision practitioners, specialist teachers and professionals from social care. However, it was subsequently decided that it would be more appropriate to develop individual questionnaires for each professional group. Each questionnaire would contain generic questions as well as questions relating to the application and use of specific skills:

Low vision practitioners:
Low vision practitioners had undertaken training about how to prescribe and use three new pieces of equipment available under the Welsh Low Vision Service. The three products were the Norville spectacle-mounted magnifier, the Keeler telescopic device and the Compact Plus electronic hand-held magnifier. In the questionnaire, low vision practitioners were invited to record their level of confidence (on a six-point Likert-scale) about prescribing the three new pieces of equipment.

Specialist teachers:

During the training days, specialist teachers had undertaken training about using the Low Vision Toolkit when supporting children and young people with low vision. In the questionnaire, specialist teachers were invited to record the extent to which they had used the Low Vision Toolkit in different educational settings and how useful it had been.

Professionals from social care:

During the training days, social care professionals had undertaken training about using the Amsler chart with patients who had central field loss. The Amsler chart consists of a grid with a dot in the centre, which is used for fixation. Patients are asked whether any of the lines of the grid appear wavy, unparallel or are missing. In the questionnaire, social care professionals were invited to record how often they had used the Amlser chart with clients with central field loss. Social care professionals were also invited to record how confident they were about advising clients on task lighting following the training.

Members of the Advisory Group were sent the draft questionnaires to check them for clarity and ease of use and to ensure that they met the needs of the evaluation process. The author also sent the questionnaires to an independent rehabilitation officer, specialist teacher and a representative from a local society (Wales Council for the Blind) for comments and feedback. The three draft questionnaires underwent a final vetting process during which key items were identified and non-essential items were removed.

The final post-training evaluation questionnaires are shown in Appendix 4.

3.2.3 Questionnaire administration

It was initially proposed that the post-training questionnaires would be dispatched in two waves, six months after the training. However, it was subsequently decided that the evaluation questionnaires would be sent out twelve months after the training. This would allow a sufficient amount of time for professionals to transfer and use skills from the training in their low vision work. It would also enable specialist teachers to become familiar with the Low Vision Toolkit and incorporate it into their teaching programmes.

The post-training questionnaires were sent out in late January 2011. Pre-paid and pre-addressed envelopes were included with the questionnaires in order to maximise the response rate. Studies have shown that the response rate is likely to be higher for questionnaires sent with a pre-paid and pre-addressed envelope than without (Oppenheim 1992; Edwards, Roberts et al. 2002). The questionnaires did not ask respondents to record any personal details. This enabled respondents to complete and return the questionnaire anonymously.

Follow-up questionnaires, along with pre-addressed and pre-paid envelopes, were sent to non-responders until June 2011.

3.2.4 Data input and analysis

The questionnaires were coded and a corresponding data file was set up using the commercially available software, SPSS 16.0. A single SPSS file was set up to accept data from the three separate questionnaires. One data file was used so that inter-disciplinary evaluations could be carried out for the generic questions.

Chi-squared and Pearson's correlations were used in the evaluation. A confidence level of significance of $p<0.05$ has been used throughout.
Some of the questions had six-point Likert-style response categories. The Advisory Group agreed that it would be appropriate to combine the six response categories into three pairs for the purpose of evaluation, i.e. 1 and 2, 3 and 4 and 5 and 6.

3.2.5 Evaluating the impact of the training on the prescription of new equipment (by low vision practitioners) and referral pathways

Pre and post-training data about the prescription rates (by low vision practitioners) of the new equipment were sought and obtained from the Welsh Low Vision Service. This enabled the impact of the training to be evaluated in terms of changes to the behaviour of low vision practitioners. In addition, pre and post-training data about referrals to and from the Welsh Low Vision Service were sought and obtained in order to evaluate the impact of the training on referral pathways.

3.3 Results

This section presents the results of the post-training evaluation questionnaire.

3.3.1 Response rate

The postal questionnaire achieved an overall response rate of 60.2% (n=154). Table 3.1 shows the response rate for each professional group.

Table 3.1

Response rate for post-training questionnaire by professional group

	Number of questionnaires sent out	Number of questionnaires completed and returned	Response rate
Low vision practitioners	153	111	72.5%
Specialist teachers	62	23	37.1%
Social care professionals	52	20	38.5%
Total	256	154	60.2%

3.3.2 Evaluation of profession-specific elements of the training

3.3.2.1 Low vision practitioners

Table 3.2 shows the reported confidence levels of low vision practitioners to prescribe each of the devices introduced to the Welsh Low Vision Service:

Table 3.2

Confidence of low vision practitioners to prescribe new devices

	Not confident (scores '1' and '2' combined)		**Somewhat confident** (scores '3' and '4' combined)		**Very confident** (scores '5' and '6' combined)		**Total**
	n	%	n	%	%	n	n
Norville	9	8.3%	46	42.6%	53	49.1%	108
Keeler	18	17.5%	46	44.7%	39	37.9%	103
Compact Plus	3	2.8%	11	10.2%	94	87.0%	108

Low vision practitioners were considerably more confident in prescribing the Compact Plus electronic hand-held magnifier than the other two pieces of equipment. Low vision practitioners were least confident about prescribing the Keeler telescopic device.

The Welsh Low Vision Service provided data about the number of these low vision aids ordered from the service (for prescription) by low vision practitioners before and after the training. The results are shown in Table 3.3.

Table 3.3

Number of low vision aids ordered by low vision practitioners before and after the training

	Before the training	**After the training**	**% change**
	1st Oct 2008- 31st Sep 2009	1st Apr 2010- 31st Mar 2011	
Number of Keeler telescopes ordered	8	27	+237.5%
Number of Compact Plus ordered	0	769	N/A
Number of Norville frames ordered (large)	0	96	N/A
Number of Norville frames ordered (small)	0	116	N/A

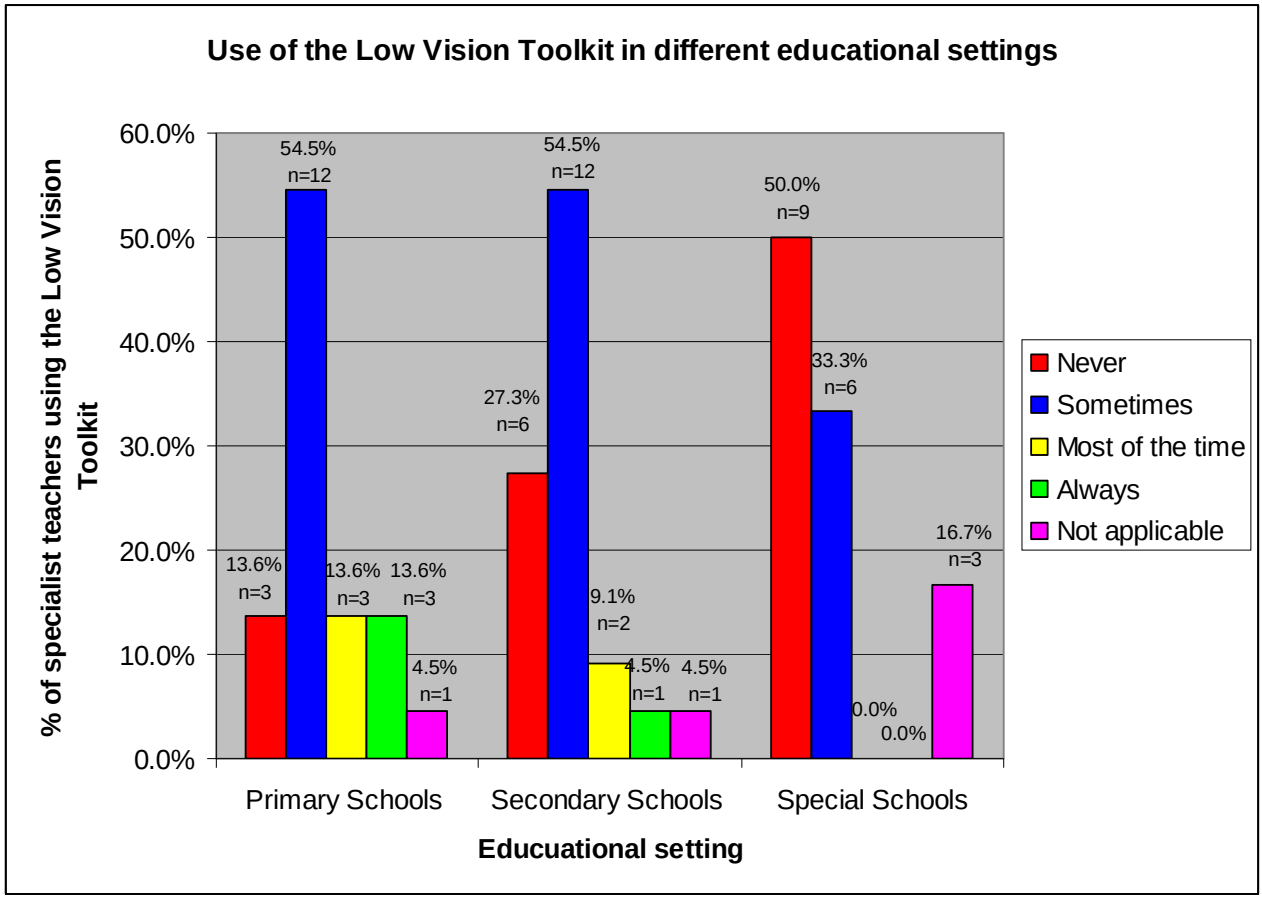
The results show that low vision practitioners ordered considerably more Compact Plus devices than the other pieces of equipment. It is acknowledged that the Keeler devices were available through the Welsh Low Vision Service before the training whereas the other devices were not.

3.3.2.2 Specialist teachers

Figure 3.2 shows the reported use of the Low Vision Toolkit by specialist teachers in different educational settings:

Figure 3.2

Reported use of the Low Vision Toolkit in different educational settings (n=23)



** By selecting Not Applicable, specialist teachers had indicated that they did not support any pupils in that particular educational setting.*

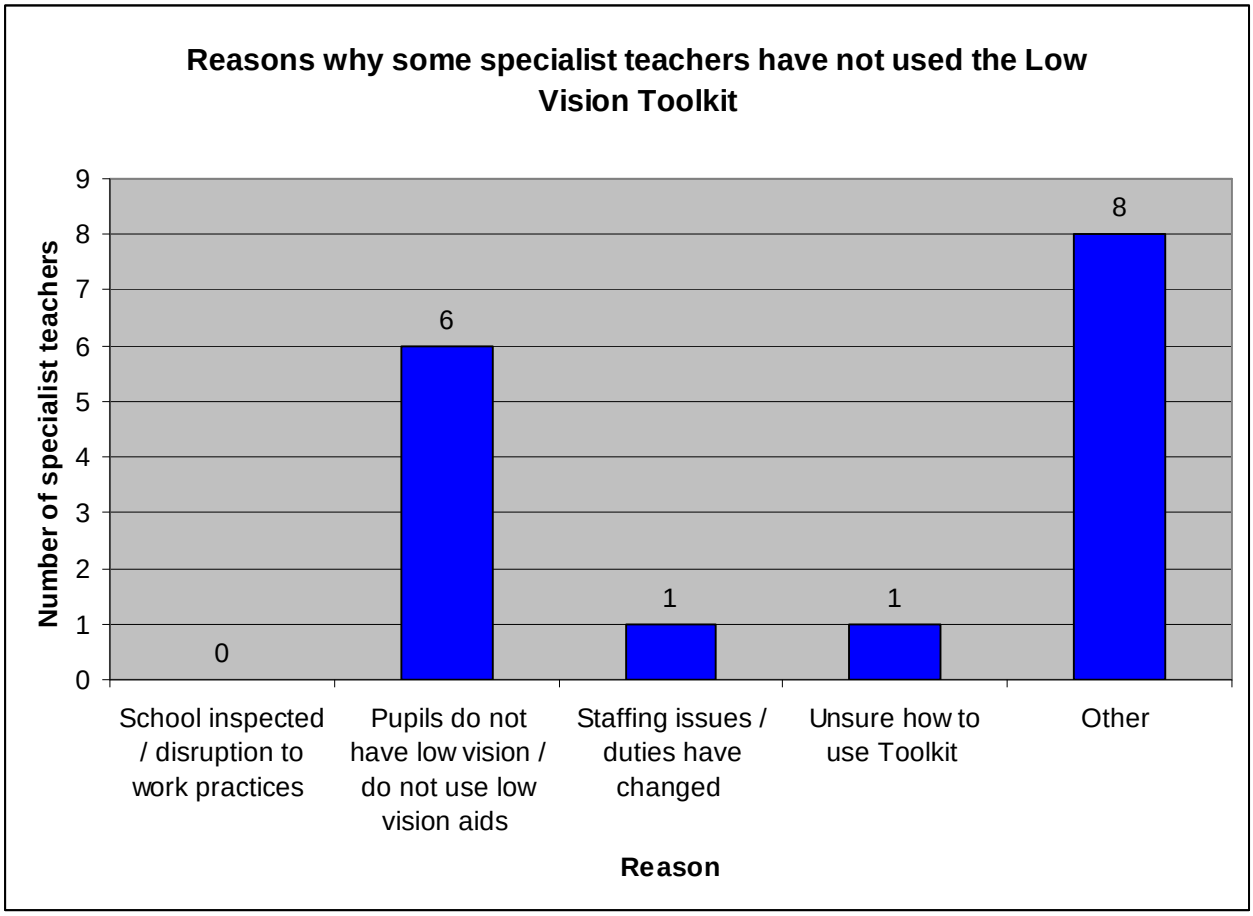
The results show that specialist teachers had mainly used the Low Vision Toolkit to support pupils in primary and secondary Schools. Six specialist teachers reported that they had used the Low Vision Toolkit either all the time or most of the time in primary schools compared with three teachers using it all the

time or most of the time in secondary schools. None of the specialist teachers used the Low Vision Toolkit all the time or most of the time in special schools.

Some specialist teachers recorded the reasons for not using the Low Vision Toolkit and the results are shown in Figure 3.3.

Figure 3.3

Reasons why some specialist teachers had not used the Low Vision Toolkit



In total, 8 specialist teachers recorded 'other' reasons why they had not used the Low Vision Toolkit. The 'other' reasons were:

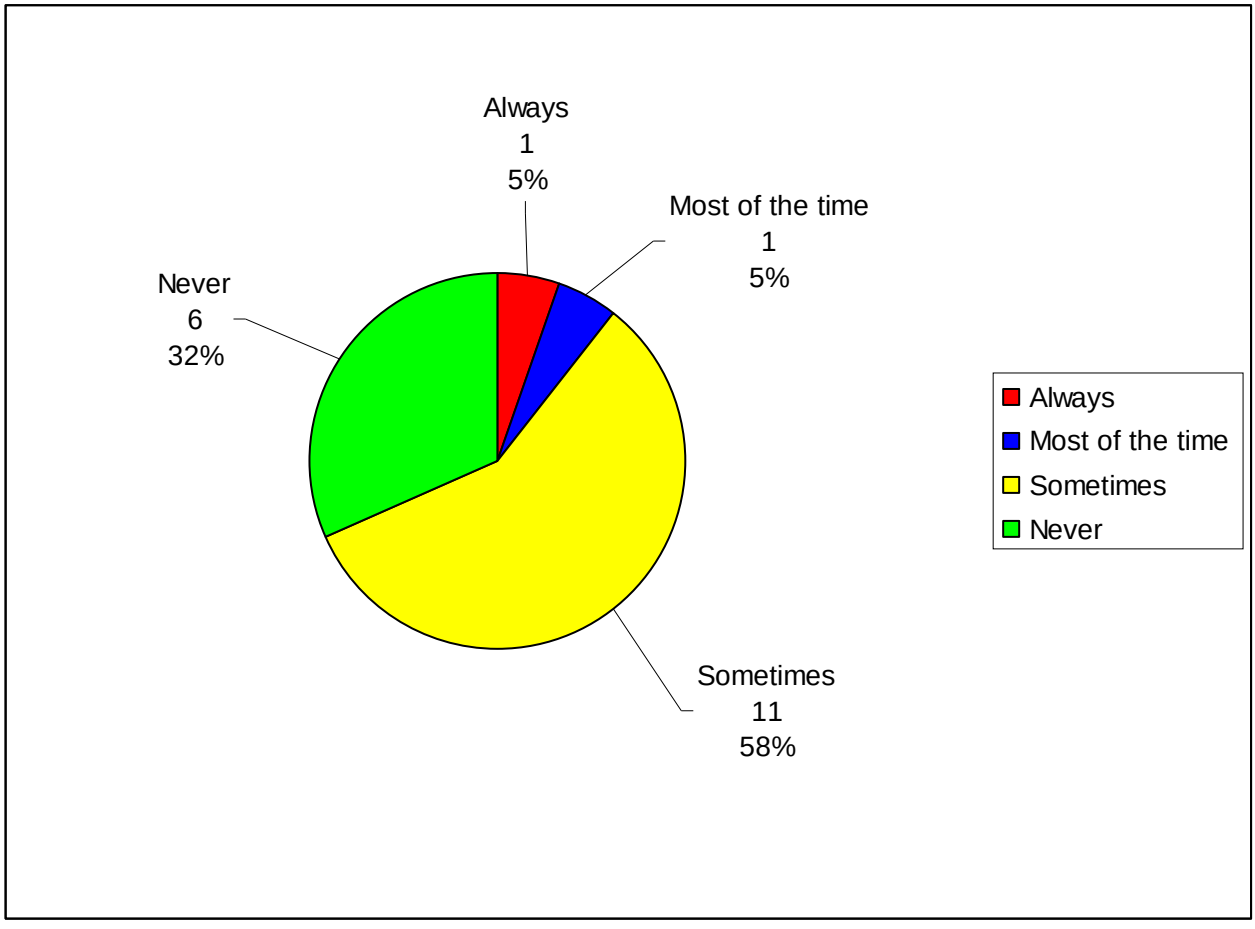
- *Do not have Secondary pupils on caseload.*
- *Haven't got used to using it.*
- *I do not work with pupils in special schools.*
- *It has been matter of time/ caseload. We are due to kick off training agenda soon and will use the information.*
- *My role doesn't involve working with individuals at school.*

- *Secondary pupils already using technology very successfully.*
- *The pictures are already quite large and using low vision aids makes them too large to identify for some pupils.*
- *The pupils use their low vision aids effectively and I don't have time free to devote to the Toolkit.*

3.3.2.3 Social care professionals

The reported use of the Amsler chart by social care professionals is shown in Figure 3.4.

Figure 3.4
Frequency of social care professionals using the Amsler chart with patients with central field loss



The majority of social care professionals (58%, n=11) sometimes used the Amsler chart with patients who had central field loss and almost one-third (32%, n=6) never used it.

Table 3.4 shows the reported confidence of social care professionals to provide advice about task lighting.

Table 3.4

Confidence of social care professionals to provide advice about task lighting

Confidence level	**n**	**%**
Not confident (scores '1' and '2' combined)	2	11.8%
Somewhat confident (scores '3' and '4' combined)	3	17.6%
Very confident (scores '5' and '6' combined)	12	70.6%
Total	17	100.0%

The majority of social care professionals (70.6%, n=12) were very confident about advising clients on appropriate task lighting.

3.3.3 Relevance of the training

Among all professional groups, the vast majority of respondents (80.8%, n=122) reported that the training had been extremely relevant to their low vision work. In total, 17.2% (n=26) of respondents reported that the training had been somewhat relevant to their work and just 2.0% (n=3) of respondents reported that the training had not been relevant at all.

Table 3.5 shows the reported relevance of the training by low vision practitioners, specialist teachers and professionals from social care.

Table 3.5

Reported relevance of the training by professional groups

	Not relevant at all (scores '1' and '2')		**Somewhat relevant** (scores '3' and '4')		**Extremely relevant** (scores '5' and '6')		**Total**
	n	%	n	%	n	%	n
Low vision practitioners	1	1.0%	15	13.5%	95	85.6%	111
Specialist teachers	1	4.5%	5	22.7%	16	72.7%	22
Social care professionals	1	5.6%	6	33.3%	11	61.1%	18

Low vision practitioners found the training most relevant to their low vision work with 85.6% (n=95) of respondents reporting that the training had been extremely relevant.

Pearson's correlations were carried out to determine the relationships between the relevance of the training (as reported in the post-training evaluation questionnaire) and the criteria used in the level 1 evaluation (reactions), as reported in Chapter 2. The results are shown in Table 3.6:

Table 3.6

Pearson's correlations between reported relevance of the training (post-training) and evaluation criteria from level 1 evaluation

Evaluation criteria (level 1 reactions)	**Relevance (post-training)**	
	Pearson correlation (r)	**p**
Pre-course information	0.146	0.077
Enrolment process	**0.229***	**0.005**
Expected enjoyment	-0.088	0.287
Expected relevance	0.003	0.967
Expected ease	0.121	0.141
Motivation	0.011	0.893
Individual tasks	0.030	0.750
Pair work	0.047	0.639
Small group work	0.101	0.231
Whole group work	0.011	0.894
Q&A sessions	-0.055	0.540
Multi-disciplinary sessions	-0.019	0.824
Hands-on/ practical	0.128	0.139
Theoretical information	0.152	0.062
Trainers' skills/ qualities	0.198*	0.014
Venue	-0.069	0.399
Actual enjoyment	0.015	0.852
Actual relevance	0.017	0.839
Actual ease	0.140	0.088
Likelihood of recommending	0.085	0.298

* Correlation is significant at $p<0.05$

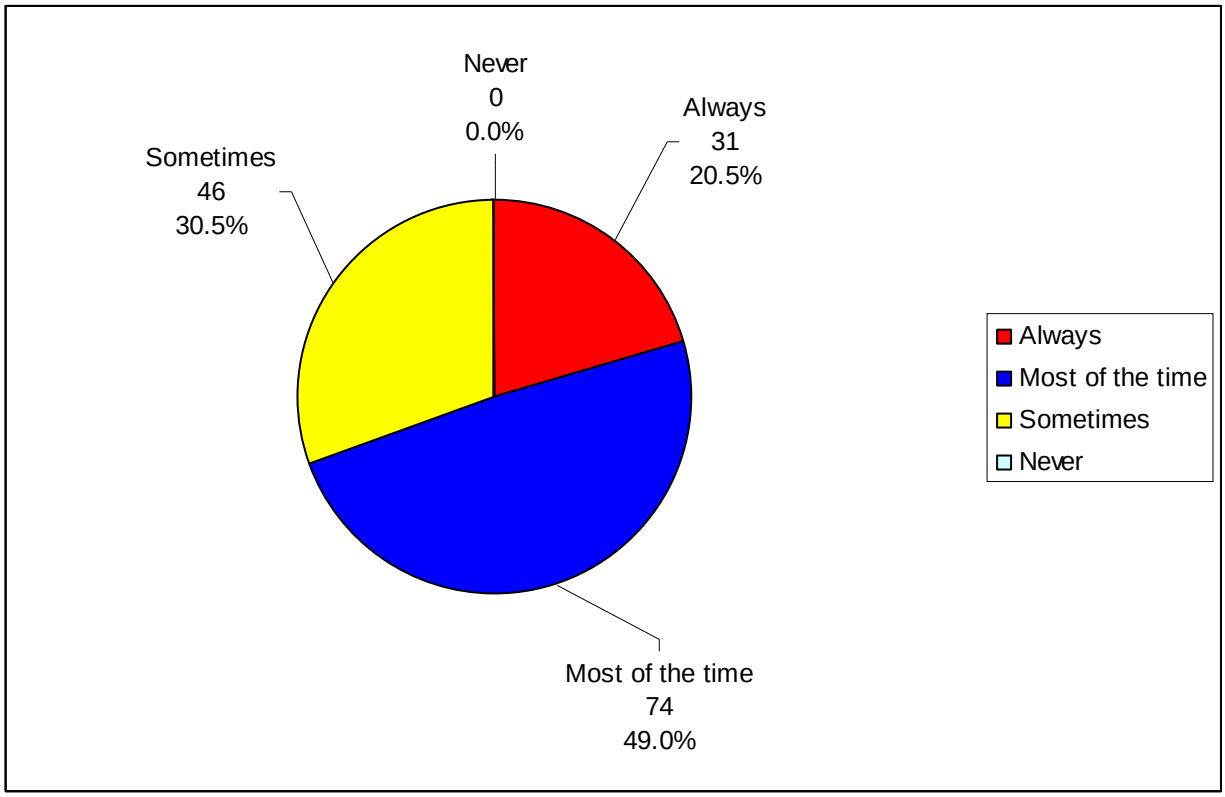
(Bold indicates strongest positive correlation)

The reported relevance of the training, approximately one year after the training had taken place, had positive and significant correlations with the skills, qualities and attributes of the training team ($r=0.198$, $p<0.05$) and the enrolment process ($r=0.229$, $p<0.05$). Although the correlations were positive, they were weak.

3.3.4 Transfer and use of skills and techniques

Overall, 151 professionals responded to the question about how often they had used skills or techniques from the training in their low vision work. The results are shown in Figure 3.5.

Figure 3.5
Frequency of using skills or techniques from the training in low vision work



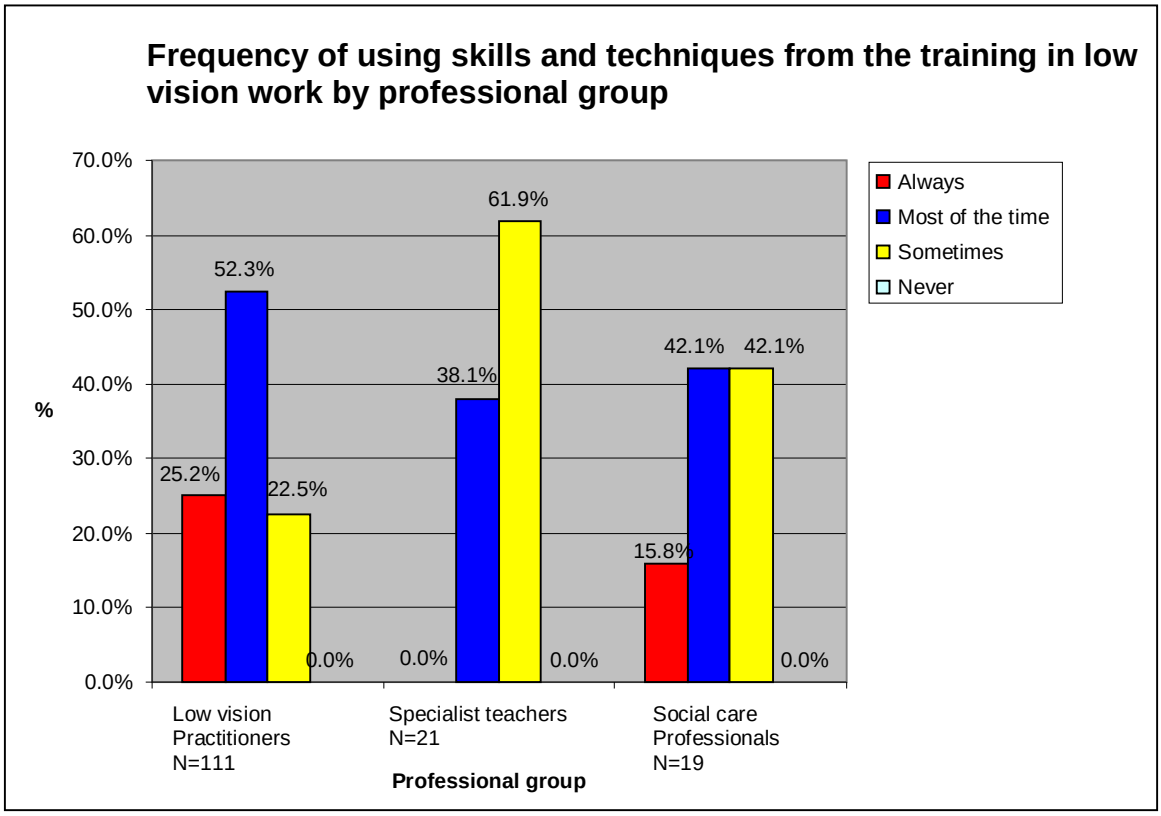
The results show that all the professionals reported using skills or techniques from the training in their low vision work. The majority (49.0%, n=74) reported that they had used skills or techniques most of the time.

There was a significant relationship between the reported relevance of the training and the frequency of using skills or techniques from the training in low vision work (Chi ^{2}=38.481, $p<0.05$). There was also a significant, relatively strong positive correlation between the reported relevance of the training and the frequency of using skills and techniques in low vision work ($r=0.454$, $p<0.05$).

Low vision practitioners used skills or techniques from the training more frequently than specialist teachers or professionals from social care, as shown in Figure 3.6 below.

Figure 3.6

Frequency of using skills and techniques from the training in low vision work by professional group



Overall, 25.2% (n=28) of low vision practitioners always used skills and techniques from the training in their low vision work compared with 15.8% (n=3) of social care professionals. The results also show that 61.9% (n=13) of specialist teachers sometimes used skills and techniques in their low vision work compared with 42.1% (n=8) of social care professionals and 22.5% (n=25) of low vision practitioners.

There was a significant relationship between professional group and the frequency of using skills or techniques from the training (Chi ^{2}=16.602, $p<0.05$).

The questionnaire invited respondents to record the aspects of their low vision work that they had changed as a direct result of the training. In total, 100

professionals provided information about the changes that they had made to their work practices. Some of the comments were:

Changes made to work practices by low vision practitioners:

Comments about prescribing low vision aids:

- *Aware of extra low vision aids available, able to try all options for patients*
- *Broadened my knowledge base and I do not become narrow minded as regards the low vision aids I offer patients*
- *Compact Plus often used but Norville/ Keeler only occasionally*
- *Identifying risk, understanding physical factors in low vision aid use*
- *More confidence and more selective in trying low vision aids*
- *More likely to use Norville or Keeler with suitable patients*
- *Offer patients greater choice. More methodological approach to dispensing low vision aids*
- *Using Norville and Compact Plus a lot more than magnifiers: Patients prefer them*
- *Using Norville where appropriate instead of hand magnifier*

Comments about multi-disciplinary working and referrals:

- *Better links with Social Services have made referrals easier*
- *Aware of what Social Services can do for low vision patients*
- *Better advice to patients about involvement of Social Services and better understanding of their prioritisation*
- *Communication with Social Services*
- *Find it easier to talk to patients about referrals*
- *Improved contact with Social Services*
- *Inter-professional communication, e.g. Social Services- better understanding of risk*
- *Trying to involve health professionals more regularly*

Comments about supporting children and young people with low vision:

- *Communication with children's 'workers'*
- *Compact Plus approach to younger people with low vision*
- *More confident in paediatric care*

- *More confident using children's magnifiers for instruction*
- *Optelec (Compact Plus) dramatically changed low vision aids, especially for children. Many more are referred to me from schools, i.e. QTVIs*
- *Seeing more children and liaising with SENCO*

Changes made to work practices by specialist teachers:

- *Equipment used for certain activities, training in use of low vision aids, information given to school and parents*
- *Formally teaching children how to make best use of their vision*
- *More confident working with pupils; Use resources and activities; networking*
- *More structured*
- *More confident in supporting/ promoting use of low vision aids*

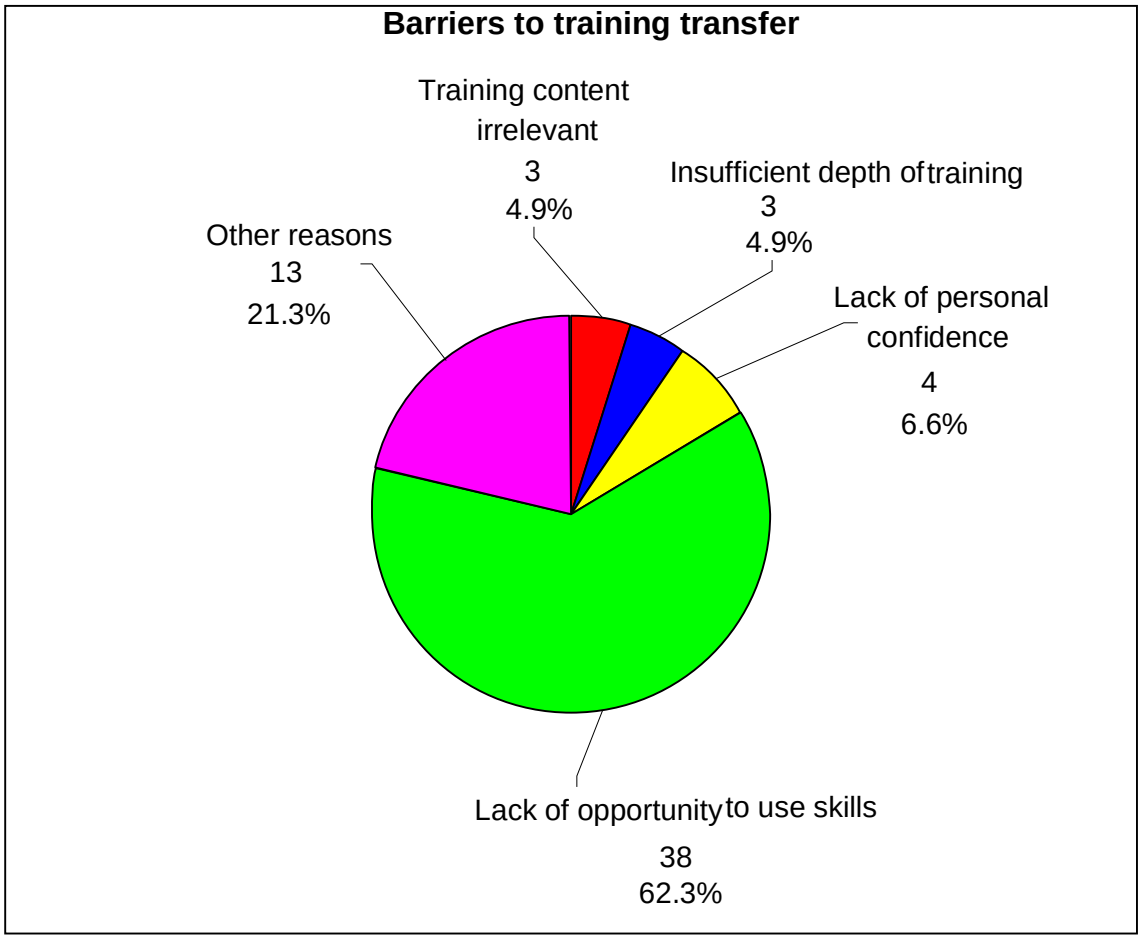
Changes made to work practices by social care professionals:

- *Enhanced my knowledge base and confidence when discussing low vision aids and services with service users*
- *More knowledge of low vision aids available through the scheme*
- *Sensory staff attended session and proved very helpful and informative. Result was amended referral card and response letter from social care.*
- *Understanding of lighting, availability of low vision scheme*
- *Better links with low vision practitioners and understanding of the equipment*
- *Better knowledge about information of what's on the low vision aid list. More informed about low vision assessments*

Although 69.5% (n=105) of all professionals described using skills and techniques from the training either all the time or most of the time in their low vision work, 30.5% (n=46) of all professionals only sometimes used skills and techniques from the training in their work. The survey asked respondents to record the barriers or reasons that had prevented them from applying and using skills and techniques from the training in their low vision work. The barriers to training transfer, as reported by all professionals, are shown in Figure 3.7.

Figure 3.7

Barriers limiting or preventing transfer and application of skills and techniques from the training to low vision work



Overall, lack of opportunity was reported to be the major barrier to training transfer with 62.3% (n=38) of professionals reporting that this had limited or prevented them from using skills from the training in their low vision work. Lack of opportunity was also the main barrier to training transfer for each professional group.

In total, 21.3% (n=13) of respondents provided details of 'other' barriers to training transfer. The comments included:

- *Compact Plus not found very useful by adult patients*
- *Keeler kit difficult to get hold of*
- *Have not used Keeler-forgotten how to*
- *Not part of my role*
- *Sometimes feels difficult to work through the theory when patient sat in front of you*

- *People who need higher magnification for reading are unwilling/ uncomfortable using them (low vision aids) because print needs to be held closer*
- *Course was only refresher- only skills were to prescribe the kit in question, which is not always appropriate*

3.3.5 Impact of the training on referral processes

One of the aims of the training was to improve referral processes. The questionnaire invited respondents to record the extent to which the training had made it easier to refer patients or clients to other services. Table 3.7 shows the respondents who reported that the training had made it very much easier (scores '5' and '6' combined) to refer children, young people or adults with low vision to other professionals and services.

Table 3.7

Respondents who reported that the training days had made it 'very much easier' to refer people with low vision to other professionals or services

		REFERRAL TO		
		Low vision practitioners	**Education professionals**	**Social care professionals**
REFFERAL FROM	**Low vision practitioners**	N/A	30.2% (n=32)	61.5% (n=67)
	Education professionals	45.5% (n=10)	N/A	25.0% (n=5)
	Social care professionals	55.6% (n=10)	18.2% (n=2)	N/A

In particular, referrals between low vision practitioners and professionals in social care were made much easier as a result of the training. Overall, 61.5% (n=67) of low vision practitioners reported that the training had made it very much easier to refer patients to colleagues in social care. Similarly, 55.6%

(n=10) of social care professionals reported that it had made it very much easier to refer patients to low vision practitioners.

The training had less impact on referral processes between education and social care. In total, 25.0% (n=5) of education professionals reported that the training had made it much easier to refer to social care and 18.2% (n=2) of social care professionals reported that it was much easier to refer to education services.

The reported improvement in referral processes is corroborated by data about referrals provided by the Welsh Low Vision Service. Table 3.8 below shows the number of patients referred to and from different services before and after the training.

Table 3.8

Number of patients referred to and from services before and after the training

	Before the training	**After the training**	**% change**
	1st Oct 2008- 31st Sep 2009	1st Apr 2010- 31st Mar 2011	
Referrals to the service* from social services	417	567	+36.0%
Referrals to the service from education	19	46	+142.1%
Referrals to the service from third sector organisations	78	117	+50.0%

	Before the training	**After the training**	**% change**
	1st Oct 2008- 31st Sep 2009	1st Apr 2010- 31st Mar 2011	
Referrals/ reports from the service to social services	382	619	+62.0%
Referrals/ reports from the service to education	9	31	+244.4%
Referrals/ reports from the service to third sector organisations	111	49	-55.9%

** 'Service' refers to the Welsh Low Vision Service and Children's Low Vision Project*

Overall, more patients were referred to other services after the training than before. For example, before the training, 417 patients were referred to the Welsh Low Vision Service from social services. However, after the training, this increased to 567, representing a 36.0% increase. Similarly, 382 patients were referred from the Welsh Low Vision Service to social services before the training but 619 were referred following the training (62.0% increase).

In addition, data provided by the Welsh Low Vision Service show that the number of children and young people who had a low vision assessment, increased after the training. Before the training (1st October 2008 and 31st September 2009), 54 children had a low vision assessment. However, after the training (1st April 2010 to 31st March 2011), 122 children had a low vision assessment. This represents an increase of 125.9%.

3.3.6 Impact of the training on multi-disciplinary working

One of the aims of the training was to improve multi-disciplinary working.

The questionnaire asked respondents to record the extent to which the training had improved multi-disciplinary working at a local level. In total, there were 150 responses to this question with 50.0% (n=75) of respondents reporting that the training had very much improved multi-disciplinary working (scores '5' and '6' combined) in the local area. Just 11.3% (n=17) of respondents reported that the training had not improved multi-disciplinary working at all (scores '1' and '2') and the remaining 38.7% (n=58) of respondents reported that the training had somewhat improved multi-disciplinary working (scores '3' and '4').

Table 3.9 shows the reported improvement in multi-disciplinary working by each professional group.

Table 3.9

Reported improvement in multi-disciplinary working by professional group

	No improvement at all (scores '1' and '2')		**Some improvement** (scores '3' and '4')		**Very much improved** (scores '5' and '6')		**Total (n)**
	n	%	n	%	n	%	n
Low vision practitioners	9	8.2%	46	41.8%	55	50.0%	110
Specialist teachers	6	27.3%	8	36.4%	8	36.4%	22
Social care professionals	2	11.1%	4	22.2%	12	66.7%	18

Professionals from social care reported that the training had improved multi-disciplinary working more than low vision practitioners or specialist teachers. There was a significant relationship between professional group and the extent to which the training days were reported to have improved multi-disciplinary working (Chi ^{2}=27.520, $p<0.05$).

3.3.7 Other comments

The questionnaire included an open-ended question for respondents to make any other comments about the training or to suggest ways that future training could be improved. Some of the comments are reported below:

Low vision practitioners:

Comments about referrals and multi-disciplinary working:

- *Contact with social services has been very helpful: Easier to refer to them*
- *Effective referrals already set up in our area, which was not altered at training days. Direct referral by telephone already possible to education professionals*
- *I've made more referrals to SS but my patients tell me they haven't been seen by social worker, even 8 months later*
- *Much better understanding of what Social Services can do*
- *Training was excellent and very pertinent. Having a multi-disciplinary approach helped improve connections with other professionals, which has been very useful*

Comments about low vision aids:

- *Biggest problem is the wait to obtain Keeler kit to make assessments in practice. I've waited for 2 months for kit so far. I'm also on waiting list with health board*
- *Dispensing Keeler and Compact Plus is almost impossible to do in domiciliary setting*
- *Having only one Keeler kit for whole of Wales is major problem which I hope can be addressed in due course subject to funding*
- *Longer time needed with Keeler kit*
- *Need more training on Norville/ Keeler. Otherwise, I am confident in dispensing low vision aids*

Comments about organisation and delivery of training:

- *It has helped. However, as an optometrist running a practice, meetings during the day are not viable. Other people attending are salaried whereas we are not. We need to be paid out of hours/ practice expenses!*
- *More detail and more case scenarios. Why not have sessions where you ask for suggestions to improve the service?*
- *No follow up; No contact details given to practitioners*
- *Training day CET points were done just before cut-off date for last period to collect points- so no use to me. Cardiff optoms had their*

training when the new term to collect CET points started so could use them

- *Written material to take away would have been very helpful*

Specialist teachers:

- *Thanks to everyone involved in training and the effect it has had on our training in the use of low vision aids*
- *Toolkit excellent but still need more time to fully implement in our service*
- *Feel very guilty that I haven't used the Toolkit but relationships formed during training have been invaluable.*
- *Would like another round of training for staff who could not attend*

Social care professionals:

- *It was a precious time to network with the optoms and discuss things in relaxed atmosphere- we are all very busy people !*
- *Networks of professionals involved in eye care are essential and the training helped to establish and maintain such networks. Long may they continue*
- *Better understanding of roles and the low vision service. Referral system set up following training day and is successful!*
- *Referral processes already in place and working well*

3.4 Discussion

3.4.1 Response rate

Postal questionnaires are often used to collect data, especially in health-related research, partly because the respondents are often spread over a large geographical area (Edwards, Roberts et al. 2002). A postal questionnaire was considered the most viable option to collect the data in this study because the respondents were spread throughout Wales.

In total, 256 postal questionnaires were distributed and 154 were completed and returned, representing an overall response rate of 60.2%. This compares favourably to a postal survey of 600 GPs in Wales, which achieved a final response rate of 67.6% (Barclay, Todd et al. 2002).

In this study, low vision practitioners had the highest response rate. This provides a sound basis for evaluating the post-training behaviour and practices of low vision practitioners. On the other hand, the response rates for specialist teachers and social care professionals were relatively modest. The high non-response by specialist teachers and social care professionals reduced the sample size and may have introduced bias (Edwards, Roberts et al. 2002), reducing the quality of the data and validity of the results.

The 18-item questionnaire sent to specialist teachers was relatively lengthy compared with the 8-item questionnaire sent to low vision practitioners and the 9-item questionnaire sent to social care professionals. The number of questions and length of the questionnaire sent to specialist teachers may have contributed to the low response rate. It has been reported that shortening a questionnaire can be an effective way of increasing the response rate (Sahlqvist, Song et al. 2011).

The questionnaires sent to low vision practitioners and social care professionals were very similar in terms of length and design. However, the response rate for low vision practitioners was considerably higher than that for social care professionals. Although this discrepancy can not be explained in full, it is suggested that the response rate for low vision practitioners was higher

because the training was a mandatory component of the re-accreditation process.

It is acknowledged that web-based or email surveys can generate equivalent or higher response rates than postal questionnaires (Kaplowitz, Hadlock et al. 2004; Glover and Bush 2005). However, the benefits and limitations of using such technology need to be considered.

3.4.2 Evaluation of profession-specific elements of the training

The results of the survey showed that low vision practitioners were most confident about prescribing the Compact Plus electronic hand-held magnifier. Conversely, low vision practitioners reported that they were least confident about prescribing the Keeler telescopic device. The Keeler device is the most specialist of the low vision devices and requires the most skill.

Data provided by the Welsh Low Vision Service show that between 1st April 2010 and 31st March 2011 (post-training), low vision practitioners prescribed 769 Compact Plus electronic hand-held magnifiers. In comparison, low vision practitioners prescribed 212 Norville frames (96 large, 116 small) and 27 Keeler devices during the same period. This reflects the results of a study of the prescribing habits of low vision practitioners at the low vision clinic at Moorfields Eye Hospital in London between 1973 and 2003. In the study, far fewer distance devices were prescribed than near magnifiers. In addition, the proportion of hand magnifiers increased linearly over time while there was a similar decrease in the proportion of spectacle-mounted telescopes prescribed (Crossland and Silver 2005).

The results of the survey showed that specialist teachers had mainly used the Low Vision Toolkit when supporting pupils in primary and secondary schools. This indicates that specialist teachers considered the Toolkit to be a useful resource to teach pupils how to make the most of their remaining sight and how to use their low vision aids. However, the results of the survey also suggested that the Toolkit had not been used as extensively as hoped, especially as approximately one year had elapsed since it had been distributed. Specialist teachers offered a number of reasons for not using the Toolkit, some of which referred to the lack of opportunity and time pressures. Both the lack of

opportunity and time pressures have been reported as training transfer barriers in other studies (Kirkpatrick 1979; Cromwell and Kolb 2004; Meyer, Lees et al. 2007; Brown and McCracken 2009).

The survey showed that there had been limited use of the Low Vision Toolkit in special schools. This is unsurprising because specialist teachers (QTVIs) may support only a few, if any, pupils in special schools. Data from the Welsh Government show that, in 2010 to 2011, only 14 out of 3985 pupils (0.35%) in special schools in Wales had visual impairment as their major or primary special educational need (StatsWales032730 2011). The result of this would be that specialist teachers (QTVIs) may have had only a few, if any, pupils in special schools in their caseloads. This may have contributed to the reported limited use of the Low Vision Toolkit in these settings.

The Amsler Chart can provide a quick way of determining eccentric fixation. Although non-healthcare professionals, including rehabilitation officers and mobility specialists, can use the Amsler Chart as a basic tool to assess visual function, the results of this study showed that social care professionals had not used it extensively when supporting clients. The questionnaire results showed that only one professional from social care always used the Amsler Chart with patients with central field loss and that just under one-third never used it. The reported lack of use of the Amsler Chart may suggest that social care professionals had limited confidence in using it. This may indicate that the training did not equip social care professionals with the knowledge and skills to use the Amsler Chart when supporting clients with central field loss. Alternatively, the limited use of the Amsler Chart may indicate that it was not suitable for the individual clients supported by social care professionals (lack of opportunity).

It is acknowledged that volunteer trainers from the Macular Disease Society (MDS) use the Amsler Chart to help clients identify their best functional vision and optimum direction of gaze. The MDS also advocates that patients should be told about the Amsler Chart.
www.maculardisease.org/page.asp?section=201&search=
(Accessed 7th November 2011)

The provision of appropriate lighting to meet an individual's needs can have a significant impact on their visual performance and visual ability. One of the roles of rehabilitation officers (social care) is to advise clients on appropriate task lighting. Following the training, the vast majority of social care professionals reported that they were very confident about advising clients on appropriate task lighting. This suggests that the training equipped social care professionals with the knowledge and skills to advise clients about their lighting needs

3.4.3 Relevance of the training

It is reassuring that, approximately one year after the training, the majority of respondents (80.8%, n=122) reported that they had found the training to be extremely relevant to their low vision work.

There was a significant relationship and relatively strong positive correlation ($r=0.454$, $p<0.05$) between the reported relevance of the training and the frequency of using skills and techniques in low vision work. These corroborate the results from the level 1 evaluation: The relevance of the training is more indicative of whether learning takes place than enjoyment. It also suggests that the relevance of the training can be used to some extent to determine the level of training transfer. This assumption is supported by the results of a study about the impact of critical care training on nursing practice. The study found that the relevance of the training was an important factor to determine how easily skills could be transferred 'to the job' (Meyer, Lees et al. 2007). Similarly, the perceived practical relevance of a training programme has been reported to be a crucial factor in the training transfer process (Liebermann and Hoffmann 2008).

In this study, low vision practitioners found the training to be most relevant to their low vision work followed by specialist teachers and professionals from social care. These results mirror those from the level 1 evaluation. This may reflect that the training formed part of the re-accreditation process for low vision practitioners, who wished to continue practicing under the Welsh Low Vision Service. It may also suggest that low vision practitioners had encountered fewer barriers to training transfer, resulting in a more positive evaluation of the relevance one year later. The high prescription rates of the new devices by low

vision practitioners may also reflect the positive evaluation of the relevance of the training.

Specialist teachers and social care professionals found the training less relevant than low vision practitioners. This may suggest that specialist teachers and social care professionals had encountered more barriers to transferring skills or techniques from the training in their low vision work, resulting in a reduced perception of relevance. This 'use it or lose it' situation may have resulted if learners found that they did not actually need to use skills or techniques acquired during the training in their work (Meyer, Lees et al. 2007; Brown and McCracken 2009).

In the initial evaluation of the training (level 1), 90.9% (n=200) of respondents reported that the training had been extremely relevant to their low vision work. The decrease in reported relevance one year later (80.8%, n=122) may indicate that some professionals had responded more favourably in the level 1 evaluation questionnaire because of a desire to 'fit in' or because they were uncomfortable or unwilling to be negative about the training at the time (Darby 2006; Darby 2008). One year later, however, this possible response bias may have reduced.

3.4.4 Transfer and use of skills and techniques

In this study, just over two-thirds of all respondents had used skills and techniques from the training either all the time or most of the time in their low vision work. It is very re-assuring that none of the respondents reported that they had never used skills and techniques from the training in their work. This indicates that professionals who attended the training learned new skills and techniques and subsequently applied them to their low vision work.

Just over one-quarter of low vision practitioners had always used newly-acquired skills and techniques in their low vision work and just over half (52.3% n=58) had used them most of the time. This suggests that the profession-specific objectives of the training for low vision practitioners were met. This is corroborated by the high confidence levels of low vision practitioners to prescribe the Compact Plus electronic device and the increase in the

prescription of the new devices (notably the Compact Plus) available under the scheme.

Although 38.1% (n=8) of specialist teachers had used skills and techniques from the training most of the time in their low vision work, none of them had used new skills and techniques all the time. This represents a lower level of training transfer than low vision practitioners and social care professionals. In the level 1 evaluation, specialist teachers had enjoyed the training the most. However, this reported enjoyment resulted in limited training transfer. This finding does not support the causal relationship between levels, which is implied in the Kirkpatrick approach.

Some social care professionals (15.8%, n=3) had always used skills and techniques from the training in their low vision work and 42.1% (n=8) had used them most of the time. This indicates that some social care professionals had encountered barriers, such as lack of opportunity, to training transfer. The relatively low use of the Amsler Chart by social care professionals may corroborate that lack of opportunity had prevented training transfer for some social care professionals.

The results of this study showed that overall, almost one third of all respondents had sometimes used skills and techniques in their low vision work approximately one year after the training had taken place. If using skills or techniques all or most of the time is considered to represent training transfer success and using skills only sometimes (or never) represents training transfer failure, the results of this study compare favourably with other studies. In this study, training transfer success (based on transfer all or most of the time) was 69.5%, representing a positive level 3 evaluation.

It has been suggested that training transfer failure can be as high as 90% for some training programmes (Marx 1986). For example, a survey of attendees of management education programmes showed that no more than 50% had made any significant attempt to transfer the training to their jobs (Baumgartel, Reynolds et al. 1984). In another study, only 35% of trainees attempted to transfer learning to the workplace environment (Huczynski and Lewis 1980). Another study, involving apprentices in the Danish vocational and educational

system, reported that about one third of the apprentices were unable to transfer skills from vocational college when learning in a place of work (Nielsen 2009). Antle et al (2009) report that training transfer diminishes to 25% at six months after the training and 15% at one year after the training (Antle, Barbee et al. 2009).

Although the studies above imply a limited amount of training transfer, it has been suggested that using percentages to represent transfer is meaningless (Ford, Yelon et al. 2011). In their report, Ford, Yelon et al. provide a critique of the commonly cited estimate that less than 10% of training content is transferred. They suggest that referring to '10% training transfer' is popular because it is a 'sticky concept': It is easy to understand, simple and straightforward. However, they also report that there is little empirical evidence to substantiate the 10% training transfer claim. The 69.5% training transfer success in the present study does not support the 10% training transfer assumption.

In his initial approach to evaluating training programmes, Kirkpatrick outlined that there was a difference between learning information or skills during a training event and subsequently applying them 'on the job' (Kirkpatrick 1960(a)). Since Kirkpatrick's seminal work, evaluating training transfer, including the factors that encourage or enable and limit or prevent training transfer, has become a core and critical component of training evaluation. As Yamnill et al (2001) note, "*Training is useless if it cannot be translated into performance."* (Yamnill and McLean 2001)

One of the aims of most work-focussed training programmes is to equip participants with skills, techniques or knowledge that can later be transferred, applied and used in work-place situations. The Transfer Process Model proposed by Baldwin and Ford remains a popular starting point when examining the training transfer process (Baldwin and Ford 1988). However, training transfer is complex and consists of a system of influences (Ruona, Leimbach et al. 2002). For example, barriers to training transfer have been reported to include lack of time and management support (Cromwell and Kolb 2004), lack of relevance and financial pressures (Meyer, Lees et al. 2007), unrealistic expectations (Phillips and Phillips 2001), lack of motivation to transfer (Bhatti

and Kaur 2010) and lack of incentives to apply new skills (Berge 2008). In addition, learner characteristics such as cognitive ability, self-efficacy and personality have all been studied in relation to training transfer success (Burke and Hutchins 2007).

In this study, the main barrier (overall and for each professional group) preventing the transfer of skills and techniques from the training to low vision work was reported to be a lack of opportunity. A lack of opportunity to use newly acquired skills and techniques has been reported as one of the barriers to training transfer in other studies (Olsen 1998; Day 2000; Clarke 2002; Ruona, Leimbach et al. 2002; Burke and Hutchins 2007). Indeed, the lack of opportunity to use skills from training has been found to be the biggest obstacle to training transfer (Martin 2010) and trainees need the opportunity to use the skills that they acquire during training 'on the job' (Ford, Quinones et al. 1992).

Overall, just over three-quarters of low vision practitioners used skills and techniques from the training either all the time or most of the time in their low vision work. This high transfer rate and use of skills can be corroborated by the high prescription rates of the Compact Plus electronic, hand-held device: 769 were prescribed in the year following the training. During the same period, 212 Norville frames were prescribed. However, in the year following the training, just 27 Keeler telescopic devices were prescribed. It is suggested that lack of opportunity, reported to be the main barrier to training transfer, may refer to a lack of opportunity to prescribe the Keeler device. This is not entirely surprising. The vast majority of low vision practitioners work in community-based optometry practices and many will see less than twenty patients per year (Court, Ryan et al. 2011). With this in mind, many low vision practitioners see very few, if any, patients for whom the Keeler telescopic device is suitable. It is also acknowledged that some patients may reject telescopic devices, such as the Keeler, because of their appearance, possible narrow field of view and weight (Peli and Vargas-Martin 2008). A study of low vision aids prescribed at Moorfields Eye Hospital (1973-2003) also showed that there had been a decrease in the number of telescopic devices prescribed (Crossland and Silver 2005).

Specialist teachers also referred to the lack of opportunity as a reason for not using the Low Vision Toolkit, e.g. *Do not have Secondary pupils on caseload.* Six specialist teachers reported that they had not used the Low Vision Toolkit because the pupils did not have low vision or did not use low vision aids. This would result in limited opportunity to use the Low Vision Toolkit or indeed the skills from the training in educational settings. New resource materials for the Low Vision Toolkit have since been developed. Specialist teachers have been invited to give feedback on the resources to ensure that they meet the needs of all pupils who have low vision. Social care professionals similarly reported that lack of opportunity had been the main barrier to training transfer. This may reflect that almost a third of social care professionals had never used the Amsler Chart with clients with central field loss. A wide range of professionals from social services attended the training, including rehabilitation officers and social workers. For some professionals, the skills and techniques from the training did not directly relate to their day-to-day roles, as suggested by some of the comments about the reasons for non-transfer, e.g. *I am the manager and my staff carry out the assessments; We do not carry out assessments, we gather information for those that do.* These comments suggest that the roles and responsibilities of some of the attendees from social services contributed to the lack of opportunity to use skills and techniques in their day-to-day work.

Only three trainees reported that they had not used skills and techniques because the training content had been irrelevant. Similarly, only three participants reported that the training had not covered subjects in sufficient depth. This suggests that the content and level of the training were appropriate for the majority of professionals. The positive evaluation of the relevance of the training and subsequent levels of training transfer support these results.

3.4.5 Referral pathways and multi-disciplinary working

Overall, the results of the questionnaire showed that the training had a positive impact on referral pathways by making it easier for professionals to refer patients or clients to colleagues in other disciplines or to other services (Table 3.7).

Prior to the introduction of the Welsh Low Vision Service, patient access to low vision services had often been restricted by complex and lengthy referral routes. These could involve referral from an optometrist to a GP then referral to an ophthalmologist followed by referral to a low vision service provider and, eventually, referral to social services (Margrain, Ryan et al. 2005).
One of the aims of the training was to improve links between the Welsh Low Vision Service and social services. The results show that this objective was met. The majority of low vision practitioners reported that the training had made it very much easier to refer patients to social services. Similarly, the majority of respondents from social services reported that the training had made it much easier to refer clients to low vision practitioners. This is a very positive outcome because clinical low vision services, funded by the National Health Service (NHS) and social services, funded by local authorities, should work together to provide seamless support for people losing their sight (Ryan, White et al. 2010). In addition, it has also been reported that eye care professionals, such as low vision practitioners, need to understand the needs of people with low vision and the benefits that low vision rehabilitation can provide (Pollard, Simpson et al. 2003). In their study, Pollard et al advocate that eye care professionals need to liaise with patients to determine any difficulties that they encounter and initiate a timely and appropriate referral. The importance of effective referral pathways has also been reported in a study of the uptake of low vision services provided by the Royal Society of the Blind (RSB) in South Australia (Matti, Pesudovs et al. 2011). In their study, the referral (and follow-up) process was reported to be a major determinant of the uptake of low vision services.

Data provided by the Welsh Low Vision Service (Table 3.8) confirm the reported improvement in referral pathways. Overall, more patients were referred to other services after the training than before. In particular, considerably more patients were referred from the Welsh Low Vision Service to social services after the training (619) than before (382). This represents a positive level 4 evaluation.

Another objective of the training had been to improve referral pathways for children and young people. The results of the study show that this objective was also met because the training was reported to have improved referral pathways between education services (specialist teachers) and low vision practitioners (and vice-versa). The reported improvement in referral pathways is supported

by data provided by the Welsh Low Vision Service: More children and young people had a low vision assessment after the training (n=122) than before (n=54). Again, this represents a positive level 4 evaluation.

In addition to improving referral pathways, the training also aimed to improve multi-disciplinary working. The results demonstrate that this objective was met, especially for low vision practitioners and professionals from social care. Half of the low vision practitioners and two thirds of social care professionals reported that the training had very much improved multi-disciplinary working (Table 3.9) This mirrors the reported positive impact of the training on referral pathways. The importance of adopting a multi-disciplinary approach in the provision of low vision services has been reported in other studies (Markowitz 2006; Chiang, Xie et al. 2011). For example, the results of a clinical trial found that rehabilitation in daily living skills, clinical low vision care and the provision of (and education in using) low vision aids showed an improvement in the visual function of patients with macular disease (Stelmack, Tang et al. 2008). Improvements in overall quality of life have also been reported to result from a multidisciplinary low vision service (Lamoureux, Pallant et al. 2007).

The training had less impact on improving multi-disciplinary working for specialist teachers. However, it is suggested that this may be because good links were already established between specialist teachers and low vision practitioners. The regional Discussion Group meetings, which take place as part of the Children's Low Vision Project, may have contributed to the established relationships between specialist teachers and low vision practitioners.

3.5 Strengths and limitations

One of the main strengths of the post-training evaluation was that it included both profession-specific and generic evaluations. This enabled both profession-specific themes as well as general outcomes to be analysed and reported.

The evaluation identified the extent and diversity of training transfer along with the main barriers that prevented transfer from taking place. The results will be useful for the development and implementation of future training programmes, especially the need to ensure that the training is as relevant as possible to low vision day-to-day work.

The post-training evaluation also assessed the impact of the training on referral pathways and multi-disciplinary working. These were not only one of the desired outcomes of the training days themselves but are also one of the ongoing aims of the Welsh Low Vision Service and Children's Low Vision Project.

As the post-training evaluation took place approximately one year after the training, a sufficient amount of time had elapsed for participants (if possible) to apply skills and techniques from the training in their work. However, the post-training evaluation would have been more robust if a comparative pre-training evaluation had taken place. This would have enabled pre and post training behaviours to be compared, resulting in the impact of the training to be more accurately reported. Measuring and evaluating behaviour before and after the training intervention is advocated in the Kirkpatrick approach (Kirkpatrick 1977).

In addition, a control group, not receiving the training, was not used in this study. This is because it would have been unethical and impossible not to offer the training to a control group, especially as the training was part of the re-accreditation process for low vision practitioners. The Kirkpatrick approach proposes that a control group should be used (Kirkpatrick 1977).

As training transfer is such an intricate and complex process, it would have been useful to carry out a more detailed evaluation of the factors that enabled transfer as well as the factors that prevented transfer from taking place. In addition, as transfer has been reported to operate along a continuum (Buckley, Goering et al. 2003), it would have been useful to carry out a more robust evaluation of transfer as an ongoing process.

3.6 Conclusions and future work

The results of this study show that the training was successful in terms of level 3 (transfer and use of skills and knowledge) and level 4 (referral pathways, multi-disciplinary working and uptake of services) evaluations.

In the Kirkpatrick approach to evaluating training programmes, a causal effect between levels is implied. Overall, the results of this evaluation support this

general principle. Professionals enjoyed the training and found it relevant (level 1), learned new information and skills (level 2), transferred those skills to their low vision work when possible (level 3), which had a positive outcome on referral pathways and the take-up of services (level 4). However, although this study supports the general principles of the Kirkpatrick approach, it has identified some limitations, e.g.

1. In the Kirkpatrick approach, level 1 reactions refer to enjoyment. However, this study found that it is more useful to collect and evaluate data about utility reactions (relevance) than affective reactions (enjoyment).

2. In the Kirkpatrick approach, level 2 learning is defined in a relatively simple way. However, the results of this study show that there are differences between learning information and learning skills. Neither enjoyment nor relevance of the training had a significant impact on learning information but they did affect whether participants learned skills. In addition, the ways that individuals learn and the different types of learning that can take place are not included in the original Kirkpatrick approach.

3. Based on the causal effect between levels, Kirkpatrick proposed that positive level 1 and level 2 evaluations would yield positive level 3 (behaviour/ transfer) outcomes. However, this study showed that the training transfer process is so intricate and complex that other factors, such as the opportunity to use new skills in the workplace, need to be included in the evaluation. In addition, the study found that although specialist teachers enjoyed the training the most (level 1 reactions), they transferred skills from the training less frequently than low vision practitioners or colleagues from social care.

In summary, this study acknowledges the benefits of using the simple yet elegant Kirkpatrick approach to evaluating training programmes. However, it has also highlighted that some elements of the original approach are too simplistic. Modifications to the Kirkpatrick approach, such as splitting level 1 reactions into affective and utility reaction measures and identifying different types of learning, can all be used to enhance it.

The flexibility of the Kirkpatrick approach to evaluate training can be demonstrated by its use to evaluate peer discussion groups for optometrists. Peer discussion groups, which attract CET points, provide an environment for optometrists to engage in case-based discussions with four to eight peers in order to share information and learn from each other.

It is proposed that future training programmes, delivered as part of the Welsh Low Vision Service and Children's Low Vision Project, need to be evaluated in full. However, the evaluations will need to take into account the limitations of the Kirkpatrick framework and will need to incorporate the modifications and extensions to the approach, which have been identified and outlined in this study.

Chapter 4 Background information about special educational needs (SEN) and special schools

This chapter provides background information about special educational needs (SEN) and special schools. It outlines the conditions and disabilities that children and young people in special schools may have and presents the reported prevalence of refractive error and sight problems among children and young people with special educational needs.

4.1 Overview of special educational needs (SEN)

4.1.1 What are special educational needs?

Special educational needs have a legal definition, which is set out in the Special Educational Needs Code of Practice:
(Department for Education and Skills 2001)

1.3
Children have special educational needs if they have a learning difficulty, which calls for special educational provision to be made for them.

Children have a learning difficulty if they:

***(a)** have a significantly greater difficulty in learning than the majority of children of the same age; or*

***(b)** have a disability which prevents or hinders them from making use of educational facilities of a kind generally provided for children of the same age in schools within the area of the local education authority.*

***(c)** are under compulsory school age and fall within the definition at (a) or (b) above or would so do if special educational provision was not made for them.*

Children must not be regarded as having a learning difficulty solely because the language or form of language of their home is different from the language

in which they will be taught.

The Special Educational Needs (SEN) Guide for Parents and Carers (revised 2009) simplifies the definition above:

Children with special educational needs all have learning difficulties or disabilities that make it harder for them to learn than most children of the same age. These children may need extra or different help from that given to other children of the same age. The law says that children do not have learning difficulties just because their first language is not English. Of course, some of these children may have learning difficulties as well.
(Department for Children Schools and Families 2009).

Children with special educational needs may need additional help because of a range of needs, including:

- Cognitive difficulties (thinking/ understanding/ applying)
- Sensory impairment (visual/ hearing)
- Behavioural or emotional difficulties
- Speech and language difficulties
- Difficulties with social and personal skills such as interaction/ expression

Many children and young people will have special educational needs at some point during their childhood. In the majority of cases, schools (and other sources of support) can help children and young people to overcome their needs easily and quickly. However, some children and young people will need ongoing additional help and support (Department for Children Schools and Families 2009).

4.1.2 Categorisation of special educational needs

The Special Educational Needs Code of Practice for Wales (Welsh Assembly Government 2001) recognises that there are no hard and fast categories of special educational need and acknowledges that each child is different. However, it is necessary to categorise (and collect information about) special

educational needs for planning purposes and to study trends and monitor the impacts of interventions put in place to support pupils with special educational needs.
www.teachernet.gov.uk/wholeschool/sen/datatypes/
(Accessed 25th May 2010)

Special educational needs are often inter-related and affect the ability of a child to function, learn and succeed. Special educational needs are divided into four main categories:

1. Communication and interaction

- Speech, language and communication needs (SLCN)
- Autistic Spectrum Disorder (ASD)

2. Cognition and learning

- Specific Learning Difficulty (SpLD)
- Moderate Learning Difficulty (MLD)
- Severe Learning Difficulty (SLD)
- Profound and Multiple Learning Difficulty (PMLD)

3. Behaviour, emotional and social development

- Behaviour, Emotional and Social Difficulty (BESD)

4. Sensory and/ or physical

- Visual impairment (VI)
- Hearing impairment (HI)
- Multi-sensory impairment (MSI)
- Physical disability (PD)

(Welsh Assembly Government 2001)
www.teachernet.gov.uk/wholeschool/sen/datatypes/
(Accessed 25th May 2010)

The Pupil Level Annual Schools Census (PLASC) is the statutory collection of information about schools and pupils, including data about special educational needs.

http://wales.gov.uk/topics/statistics/othersources/childrendata/earlyyears/pupilcensus/?lang=en
(Accessed 1st March 2011)

Schools have a statutory obligation to complete PLASC returns, including the primary or major need of pupils who have special educational needs. If a pupil has a statement of special educational need ("statement"), their needs will have been assessed during the 'statementing' process and the primary or major need recorded.

It is also possible to record a secondary special educational need for individual pupils in the PLASC return.

4.1.3 Special educational needs: Legislative background

Article 23 (1) of the 1989 United Nation's Convention on the Rights of the Child (UNCRC) states that,
A mentally or physically disabled child should enjoy a full and decent life….
Article 23 (3) also states,

….the disabled child has effective access to and receives education, training, health care services, rehabilitation services, preparation for employment and recreation opportunities….

Article 28 (1) recognises the right of the child to an education and outlines several ways in which education should be provided, e.g. primary education should be compulsory and free (United Nations 1989).

The UNCRC formalised and standardised rights, including educational rights, for all children and young people. The education system in the United Kingdom has recognised, acknowledged and made provision for children and young people with special educational needs for several decades. A summary of the evolution of the provision of education for children and young people with SEN is provided below.

The 1944 Education Act, commonly known as the Butler Act, significantly changed the provision of education in the UK. The Act provided free secondary education for all pupils and the school leaving age was raised to 15. Under the Act, children with special educational needs were categorised by their disabilities, which were defined in medical terms. Many children with special educational needs were considered 'uneducable' and were placed in categories such as 'educationally sub-normal' or 'maladjusted' (The Education Act 1944).

The Act provided the framework for the provision of state education for the next three decades. The 1970 (Handicapped Children) Education Act was a key milestone in the consideration and provision of state education for children and young people with special educational needs. The Act ended the practice of classifying children and young people with SEN as 'uneducable' and removed the power of health authorities to provide training for *'children who suffer from a disability of mind'*. Under the Act, every school-aged child was entitled to an education (The Education (Handicapped Children) Act 1970).

In 1978, the Warnock Report (Warnock 1978) on special education in England, Wales and Scotland radically changed the conceptualisation of special educational needs. The report was the most comprehensive analysis and review of the education of children and young people with 'special needs' and put special needs on the national agenda. The Warnock Report introduced the ideas of special educational needs (SEN), 'statements' of SEN and 'integrative', which was to become known as 'inclusion'. The 'integrative' or 'inclusive' approach recognised that all children should have common educational goals, regardless of their abilities or disabilities, i.e. independence, enjoyment and understanding. Although the Warnock Report promoted an inclusive approach to educating children with special educational needs, it also acknowledged that not all children would benefit from inclusion. The report also recognised the importance of 'parental' views, opinions and aspirations relating to their child and emphasised the importance of the early identification of special needs. The Warnock Report greatly influenced the legislation concerning the education of children and young people with special educational needs from the 1981 Education Act onwards (Callias 2001).

The 1981 Education Act attempted to provide adequate safeguards, rights and duties for anyone concerned with the education of children with special educational needs (The Education Act 1981). The Act also promoted the rights of children so that they were integrated into the life and work of the community (Macfarlane 1985).

The Act gave a clearer definition of SEN. The definition of special educational needs included children and young people with certain disabilities and conditions, such as cerebral palsy, severe visual or auditory difficulties or inoperable congenital heart disease. However, it was unclear whether children with other conditions, such as severe behavioural disorders or slightly reduced Intelligence Quotients (IQ) would be considered as having special educational needs (Macfarlane 1985).

The 1981 Education Act introduced the conceptual models and frameworks of multi-disciplinary assessments. In addition, the Act outlined the importance of determining the child's needs and identifying how those needs would be met. Parents were also given more involvement in decisions about their child (Callias 2001).

Although the 1981 Education Act was recognised as important in achieving and maintaining an inclusive state education system, it was considered to have fundamental limitations. For example, the assessment and 'statementing' processes were considered lengthy, bureaucratic and controversial. In addition, the Act prompted the initial inclusion of some children and young people with special educational needs into mainstream schools. Professional and administrative resistance meant that these transitions did not always benefit children and young people. Many teachers in mainstream schools were untrained in how to meet the needs of children and young people with SEN. In addition, the implementation of the Act led to increased demand on already-stretched resources and services, including those provided by the NHS (Macfarlane 1985), without making additional funds available.

The Education Act 1993 (The Education Act 1993), which superseded the 1981 Act, was implemented in 1994 and brought about changes for children and young people with special educational needs, e.g.

- To define schools' responsibilities toward pupils with SEN with expectations of clear and transparent policies and procedures for meeting their needs (Callias 2001).
- To place a duty on the Secretary of State to produce a Code of Practice and the power to revise it from time to time.
- To give more emphasis to the wishes and needs of 'parents', including the Special Educational Needs Tribunal.
- To give practical guidance to schools and Local Education Authorities about how to meet their responsibilities.

By this time, the promotion and implementation of 'inclusive education' meant that children and young people with special educational needs, who would have previously received education in special schools or other settings, were increasingly receiving their education, with specialist support, in mainstream schools.

4.1.4 Special Educational Needs Code of Practice

The first Special Educational Needs Code of Practice came into effect in 1994. It set out a five-stage approach to special educational needs' assessment. Stages 1 and 2 were the responsibility of the school to identify and assess the needs of children and take appropriate action. Stage 3 involved schools seeking support from Local Education Authority (LEA) specialists and preparing a pre-assessment report. At Stage 4, the LEA considered the need for a statutory assessment and carried one out if required. At Stage 5, the LEA considered the assessment and decided whether to issue a statement of special educational needs, commonly known as a statement.

The Code of Practice was revised and the amended Code of Practice was published in 2001 and became effective in 2002 (Department for Education and Skills 2001). An equivalent document for Wales was also produced (Welsh Assembly Government 2001). The Code of Practice set out guidance on policies and procedures to enable pupils with special educational needs to reach their full potential, to be fully included in their school communities and to make a successful transition to adulthood.

Five general principles underpinned the SEN Code of Practice, including the Code of Practice for Wales:

1. Any child with SEN should have their needs met.
2. The special educational needs of children will normally be met in mainstream schools or settings.
3. The views of the child should be sought and taken into account.
4. Parents (including anyone with parental responsibilities) have a vital role to play in supporting their child's education.
5. Children with special educational needs should be offered full access to a broad, balanced and relevant education, including an appropriate curriculum.

Although the revised Code of Practice took account of and reflected the previous Code of Practice, it included some important changes, e.g.

a) A stronger right for children to be educated at a mainstream school.

b) New duties on Local Education Authorities to arrange for parents of children with SEN to be provided with services offering advice and information.

c) A new duty for schools and other education providers to inform parents when they are making SEN provision for their child.

d) A new right for schools and other education providers to request a statutory assessment of a child.

e) A new emphasis on pupil participation.

f) A new emphasis on working with other agencies.

4.2 Overview of special schools

4.2.1 What are special schools?

A special school can be defined as:

Special school: *A school which is specially organised to make special educational provision for pupils with special educational needs and is for the time being approved by the Secretary of State under section 188 of the Education Act 1993.*
www.teachernet.gov.uk/wholeschool/sen/senglossary/
(Accessed 25th May 2010)

The Special Educational Needs Code of Practice for Wales expands on this definition:

Special school*: A school which is specially organised to make special educational provision for pupils with special educational needs. Special schools maintained by the LEA comprise of community special schools and foundation special schools, and non-maintained special schools are approved by the Secretary of State under section 342 of the Education Act 1996.*
(Welsh Assembly Government 2001)

4.2.2 Special schools and inclusive education

The national policy and legislative frameworks for inclusive education mean that many children and young people with special educational needs can be educated (and have their needs met) in their local mainstream school with specialist support.

However, there are some children and young people for whom inclusion in mainstream educational settings is neither viable nor beneficial because of the nature, extent and diversity of their individual needs, disabilities or impairments. For these children and young people, attending a special school may be more appropriate and suitable. This is reflected in the special educational needs

policies of Local Education Authorities. For example, the City and County of Swansea special educational needs policy states:

…Provide special education in the child's local school whenever possible, taking account of parental wishes unless:

a) the school is unsuitable to the child's age, ability and aptitude or to his special educational needs or
b) the attendance of the child at the school would be incompatible with the provision of efficient education for the children with whom he would be educated or the efficient use of resources;
(Schedule 27, para (3), Education Act 1996)
(City and County of Swansea 2009)

4.3 Special educational needs and sight problems

Pupils attending special schools have a wide range of special educational needs. In 2008/09, the majority of pupils in special schools in Wales had learning disabilities as their primary or major need and a considerable number of pupils had autistic spectrum disorders as their primary or major need (StatsWales007672 2010). For these reasons, this section examines the relationships between learning disabilities and autistic spectrum disorders and refractive errors, ophthalmologic diagnoses and visual impairment. In addition, as some pupils in special schools had physical difficulties, the relationships between cerebral palsy and ocular disorders have also been reported.

4.3.1 Overview of learning disabilities (LD)

The term 'learning disability' is a commonly used label for a wide spectrum of genetic, social or medical conditions, which result in a reduced or restricted capacity to learn (Cockerill 2002). Learning disabilities are diagnoses, not diseases or physical or mental illnesses (British Institute of Learning Disabilities 2007). Each learning disability condition or syndrome results in different behaviours and symptoms, which manifest differently in each individual.
www.aboutlearningdisabilities.co.uk/how-define-categorise-learning-disabilities.html
(Accessed 26th May 2010)

It is generally accepted that three criteria need to be met before a learning disability can be identified:
www.library.nhs.uk/Eyes/ViewResource.aspx?resID=289966&tabID=290
(Accessed 26th May 2010)

1. Significant impairment of *intellectual functioning*
2. Significant impairment of *adaptive/ social functioning*
3. A state of *arrested or incomplete development of mind (early onset)*

Intellectual functioning is often assessed by psychometric testing, which measures Intelligence Quotient (IQ) (Northfield 2004). IQ scores are often used to categorise learning disabilities into:

IQ	50- 70	Mild learning disability
IQ	35- 50	Moderate learning disability (MLD)
IQ	20- 35	Severe learning disability (SLD)
IQ	below 20	Profound learning disability (PLD)

(British Institute of Learning Disabilities 2007)

However, using IQ scores alone can be problematic. For example, the validity of testing procedures with children with learning disabilities can be questioned (Cockerill 2002) and IQ measures alone do not reflect individual strengths and abilities.

Social or adaptive functioning can also be difficult to assess and measure. Scales such as the Hampshire Assessment for Living with Others (HALO) and the Adaptive Behaviour Scale (ABS) have been developed to assess social functioning (Northfield 2003). However, any assessment must take into account each individual's personal circumstances and the context within which the person is living, e.g. age, gender, culture and family life.

The third criterion to be met is that the learning disability is present from childhood, i.e. *early onset,* rather than presenting in adulthood because of, for example, injury or accident. This reflects the multi-factorial causes of learning disabilities, including genetic influences and dysfunctional brain systems (Lagae 2008).

4.3.2 Learning disabilities and visual difficulties

Children and young people with learning disabilities often have co-existing impairments, such as hearing or visual impairment, which impact on communication skills (Cockerill 2002).

Studies carried out in Denmark concluded that the prevalence of visual impairment, refractive errors and strabismus among children with 'developmental delay' (learning disabilities) is significantly higher than that found in children who do not have developmental delay (Nielsen, Skov et al. 2007a;

Nielsen, Skov et al. 2007b). The terms developmental delay (DD) or intellectual disability (ID) are synonymous with learning disability.

In one of the Danish studies, 923 children, aged 4 to 15, all with IQs equal to or less than 80, underwent an eye examination (Nielsen, Skov et al. 2007a). The results of the study included:

- 10.5% (n=97) of the 923 children had visual impairment.
- The children with visual impairment were predominantly among the children with low IQ; 22.4% of children with IQ less than 50 had visual impairment.
- Most commonly, visual impairment among the 97 children with visual impairment was due to prenatal causes (55.7%, n=54) such as genetic or chromosomal.
- Overall, the main cause of visual impairment among the 97 children were sequelae to brain disorders (64.9%, n=63), comprising cerebral visual impairment (49.5%, n=48), secondary optic atrophy (13.4%, n=13) and hemianopia (2.1%, n=2).
- Congenital cataracts caused visual impairment in 7 (7.2%) of the 97 children.
- Overall, the prevalence of blindness was 3.8%.
- Children with developmental delay had a highly increased risk of visual impairment.

Nielson, Skov and Jensen also examined refractive errors, strabismus and contrast sensitivity among the same population (Nielsen, Skov et al. 2007b):

- 53.0% (n=470) of the children had hyperopia greater than +1D in the right eye.
- 15.3% (n=136) of the children had hyperopia equal to or greater than +3D in the right eye.
- 10.8% (n=96) of the children had myopia equal to or less than -0.5D.
- 1.8% (n=16) of the children had excessive myopia equal to or less than - 6.0D.
- Astigmatism was more frequent and more pronounced in children with low IQ.

- 26.8% (n=244) of the children had manifest strabismus (squint).
- The prevalence of strabismus was highest among children with low IQ.
- Contrast sensitivity was evaluated in 40.0% (n=365) of the children. Reduced contrast sensitivity was associated with low IQ and low visual acuity.

Similar results have been found in other studies. For example:

a) Another study carried out in Denmark (Nielsen, Jensen et al. 2008), involving 719 children aged 4 to 15, found that visual impairment was diagnosed in 12.9% of the children, significant refractive errors in 44.8% and strabismus in 31.1%. The study also found that if a child has cerebral dysfunctions or a known genetic syndrome, the risk of ophthalmic disorders increased significantly. In addition, the study proposed that children suspected of having developmental delay should be referred (early) for an ophthalmological examination.

b) An usually high prevalence of severe visual impairment (25%), refractive errors (24%) and squint (8%) were found among 260 residents in a specialist unit (Kwok, Ho et al. 1996).

c) A study involving 73 children, aged 5 to 19, showed that ophthalmologic abnormalities were present in 60.2%. The most common disorder was optic atrophy (16.4%) followed by refractive errors (15%). The results of visual acuity testing of 60 children showed that 25 (41.6%) had visual impairment (Mwanza, Nkidiaka et al. 2000).

d) Another study in Denmark, involving 7722 children aged under 21 years, with IQ equal to or less than 70, found that 3.9% (300) were blind (acuity equal to or less than 6/60), compared with the prevalence among all Danish children of 0.0019% (Warburg 1979).

The prevalence of visual impairment, refractive errors and ocular disorders among children with learning disabilities are higher than among children without learning disabilities. The American Academy of Neurology recognises this and recommends:

1. Children with global developmental delay may undergo appropriate vision and audiometric assessment at the time of their diagnoses.

2. Vision assessment can include vision screening and a full ophthalmologic examination (visual acuity, extra-ocolor-movements, funduscopic).
(Shevell, Ashwal et al. 2003)

In addition to studies involving children and young people, studies with adult cohorts have shown that visual impairment is more prevalent among individuals with learning disabilities than among those without (Kiani and Miller 2010).

One study found that 92% of adults (n=76) with severe and profound multiple disabilities (SPMD) had a visual impairment (van den Broek, Janssen et al. 2006). Prior to the study, only 30% were known to have visual problems. None of the participants had 'normal' acuity and the severity of visual impairment correlated positively with the severity of the learning disability. Impaired visual fields, contrast sensitivity and binocular functioning were also found among the study cohort.

A literature review was carried out by Warburg to compare the results of studies of the prevalence of visual impairment among individuals with intellectual disabilities (Warburg 2001). One study, presented in the literature review, found the prevalence of visual impairment to be 40% (Sacks, Goren et al. 1991). Another study found a prevalence of 28% (Haire, Vernon et al. 1991). Every study described a high prevalence of visual impairment among individuals with learning disability. In addition, the studies showed that the severity of visual impairment increased significantly with the severity of the intellectual disability and with age.

In another study, involving 1358 individuals, the prevalence of visual impairment ranged from 2.2% (young people with mild learning disability due to causes other than Down's Syndrome) to 66.7% (people aged 50 or over with Down's Syndrome and profound intellectual disabilities) (van Splunder, Stilma et al. 2006).

In a study of 269 individuals (aged 17-79) with intellectual disabilities, 107 (52%) were found to be visually impaired or blind, based on WHO definitions (Evenhuis, Sjoukes et al. 2009).

A study of 166 individuals (aged 9 to 50) found that refractive error was the principle ocular diagnosis (33.8%). Strabismus was found in 31 of the 166 individuals (18.7%) (Karadag, Yagci et al. 2007).

As the prevalence rates of visual impairment, refractive errors and ocular disorders are high among adults with learning disabilities, it has been proposed that adults with severe or profound learning disabilities should be considered visually impaired until proven otherwise (van Splunder, Stilma et al. 2006).

4.3.3 Overview of autistic spectrum disorder (ASD)

In 1943, Leo Kanner first described the disorder that is now known as autism or autistic spectrum disorder (Kanner 1943). Between Kanner's pivotal article and the 1980s, autism was generally considered to be a psychiatric disorder, possibly caused by *'parents who did not sufficiently love their children'* (Taub and Russell 2007). However, it is now known that autistic spectrum disorders are lifelong neurobiological or neurodevelopmental behavioural disorders, which are usually identified by 30 months of age (Scharre and Creedon 1992; Ashwin, Ashwin et al. 2009). The aetiology of autism is very diverse (Hobson and Bishop 2003).

Autism is defined in terms of a 'spectrum' because, although individuals with autism share three common areas of difficulty, they exhibit many different behaviours and subsequently have very diverse needs. The three areas of difficulty experienced by all people with autism are sometimes known as the 'triad of disabilities' or 'triad of impairments' and underpin the diagnosis of the condition:
www.autism.org.uk/About-autism/Autism-and-Asperger-syndrome-an-introduction/What-is-autism.aspx
(Accessed 19th July 2010)

1. Difficulties with social communication

Individuals with autism have difficulties with or impairments of communication (Gerrard and Rugg 2009). This includes both verbal and non-verbal communication. Individuals with autism may not speak or may have limited speech and may find it difficult to understand communication cues such as body language or changes to the pitch or tone of the voice. On the other hand, some individuals with autism may have good speech but may find it difficult to participate actively in a two-way conversation.

2. Difficulties with social interaction

Individuals with autism find it difficult to recognise and understand others' emotions. They also find it difficult to express their own emotions.
www.autism.org.uk/About-autism/Autism-and-Asperger-syndrome-an-introduction/What-is-autism.aspx
(Accessed 19th July 2010)

Individuals with autism may prefer to spend time on their own, misunderstand 'unwritten' social rules or display inappropriate behaviour. This can lead to deficits in social interaction and result in social isolation (Fujita, Yamasaki et al. 2010; Grinter, Maybery et al. 2010).

3. Difficulties with 'social imagination' (restricted/ repetitive behaviours)

Individuals with autism find it difficult to understand abstract ideas or concepts such as 'danger'. They may also find it difficult to understand, interpret and predict the behaviour of other people.
www.autism.org.uk/About-autism/Autism-and-Asperger-syndrome-an-introduction/What-is-autism.aspx
(Accessed 20th July 2010)

This can manifest in restricted or repetitive behaviours, interests and activities (Ashwin, Ashwin et al. 2009; Fujita, Yamasaki et al. 2010). Individuals with autism may also have a need for clear, unambiguous routines and may be unable to accept change in those routines.

Although individuals with autism share the triad of disabilities, autism exists as a spectrum of conditions, which are: (Taub and Russell 2007)

1. Autistic disorder
2. Asperger syndrome (a milder form of autism)
3. Rett syndrome (genetic condition usually affecting females) (Clarke and Jaworska)
4. Childhood disintegrative disorder
5. Pervasive developmental disorder

The incidence of autism is difficult to determine partly because of differences in the diagnostic criteria used. However, the range has been noted as 1.2 to 16 per 10,000 in the US, Europe and Japan. For the autistic spectrum, the incidence has been reported to be as a high as 47 per 10,000 (Trachtman 2008). Other reports suggest that the incidence of autism in the UK is about 1 per 100 people.
www.autism.org.uk/About-autism/Autism-and-Asperger-syndrome-an-introduction/What-is-autism.aspx
(Accessed 20th July 2010)

4.3.4 Autistic spectrum disorders and visual difficulties

Individuals with autistic spectrum disorders often have sensory abnormalities or unusual sensory experiences, including visual (Leekam, Nieto et al. 2007; Trachtman 2008; Ashwin, Ashwin et al. 2009; Crewther and Sutherland 2009; Gerrard and Rugg 2009). Some of the visual abnormalities and visual experiences associated with autistic spectrum disorders are:

a) Enhanced visual acuity (hyperacuity)

Visual hyperacuity, reported by some people with autism, refers to the extreme visual clarity when using foveal focus (Gerrard and Rugg 2009). One study compared the acuity of individuals with autistic spectrum disorder (n=15) with the acuity of a control group. The study found that individuals with autistic spectrum disorder could discriminate the same detail of an object at a distance of 20ft as an individual with 'normal' vision could see from a distance of 7ft (Ashwin, Ashwin et al. 2009). The authors put this in perspective by noting that the visual acuity levels of the individuals with autism were outside the typical range of human acuity levels and were approaching those of birds of prey. In the study, the cause of the hyperacuity shown by individuals with autism was

attributed to an atypically high number of foveal cone cells or to dopamine receptors at the retinal or neural level.

However, the methodological basis and subsequent results of the Ashwin study have been criticised (Crewther and Sutherland 2009). Factors such as the testing distance used and number of trials carried out are considered to have contributed to the reported hyperacuity.

b) Prosopagnosia (face recognition)

Individuals with autism have difficulties with social cognition, which may include identifying facial expressions and recognising and memorising faces (Corbett, Carmean et al. 2009; Grinter, Maybery et al. 2010). As the human face is such an important tool for social interaction and communication, the diagnostic criteria for Asperger's include impaired eye-to-eye gaze and facial expression (Barton, Cherkasova et al. 2004).

One study found that the difficulties with social interaction experienced by individuals with autistic spectrum disorders do not invariably lead to an impairment of face recognition. The study also concluded that the abnormal face recognition among some individuals with autistic spectrum disorders is related to impaired perception of the facial structure, indicative of occipitotemporal dysfunction (Barton, Cherkasova et al. 2004).

The reported hyperacuity of individuals with autistic spectrum disorder may be involved in impaired facial recognition: Individuals with hyperacuity report that they avoid foveal focus of moving or complex targets such as eyes and faces (Gerrard and Rugg 2009).

c) Visual perception

The dorsal stream visual pathway is important in conveying information about spatiality and motion. It has been suggested that global impairment of dorsal stream functioning may be the cause of the motor functioning deficits, such as limited co-ordination and balance, which are common among individuals with autistic spectrum disorders (Grinter, Maybery et al. 2010).

It has also been reported that the atypical superior visual processing skills among ASD individuals may be attributable to the superior functioning of the parvo-cellular visual pathway. Conversely, ASD individuals may have a dysfunctional magno-cellular visual pathway, resulting in inferior global visual processing skills and impaired motion perception (Fujita, Yamasaki et al. 2010).

d) Oculo-motor dysfunction

Abnormal eye movements are common among individuals with autistic spectrum disorders (Gerrard and Rugg 2009). For example, two studies are noted, which found oculo-motor dysfunction among ASD individuals One study found that six out of eleven subjects had dysfunctional saccadic eye movements; the second found poor pursuits and poor fixation among individuals with ASD (Taub and Russell 2007).

e) Strabismus

Studies have shown that strabismus is more prevalent among individuals with ASD than in those without. For example, in one study of 34 children with ASD, 21% were found to have strabismus (Scharre and Creedon 1992). The prevalence of strabismus among the 'normal' population is 3.7% (Scharre and Creedon 1992).

Individuals with autistic spectrum disorders are more likely to have sensory abnormalities or dysfunctional sensory systems, including vision. For that reason, it has been suggested that individuals with ASD are screened for orthoptic problems, especially abnormalities of convergence (Milne, Griffiths et al. 2009).

4.3.5 Overview of cerebral palsy (CP)

Cerebral palsy (CP) is a permanent, non-progressive disorder of movement, co-ordination and posture and is caused by lesion to or damage of the cerebrum in the foetal or infant brain.
www.nhs.uk/Conditions/Cerebral-palsy/Pages/Introduction.aspx
(Accessed 27th May 2010)

In addition to movement, co-ordination and posture, the cerebrum has many other functions and responsibilities, including communication, learning and interpretation of sensory impulses such as hearing and sight.

Cerebral palsy is the most common cause of physical disability in childhood. Prevalence rates of 3 infants per 1000 live births (survey from eight countries in Europe) (Cans 2000; Morris 2007) and 2 per 1000 live births in Western Sweden have been found (Himmelmann, Beckung et al. 2006).

Cerebral palsy is a general term used to refer to a set of neurological conditions, rather than a specific disease, in which motor abnormalities dominate the clinical picture (Sobrado, Suarez et al. 1999). Since cerebral palsy refers to a set of neurological conditions rather than a single condition, sub-types have been identified. The sub-types include spastic hemiplegia and diplegia, ataxic, athetoid or dyskinetic and spastic quadriplegia.

In order to establish a standardised scale to represent the severity of cerebral palsy, the Gross Motor Function Classification System (GMFCS) was developed in 1987. The GMFCS objectively defines a child's current gross motor function with particular reference to sitting and walking. There are five levels in the GMFCS. A child at level 1 (least severe) can walk and perform all the activities of peers of the same age without cerebral palsy but with limitations of balance, speed and co-ordination. A child at level 5 (most severe) will have extreme difficulties with trunk posture, have limited control of limb movement and will be unable to walk (Ghasia, Brunstrom et al. 2008). Most children will remain at the same level on the GMFCS from age 2 to 12 years (Carnahan, Arner et al. 2007).

The Bimanual Fine Motor Function (BFMF) scale has also been developed. This mirrors the five levels of the GMFCS but refers to manual dexterity and functioning (Himmelmann, Beckung et al. 2006).

4.3.6 Cerebral palsy and visual difficulties

High prevalence rates of visual impairment, ocular disorders and refractive errors have been reported among children with cerebral palsy. Prevalence rates vary considerably because of the selection criteria for the study cohorts and the ways in which both the cerebral palsy and visual impairment are defined.

One of the most common results is that there is a greater frequency of hyperopia (long-sightedness) among people with cerebral palsy than among people without cerebral palsy (Sobrado, Suarez et al. 1999). For example, in a study of 50 children and young people, aged 2 to 19.5 years (mean age 5.6 years), most had low to moderate degrees of ametropia. Hyperopes exceeded myopes by 2.5:1 and the most common type of ametropia was low to moderate hyperopia (Ghasia, Brunstrom et al. 2008). Studies have shown that the prevalence of refractive errors correlates with the severity of CP. For example, children with Level 5 CP are at greatest risk of high myopia (Ghasia, Brunstrom et al. 2008).

High levels of hyperopia are one of the more common causes of childhood amblyopia ('lazy eye'). For that reason, the risk of amblyopia among children with neurological conditions, such as CP, is likely to be higher than among non-pathological children because of the apparent high prevalence rates of hyperopia. Early identification and correction of refractive errors, especially high hyperopia, among children with neurological conditions, must be achieved. (Sobrado, Suarez et al. 1999).

There is also a higher prevalence of visual impairment and ocular disorders among children with cerebral palsy than among those without. For example, in a study of 353 children, 66 (19%) had severe visual impairment (Himmelmann, Beckung et al. 2006). In addition, the study found that the level of GMFCS correlated positively with the prevalence of visual impairment.

Cerebral visual impairment (CVI) has also been found to be more prevalent in children with CP than in children without CP. For example, 16% (n=50) of children with CP (all levels) were found to have CVI in one study (Ghasia, Brunstrom et al. 2008). This rate is three to five times lower than studies carried out in Europe. The discrepancy is likely to be attributable to different definitions of CVI. In the same study, optic atrophy rates varied between 10% (level 1) and 60% (level 5).

As the severity of cerebral palsy, indicated by the GMFCS, correlates with accompanying impairments, including visual impairment, the GMFCS can be considered as an indicator of the child's 'total disability load' (Himmelmann, Beckung et al. 2006).

4.4 Vision screening

4.4.1 Introduction to screening

Screening can be defined as:

A process of identifying apparently healthy people who may be at increased risk of a disease or condition. They can then be offered information, further tests and appropriate treatment to reduce their risk and/or any complications arising from the disease or condition.
www.screening.nhs.uk/screening
(Accessed 20th July 2010)

The process of screening is attractive in many cases because it helps to identify diseases, conditions or disorders in their early, pre-symptomatic stages (Hall and Elliman 2008).

The ideal screening test should be (Cochrane and Holland 1971):

1. Simple and easy to administer
2. Acceptable to the participants, especially as involvement is voluntary
3. Accurate
4. Repeatable and give consistent results
5. Sensitive: The ability of the test to give a positive finding when the individual screened has the disease or abnormality under investigation
6. Specific: This may be defined as the ability of the test to give a negative finding when the individual does not have the disease or abnormality under investigation.
7. Cost-effective: The expense of screening should be considered in relation to the benefits of early detection of the target condition or disease.

However, no screening tests are completely accurate. Some individuals, who have the condition being screened for, are not referred for further assessment or treatment (false negatives). Other individuals, who do not have the condition, are referred for further assessment or treatment (false positive)

www.screening.nhs.uk/screening#fileid8760_1
(Accessed 20th July 2010)

It is important that screening programmes are effective and that they are carefully monitored and evaluated. Elements of screening programmes that need to be evaluated include:

1. Sensitivity of the test (related to rate of false positives)
2. Specificity of the test (related to rate of false negatives)
3. Predictive value of the test
4. Timeliness of the test, referral, diagnosis and treatment
5. Initial and ongoing training relating to the screening programme
6. Satisfaction and understanding of participants in the screening programme
(Hall and Elliman 2008)

The UK National Screening Committee has produced criteria to appraise the viability, effectiveness and appropriateness of a screening programme. Examples of the criteria are that the condition should be an important health problem and that the test should be simple, safe, precise and validated. Ideally, all the criteria should be met before a screening programme is introduced.
www.screening.nhs.uk/criteria#fileid9287
(Accessed 20th July 2010)

4.4.2 Children's vision screening

One of the recommendations in the Hall Report (Hall and Elliman 2008) is that a visual assessment of all children aged 4 to 5 should be carried out by an orthoptist. The report also recommends that children of any age with suspected visual deficits, a significant family history or any neurological or disabling condition, should be routinely referred for a visual assessment.

Part of the remit of the UK National Screening Committee is to advise Ministers and the NHS in all four UK countries about all aspects of screening policy, e.g. by providing advice about implementing new screening programmes not currently provided by the NHS. The UK National Screening Committee agreed with the recommendation in the Hall Report.
www.screening.nhs.uk/vision-child

(Accessed 21st July 2010)

Following the recommendations of the original Hall and Elliman report, the Government published the National Service Framework (NSF) for Children, Young People and Maternity Services in 2004 (Department for Education and Skills and Department of Health 2004). The NSF set out health services that would be offered to all children and recommended (p28):

National orthoptist-led programme for pre-school vision screening to be introduced.

Despite the recommendation in the Hall Report that orthoptic-led vision screening programmes should be implemented for all 4 to 5 year old children, the report also recognised the practical difficulties of this:

Universal coverage may still be a problem in the pre-school years and it is as yet uncertain whether orthoptists will be in a position to deliver such a programme.
(Hall and Elliman 2008)

It is generally acknowledged that children's vision screening varies considerably in terms of provision, attendance rates, referral criteria and evaluations (Zoete 2007). For example:

The quality and quantity of vision screening in schools varies throughout the UK. In some schools, screening takes place at regular intervals. In others, there is little or no screening programme.
www.healthyeyes.org.uk/index.php?id=122&no_cache=1&sword_list[]=screening
(Accessed 21st July 2010)

This is corroborated by an Ophthalmic Service Guidance report for ophthalmologists:

Not all healthcare regions fund school screening (vision testing at age 4-5 years) outside mainstream schools so children with a learning disability are less likely to be able to benefit.
(Pilling 2011)

This may be substantiated by the British and Irish Orthoptic Society (BIOS) 2009 Workforce Planning Review for Wales (BIOS 2009). The report noted that there were 45 orthoptic staff throughout Wales (38.86 whole time equivalent). In addition to the limited number of orthoptists in Wales, the comments in the 'Service Development' section of the review about children's vision screening were:

There was a large variation in the provision of vision screening in line with the recommendations of the UK National screening committee. Some services were unable to secure funding, some were unable to recruit staff and some had already lost the service provision to optometrists because they were in a position to provide services immediately. While commissioners are at liberty to purchase services from any suitable provider, it seems unfair to exclude orthoptic providers because of service constraints even if they are deemed to be the most appropriate by the UK bodies such as the UK National Screening committee and the strategic advisory group of the UK Vision Strategy.

In Wales, the current discrepancies in children's vision screening have been identified and objectives have been put in place to address them:
(UK Vision Strategy: Wales Vision Strategy Implementation plan 2010 to 2014 2010)

Objective 1.2
Ensure equitable provision of effective eye health screening services for children in Wales.

This objective will be met by:

- *Publishing existing uptake of eye health checks and screening.*

- *Developing multi-agency consensus relating to screening and eye care services for children.*

- *Ensuring recommendations are implemented and annual publication of benchmark data.*

Another objective of the Wales Vision Strategy Implementation Plan is:

Objective 1.3
Increase of eye health checks and low vision services to children and adults with additional needs, e.g. learning disability.

4.5 Conclusion

Children and young people in special schools in Wales, who have a range of needs, disabilities and impairments, are more likely to have visual difficulties than children and young people without such needs, disabilities and impairments.

Although guidelines and recommendations about children's vision screening are in place, the provision of vision screening in Wales is patchy. With this in mind, it is considered that there are children and young people in special schools in Wales with uncorrected refractive errors and undetected and undiagnosed ocular disorders or visual impairment. In order to address these concerns, a pilot vision care programme for children and young people in special schools in Wales was set up as part of the Children's Low Vision Project. In the pilot programme, all pupils (in the five participating special schools) with consent had a free optometric sight test in school. Glasses were prescribed and referrals were made to other services, including ophthalmology, GPs and the sensory support service in the Local Education Authority, when needed.

Chapter 5 Survey of special schools in Wales

This chapter reports a survey of all the special schools in Wales. The survey aimed to determine:

- The prevalence of corrected refractive error among pupils in special schools
- If and how vision screening was provided in special schools
- The prevalence of known visual impairment among pupils in special schools
- The type and level of support available to pupils in special schools with known visual impairment

The survey was the initial phase of a pilot vision care programme for pupils in special schools in Wales.

5.1 Special schools in Wales

5.1.1 The need to survey special schools in Wales

As reported in Chapter 4, children and young people with special educational needs, including but not limited to learning disabilities, are more likely to have refractive errors, ocular disorders, ophthalmologic diagnoses and visual impairment than children and young people without SEN. With this in mind and with a scarcity of knowledge about vision screening programmes in special schools, there were concerns about the likely prevalence of undetected and uncorrected refractive errors and undiagnosed and untreated ocular disorders or visual impairment among pupils in special schools in Wales.

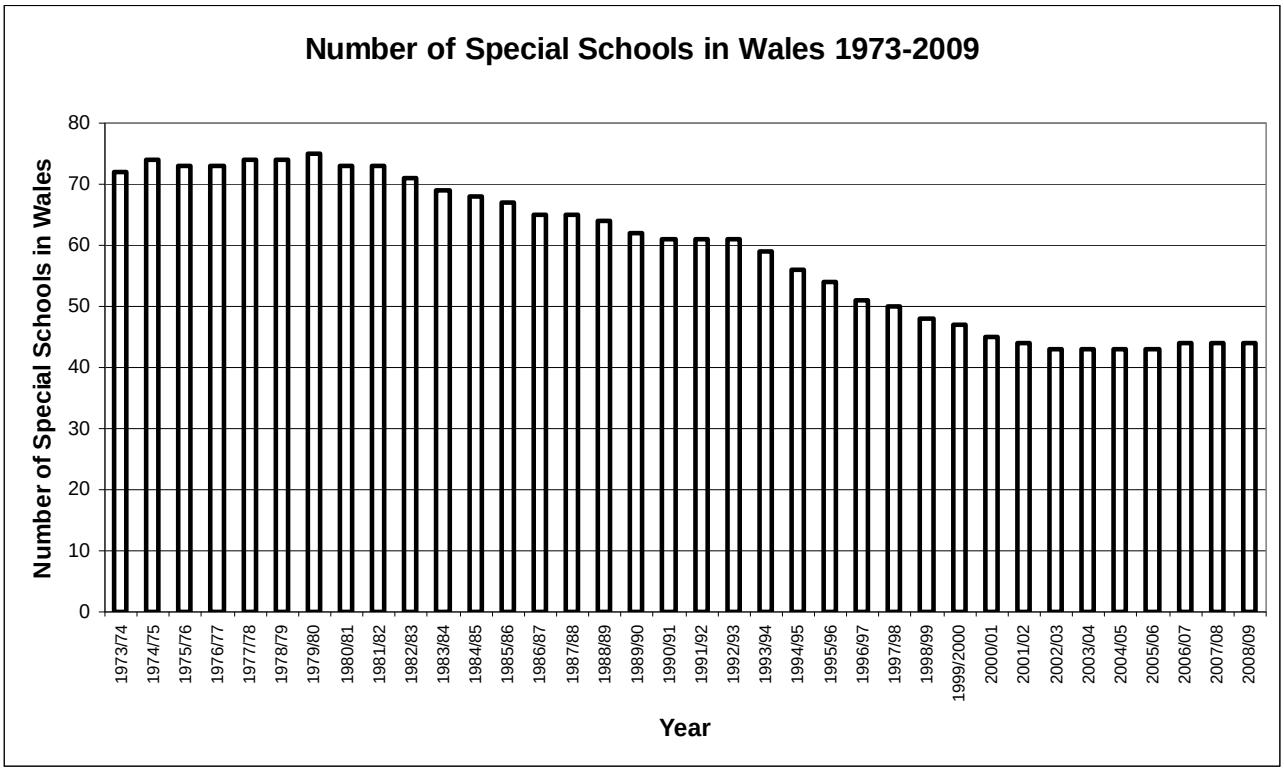
5.1.2 Number of special schools in Wales

There has been an overall decrease in the number of special schools in Wales over the last thirty years or so. In 1973/74, there were 72 special schools in Wales. By 1979/80, the number of special schools in Wales peaked at 75. Since 1979/80, there has been a steady decrease in the number of special schools and by 2008/09, there were 44 special schools throughout Wales (StatsWales007503 2010).

The overall decrease in the number of special schools in Wales may be attributable to the implementation of legislation to promote inclusive education. Pupils who previously received education in special schools are increasingly attending mainstream schools, reducing the need for separate special education provision. Figure 5.1 shows the total number of special schools in Wales from 1973/4 to 2008/09 (StatsWales007503 2010).

Figure 5.1

Number of special schools in Wales 1973/74-2008/09



5.1.3 Distribution of special schools in Wales

The 44 special schools (in 2008/09) were distributed throughout the Local Education Authorities (LEAs) in Wales, as shown in Table 5.1 (StatsWales009943 2010). Cardiff had more special schools (seven) than any other LEA. Rhondda Cynon Taf, the second most populated local authority after Cardiff, had four special schools. Ceredigion did not have any designated maintained special schools. However, there were four support centres in the local authority, which catered for the needs of pupils with profound developmental and learning difficulties. The support centres provide a short period of intensive support for pupils before they join mainstream schools on a

full or part-time basis. The four centres are managed by the head teachers of the schools in which they are based (Ceredigion County Council 2010).

Table 5.1

Number of special schools in Wales by Local Education Authority 2008/09

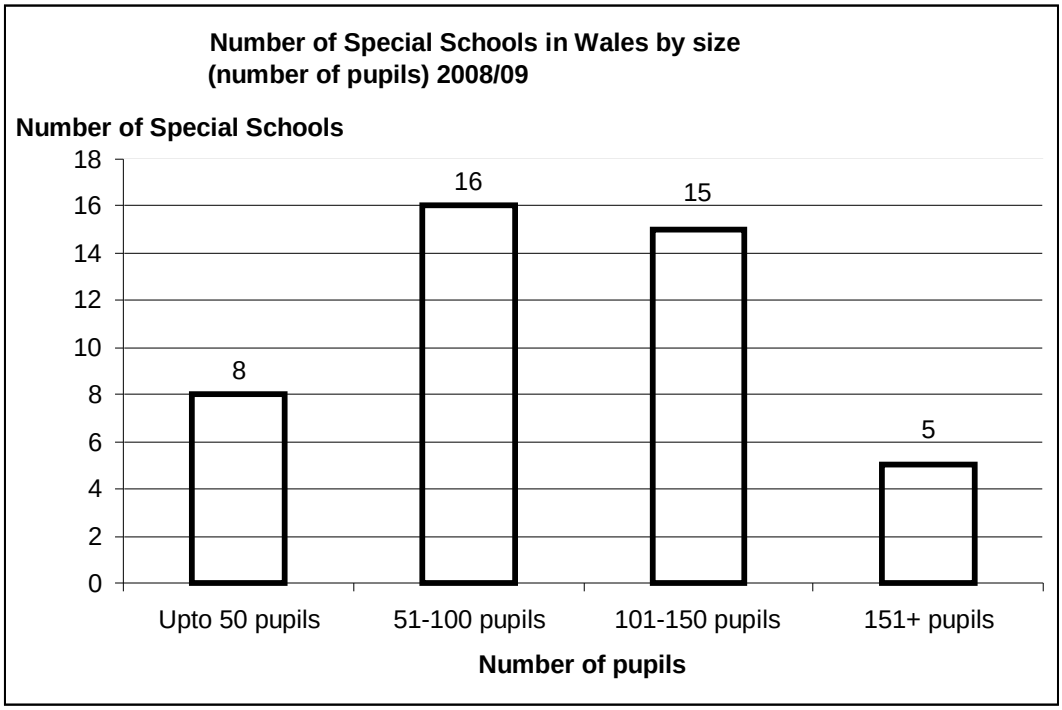
Local Education Authority	Number of special schools (2008/09)
Isle of Anglesey	1
Gwynedd	3
Conwy	1
Denbighshire	2
Flintshire	3
Wrexham	1
Powys	3
Ceredigion	0
Pembrokeshire	1
Carmarthenshire	2
Swansea	2
Neath Port Talbot	3
Bridgend	2
Vale of Glamorgan	3
Rhondda Cynon Taf	4
Merthyr Tydfil	1
Caerphilly	1
Blaenau Gwent	1
Torfaen	1
Monmouthshire	1
Newport	1
Cardiff	7
Total	**44**

5.1.4 Sizes of special schools in Wales by number of pupils

Special schools vary considerably in size, based on the number of pupils, as shown in Figure 5.2 (StatsWales009953 2010).

Figure 5.2

Special schools in Wales by size (number of pupils) 2008/09



Two of the five largest schools (151+ pupils) were in Bridgend, the remainder were in Conwy (1), Wrexham (1) and Denbighshire (1).

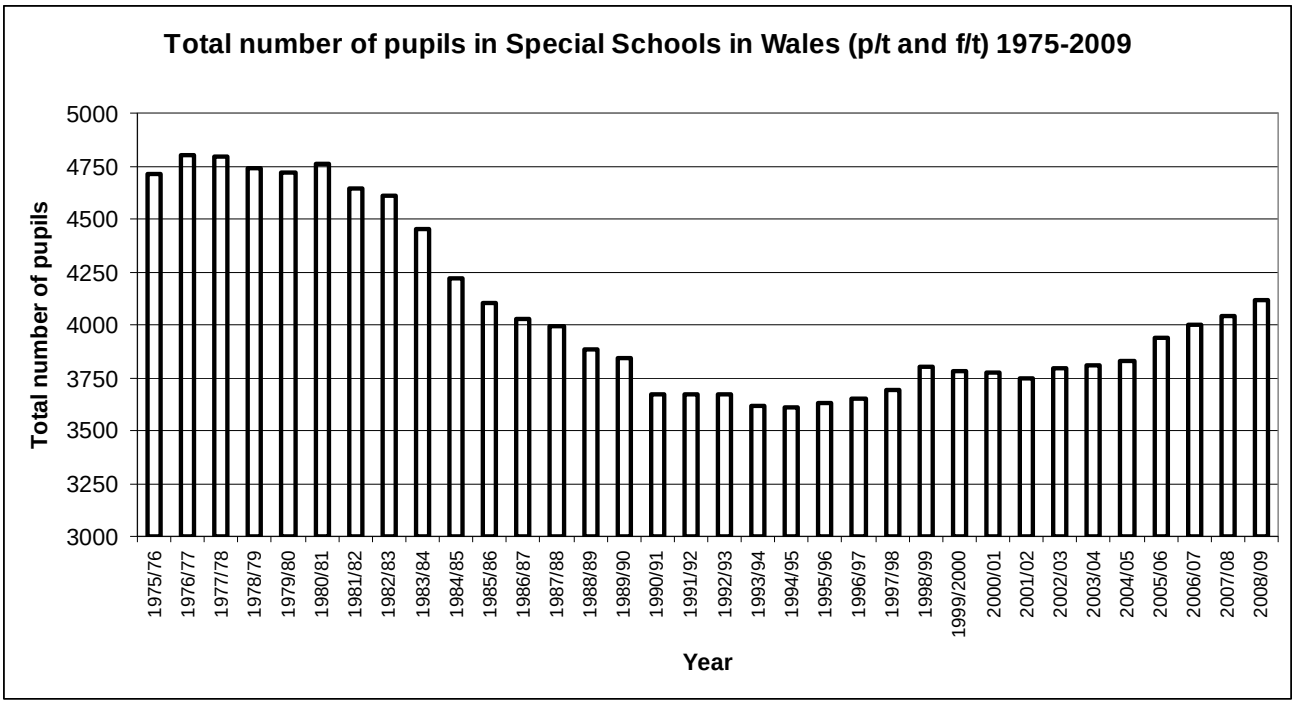
5.1.5 Number of pupils attending special schools in Wales

In 2008/09, a total of 4115 pupils attended special schools in Wales (StatsWales007538 2010). This comprised 4059 full-time and 56 part-time pupils.

The number of pupils attending special schools has fluctuated since 1975, as shown in Figure 5.3. The total number of pupils in special schools peaked at 4798 in 1976/77 and reached a low of 3607 in 1994/95. There was an overall decrease in the number of pupils attending special schools between 1975 and the mid-1990s. However, there has since been an overall increase in the number of pupils attending special schools. In contrast, the actual number of special schools has steadily decreased since this time. This suggests that although there are fewer special schools because of inclusive education policies, the remaining special schools have to cater for the increasing number of pupils who need specialist education support. Improved medical treatment may mean that premature babies and children with complex needs are surviving infancy, leading to the increased number of pupils in special schools.

Figure 5.3

Total number of pupils (p/t and f/t) in special schools in Wales 1975-2009



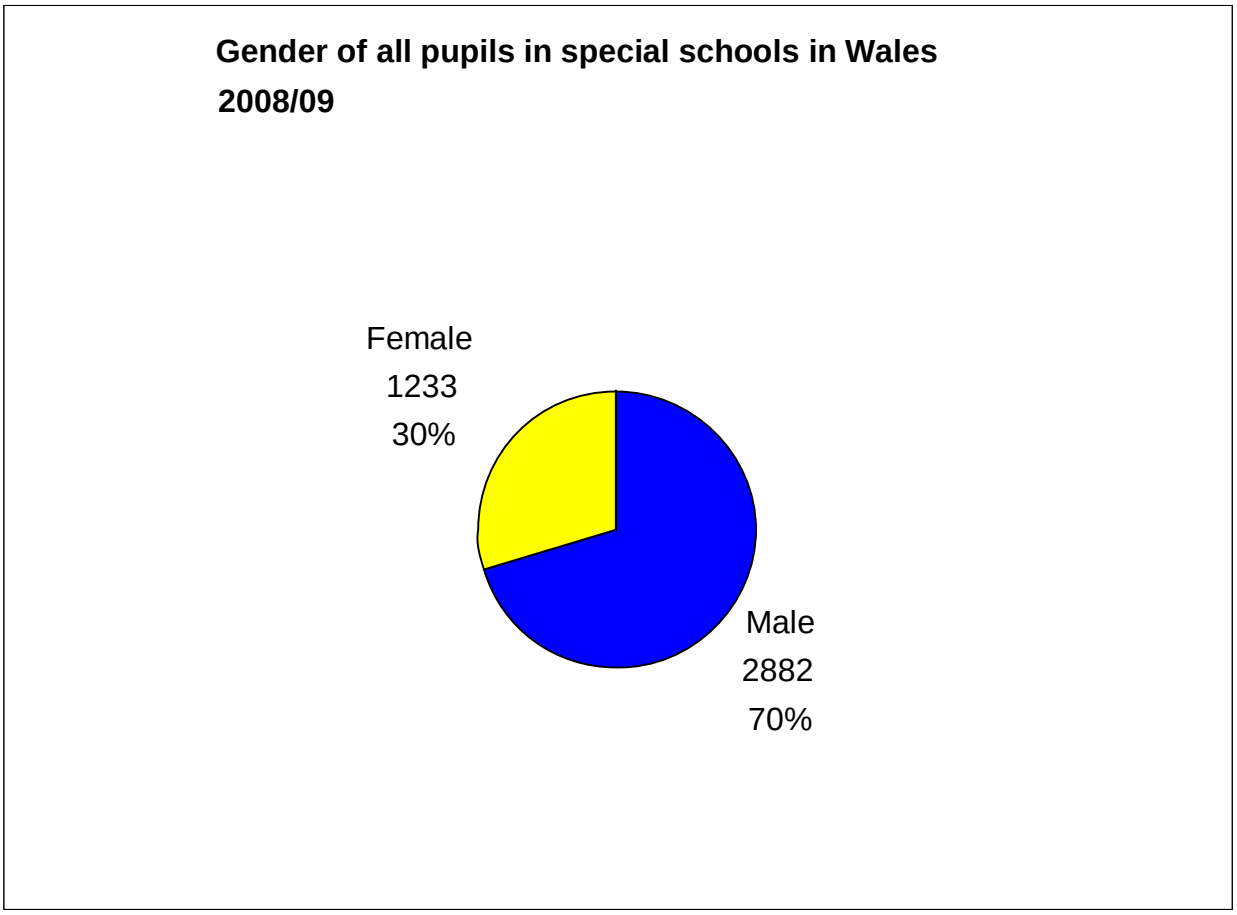
5.1.6 Age and gender of pupils attending special schools in Wales

Of the 4115 pupils in special schools in 2008/2009, 77% (n=3182) were aged between 5 and 15, 18% (n=732) were over school leaving age and 5% (n=201) were aged under 5 years (StatsWales007541 2010).

Overall, there were more boys than girls (all ages) in special schools in Wales in 2008/09 (StatsWales009964 2010), as shown in Figure 5.4. This is unsurprising because many of the disabilities and conditions found among pupils in special schools are gender-related. For example, cerebral palsy has been found to be more prevalent in boys than girls at a ratio of 5:1 (Murphy, Yeargin-Allsopp et al. 1993) and autistic spectrum conditions have been shown to affect males more than females with a ratio of at least 10:1 (Baron-Cohen 2002). The effect of low birth weight on learning disabilities has also been shown to be specific to males (Johnson and Breslau 2000).

Figure 5.4

Gender of all pupils in special schools in Wales 2008/09



5.1.7 Needs of pupils in special schools in Wales

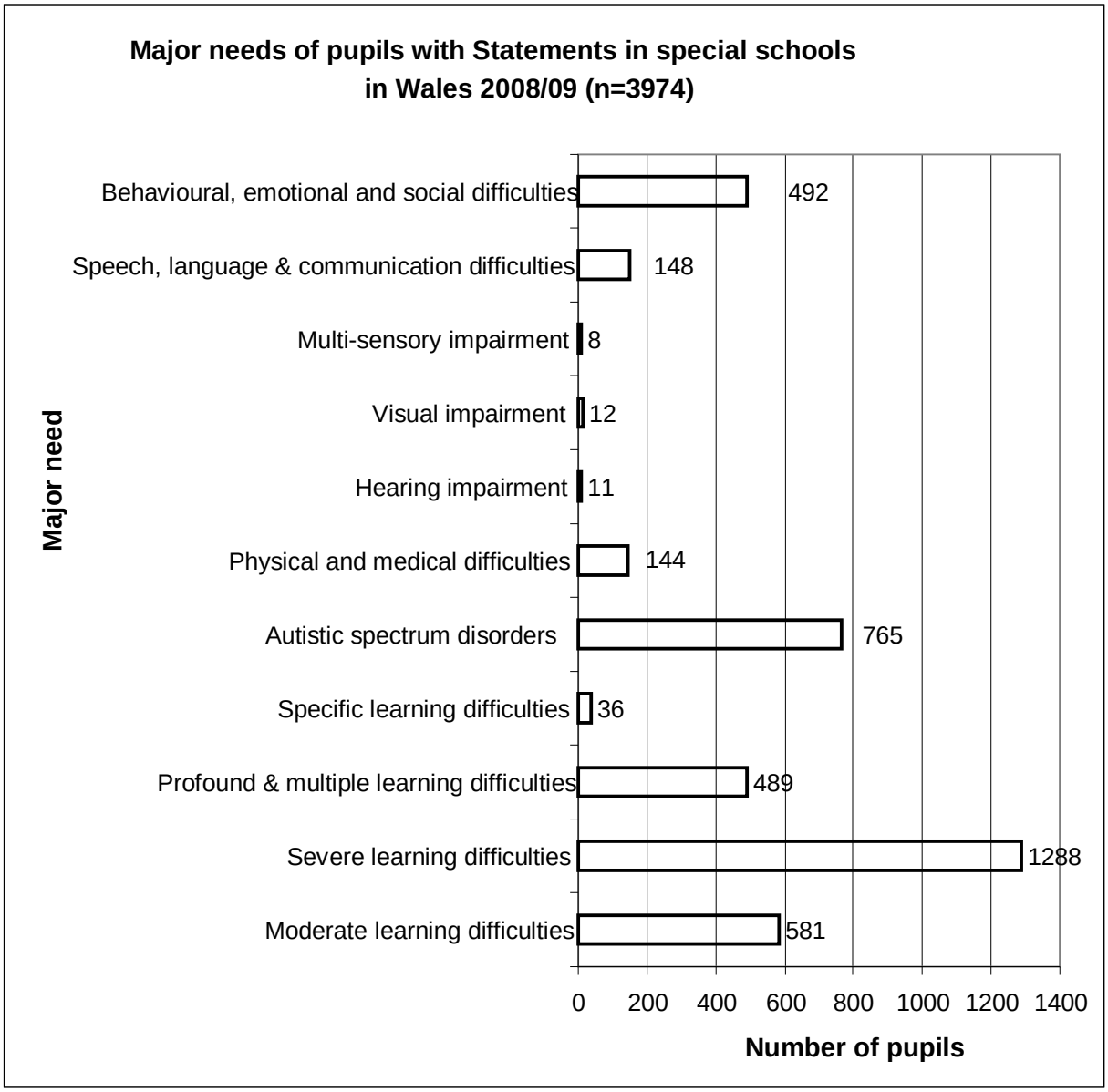
In 2008/09, 3974 pupils in special schools in Wales had a Statement of Special Educational Need. Of these, 60.2% (n=2394) had learning disabilities as their primary or major need. Of the 2394 pupils with learning disabilities:

- 1.5% (n=36) had specific learning disabilities (SpLD)
- 20.4% (n=489) had profound and multiple learning disabilities (PMLD)
- 24.3% (n=581) had moderate learning disabilities (MLD)
- 53.8% (n=1288) had severe learning disabilities (SLD)

Figure 5.5 shows the primary or major needs of the 3974 pupils with Statements in special schools in Wales in 2008/09.

Figure 5.5

Major needs of pupils with Statements in special schools in Wales 2008/09

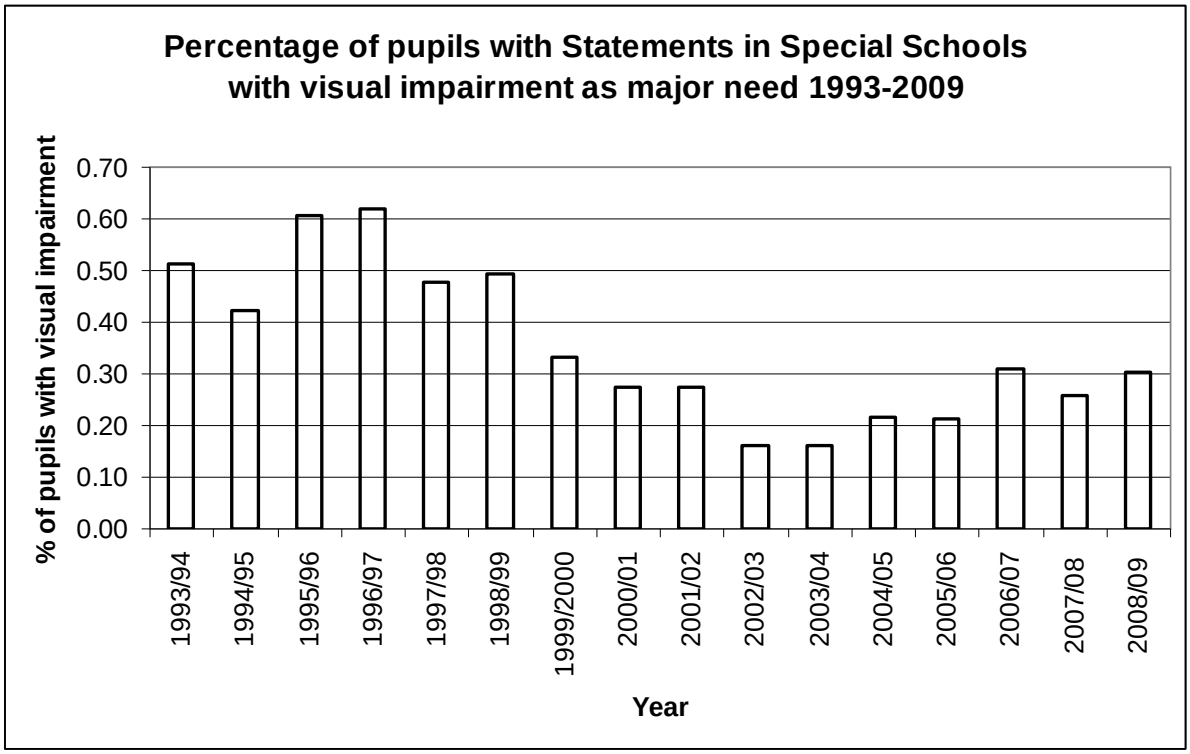


5.1.8 Visual impairment as primary or major special educational need

The number of pupils (with Statements) in special schools with visual impairment recorded as their primary or major need has fluctuated since 1993, as shown in Figure 5.6. In 1996/97, 22 of the 3546 pupils (0.62%) with a Statement in special schools had visual impairment as their primary or major need. However, this decreased to a low of 6 pupils (0.16%) in 2002/03 (StatsWales007672 2010).

Figure 5.6

Percentage of pupils with Statements in special schools with visual impairment as their major need 1993-2009



In 2008/09, 3974 pupils in special schools in Wales had a Statement of special educational need. Of these 3974 pupils, 12 (0.30%) had visual impairment recorded as their major need. The 12 pupils with visual impairment as their major need were in Conwy (5), the Vale of Glamorgan (3), Rhondda Cynon Taf (3) and Swansea (1). None of the 141 pupils without a Statement in special schools had visual impairment recorded as their SEN.

5.2 Methods

5.2.1 Advisory Group

An Advisory Group was set up, which consisted of:

Nathan Davies, Children's Low Vision Advocate for Wales, RNIB Cymru (funded by the Welsh Government).

Dr Barbara Ryan, Clinical Lead, Welsh Low Vision Service and Co-Director, Wales Optometry Postgraduate Education Centre, School of Optometry and Vision Sciences, Cardiff University.

Dr Maggie Woodhouse, Senior Lecturer, School of Optometry and Vision Sciences, Cardiff University (specialist interest in learning disabilities and Down's syndrome).

Ms Nicola Crews, Manager, Education, children and families team, RNIB Cymru.

Mrs Sue Keil, Research Officer, RNIB.

Between them, members of the Advisory Group had:

- Knowledge of the literature about visual impairment and SEN.
- Clinical experience of carrying out visual assessments with children and young people with SEN.
- Knowledge and experience of the educational support services available to children and young people with visual impairment.
- Knowledge of social research methodologies, including survey design, administration and analysis.

During an initial brainstorming session, the Advisory Group concluded that:

- The prevalence of refractive error (corrected or uncorrected) among children and young people in special schools in Wales was unknown.

- The prevalence of visual impairment (diagnosed or undiagnosed) among children and young people in special schools in Wales was unknown.
- The provision and availability of vision care and educational support services for children and young people in special schools varied considerably throughout Wales.
- Vision screening of children and young people in special schools in Wales was carried out in an ad-hoc manner and by a variety of professionals.
- There was a need for a robust and comprehensive survey to collect data about refractive error and visual impairment among pupils in special schools and the type and level of support available, including vision screening programmes.

5.2.2 Survey questionnaire design

The Advisory Group decided that a postal questionnaire would be the most appropriate method to collect data because of the geographical spread of the special schools throughout Wales and the limited personnel resources available.

The author drafted an initial questionnaire and revised it to reflect feedback from members of the Advisory Group. The questionnaire consisted of closed and open questions to capture a variety of data and information.

The author also produced a glossary to accompany the questionnaire, which defined some of the terms used in the questionnaire itself, e.g. screening.

A covering letter was prepared, which included the logos of the Royal National Institute of Blind people (RNIB), the Welsh Low Vision Service (WLVS), Cardiff University (CU) and the Welsh Assembly Government (WAG). The different logos were included to reflect the contribution to the study by the organisations and to maximise the response rate. Studies have shown that response rates to postal questionnaires are higher if the questionnaire is sent from a university rather than from a commercial organisation (Edwards, Roberts et al. 2002). Representatives from RNIB Cymru and Cardiff University, who were most likely

to be known, respected and recognised (from previous work) by the special school recipients, signed the letter. Covering letters signed by eminent, recognised or respected professionals have been shown to increase the response rate to postal questionnaires (Lane 2004).

The author sent a copy of the questionnaire and glossary to four special schools in Wales (Merthyr, Pontypridd, Swansea and Llandudno) for comments and feedback. The questionnaire and glossary were revised in light of feedback and comments from the schools.

The final 21-item questionnaire, glossary and covering letter are shown in Appendix 5. The aim was to achieve a 100% response rate for the postal survey in order to show local, regional and national trends.

5.2.3 Questionnaire administration

Postal questionnaires and a copy of the glossary were sent to all 44 special schools in Wales in February 2010. Eight weeks after the initial questionnaire had been sent out, follow-up questionnaires were posted to the non-responders. A pre-paid and pre-addressed envelope were sent with the follow-up questionnaires to maximise the response rate. Studies have shown that the response rate is likely to be higher for questionnaires sent with a pre-paid and pre-addressed envelope than without (Oppenheim 1992; Edwards, Roberts et al. 2002).

Twelve weeks after the initial questionnaire had been sent out, non-responders were contacted by telephone. Follow-up telephone contact has been shown to improve response rates to postal questionnaires (Parker and Dewey 2000; Edwards, Roberts et al. 2002). Following telephone contact, the questionnaire and glossary were emailed to twenty-one special schools and posted to one special school. Most of the schools that asked for an electronic copy of the questionnaire had mislaid the original paper-based version. Two schools, which were sent the questionnaire by email, returned the completed questionnaire by email.

The author continued to follow-up non-responders by email and telephone. In addition, the author asked specialist teachers (QTVIs) throughout Wales to support or assist special schools in completing the questionnaire with the aim of achieving a 100% response rate.

Follow-up by email and telephone continued until July 2010.

5.2.4 Data input and analysis

The final questionnaire was coded and a corresponding data file set up using the commercially available software, SPSS 16.0. The author manually entered data from the completed questionnaires into the SPSS file. Microsoft Word and Excel files were also set up and used to summarise the data for specific questions.

5.3 Results of the special school survey

5.3.1 Response rate

The postal survey was sent to all 44 special schools in Wales; 39 responded, representing a response rate of 88.6%.

Of the 39 special schools that engaged with the survey, 26 returned the questionnaire itself (including two by email). The remaining 13 schools provided core information during telephone interviews with the author.

Although most questionnaires were completed by head teachers or assistant head teachers, some were completed by other members of staff, e.g. school nurses, teaching assistants, QTVIs, teachers, a school secretary and school liaison officer.

5.3.2 Designation and distribution of special schools

The majority of schools were generic, maintained special schools. However, some schools reported that their pupils had specific needs. For example, five schools noted that they provided support for pupils with Social, Emotional and Behavioural Difficulties (SEBD).

The schools that responded were distributed throughout the whole of Wales. The five schools that did not respond to the survey were located in Penarth, Barry, Merthyr Tydfil and Rhondda.

5.3.3 Age ranges of pupils

Of the 39 schools that responded, 37 provided information about the age of the youngest pupils in school: This was 3 years in 19 (51.4%) schools and 11 years in 7 (18.9%) schools. The age range of the youngest pupils in the remaining 11 schools ranged from 2 to 10 years.

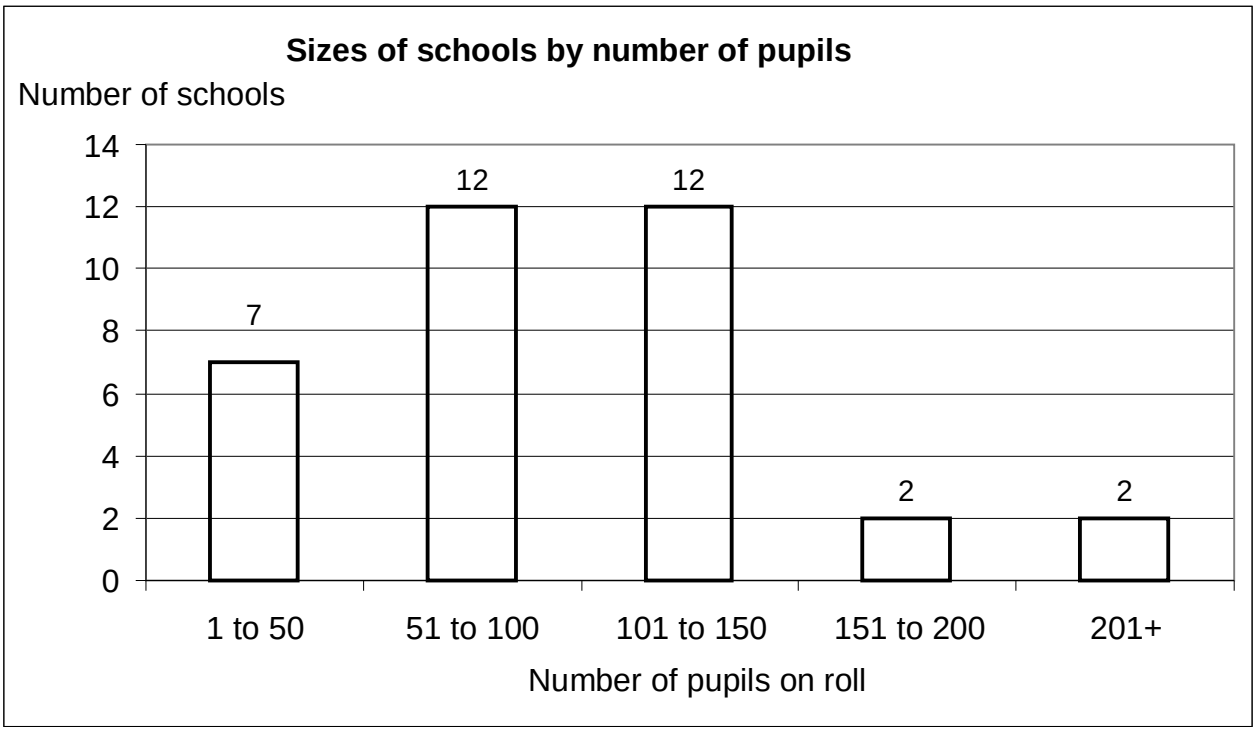
Of the 39 schools that responded, 38 provided information about the age of the oldest pupils: This was 11 years in 5 (13.2%) schools, 16 years in 7 (18.4%) schools and 19 years in 26 (68.4%) schools.

5.3.4 Sizes of special schools by number of pupils on roll

In total, 35 schools provided information about the number of pupils on roll, as shown in Figure 5.7.

Figure 5.7

Sizes of special schools by number of pupils



The two largest schools (201+ pupils) were in Wrexham and Bridgend. The school with fewest pupils (14) was in Neath, Port Talbot and was a school specifically for pupils with Social, Emotional and Behavioural Difficulties (SEBD). In total, 3297.5 pupils were reported to be on school rolls. It is suggested that the 'half-pupil' recorded by one school was a pupil who, although attending the special school, also spent a significant amount of his/ her time at a mainstream school.

5.3.5 Pupils who wore glasses

Of the schools that recorded the number of pupils on roll, 21 also provided information about the number of pupils who wore glasses. There were 2067 pupils on roll in these 21 schools of which 464 wore glasses. This indicates a prevalence of identified and corrected refractive error of 22.45%.

The proportion of pupils who wore glasses ranged from 5.4% (n=3) to 50.0% (n=34). None of the schools reported that none of their pupils wore glasses.

Among all 39 schools, the survey showed that 498 pupils wore glasses.

The vast majority of schools (24 out of 26, 92.3%) reported that the pupils were reluctant to wear their glasses. All 24 schools suggested reasons for this, e.g.

Name calling/ peer pressure/ embarrassed/ not cool/ fear of teasing/ feel a freak
Some hide glasses/ break them/ left at home
Unable to perceive benefits/ can't be bothered
Don't like feel of things on face or head/ behaviour issues affect compliance
Poor fit/ ill-fitting spectacles/ uncomfortable with wheelchair headrest
Lack of parental support in maintaining opticians' appointments/ parental neglect

The survey invited schools to record the number of pupils suspected of having difficulties seeing near or distant objects, i.e. possible hyperopia and myopia. Only seven schools responded to the question. Of these, three schools reported that none of the pupils were suspected of having difficulties with near or distance viewing. In total, 11 pupils were suspected of having difficulties with near vision and 8 with distance vision. One school suspected five pupils of having difficulties with their near vision and five with their distance vision.

Although the number of pupils reported as having suspected refractive error was relatively low, some schools provided additional information about other suspected visual problems among the pupils, e.g.

- *Some pupils have visual perception difficulties not recognised medical visual impairment. Difficult to tell difference between visual difficulties and cognitive development at times.*
- *Two pupils who have very complex learning difficulties are suspected of having CVI (Cerebral Visual Impairment).*
- *There has not been a visiting optometrist to the school for a long time as far as I am aware. We have difficulties accessing local services due to staff restrictions so that we are not always able to take the boys to the optician ourselves. We have an excellent community dental service which is expanding and the boys are coming forward and taking responsibility for their dental health. I would love to see a similar situation for sight testing. I believe that there are many boys who need glasses but are not aware that they even have a problem.*

5.3.6 Vision screening

In total, 20 out of 38 schools (52.6%) reported that vision screening took place in school; The remainder reported no vision screening.

The survey also asked schools to record which professional group(s) carried out vision screening. The results are shown in Table 5.2.

Table 5.2

Professional groups reported to carry out vision screening

(Data from 19 schools)

Professional group reported to carry out screening	Number of schools reported	% of schools that responded to question (n=19)
Orthoptists	9	47.4%
School nurse	7	36.8%
QTVI from LEA	6	31.6%
Optometrists	3	15.8%
QTVI on staff	1	5.3%
Paediatrician	1	5.3%
School staff	1	5.3%
Other	1*	5.3%

**This was the school doctor, who accompanied the school nurse during vision screening.*

The results show that orthoptists carried out vision screening in special schools in Wales more than other professional groups.

Schools were also asked to record the Key Stage(s) in which pupils had their vision screened. The results show that pupils in the Foundation Phase (aged 3-7 years) had their vision screened more than pupils in other Key Stages. In total, 13 out of 19 schools (68.4%) reported that vision screening took place in the Foundation Phase. 10 schools (52.6%) reported that screening took place in Key Stage 2 (aged 7-11), 12 (63.2%) in Key Stage 3 (aged 11-14) and 9 (47.4%) in Key Stage 4 (aged 14-16).

Some schools in which screening took place, reported that not all pupils had their vision screened (9 out of 16, 56.3%). The reasons why some pupils did not have their vision screened included:

- *Depends on consent being received*
- *Not always possible for screening to be done at school due to varying severity of disabilities*
- *If pupils join school later, not screened unless there is concern*
- *Mass screening does not take place: Only pupils with concern are screened*
- *Should do but not consistent from school nursing provision as we do not have school nurse on site*
- *Unsure about screening criteria*
- *Screening of all children used to take place (orthoptist) but now only children in nursery*

Some schools suggested ways in which the vision screening process could be improved. The suggestions included:

- *A visiting optometrist similar to the service provided by the community dentist would be very helpful*
- *By having an orthoptist-led service*
- *It is difficult to gain information from the optometrists etc as to the exact eye condition if diagnosed in later Key Stages*
- *Link to refraction and dispensing- one stop shop in school. Link to Yr 6 and Yr 9 (Transition)*
- *Regular timetabled screening year on year*

Other schools used the opportunity to comment on the established and existing screening processes, e.g.

- *Process works in this area- any concerns are able to be passed on. We have a school nurse, school community consultant paediatrician and concerns are followed up by appropriate professionals*
- *Seems to be working successfully*

- *System audited by school nurse regularly so no improvement needed at present*

In total, 23 out of 24 schools (95.8%) reported that it would be useful for routine vision screening to take place in school. The one school that did not think routine vision screening would be useful commented that it *'…already happens'*.

5.3.7 Pupils with known visual impairment

The survey asked schools to record the number of pupils with visual impairment recorded as their primary or secondary special educational need. Schools were also asked to report the number of pupils who had a known visual impairment, which was not their primary or secondary SEN. The results are shown in Table 5.3.

Table 5.3
Pupils in special schools with known visual impairment

	Number of schools *	**Number of pupils on roll**	**Number of pupils with visual impairment**	**% of pupils on roll with visual impairment**
Visual impairment as primary or secondary SEN	24	2256.5	138	6.1%
Known visual impairment <u>not</u> primary or secondary SEN	19	1655.5	137	8.3%

*Number of schools that provided data about the number of pupils on roll and the number of pupils with visual impairment.

The proportion of pupils with visual impairment as their primary or secondary SEN ranged from 0.0% to 31.9% (n=15).

The proportion of pupils with known visual impairment, which was not their primary or secondary SEN, ranged from 0.0% to 33.02% (n=35).

Among all 39 schools, including those that did not provide information about the number of pupils on roll, 292 pupils in total were reported as having visual impairment. Of these, 155 had visual impairment as their primary or secondary SEN and 137 had a known visual impairment that was not their primary or secondary SEN.

5.3.8 Support for pupils with visual impairment

The survey invited schools to record which professional group(s) carried out assessments with pupils known to have visual impairment. The results are shown in Table 5.4.

Table 5.4
Professional groups reported to assess pupils with known visual impairment

Professional group	Number of schools that reported professional group carried out assessment	Number of schools that responded to the question	% of schools that reported professional group carried out assessment
QTVI LEA	24	31	77.4%
Orthoptists	7	22	31.8%
Paediatrician	6	20	30.0%
Other	4	15	26.7%
QTVI staff	4	19	21.1%
Optometrists	4	20	20.0%

The results show that QTVIs (specialist teachers) from the Local Education Authority Visual Impairment service (or Sensory Support Service) carried out assessments more than other professional groups. Over three quarters (77.4%) of schools reported that QTVIs from the LEA visited the school to carry out assessments with pupils with known visual impairment.

The 'other' professionals who carried out assessments included *'mobility officers'* and *'occupational health'.*

The survey asked schools to indicate how often they received a copy of the report following a visual assessment. In total, 20 schools responded to the question and the results are shown in Table 5.5.

Table 5.5

Frequency of schools sent copy of report from visual assessment

Response	**Frequency (number of schools)**	**%**
Always	10	50.0%
Most of the time	2	10.0%
Sometimes	5	25.0%
Never	3	15.0%
Total	20	100.0%

The results show that 50% (n=10) of schools 'always' received a copy of the report following the visual assessment. Just 15.0% (n=3) of schools 'never' received a copy of the report.

5.3.9 Pupils who used low vision aids (LVAs)

In total, 15 schools provided information about the number of pupils who used optical low vision aids, such as hand-held magnifiers.

- 10 schools reported that none of the pupils used optical LVAs.
- 3 schools reported that one pupil used an optical LVA.
- 1 school reported that three pupils used optical LVAs.
- 1 school reported that four pupils used optical LVAs.

In total, 10 pupils were reported to use optical low vision aids such as hand-held magnifiers. In contrast, 36 pupils in total were reported to use non-optical LVAs such as reading stands or task lighting. In one school, 16 of the 78 pupils (20.5%) used non-optical LVAs. However, in that school, only 12 pupils had

visual impairment as their primary or secondary special educational need. The discrepancy is unexplained.

In total, 5 pupils were reported to use hi-tech LVAs such as desktop video magnifiers, commonly known as CCTVs. Ten schools reported that none of the pupils used hi-tech LVAs.

5.3.10 Adaptations for pupils with visual impairment

Overall, 21 schools responded to the question about how often adaptations were made for pupils with visual impairment. One school reported that adaptations were 'never' made. However, that school also reported that none of the pupils had visual impairment. The results for the 20 schools, in which there were pupils with visual impairment, are shown in Table 5.6.

Table 5.6

Frequency of adaptations made for pupils with visual impairment

Response	Frequency (number of schools)	% of schools
Always	8	40.0%
Most of the time	6	30.0%
Sometimes	6	30.0%
Total	20	100%

5.3.11 Staff training and development

The survey asked schools to record the proportion of staff who had undertaken training about how to support pupils with visual impairment. Table 5.7 shows the proportion of different groups of staff who had undertaken such training.

Table 5.7

Proportion of staff who had undertaken training about how to support pupils with visual impairment

	Number of schools that reported proportion of staff who had undertaken training			
	All	**Most**	**Some**	**None**
Teachers	5	5	10	2
LSAs *	5	4	10	2
Other **	0	2	1	2

*Learning Support Assistants

** 'Other' members of staff included nurses and healthcare assistants

The survey also asked schools to record whether staff would be likely to undertake training about how to support pupils with visual impairment if it were offered. The results are shown in Table 5.8.

Table 5.8

Likelihood of staff to undertake training about how to support pupils with visual impairment

	Number of schools that reported likelihood of staff to undertake training			
	Very likely	**Likely**	**Unlikely**	**Very unlikely**
Teachers	12	9	1	0
LSAs *	11	9	1	0
Other	2	0	3	0

Table 5.8 shows that teachers, LSAs and some 'other' staff, e.g. admin staff, cook and school nurse, would generally be 'very likely' or 'likely' to undertake

training about how to support pupils with visual impairment. The one school that reported that teachers would be unlikely to attend training also reported that LSAs would be unlikely to undertake training. Only one pupil (out of 46) in this school was reported to have visual impairment.

5.3.12 Support from other professionals

Many different professionals provide support to pupils in special schools, reflecting their diverse needs and disabilities. The survey invited schools to record if and how different professionals provided support to pupils with visual impairment. The results are summarised below:

1. QTVI (LEA)- support for pupils:

- *Two a week for one pupil, one a week for other: Braille, touch-typing, listening and comprehension skills, training in technology, training in using low vision aids*
- *Regular visits to named students and use of light/ dark room*
- *1.5 days a week from two QTVIs to see 35 children. Assess (care) and observe*
- *Very regular involvement: weekly visits to monitor, assess and offer advice to staff*
- *QTVI visits school on half-termly basis to monitor progress and talk to staff and pupils*
- *Visits regularly and helps set up visual stimulation programmes*
- *Weekly*
- *Weekly but not this year due to staff long-term sickness*
- *Supports all children*
- *Two peri QTVIs are called in when there are concerns*
- *QTVI comes in when needed*
- *We know who to contact if we need support*
- *Occasional visit from LEA QTVI*
- *No support*

2. QTVI (LEA)- support for staff:

- *Advice available to staff if required*
- *Advice for Annual Review and feedback to classroom staff*
- *Available on request of school*
- *Help staff with planning/ IEPs and delivers INSET*
- *1:1 visual training sessions, advice to staff, joint sessions with therapists, attendance at visual assessments, liaison with ophthalmology*
- *Work well as team to support pupils*
- *Always on hand to offer advice or answer queries*
- *Gives advice, provides equipment as necessary. Extremely helpful. Provides training and information*

3. QTVI (on school staff)- support for pupils:

- *QTVI on staff. Works well with LEA QTVI where necessary and takes responsibility for pupils with VI in school*

4. QTVI (on school staff)- support for other members of staff:

- *Multi-sensory impairment (MSI) teacher on school staff*

5. Mobility specialists- support for pupils:

- *Once a week. Long cane skills, social skills, travelling out and about*
- *Mobility officer (LEA) visits weekly. Now have member of staff recently qualified*
- *One or two children have access to mobility support*
- *Training and resource development*
- *Yes, when needed*
- *In the past, yes*
- *Provided previously when on Statement*
- *Used to teach cane skills when we had a blind pupil*
- *Not got a visiting mobility specialist- have physios and OTs who offer support and advice and work with pupils*

6. Mobility specialists- support for staff:

- *Gives regular advice to classroom staff*
- *General sessions on training in the past*

7. Rehabilitation specialists- support for pupils:

- *Not available for children services in Swansea*
- *This could include OTs and physios and healthcare workers in our school. School nurse also on hand to offer advice and support*

8. Rehabilitation specialists- support for staff:

- *None*

9. Optometrists- support for pupils:

- *Regular visitor to school- visits specific pupils*
- *Occasional visits to test pupils*
- *Termly*
- *Local optician as and when required but does not visit school*
- *Under low vision scheme- assessments, lamps provided, not ongoing*

10. Optometrists- support for staff:

- *Answers any questions staff have and offers advice about how to deal with visual difficulties. Liaises with parents too*
- *Briefs staff on how they can assist pupils*
- *Advice to staff*

11. Orthoptists- support for pupils:

- *Visits every 2 months to assess any child referred to service*
- *Vision testing and monitoring 3-4 times per year*
- *Vision testing*

12. Orthoptists- support for staff:

- *Provides information and advice to school staff and parents*

5.3.13 Other comments

An open-ended question was included in the survey for respondents to make any other comments. In total, 25 out of the 39 schools provided additional comments, which covered a range of issues, such as current screening practices and the reluctance of some pupils to wear their glasses. The comments are summarised in Appendix 6.

5.4 Discussion

5.4.1 Response rate

The high overall response rate of 88.6% (n=39) means that the questionnaire provided a good indication about the provision of vision screening in special schools and the support available for pupils with visual impairment.

The response rate compares very favourably with similar postal surveys. For example, a postal survey about support staff in UK schools achieved an overall response rate of 23% (n=2318). The response rate to that survey by special schools was 27% (n=279) (Blatchford, Basset et al. 2006). Another survey about UK school buildings, staff recruitment and other school issues achieved a response rate (by head teachers) of 17% (n=325) (Department for Children Schools and Families Publications 2007).

5.4.2 Pupils who wore glasses

The results of the survey showed a prevalence of identified and corrected refractive error of 22.45% (n=464). As reported in Chapter 4, other studies have found the prevalence of refractive error among children and young people with learning disabilities or medical conditions to be between 10.2% and about 70%. The results of those studies varied considerably because they included children with a wide range of disabilities and medical conditions. In addition, the methods used to assess refractive error, the definitions of refractive error and the ages of the children varied between the studies. In comparison to the high prevalence of refractive error found in some of the studies, the results of this study suggested that there were children and young people in special schools in Wales with unidentified and uncorrected refractive error.

In order to address concerns about sight problems among pupils in special schools, a vision care programme for pupils in special schools in Wales was piloted as part of the Children's Low Vision Project. In the pilot project, all pupils with consent had an optometric sight test in school, including those with known sight problems and those who already wore glasses. The results of the pilot project confirmed the concerns that some pupils in special schools had

unidentified refractive error or undiagnosed sight problems. For example, over one third (58) of pupils in the pilot project had never had a sight test. Moreover, 53% (80 pupils) received a prescription for glasses, comprising 24% (36 pupils) who received a prescription for glasses for the first time, 15% (23) who had a change in their prescription and 14% (21 pupils) who needed new glasses because of wear and tear to their previous pair.

In this study, it was widely reported that pupils were reluctant to wear their glasses and a number of reasons were given for this, e.g. name calling, pupils unable to perceive benefits and poor-fitting spectacles. Encouraging children to wear their glasses can be difficult, especially if they have additional needs or disabilities. However, although children can be reluctant to wear their glasses, many strategies can be employed to address this. For example, it can be useful to enable the child to appreciate that the glasses will not harm them. The study also highlighted the need for all professionals working with pupils in special schools to be aware of the importance of wearing glasses. www.cardiff.ac.uk/optom/resources/Encouragingyourchildtowearglasses.pdf (Accessed 29th November 2010)

School staff proposed reasons why some pupils were reluctant to wear their glasses. However, it would be useful to involve the children and young people themselves when possible, as well as their parents, to obtain a more thorough understanding of this issue.

5.4.3 Vision screening

The survey showed that there was little uniformity in the provision of vision screening in special schools. Vision screening only took place in just over half of the schools.

There was also inconsistency in the professionals reported as carrying out vision screening. Although orthoptists were reported to be the professional group who carried out vision screening the most, school nurses, specialist teachers (QTVIs), optometrists, staff in school and a paediatrician were also reported as carrying out vision screening. The knowledge and skill of the professional carrying out screening, the range of tests used and the target

conditions screened for, can all lead to discrepancies in the sensitivity and specificity of a screening programme.

A glossary of some of the terms used in the survey, e.g. 'screening', was included with the questionnaire. However, the results suggest that some schools may have confused the concept of 'screening' with '(functional) visual assessment'. For example, six schools reported that specialist teachers (QTVIs) carried out vision screening. Although specialist teachers may visit schools to assess and support pupils with visual problems, they would not carry out a blanket vision screen of all the pupils. For this reason, it is likely that vision screening, as a blanket process, takes place in fewer schools than the survey results suggest.

The findings of the survey are inconsistent with one of the recommendations in the Hall Report (Hall and Elliman 2008): A visual assessment of all children aged 4 to 5 should be carried out by an orthoptist. The report also recommended that children of any age with suspected visual deficits, a significant family history or any neurological or disabling condition, should be routinely referred for a visual assessment. This could be argued as applying to all pupils in special schools.

Although the UK National Screening Committee agreed with the recommendations in the Hall Report, the survey showed that routine vision screening did not always take place in special schools in Wales. This is concerning, especially as the prevalence rates of refractive errors and other visual problems are likely to be higher among pupils in special schools than among the general childhood population.

The lack of uniformity in the provision of vision screening was further demonstrated by the fact that 23 out of 24 Special Schools reported that it would be useful for routine vision screening to take place. This suggests that schools are aware of the importance of vision screening. It also shows that there is a need for a standardised vision care programme similar to the Designed to Smile oral health programme.

5.4.4 Pupils with visual impairment

The prevalence of disabilities among children and young people in the UK is difficult to measure and estimates of childhood disability vary. This is for a number of reasons, including the definitions of disability used, reporting methods and demographic changes. However, it has been estimated that 1 in 20 children (5%) aged under 16 years in the UK are disabled, as defined in the Disability Discrimination Act.
www.patient.co.uk/doctor/Disability-and-Handicap-in-Childhood.htm
(Accessed 17th January 2011)

An estimate of severe disability among children aged under 17 years in 2000 was 11 boys per 10,000 of the male population and 5 girls per 10,000 of the female population.
www.statistics.gov.uk/cci/nugget.asp?id=795
(Accessed 17th January 2011)

As with all disabilities, it is difficult to measure the prevalence of visual impairment among children. There are many reasons for this, including the definitions used and the fact that registration as 'severely sight impaired' (blind) or 'sight impaired' (partially sighted) is voluntary. In 1990-91, the combined incidence of certification of blindness and partial sightedness among children aged 0-15 years was 8 per 100,000 (0.008%) (Rahi and Dezateux 1998). However, this was a minimum estimate. Two UK national surveys in 1985 and 1998 reported that a 'seeing disability' (based on vision-dependent tasks rather than acuity) affected 2 per 1000 children (0.2%) overall. It has been suggested that at least 1 per 1000 children (0.1%) in Britain is blind, severely visually impaired or visually impaired (Rahi and Dezateux 1998).

In the present study, the prevalence of visual impairment as a primary or secondary special educational need was 6.1% (n=138) and the prevalence of known visual impairment, which was not a primary or secondary special educational need was 8.3% (n=137). However, these findings are lower than the prevalence rates of visual impairment among children with disabilities or medical conditions reported in other studies (Chapter 4). For example, one study found that 41.6% (n=25) of children aged 5 to 19, who were 'mentally

retarded', had visual impairment based on their visual acuity (Mwanza, Nkidiaka et al. 2000).

In comparison to the studies outlined in Chapter 4, the prevalence of visual impairment reported in this survey is relatively low. The survey relied on schools reporting the number of pupils with known visual impairment. However, some pupils may have complex and diverse needs, which can mask visual impairment or result in visual impairment being considered incidental to other needs.

Although the prevalence of visual impairment in this study is lower than prevalence rates reported in similar studies, it is still higher than the overall UK prevalence of 0.2%, as described above. Therefore, the study confirms the results of similar studies in that children with learning disabilities or medical conditions are more likely to have visual impairment than children without disabilities or medical conditions. This further demonstrates the need for a vision care programme for pupils in special schools in Wales.

5.4.5 Support for pupils with visual impairment

Over three-quarters of the 31 schools that responded to the question indicated that specialist teachers (QTVIs) visited the school to assess pupils with visual impairment. This is unsurprising because all children with visual impairment are entitled to support from a specialist teacher (QTVI).
www.newport.ac.uk/study/postgraduate/courses/Pages/SEN-Visual-Impairment.aspx
(Accessed 30th November 2010)

In addition, the Quality Standards in Education Support Services for Children and Young People with Visual Impairment (Department for Education and Skills 2002) state that:

> **A2:**
> An initial assessment of the child's functional vision is undertaken as soon as possible after referral and is carried out by a qualified teacher of the visually impaired (QTVI) in an environment familiar to the child.

A10:

As part of the process of providing advice during statutory assessment, the contribution from the QTVI contains a clear description of the child's educational needs arising from the visual impairment and recommendations as to the provision the QTVI considers appropriate in the light of those needs, in terms of facilities and equipment, teaching strategies and staffing support.

SY1:

Pupils with VI have, as appropriate, access to and support from a QTVI throughout their school years.

Although the Quality Standards are not mandatory, they provide a useful framework for Local Education Authorities and others to monitor the provision of specialist support for pupils with visual impairment. The survey results suggest that pupils with known visual impairment are generally receiving the support that they are entitled to.

The survey showed that although there is a good flow of information between some QTVIs and staff in special schools, there is also scope for improving the sharing of information following a child's visual assessment. More than half of the 20 schools that responded to the question reported that they received a report following a child's visual assessment either 'always' or 'most of the time'. However, 40% of the schools received a report only 'sometimes' or 'never'. The importance of sharing information about the functional impacts of sight loss on educational achievement and social interaction are highlighted by the Quality Standards in Education Support Services for Children and Young People with Visual Impairment (2002):

A4:

Assessments lead to written recommendations about practical strategies to be adopted in order to maximise the child’s ability to operate with their level of available vision.

One of the aims of the pilot vision care programme was to address the need for improved communication between specialist teachers (QTVIs) and special school staff.

5.4.6 Pupils who used low vision aids

Low vision aids (LVAs) are devices that can help people with low vision to carry out tasks more easily. They can also promote and enable independence (Schurink, Cox et al. 2011). There are many different types of low vision aids, including optical devices such as hand-held magnifiers, non-optical devices such as reading stands and hi-tech low vision aids such as desktop video magnifiers (CCTVs). Many types of LVAs are available, free of charge, to children and young people through the Children's Low Vision Project in Wales.

In total, 51 pupils were reported to use low vision aids. However, the survey did not identify whether individual pupils used one or more low vision aids. The majority of pupils (n=36) used non-optical devices. Non-optical devices refer to task lighting, typoscopes, clipboards, reading stands and other devices or products that do not rely on magnification. Non-optical devices are generally accessible to (and can be used by) the majority of people, including those with physical disabilities or problems with dexterity. Non-optical devices can help a person access text or objects more easily by reducing 'shake' or by improving lighting conditions. Non-optical devices can also promote and enable independent living, e.g. high-contrast watches (Minto and Butt 2004).

Only a few pupils used optical low vision aids (n=10). Optical low vision aids refer to magnifiers for near and distance viewing, e.g. hand-held or dome magnifiers and monoculars respectively. Some people find optical low vision aids difficult to use, e.g. the correct focal distance needs to be achieved and maintained when using hand-held magnifiers. Similarly, a steady image can be difficult to achieve when using binoculars, especially if the user has weak or shaky hands. For these reasons, the survey results are perhaps unsurprising. Pupils in special schools may have physical difficulties and problems with gross or fine motor skills. These could make it very difficult for pupils to use some of the optical low vision aids that are available. This finding supports the results of a study in Scotland, which found that children with additional disabilities were

reported to be less likely (21%, n=15) to use low vision aids than children without additional disabilities (58%, n=49).
www.ssc.education.ed.ac.uk/research/vi&multi/lvapp.html
(Accessed 10th January 2012)

It is also acknowledged that children and young people may be reluctant or may refuse to use their low vision aids, especially in school, because of the belief that they draw attention to themselves (Zammitt, O'Hare et al. 1999; Dyment 2009). Some pupils may also have a fear of being stigmatised if they use their low vision aid(s) (Schurink, Cox et al. 2011). One proposed solution to this is that low vision aids should be introduced to children at an early age before they develop an aversion to them (Leat and Karadesh 1991; Carvalho, Miniguini et al. 1998). Learning to use low vision aids at an early age can help children to become more confident and comfortable with them and feel less awkward about using them as they mature (Lee and Cho 2007).

Very few pupils (n=5) were reported to use hi-tech LVAs, such as desktop video magnifiers, commonly referred to as CCTVs. Hi-tech LVAs can be very expensive and schools may not be in a position to invest in them. However, the Compact Plus electronic hand-held video magnifier is available (without charge) through the Children's Low Vision Project in Wales and some pupils may benefit from using this device. One of the main reported benefits of the Compact Plus is that it is simple and easy to use (Dyment 2009).

One of the aims of the pilot vision care programme was to inform special schools about the Children's Low Vision Project, low vision assessments and the availability of low vision aids.

5.4.7 Support from other professionals

The survey showed that professionals from other disciplines provided support to pupils and staff in special schools.

Some specialist teachers (QTVIs) regularly supported pupils in special schools, e.g. *weekly or half-termly*. Others provided intermittent support, e.g. *as and when needed*. Specialist teachers provided a range of support, including tuition

in Braille, touch-typing and listening and comprehension skills. Specialist teachers also trained pupils how to use their low vision aids. It is encouraging that pupils in special schools were reported to be receiving the specialist support that they needed.

Some specialist teachers were also reported to provide support to special school staff, mainly by offering advice and delivering training. Some training was delivered as INSET (In Service Educational Training), which allows all members of staff to undertake Continuing Professional Development activities.

It was also reported that mobility specialists provided support to pupils and staff, e.g. teaching cane skills and delivering training respectively. This is re-assuring, indicating that the pupils' educational and non-educational needs are being met.

Optometrists and orthoptists were reported as providing a range of support in a few schools. This included assessing and testing pupils' vision, briefing staff about how to assist pupils with visual difficulties and providing information and advice. It is encouraging that there are already links between some eye health care services and special schools. This may be particularly useful if the vision care programme is subsequently rolled-out throughout Wales.

5.5 Strengths and limitations of the study

One of the main strengths of the study was that most special schools in Wales engaged with the questionnaire, resulting in an overall high response rate. However, some schools, which did not complete the initial postal questionnaire, provided only core information during a telephone interview with the author. The result of this was that the sample size for some questions was too low to allow any firm conclusions to be made.

The results of the questionnaire indicated that some special schools misinterpreted some of the questions. In particular, there was concern about the results of the question about screening: some schools reported that screening did not take place but subsequently noted that QTVIs carried out screening. Although a glossary was included with the questionnaire to maximise consistency and minimise misinterpretation, some schools provided information

that was perhaps not entirely accurate. In addition, some schools reported estimates rather than accurate data. For example, two schools recorded the number of pupils with visual impairment as *'approximately 31'* and *'less than 10'.*

It is also worth noting that one of the limitations of postal questionnaires is the lack of control over who completes them (Williams 2003). In this study, different members of staff completed the questionnaires, including head teachers, teachers, school nurses and members of the administration team. This can be problematic because the school nurse or head teacher, for example, may have a more robust understanding of the vision screening processes in school than some other members of staff.

Despite the limitations, the survey provided a useful insight about current vision screening practices in special schools in Wales, the number of pupils with sight problems and the support provided by professionals from different disciplines.

5.6 Conclusions and future work

The survey showed that there is a need to offer training to special school staff, notably teachers and learning support assistants, about how to support pupils with sight problems.

The survey also showed that there was little uniformity in the provision of vision screening in special schools in Wales. It also highlighted that there are likely to be children and young people in special schools with uncorrected refractive error or undiagnosed visual impairment, sight problems or ocular disorders.

The results of the survey provided the impetus for the pilot vision care programme for pupils in special schools in Wales. Five special schools took part in the pilot project in which an optometrist carried out sight tests with all the pupils who had consent to take part. The results of the pilot confirmed initial concerns about the number of pupils in special schools with uncorrected refractive error and undiagnosed or undetected sight problems and ocular disorders. For example, 38% (n=58) of pupils who had a sight test in the pilot project had never had a sight test. Moreover, 53% (n=80) of pupils who had a sight test during the pilot received a prescription for glasses. This included 36

pupils who received a prescription for the first time. In addition, 47% (n=71) of pupils who had a sight test were found to have at least one ocular disorder.

At the time of writing, the evaluation report for the pilot project has been submitted to the Welsh Government. A number of recommendations have been made in the report, including that an optometric service should be provided to pupils in special schools. It is hoped that the evidence base provided by the pilot project will determine the future provision of eye care services for pupils in special schools in Wales.

Chapter 6 Reflection

6.1 Introduction

This chapter reflects on various elements of the thesis, including a description of the link between the two studies and a commentary about the ways in which some data were analysed and reported.

6.1.1 The common link between the two studies

The author acknowledges that the two studies presented in the thesis are different in terms of subject matter and research techniques. In the first study, a multi-disciplinary training programme was evaluated. This included collecting and reporting some longitudinal data (one year after the training). The second study focused on the provision of eye care services in special schools in Wales.

Although the two studies are different, the common link between them is the Children's Low Vision Project in Wales.

The multi-disciplinary training programme was provided as part of the Welsh Low Vision Service (now Low Vision Service Wales) and the Children's Low Vision Project in Wales. These two projects, both funded by the Welsh Government, run alongside each other as part of the Welsh Eye Care Initiative (WECI). When planning the training programme, it was acknowledged that it needed to include objectives relating to children and young people, e.g. to improve referral processes for children and young people. The training also provided an opportunity for Qualified Teachers of pupils with Visual Impairment (QTVIs) to interact with eye health professionals (optometrists) and colleagues from social care and vice-versa. The reported usefulness of the multi-disciplinary approach of the training programme, along with data that showed that the training increased referrals of children and young people, confirmed that the training was beneficial to the Children's Low Vision Project.

The Children's Low Vision Project in Wales, which started in 2004, had focused mainly on the provision of low vision services for children and young people in mainstream schools, e.g. the production of the Low Vision Toolkit. However, as the prevalence of sight problems is higher among children and young people

with special educational needs than among the general childhood population, it was appropriate that the Children's Low Vision Project acknowledged this. The author, the Children's Low Vision Advocate for Wales, carried out the special school study to collect and present data about eye care services in special schools in Wales. These baseline data provided the evidence base for the implementation of a pilot eye care service in special schools in Wales. The pilot was carried out as part of the Children's Low Vision Project. The results of the pilot provided further evidence for the need for a 'vision care programme' for all special schools in Wales. The vision care programme is currently being developed by a planning group on behalf of Welsh Government.

Therefore, the two studies both benefited the Children's Low Vision Project in Wales and, ultimately, contributed to improving and developing eye care services for children and young people.

6.1.2 The role of the author as researcher and employee

The author carried out the two studies as a researcher (student) and as an employee (funded by the Welsh Government, employed by RNIB Cymru). It is acknowledged that there were advantages and limitations of carrying out the research within these two separate roles. The issues of carrying out the research as part of the Welsh Government-funded Children's Low Vision Project in Wales are also recognised.

One benefit of the author carrying out the research in the role of Children's Low Vision Advocate for Wales was that the research was carried out within the framework of the Children's Low Vision Project. This meant that the research had clear practical outcomes and benefits, e.g. the special school study provided the evidence base for the pilot vision care programme. Similarly, operating within the framework of the Children's Low Vision Project, may have given the research study more credibility, e.g. it may have contributed to the high response rate to the special school questionnaire. In addition, being in the role of Children's Low Vision Advocate for Wales enabled the author to promote the Children's Low Vision Project to research participants, such as staff in special schools.

However, issues of carrying out the research for different audiences, i.e. for Cardiff University and for the funder and employer, are acknowledged. For example, the research needed a sound theoretical basis for submission as an MPhil but the funder and employer were more concerned with the implications of the research on the future development of eye care services. Similarly, the employer wanted to use the special school study as a training needs analysis with a view to providing training if needed. Although it was useful to incorporate this into the special school questionnaire, it may not have been included if the author had carried out the research solely as a student rather than as both student and employee.

Despite the above issues, the author carried out the research in a transparent way and successfully balanced professional and personal interests.

6.1.3 Statistical analysis and reporting of data

Different types of data were collected in the studies and various statistical tests were used to analyse the data, including Pearson's correlation and the Confidence Interval of a mean. However, it is acknowledged that some of the data analysis in the thesis could have been improved.

6.1.3.1 Likert rating scale data

The questionnaires used for the evaluation of the multi-disciplinary training included several questions with six-point Likert scale response categories, e.g. Level 1 and 2 evaluation questionnaire Q18: "Overall, how enjoyable did you find the training?" (1=not enjoyable at all; 6=extremely enjoyable). For some questions, the responses were combined into three pairs for analysis, i.e. 1 and 2, 3 and 4 and 5 and 6. It was appropriate to use questions with Likert scale response categories to collect data in these studies.

Ordinal scales 'order' or 'rank' data. Although ordinal scales order or rank items, it is not possible to determine whether the 'distance' between the response categories are equal. In addition, ordinal scales do not have an objective numerical basis: The values assigned to the response items are determined by the researcher.

Interval scales also order or rank data. However, in interval scales, the difference between values is equal, known and measurable, e.g. degree Celsius to measure temperature is an interval (or ratio) scale.

It is acknowledged that Likert scales are ordinal.

There is a debate about how ordinal Likert scale data can be analysed. If a number of scales are combined or the responses have a relatively normal distribution, parametric tests, such as Pearson's correlation coefficient (r), can be used. This is because some parametric tests are considered robust enough to be carried out with non-parametric ordinal data. However, it would be safer to use non-parametric tests, such as Spearman's rank correlation coefficient (Rho), with ordinal Likert scale data.

In this thesis, Pearson's correlation coefficient was used to calculate correlations between, for example, the reported 'enjoyment' and 'relevance' of the training. However, as Likert scales are ordinal, it would be preferable to use non-parametric tests, such as Spearman's rank correlation coefficient, if the analysis were carried out again. Despite this, the parametric tests that were used are adequate for the purpose of the thesis.

6.1.3.2 Data analysis and data presentation

In the study to evaluate the multi-disciplinary training, several Pearson's correlation coefficients were calculated, e.g. correlations between the reported 'enjoyment' and 'relevance' of the training and the other evaluation criteria. Although it is useful to calculate and report correlations because they show the index of the strength of a linear association between two variables, they have limitations.

Correlations do not show causality. For example, in the Level 1 evaluation, the correlation between reported 'enjoyment' and reported 'relevance' was r=0.507. However, it is impossible to determine whether an increase in 'enjoyment' resulted in an increase in 'relevance' or vice-versa. Similarly, although

correlations show the linear association between two variables, they do not show the impact of other variables on the two variables in question.

In the Level 1 evaluation, the vast majority of respondents (92.0%, n=217) reported that they had found the training to be ‘extremely enjoyable’. Similarly, 90.9% (n=200) of respondents reported that the training had been ‘extremely relevant’. Although these results showed a positive Level 1 evaluation, it is acknowledged that there was little variance in responses and that both evaluation criteria were strongly weighted towards very positive ratings. This meant that these result data did not have a normal distribution. Normally distributed data produce more accurate Pearson’s correlation coefficients. Spearman’s rank correlation coefficient (Rho) or Kendall’s rank correlation coefficient (Tau) are alternate ways to calculate correlation with data that are not normally distributed. Visualising the relationships between criteria such as ‘enjoyment’ and ‘relevance’ with scattergrams would be useful.

Descriptive statistics describe the sample data, e.g. mean, median and mode are examples of descriptive statistics. Conversely, inferential statistics are used to make inferences or predictions about the population from the sample data. Both descriptive and inferential statistics were used in the thesis. However, it is acknowledged that, in certain cases, descriptive statistics would have been sufficient to analyse and report the data. For example, cross-tabulation could have been used to analyse and present the data about learning information and skills (p70 and p71).

One limitation of the training evaluation study was that multiple comparisons were carried out on the same data sets, i.e. immediate and post-training evaluation results. Although multiple comparisons were carried out, the confidence level of significance remained constant at $p<0.05$ throughout. This is problematic because obtaining at least one significant result by chance (Type 1 error, i.e. false positives) increases as more comparisons are carried out or more hypotheses are tested. This may be applicable in the section of this study in which the criteria that affected ‘learning’ were evaluated. One way to overcome the problem of multiple comparisons and Type 1 errors is to use Bonferroni Correction. The Bonferroni Correction adjusts (reduces) the p-value according to the number of tests carried out or comparisons made. The new,

lower p-value is calculated by dividing the original p-value (in this study $p<0.05$) by the number of tests or comparisons being carried out. The study would have benefited from the Bonferroni Correction being applied in order to negate the probability of Type 1 errors being calculated and reported.

6.1.3.3 Reporting of statistics

The terminology initially used to report some of the statistics in the thesis implied causality rather than association, e.g.:

Page 62:
The attribute that most strongly *influenced* how enjoyable participants found the training was the actual relevance of the training ($r=0.507$, $p<0.05$, $n=218$).

Pages 70 and 71:
The only criteria that significantly *affected* learning information were:

- Whole group work ($Chi^2=10.940$, $p<0.05$)
- Learning skills ($Chi^2=6.755$, $p<0.05$)
- Venue ($Chi^2=43.196$, $p<0.05$)
- Actual enjoyment ($Chi^2=14.853$,$p<0.05$)

It is acknowledged that the implied causality in these two examples cannot be justified. It would be more appropriate to use alternative terminology, such as ‘associated with’, to report statistics in order to negate any ambiguity.

Statistical significance was based on $p<0.05$ throughout the thesis. However, some non-significant results were reported, e.g.:

P64:
Social care professionals found the training the easiest: 44.8% (n=26) reported that the training was very easy compared with 40.0% (n=14) of education professionals and 36.4% (n=51) of low vision practitioners. However, the *relationship between reported ease and professional group was not significant* ($Chi^2=3.679$, $p=0.885$).

In cases such as this, it would be more accurate to report that there was no difference.

Much of the data in the thesis were based on participant self-reporting rather than direct observation, e.g. self-reported learning of information and skills (p66). Therefore, a caveat must be applied to the thesis to acknowledge that the majority of the data and results are based on and reflect participant self-reporting. For example:

P178
In one school, 16 of the 78 pupils (20.5%) used non-optical LVAs.

As this statement reflects information provided by a special school, it would be more accurate to report this result as, “In one school, 16 of the 78 pupils (20.5%) were reported to use non-optical LVAs.”

Despite the limitations in some of the statistical analysis and data reporting, the thesis presents useful information. Section A shows that the training programme achieved its objectives and that the Kirkpatrick approach provides a useful evaluation framework. Section B demonstrates the need for a statutory eye care service for pupils in special schools.

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Appendices *

***** Most of the documents in the appendices are reformatted versions of the original documents so that they are consistent with the rest of this thesis.

Appendix 1

Summary of the Low Vision Toolkit

The Low Vision Toolkit

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The Low Vision Toolkit is a modular, structured and flexible training programme.

Specialist teachers can use the Toolkit to teach children and young people with low vision how to make the most of their sight and when and how to use their low vision aids.

The Toolkit consists of seven Modules, which can be used either on their own or together to form a complete training programme. The seven Modules are:

Module 1	Eye conditions, vision and sources of support
Module 2	The importance of lighting, colour and contrast
Module 3	Understanding magnification and large print
Module 4	Introduction to low-tech low vision aids
Module 5	Using low-tech low vision aids for near tasks, e.g. bar magnifiers
Module 6	Using low vision aids for distance viewing, e.g. monoculars
Module 7	Using hi-tech low vision aids and computer technology

Each Module has differentiated learning objectives, resources that can be copied, ideas for practical activities and assessment sheets.

For more information about the Low Vision Toolkit, please contact Nathan Davies either by email at Nathan.davies@rnib.org.uk or by phone on 01558 650281 (UK).

The Toolkit is available for purchase from the RNIB Shop. For international orders:

Telephone: +44 (0)1733 37 54 00

Email: exports@rnib.org.uk

Website: http://onlineshop.rnib.org.uk/ (search Low Vision Toolkit)

Appendix 2

Promotional flyer and programme for the multi- disciplinary training days

Training for all professionals who support children, young people and adults with low vision in Wales.

Welsh Low Vision Service and Children's Low Vision Project

Helping us to work better together. 2009-2010

- One day training course
- **Free** of charge
- For education professionals, accredited low vision practitioners, professionals from social care (including people who assess referrals) and colleagues from the voluntary sector
- Tailored sessions for your profession and general sessions to enable multi-disciplinary working
- Demonstrations of equipment and technology
- Courses throughout Wales 2009-2010

This is the re-accreditation programme for accredited low vision practitioners. You must attend to continue to provide the Welsh Low Vision Service.

Funded by the Welsh Assembly, this is a must-attend event for **all** professionals providing habilitation or rehabilitation services in Wales.

RNIB Cymru yn cefnogi pobl ddall ac â golwg rhannol supporting blind and partially sighted people

Llywodraeth Cynulliad Cymru Welsh Assembly Government

Cardiff University Prifysgol Caerdydd

Why should you attend?

Whole group sessions will also take place to discuss case studies and share information.

Education professionals

Tailored sessions will enable you to consolidate and build on existing knowledge. A combination of interactive, 'hands-on' activities and theoretical sessions will enable you to explore:

- Concepts relating to low vision, e.g. magnification, lenses, colour, contrast and lighting.
- Optical low vision aids and 'hi-tech' devices.
- Working with accredited low vision practitioners

Low vision practitioners

This is the re-accreditation programme for accredited low vision practitioners. You must attend to continue to provide the Welsh Low Vision Service.

Rehabilitation officers

Tailored sessions will enable you to consolidate and build on existing knowledge. A combination of interactive, 'hands-on' activities and theoretical sessions will enable you to explore:

- Low vision therapy- Eccentric viewing
- Task lighting update
- Working with accredited low vision practitioners

Social workers

Tailored sessions will enable you to consolidate and build on existing knowledge. A combination of interactive, 'hands-on' activities and theoretical sessions will enable you to explore:

- What's in a low vision assessment?
- Task lighting update
- Working with accredited low vision practitioners

Voluntary sector representatives
This is an ideal opportunity to link with the statutory services in your local area.

Programme

8:45 Coffee and registration

9:15 Welcome and introductions: Barbara Ryan

9:20 **Education professionals**
The human eye, paediatric eye conditions, definitions and prevalence of low vision

Low vision practitioners
Working with children and service update

Social care professionals
Your role in the Welsh Low Vision Service: What can you do to help?

10:20 **Education professionals**
'Hands-on' activities: colour, contrast, magnification, lenses

Low vision practitioners and social care professionals
Audit, referrals and one case study

11:15 Coffee

11:30 **Whole group:**
Problem solving and new technology: Chantel Rhodes

12:15 Lunch

1:00 **Education professionals and low vision practitioners**
Audit of referral process; Case studies x 2

Social workers
What's in a low vision assessment

Rehabilitation officers
Eccentric viewing: Finding the spot

2:15 **Education professionals**
'Hi-tech low vision aids'

Low vision practitioners and social care professionals
Working together and case studies

3:00 **Coffee**

3:15 **Education professionals**
Optical low vision aids
Low vision practitioners
Spectacle-mounted low vision aids and exploring the low vision aid 'kit'

Social care professionals
Task lighting update

4:15 Question and answer session

4:30 Thanks and close

Course contributors

Barbara Ryan
Clinical Lead, Welsh Low Vision Service
Co-Director, Wales Optometry Postgraduate Education Centre, Cardiff University

Nathan Davies
Children's Low Vision Advocate, Cardiff University (seconded from RNIB Cymru)

Andy Fisher
Focal Point UK

Marek Karas
Senior service advisor, RNIB

Chantel Rhodes
Welsh Low Vision Service Administration Scheme Manager, Carmarthenshire LHB

Robert Hall
Technology officer, RNIB Cymru

Owen Williams
Technology officer, Wales Council for the Blind

Sophie Dyment
Wales Council for the Blind

Edward Marcus Ltd
UK wholesale supplier of magnifiers and low vision aids

Appendix 3

Evaluation questionnaire for training days

Children's Low Vision Project and Welsh Low Vision Service Training

Evaluation of training day

We would like to find out your opinions about the training day. For that reason, we would be very grateful if you could please complete this short questionnaire.

Please note that you do **not** need to put your name, address or any other personal details on the form. All the information you give in the questionnaire will be private and confidential. The questionnaires have been numbered to aid administration.

Please answer the questionnaire as honestly as possible so that we can use the results to improve future training programmes.

The questionnaire consists of 5 sections:

Section A	Before the training
Section B	Evaluation of the training
	a) Teaching and learning approaches
	b) About the trainers
	c) Consolidation/ acquisition of skills and knowledge
	d) About the venue
Section C	Overall opinions
Section D	Looking to the future
Section E	Other comments

Thank you very much.
Nathan Davies

Section A Before the training

1. Overall, what did you think about the pre-course information? Please tick.

❑ Very poor ❑ Poor ❑ Satisfactory ❑ Good ❑ Very good

2. Overall, what did you think about the enrolment process? Please tick.

❑ Very poor ❑ Poor ❑ Satisfactory ❑ Good ❑ Very good

3. Which of the following best describes the main reason why you have come to the training? Please tick.

❑Own choice ❑Advised to attend by manager

❑Needed to attend for re-accreditation ❑Other _____

4. How enjoyable do you think the training will be? Please circle.

Not enjoyable at all					Extremely enjoyable
1	2	3	4	5	6

5. How relevant do you think the training will be? Please circle.

Not relevant at all					Extremely relevant
1	2	3	4	5	6

6. Do you think that the content of the training will be: Please circle

Very difficult					Very easy
1	2	3	4	5	6

7. How motivated do you feel about today's training? Please circle.

Not motivated at all Very motivated

1	2	3	4	5	6

8. What are you expecting from the training?
Please comment.

_____

_____

9. Other comments

_____

_____

_____

Section B Evaluation of the training

a) Teaching and learning approaches

10. Overall, how useful did you find each of the following teaching and learning approaches?
Please circle your answer for each.

Teaching and learning approach	Your score					
	Not useful at all					Very useful
Individual tasks	1	2	3	4	5	6
Pair work	1	2	3	4	5	6
Small group work	1	2	3	4	5	6
Whole group discussions	1	2	3	4	5	6
Question & Answer sessions	1	2	3	4	5	6
Multi-disciplinary sessions	1	2	3	4	5	6
'Hands-on'/ practical activities	1	2	3	4	5	6

11. Thinking about the theoretical information covered during the day, do you feel that there was: Please circle.

Too little Too much
1 2 3 4 5 6

b) About the trainers

12. Overall, how would you rate the skills, qualities and attributes of the trainers? Please circle.

Very poor Very good
1 2 3 4 5 6

c) Consolidation/ acquisition of skills/ knowledge

13. To what extent did the training consolidate or challenge your existing knowledge? Please tick.

Consolidated Challenged
1 2 3 4 5 6

14. During the training, did you learn any new information or skills? Please tick for each and give brief details.

	Yes	No	Details/ comments
Learn new information			
Learn skills			

d) About the venue

15. Overall, what did you think about the venue?
Please circle.

Very poor Very good
1 2 3 4 5 6

Section C Overall opinions

16. Overall, how enjoyable did you find the training?
Please circle.

Not enjoyable at all					Extremely enjoyable
1	2	3	4	5	6

17. What did you enjoy most about the training?

_____

18. What did you enjoy least about the training?

_____

19. Overall, how relevant did you find the training?
Please circle.

Not relevant at all					Extremely relevant
1	2	3	4	5	6

20. What did you find most relevant? Please comment.

_____

21. What did you find least relevant? Please comment.

_____

22. To what extent did the training meet your expectations?
Please circle.

Not at all					In full
1	2	3	4	5	6

23. Was the training a good use of your time? Please tick.

❑ Yes ❑ No

24. Do you feel that the content of the training was:
Please circle.

Very difficult					Very easy
1	2	3	4	5	6

Section D Looking to the future

25. How likely is it that you would recommend the course to your colleagues? Please circle.

Very unlikely					Very likely
1	2	3	4	5	6

26. How do you think this training could be improved for the future?

_____

_____

Section E Other comments

27. Please use this space to make any other comments about the training.

_____

_____

Appendix 4

Post-training evaluation questionnaires

Welsh Low Vision Service and Children's Low Vision Project

Post-training evaluation questionnaire for low vision practitioners

1. How confident are you about prescribing the following products? Please circle.

	Not confident					Very confident	N/A
Norville kit	1	2	3	4	5	6	❑
Keeler kit	1	2	3	4	5	6	❑
Compact Plus	1	2	3	4	5	6	❑

2. Overall, how relevant was the training to your low vision work? Please circle.

Not relevant at all					Extremely relevant
1	2	3	4	5	6

3. When the opportunities arise, how often do you use skills or techniques learned during the training in your low vision work?
If you answer 'never' or 'sometimes', please go to Question 5. Otherwise, please go to Question 4.

❑Never ❑Sometimes ❑Most of the time ❑Always

4. Which aspects of your low vision work have you changed as a direct result of the training?
Please comment then go to Question 6.

_____

5. Listed below are some reasons why you may have 'never' or 'sometimes' used skills or techniques from the training in your low vision work.
Please tick all the reasons that apply to you then go to Question 6.

- ❑ Skills and techniques covered during the training have been irrelevant to my work.
- ❑ The training did not cover the skills and techniques in sufficient detail.

- ❑ I am not confident using the skills or techniques in my low vision work.

- ❑ There is been no or only limited opportunity for me to use the skills or techniques in my low vision work.

- ❑ Other (please comment)

_____

6. To what extent has the training day made it easier for you to refer patients to:

	Not at all					Very much
Education professionals	1	2	3	4	5	6
Social care professionals	1	2	3	4	5	6

7. Overall, to what extent has the training day improved multi-disciplinary working in your area? Please circle.

Not at all					Very much
1	2	3	4	5	6

8. Please use this space to make any other comments about the impact of the training on your low vision work.

_____

_____

_____

Thank you very much for completing this questionnaire. Please return it to: Nathan Davies, RNIB Cymru, Trident Court, East Moors Road, Cardiff CF24 5TD.

Welsh Low Vision Service and Children's Low Vision Project

Post-training evaluation questionnaire for education professionals

1. How often do you use the Toolkit when supporting children and young people who have low vision? Please tick. If you answer 'never' for any option, please go to Question 2. Otherwise, please go to Question 3.

	Never	Sometimes	Most of the time	Always	Not applicable
Pupils in Primary Schools					
Pupils in Secondary Schools					
Pupils in Special Schools					

2. Listed below are some possible reasons why you may not have used the Toolkit. Please tick all that apply then go to Question 3.

- ❑ The school has been inspected and daily work practices have been affected
- ❑ The pupils being supported do not have low vision / do not use low vision aids
- ❑ There has been reduction in staffing / staffing duties have changed
- ❑ Unsure how the Toolkit should be used
- ❑ Other (please comment)_____

3. How useful have the following elements of the Toolkit been? Please circle.

	Not useful at all					Very useful	Not used
Background information	1	2	3	4	5	6	❑
Resource sheets	1	2	3	4	5	6	❑
Suggested activities	1	2	3	4	5	6	❑
Teacher evaluation materials	1	2	3	4	5	6	❑
Pupil evaluation materials	1	2	3	4	5	6	❑
"What's it like?" Appendix	1	2	3	4	5	6	❑
Other (please note)_____	1	2	3	4	5	6	❑

4. Do you teach pupils with low vision the following topics more or less often than you did before receiving the Toolkit and attending the training? Please tick for each.

Topic	Less often	About the same	More often	Not applicable
Sources of information				
Contrast				
Lighting				
Lenses and magnification				
Large/ clear print				
Using low vision aids				
Peer awareness				

5. How confident are you about your knowledge in the following areas? Please circle.

	Not confident					Very confident	Unsure
Luminance contrast	1	2	3	4	5	6	❑
Lighting	1	2	3	4	5	6	❑
Types of lenses	1	2	3	4	5	6	❑
Hi-tech low vision aids	1	2	3	4	5	6	❑

6. How useful has the Toolkit been to teach pupils to use low vision aids for near viewing? Please circle.

Not useful at all				Very useful		Not used
1	2	3	4	5	6	❑

7. How useful has the Toolkit been to teach pupils to use low vision aids for distance viewing? Please circle.

Not useful at all				Very useful		Not used
1	2	3	4	5	6	❑

8. How useful has the Toolkit been to teach pupils to use hi-tech low vision aids? Please circle.

Not useful at all				Very useful		Not used
1	2	3	4	5	6	❑

9. Have you used the Toolkit for anything other than to teach pupils with low vision how to make the most of their sight and how to use their low vision aids? Please tick and comment.

❑ Yes_____

❑ No _____

10. How useful is the semi-interactive presentation (on CD-Rom), which accompanies the Toolkit? Please circle.

Not useful at all				Very useful		Not used
1	2	3	4	5	6	❑

11. Overall, how relevant was the training day to your work? Please circle. If you did not attend, please go to Question 18.

Not relevant at all				Extremely relevant		Did not attend
1	2	3	4	5	6	❑

12. When the opportunities arise, how often do you use skills or techniques learned during the training in your work? If you answer 'never' or 'sometimes', please go to Question 14. Otherwise, please go to Question 13.

❑Never ❑Sometimes ❑Most of the time ❑Always

13. Which aspects of your work have you changed as a direct result of the training? Please comment then go to Question 15.

_____

_____

14. Listed below are some reasons why you may have 'never' or 'sometimes' used skills or techniques from the training in your work. Please tick all the reasons that apply to you then go to Question 15.

❑ Skills and techniques covered during the training have been irrelevant to my work.

❑ The training did not cover the skills and techniques in sufficient detail.

❑ I am not confident using the skills or techniques in my work.

❑ There is been no or only limited opportunity for me to use the skills or techniques in my work.

❑ Other (please comment)

_____

15. Has the training resulted in any changes to the ways in which your organisation or department carries out its work? Please tick and comment.

❑Yes ❑No

_____

16. To what extent has the training day made it easier for you to refer children to:

	Not at all					Very much
Low vision practitioners	1	2	3	4	5	6
Social care professionals	1	2	3	4	5	6

17. Overall, to what extent has the training day improved multi-disciplinary working in your area? Please circle.

Not at all					Very much
1	2	3	4	5	6

18. Please use this space to make any other comments about the impact of the Toolkit or training on your work.

_____

Thank you very much for completing the questionnaire. Please return it to:

Nathan Davies, RNIB Cymru, Trident Court, East Moors Road, Cardiff CF24 5TD.

Welsh Low Vision Service and Children's Low Vision Project

Post-training evaluation questionnaire for professionals in Social Services

1. Since the training, how often do you use the Amsler chart with clients who have central vision loss? Please tick.

❑Never ❑Sometimes ❑Most of the time ❑Always

2. How confident are you about advising clients on appropriate task lighting equipment? Please circle.

Not confident at all					Very confident
1	2	3	4	5	6

3. Overall, how relevant was the training to your work? Please circle.

Not relevant at all					Extremely relevant
1	2	3	4	5	6

4. When the opportunities arise, how often do you use skills or techniques learned during the training in your work? If you answer 'never' or 'sometimes', please go to Question 6. Otherwise, please go to Question 5.

❑Never ❑Sometimes ❑Most of the time ❑Always

5. Which aspects of your work have you changed as a direct result of the training? Please comment then go to Question 7.

_____

6. Listed below are some reasons why you may have 'never' or 'sometimes' used skills or techniques from the training in your work. Please tick all the reasons that apply to you then go to Question 7.

❑ Skills and techniques covered during the training have been irrelevant to my work.

- ❑ The training did not cover the skills and techniques in sufficient detail.
- ❑ I am not confident using the skills or techniques in my work.
- ❑ There is been no or only limited opportunity for me to use the skills or techniques in my work.
- ❑ Other (please comment)

_____

7. To what extent has the training day made it easier for you to refer clients to:

	Not at all					Very much
Low vision practitioners	1	2	3	4	5	6
Education professionals	1	2	3	4	5	6

8. Overall, to what extent has the training day improved multi-disciplinary working in your area? Please circle.

Not at all					Very much
1	2	3	4	5	6

9. Please use this space to make any other comments about the impact of the training on your work.

_____

Thank you very much for completing this questionnaire. Please return it to:

Nathan Davies
RNIB Cymru
Trident Court
East Moors Road
Cardiff
CF24 5TD
01558 650281

Appendix 5

Postal questionnaire, glossary and cover letter for special schools in Wales

Section A School details

1. Please give details about the school:

Name of school	
Address	
Postcode	
Telephone number	
Email address	
Website	
LEA	
Head Teacher	
Age range of pupils	
Number of pupils on roll	
Type of school, e.g. Maintained	
Designation of school	

Section B Pupils who wear glasses

2. In total, how many pupils in school wear glasses?

_____

3. Are any pupils, who have been prescribed glasses, reluctant (or refuse) to wear their glasses? Please tick. If 'Yes', please note some of the reasons why the pupils are reluctant (or refuse) to wear their glasses.

❑ Yes ❑ No

_____

Section C Vision screening

Please refer to the glossary for information about vision screening.

4. Does children's vision screening take place in school? Please tick.

❑ Yes (please go to Question 5)
❑ No (please go to Question 9)

5. **Who usually carries out children's vision screening?** Please tick all that apply. Please refer to the glossary for more information about some of the roles below.

❑ Orthoptist
❑ Optometrist
❑ School Nurse
❑ QTVI * from Visual Impairment Service
❑ QTVI * on school staff
❑ Community paediatrician
❑ Staff in school (please specify)_____
❑ Other (please specify)_____

*Qualified Teacher of Visually Impaired pupils

6. When does vision screening take place? Please tick all that apply.

❑Foundation Phase ❑Key Stage 2 ❑Key Stage 3
❑Key Stage 4

7. Do all pupils in school have their vision assessed as part of the vision screening process? Please tick. If 'No', please give details about which pupils would **not** take part in the vision screening process.

❑ Yes ❑ No

_____

8. How could the vision screening process be improved? Please comment.

_____

9. Would it be useful if children's vision screening routinely took place? Please tick.

❑ Yes ❑ No

Section D Pupils known and suspected of having a visual impairment

10. How many pupils have a visual impairment recorded as their primary or secondary SEN category? PLASC data may be helpful to answer this question.

_____

11. How many pupils are known to have a visual impairment that is <u>not</u> recorded as their primary or secondary SEN category? PLASC data may be helpful to answer this question.

_____

12. Do any of the professionals below visit the school to do a vision assessment of pupils known to have a visual impairment? Please complete the table to show which professionals carry out assessments.

Professional	Yes	No
Orthoptist		
Optometrist		
QTVI from VI Service		
QTVI on school staff		
Community Paediatrician		
Other (please specify)		

13. If a vision assessment is carried out, how often does the school receive a copy of the report? Please tick.

❑ Always ❑ Most of the time ❑ Sometimes
❑ Never

14. How many pupils without a known visual impairment, who do not wear glasses, are suspected of having difficulties seeing near or distant objects?

Difficulties seeing:	Number of pupils
Near objects, e.g. text/ symbols	
Distant objects, e.g. friends in the playground	

15. Please use this space to expand on any of the questions in Section D.

_____

Section E Low vision aids and adaptations

16. How many pupils in school use optical, non-optical or hi-tech low vision aids? Please complete the table. Please refer to the glossary for more information about low vision aids.

Type of low vision aid	Total number of pupils who use
Optical low vision aids, e.g. hand-held magnifiers, monoculars	
Non-optical devices, e.g. reading stands, task lighting	
Hi-tech devices, e.g. desktop video magnifier (CCTV)	

17. In general, how often are adaptations made to meet the needs of pupils with visual impairment, e.g. production of material in large-print / symbols?

❑ Always ❑ Most of the time ❑ Sometimes
❑ Never

Section F Staff training and development

18. What proportion of staff have had some form of training about how to work with and support children and young people with visual impairment?
Please tick for each group of staff.

Staff	All	Most	Some	None
Teachers				
Learning Support Assistants				
Other staff (please note)				
Other staff (please note)				
Other staff (please note)				

19. If training about how to work with and support children and young people with visual impairment was offered, how likely is it that the following groups of staff would be able to undertake the training? Please tick for each group of staff.

Staff	Very likely	Likely	Unlikely	Very unlikely
Teachers				
Learning Support Assistants				
Other staff (please note)				
Other staff (please note)				
Other staff (please note)				

Section G Support from other professionals

20. Do any of the following professionals provide support to pupils with visual impairment either directly or indirectly, e.g. through advisory support to teachers? Please summarise the type of support provided, including frequency and continue on a separate sheet if needed.

	Direct support to pupils	Indirect support, e.g. advisory support to teachers
Qualified Teacher of Visually Impaired pupils (QTVI) from VI Service.		
Qualified Teacher of Visually Impaired pupils (on school staff)		
Mobility specialist		
Rehabilitation specialist		
Optometrist		
Orthoptist		
Low vision practitioner		

Section H Other comments

21. Please use this section to make any other comments.

_____

Thank you very much for completing this questionnaire. I very much appreciate your support. Please return it to me by 5th March 2010 at the latest.

Nathan Davies
Children's Low Vision Advocate for Wales
Cardiff University
School of Optometry and Vision Sciences
Maindy Road
Cardiff
CF24 4LU

It would be helpful to have your contact details. If you are happy to give your details, please complete the table below:

Title	
Name	
Position/ job title	
Telephone number	
Email address	

The Children's Low Vision Project in Wales:
Special School exploratory survey

Glossary of terms

Desktop video magnifiers (CCTVs)

Desktop video magnifiers are also known as CCTVs. The text or object to be viewed is placed under a camera and the magnified image appears on a screen. There are controls to make the image bigger and bolder and options to change the colours. Desktop video magnifiers can achieve magnification of about x2 to x70.

Low vision

There are many different definitions of low vision. However, a widely used definition is:

A person with low vision is one who has an impairment of visual function for whom full remediation is not possible by conventional spectacles, contact lenses or medical intervention and which causes restriction in that person's everyday life. *

* Low Vision Services: Recommendations for future service delivery in the UK, 1999, 3.1, p12

Low vision aids

People who have low vision may benefit from using one or more low vision aids. There are many different types of low vision aids or low vision devices. They include optical devices for near viewing, e.g. hand-held or bar magnifiers, optical devices for distance viewing, e.g. monoculars and binoculars and non-optical devices such as reading stands or task lamps. Hi-tech low vision aids are also available, e.g. desktop video magnifiers, sometimes known as CCTVs.

Low vision practitioner

In Wales, eye health professionals, such as optometrists, can undertake extra training provided by the School of Optometry and Vision Sciences, Cardiff University to become accredited low vision practitioners. Accredited low vision practitioners carry out (free) low vision assessments as part of the Welsh Low Vision Service. Most low vision practitioners work in community optometry practices but some work in hospital settings.
For a list of all the accredited low vision practitioners in Wales, please visit **www.eyecarewales.nhs.uk** and click on 'Services in your area'.

Orthoptist *
Orthoptists are concerned with the diagnosis and treatment of ocular motility and problems relating to vision. Some examples of these problems include lazy eye (amblyopia), inability to use the two eyes together in the correct way, abnormal eye movements or double vision (diplopia).

Orthoptists perform and interpret a variety of diagnostic procedures where an underlying ophthalmological condition exists. Some examples are: assessment of field of vision, measurement of the pressure inside the eye and photography of the retina. Orthoptists usually work in hospital settings.

* www.orthoptics.org.uk/patients/orthoptics

Optometrist *
Optometrists, previously known as ophthalmic opticians, are trained professionals who examine eyes, test sight, give advice on visual problems and prescribe and dispense spectacles or contact lenses. They also recommend other treatments or visual aids where appropriate. Optometrists are trained to recognize eye diseases, referring such cases as necessary and can also use or supply various eye drugs.

All optometrists practicing in the UK must be registered with the General Optical Council, the profession's regulatory body, and are listed in the Opticians Register.
Optometrists practice in either community practices or hospital clinics.
*www.college-optometrists.org

Screening *
Screening is a process of identifying apparently healthy people who may be at increased risk of a disease or condition. They can then be offered information, further tests and appropriate treatment to reduce their risk and/or any complications arising from the disease or condition.

* www.screening.nhs.uk/screening

Vision screening programmes may include assessments for short or long-sightedness (refractive errors), lazy eye (amblyopia) or squints (strabismus).

However, vision screening is **not** a full eye test and may be carried out by non-eye specialists.

Vision assessment
There are two main types of vision assessment: clinical and functional.

During a clinical vision assessment, a diagnosis is made and treatment options are offered.

A functional vision assessment assesses how vision is used in real-life, everyday situations. The assessment can identify certain skills and techniques that may enable the individual to make the most of their vision.

Nathan Davies (2010)

Dear colleague

3rd February 2010

The Children's Low Vision Project in Wales:
Invitation to take part in an exploratory survey

We are writing to invite your school to take part in an exploratory research project, which is being carried out as part of the Children's Low Vision Project in Wales. This project is funded by the Welsh Assembly Government as part of the Welsh Eye Care Initiative (www.eyecarewales.nhs.uk).

The aim of the research is to determine the number of children and young people in Special Schools in Wales who have a visual impairment and the type and level of support that they receive. This will help to shape the future of screening and support received by children and young people in Special Schools in Wales.

We would be very grateful if you would complete the enclosed questionnaire. If your school currently receives support from the LEA Visual Impairment Service, you may like to consult the Qualified Teacher(s) of Visually Impaired pupils (QTVIs) before completing the questionnaire. We have also enclosed a glossary of some of the terms that are used in the questionnaire, which you may find helpful.

Please complete the questionnaire and return it to Nathan Davies by 5th March 2010. Please send your completed questionnaire to:

Cardiff University
School of Optometry and Vision Sciences
Maindy Road
Cardiff
CF24 4LU

Please be assured that this is an exploratory survey only and that any information you provide will remain strictly private and confidential. We would like to add that individuals or schools will **not** be identifiable in any reports.

Please contact Nathan Davies if you have any questions. You can either phone Nathan on 02920 870 233 or send an email to Nathan.davies@rnib.org.uk.

Nathan Davies

Children's Low Vision Advocate for Wales

Dr Maggie Woodhouse

School of Optometry & Vision Sciences
Cardiff University

Nicola Crews MBE

RNIB Cymru

Appendix 6

Open-ended comments in special school postal questionnaire

1. Comments relating to current provision of support / current screening practices

- *Three PMLD students have vision difficulties and support is provided by MSI advisory teacher.*
- *50% of children (should) wear glasses; Many children refuse or are reluctant to wear their glasses; Screening of all children used to take place but now only Reception children have vision screened.*
- *Children are seen by eye health professionals in Swansea or Cardiff, which involves quite a lot of travel; Staff refer children with eye conditions or children or they are concerned about.*
- *Children throughout school have vision screened but not sure of screening criteria; A couple of children in school are blind.*
- *Currently, we do not have any pupils with severe VI. A few wear glasses but sometimes refuse to wear them.*
- *Dental screening takes place but not vision or hearing.*
- *ILS carry out assessments and provide indirect support. Pupils seen weekly again but only for half a term. Situation will be resolved in Sep. Most children have little/no reading skills (PMLD). Magnifiers not useful- need too much co-ordination.*
- *Lots of our pupils have complex and multiple needs that can mask the significance of restricted vision.*
- *…is a school for children with speech, language and communication disorders. There are only one or two children*

with VI but this is incidental to their primary need of SCLD. Screening usually takes place in Autumn term.

- *No Braillists at present. Examples of adaptations include making PECS symbols larger. We are lucky with the service we've got.*
- *Occupational Therapist supports mobility of one VI pupil who is mobile; Hearing screening takes place and dentistry screening just about to start.*
- *Service we receive from LEA is very good. Regular contact with QTVI responsible for our school and have QTVI on staff. Work well as team with all agencies.*
- *Suspected that a lot of children in school have undiagnosed visual impairment; Training for staff in school would be useful.*
- *The pupils in school generally have MLD and we do not specialise in VI. No pupils are registered blind. 8 pupils in Primary unit, 99 in Secondary.*
- *Three blind students in school; QTVI from Gwent MSI Service is bought in when needed; The paediatrician sees most children at least once per year and refers them if needed.*
- *Vision screening used to take place but blanket screening no longer takes place. Children are monitored or referred if there is concern about their vision.*
- *We are a school for pupils with ASD. As such, our pupils find dealing with change and unexpected events difficult. Screening for this group might therefore be more effectively carried out individually out of school.*
- *We have a handful of pupils with visual impairment; Don't know how many. School Nurse on site.*

- *While we are a Special School, we support children with emotional and behavioural difficulties. Vision assessments routinely given at school would be great facility as many pupils do not have support with such needs at home. Two pupils in school with known visual issues but neither wears they glasses as they should. Adaptations made as necessary, e.g. visiting pupil needed enlarged print.*
- *Whilst we are a special school (for pupils with Social Emotional and/or Behavioural difficulties) we do not have pupils with VI difficulties other than 2 pupils who 'should' wear spectacles due to short-sightedness. Good luck with your research.*

2. Comments relating to proposed vision care project

- *Clear need for medical screening process to diagnose visual difficulties, prescribe aids when needed and give advice to staff. Ideally, should be school based: Children in familiar environment, staff can ask questions, medical personnel can appreciate what pupils do at school.*
- *I would be very happy to work with any service that would aim to enhance the sight health of the very needy boys we care for…*
- *Might be useful if there was professional at hand who may be willing to give presentation on importance of eye care and how neglect during teenage years may cause difficulties later on.*
- *Consideration for any screening in special school sector should include the resources used for screening-objects/ pictures are often used to assist teaching and should be used in screening too !*

- *We are a new school (3 previous special schools in county closed last summer) so I do not have information at fingertips. V interested in VI and would be glad to continue training.*