

**Research Report
No 227**



Literacy and Special Educational Needs: A Review of the Literature

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Chapter 1 Introduction

In Autumn 1999, the Department for Education and Employment (DfEE) commissioned a review of the research literature on teaching approaches designed to help pupils with significant learning difficulties acquire literacy skills. The work was undertaken by the National Foundation for Educational Research (NFER) in collaboration with a range of specialists from six academic institutions (see appendix 1).

The main focus of the review was on pupils with severe sensory impairment, severe learning difficulties, severe language impairment, and profound and multiple learning difficulties, most of whom, within England and Wales, would be within the population of pupils with a statement of special educational need. A subsidiary focus was pupils with mild/moderate learning difficulties and pupils with specific learning difficulties; some of these pupils may have statements but the majority will probably be at stage 3 of the Code of Practice (DFE, 1994) (the Code was under review at the time of this research).

In order to understand the corpus of available research literature, it is important to put the review in context, considering both literacy and broader curriculum issues relating to pupils with significant learning difficulties.

1.1 Literacy context

The National Literacy Strategy (DfEE. SEU, 1998) defines literacy as reading and writing — essentially, making sense of text and making sense in text. Fluent readers can read silently with comprehension any text which is significant to them and which relates to a topic with which they could cope in their spoken language. Similarly, fluent writers can compose texts on such topics. So fluent readers and writers can deal with text equally competently at the word, sentence and text levels, and are so familiar with the literacy skills that they can deploy them automatically.

A usual learning sequence leading to such fluency may begin with sharing books from an early age and/or structured early teaching of the relationships between speech and text and meaning. Whatever the starting point(s) and route, learners need to infer or be taught certain prerequisites to literacy – for example, the difference between text and pictures, the directionality of print and, above all, the fact that text encodes both meaning and (in alphabetic scripts) the sounds of words.

Early learning and therefore, for most children, early teaching includes the relationships between the basic constituents of speech (phonemes) and text (graphemes). These basic relationships and their teaching are conventionally known as ‘phonics’, and are a means to the end of independent reading and writing. Higher-order connections between text and meaning, such as the ability to predict or ‘fill in’ upcoming words in a familiar story, also play a crucial role, since the whole purpose is to make meaning from and in text. Enjoyment and enthusiasm speed the process at all stages and ages.

The usual sequence of literacy learning requires intact neural, auditory, articulatory, visual and motor systems. Gross impairment in any one or more of these systems may render the usual learning route extremely difficult or impossible; and early, repeated and demoralising failure may convince the learner that the effort is not worth making anyway. Much of the review reported below is concerned with children whose impairments are of that degree of severity, and whose learning therefore has to proceed by other means.

1.2 Literacy within the curriculum of pupils with significant special educational needs

It is only within the past 25 years or so that there has been serious consideration of education for young people with severe learning difficulties, let alone attention to the acquisition of literacy skills for this group. In the UK, prior to 1971, children with measured intelligent quotients (IQs) of less than 50 were considered to be ‘severely subnormal’ and unable to benefit from schooling. Their needs were generally met in Junior Training Centres where work was focused on occupational and independence training rather than on any recognisable school curriculum. In schools for pupils considered to be ‘educationally subnormal (severe)’, developed in the early 1970’s, teaching tended to be based on behaviourist principles and to focus on what were loosely described as life skills. Literacy teaching was usually limited to teaching a social sight vocabulary of functional words – allied to life skills work – to secondary aged pupils; it was rarely considered appropriate to introduce literacy to young pupils with Down syndrome at the age of five, for example, as may be the practice today. Thus literacy was very often simply not considered for this population at school although literature pertaining to the USA, Australia and the UK (on which this review is based) suggests there has been an awareness of the potential for literacy development for these children for at least twenty years.

The introduction of the National Curriculum as a ‘curriculum for all’ (NCC, 1989) had a major impact upon the curriculum for pupils with special educational needs, particularly for those with severe learning difficulties and profound and multiple learning difficulties. Often for the first time, staff began to seek access to a range of subject areas for this group of pupils. A series of government initiatives through the 1990s has reinforced and accelerated consideration of more integrated provision and inclusive approaches to curriculum planning. This means that the majority of pupils with statements (the group who have the most severe learning difficulties) are attending the same neighbourhood primary schools as the typically developing children in their community from five years of age and, in most cases, having opportunities to acquire literacy skills.

For children with significant learning difficulties, the benefits of acquiring literacy skills may exceed the mere fact of attaining a functionally useful level of reading and writing skill. Progress in reading can develop speech and language skills, auditory perceptual skills and working memory function: these are all areas where children with Down syndrome, for example, usually display difficulties. Furthermore, the fact that the life span of particular groups of people with significant special needs is lengthening means that it is all the more important to ensure that their education

realises their latent abilities as fully as possible in order to give them maximum independence and opportunities to engage in employment.

It is, however, important to separate out precursors of literacy from literacy itself. Reference was made above to the former: these precursors may be different for pupils with significant learning difficulties or sensory impairments and may thus sometimes be confused with evidence of progress within literacy. The literature illustrates some of the debates. For example, listening is a critical precursor for blind children but listening skills do not constitute literacy, listening merely being a key element in the process of becoming literate as a visually impaired individual (Tuttle and Hatlen, 1996). Similarly, commentators on educating visual impaired pupils stress the importance of recognising progress in tactual development: again, this is a precursor that provides the foundation for the recognition of tactual symbols other than Braille (McCall and McLinden, 1997). Many young people with profound and multiple learning difficulties are also empowered by the use of tactile symbols or 'objects of reference' but, again, these are primarily the first steps in communication and independence and cannot be a mode of literacy: indeed, in this case, there is no cogent research evidence that objects of reference necessarily lead to text.

However, at the same time, it is important to realise that the absence of specific literacy skills does not necessarily mean that young people are denied access to the experiences that such skills customarily bring – in particular, the experience of literature. There is increasing interest in the way that young people whose cognitive impairment is such that they are unable to acquire the full repertoire of literacy skills can yet be meaningfully engaged in story, poetry and drama (see, for example, Groves, 1998). Two of the characteristics of the literate primary pupil as articulated in the introduction to the National Literacy Strategy are an interest in books and enjoyment of reading: pupils with significant learning difficulties who are unable to engage in the actual 'decoding' can yet find interest and enjoyment from the content of books and thus 'develop their powers of imagination, inventiveness and critical awareness' (DfEE, 1998, p3) at a level appropriate to their own particular stage of development.

The relatively recent application of literacy teaching to pupils with severe learning difficulties has meant that the research base is weak in comparison to that for typically developing children – see, for example, the review, sponsored by the DfEE, which supported the National Literacy Strategy (Beard, 1998). It is only relatively recently that it has become possible to begin to study the literacy development of truly representative population samples of children with Down syndrome, for example. Furthermore, a recent DfEE Research Report (Cline and Shamsi, 2000) provides cogent evidence that the research base for developing literacy in pupils with special educational needs who are also learning English as an Additional Language, is similarly limited: this issue is not discussed in the present review but should be borne in mind.

1.3 The National Literacy Strategy

The National Literacy Strategy (NLS) (GB. DfEE, 1998) was introduced in 1998 with the aim of raising standards of literacy by:

- enhancing progress by systematic planning of lessons and monitoring of teaching and learning;
- setting clear expectations for each term in key stages one and two
- improving the quality of teaching by focusing on whole-class teaching and management.

Pupils with severe, profound and multiple learning difficulties who would not be expected to reach the literacy National Learning Targets for 11 year olds are expected to be accommodated within the National Literacy Strategy as far as possible; and the way in which schools manage this will be scrutinised within Ofsted inspections. The requirement has encouraged many schools for pupils with significant learning difficulties in England to consider the provision of a daily session dedicated to literacy for the first time. Special schools are now required to set targets and to produce literacy action plans. These considerations were, thus, at the time of the review, the most recent of the government's initiatives which encouraged those working with pupils with significant learning difficulties to plan the curriculum for the development of literacy skills.

Specific consideration of the NLS is not contained within this present literature review, largely because research on the Strategy generally was embryonic, and, in particular, research on its application to pupils with significant learning difficulties was negligible so soon after implementation. Available literature in relation to pupils with special educational needs and was mostly prescriptive and dealt with practical details and mostly based on practitioner experience (see, for example, Berger and Gross, 1999; Berger *et al.*, 1999). The evaluation of the National Literacy Project (Sainsbury *et al.*, 1998) considered special educational needs as only one of a range of background variables and Ofsted (1999) commented that LEAs have tended to focus on implementation in mainstream schools so that there is presently a restricted view of effective implementation in special schools (where the majority of pupils will have the most significant special educational needs). Also, the research review which supports the NLS (Beard, 1998) did not explore literature relating to pupils with significant special educational needs. The present review, therefore, examines the literature on the acquisition of literacy for the target groups generally and is not constrained by attention to the NLS though the latter is mentioned where it is obviously implicated by research.

It should be pointed out that this review does not consider emergent practice which has developed as a result of the implementation of the NLS as this practice has not yet found its way into the literature and, in particular, has not been evaluated. However, it was decided with the project steering group and the DfEE that the review should also refer to emergent practice as relevant. It should be pointed out that emergent practice may develop in two broad ways:

- *from the internal environment* - practice that has been evaluated and discussed in the research literature. This may include, for example, circumstances where findings from single cases have been applied to a larger cohort or practice transferred to a different context
- *from the external environment* - practice which is developing on account of practice in the wider education system. This may include cases where pupils with special educational needs are involved in mainstream practices; this is the case with the application of the National Literacy Strategy.

There are advantages and disadvantages of both approaches. The first is the more cautious, insofar as knowledge is gained incrementally and from a secure starting-point; however, it is slow and can be restrictive. The second is more radical, faster and has a wide range of impact. However, the evidence base from which it starts is often negligible.

The critical factor for both approaches is rigorous evaluation of both process and outcomes. It should be noted that the literature does not yet make these evaluation data available: thus the sections in this review on emergent practice should be read with this in mind.

1.4 Literacy targets and quantification of the population with literacy difficulties

The government set National Learning targets for literacy which the NLS aims to support. The aim is for 80 per cent of 11 year old pupils to reach level 4 or above by 2002, as measured by Key Stage 2 English tests. The most recent figures available (DfEE, 2000) suggest that in English, 30 per cent of pupils (19% for reading and 44% for writing) did not reach the level expected, and thus could be said to have a degree of difficulty with literacy. Only a proportion of these will be on their school's register of special educational needs: at January 1999, 1.6 per cent of pupils in mainstream primary schools had a statement and 19.3 per cent of pupils were on the school's register of special educational needs but had no statement. There are no national statistics for the literacy attainment of pupils with special educational needs in mainstream schools but according to recently published data (DfEE, 2000), only three per cent of 11 year old pupils in special schools reached Level 4 or above in the English test (six per cent for the reading test and one per cent for the writing test) (1.4 per cent of the total cohort of pupils in England are placed in special schools, the vast majority with a statement).

There are, thus, a considerable number of teachers who have the responsibility for attending to relatively significant literacy difficulties in their pupils.

1.5 The nature of the populations of pupils with significant special educational needs for the purposes of the review

Each section of the review outlines the nature of the population to which it refers and the specific characteristics of the special educational needs that directly affect with the acquisition of literacy – rather than general characteristics which may need to be taken into consideration within the classroom or the prerequisites for learning.

This review relates to pupils whose special educational needs is such that it interferes with the acquisition of literacy. The difficulty is thus conceptualised in functional terms rather than in some other formal assessment measure such as degree of hearing loss or visual impairment. There is evidence that pupils with similar objective assessment of a particular difficulty will respond to classroom tasks differently and will have different degrees of difficulty with acquiring literacy skills.

Descriptions of the relevant populations were thus left to the reviewers who had specific expertise in the acquisition of literacy for particular groups of young people.

Where some background to the particular difficulty or impairment is given, this is limited to the way in which a pupil's early experiences influence the degree to which his/her disability affects literacy acquisition. For example, in the review, reference is made to the fact that pupils' difficulties may be caused, or exacerbated by, the way in which others relate to them in the early years as a result of their principal disability. This may mean that the early experiences which lay the foundations for the acquisition of literacy skills are different for these children not on account of the difficulty *per se* but on account of others' response to that difficulty. For example, Fellenius (1999) studied the reading performance of 82 nine-year-old visually impaired readers in Sweden and compared these with age peers who were sighted; the study revealed that the greatest differences between the two groups were found in their interactions with family members at home, particularly for readers who required Braille or CCTV to allow access to large print. Readers with low vision had less knowledge about letters and words when they started school and were an at-risk group among young readers with visual impairments. This research indicates that children with low vision were less able to read words, sentences and books when they started school compared with fully sighted pupils. Studies such as this one are pointed out in the review as they have implications for pedagogy in later years.

1.6 Methodology

The management of the review was premised on the belief that, given the scope of the review, such a wide-ranging piece of work was most effectively undertaken by a team of expert reviewers, with each member working within his/her specialist area, rather than a generalist team taking on the whole range of the literature. It was suggested that such an approach would ensure that:

- key issues were addressed and prioritised
- the core texts would be identified
- texts would be reviewed from the perspective of an expert

- standard library searches could be supported by experts' own bibliographic bases built up over years of working in the field.

1.6.1 Dates and countries of origin

In discussion within the team, it became apparent that it was appropriate to accept different parameters for the different sections of the review. Normally, the review parameters would be consistent across the whole review. However, when the team met to discuss the review framework, it became clear that there were differences not only in key dates for the start of the searches in particular areas but also in the countries which were relevant to the review. In some cases, for example, most of the significant work had been undertaken in the UK; in others, a wider field was recommended. Furthermore, the volume of material differed so while in some areas it was only feasible, given the resources available, to consider the UK literature, in others, literature from the US and Australia could be included. It was considered the responsibility of the relevant expert to set the parameters for his/her own specialist area. In effect, the majority of the literature reviewed was published between 1990 and 1999 in the UK.

1.6.2 Type of literature

The focus of the review was on the research literature. Most of the research literature identified was published in journals; books were included but the number of research studies here was limited. 'Opinion pieces' or 'teachers' handbooks' were excluded. Searches revealed, and expert opinion confirmed, that there was a significant body of literature grounded in practitioner observation and experience; this is largely what is presently influencing teachers of pupils with significant special educational needs. Thus this literature is included in the review, where it rested on practical observation and reflection; it was not included where it appeared to be received wisdom with no evidence of a critical approach.

1.6.3 Age range

The review pertained to pupils from the ages of 5 - 16. Reference is made to interventions in the early years where this is directly relevant to interventions during the ages of statutory schooling.

1.6.4 Type of intervention

The review focused on teaching strategies in schools. Interventions which only involved a pupil's parents are not included although some interventions which involved the triad of home, school and pupil were included where relevant according to other criteria.

1.6.5 Searches

Staff at the NFER Library searched a range of different databases as the primary method of identifying published literature for this review. Due to limited resources, other recommended means of searching, such as handsearching of journals, were not

undertaken systematically. However, individual reviewers drew on their own knowledge of the literature and, in some cases, had previously undertaken more detailed searches.

Searches were conducted on the following sociological, educational and psychological databases: ASSIA, ChildData, International ERIC, PsycLit and BIDS, as well as the Library's own internal databases. Search strategies were developed using the controlled vocabulary pertinent to each database, under the broad subject areas of special educational needs and literacy. The subsequent sets of keywords identified were then presented to the specialists at the project team meeting for further suggestions. Each database has its own standardised search terms and the search strategies which were implemented across the databases were developed to maximise consistency.

1.6.6 Data extraction form

In order to make the reviewing process transparent and to make available to the reader the reviewers' comments, each reviewer was required to complete a pro forma for each research-based text reviewed (see appendix 2). The pro forma requested technical details of source, details of the type of research and methodology, a summary of the findings and a critical, evaluative comment. The collection of pro forma constitutes an annotated bibliography which supports the review which follows this introductory section. The annotated bibliography is available on request from the National Foundation for Educational Research.

1.6.7 The structure of the review

There follow chapters on:

- pupils with hearing impairment (chapter 2)
- pupils with visual impairment (chapter 3)
- pupils with learning difficulties (chapter 4)
- pupils with communication difficulties (chapter 5)
- pupils with moderate learning difficulties and pupils with specific learning difficulties (chapter 6)
- conclusions (chapter 7)

Each chapter is concluded with a summary of the main points and can be read independently of the other chapters. It should be noted that chapter 6 is treated in far less detail than the preceding chapters: the research brief only required existing reviews to be examined for pupils with moderate learning difficulties and pupils with specific learning difficulties - rather than reporting the original research studies themselves.

Chapter 2 - Pupils with hearing impairment

2.1 The nature of the population

This section of the review focuses on pupils with literacy difficulties associated with a severe to profound sensori-neural hearing impairment. Hearing loss is conventionally categorised according to better ear pure tone thresholds averaged over frequencies important for speech perception. However, these audiometric definitions have little functional meaning in terms of educational needs or strategies, and in a recent DfEE-commissioned review of the educational achievements of deaf children (Powers *et al.*, 1998) the degree of hearing loss itself was held *not* to correlate with educational achievement. Some children with profound hearing losses develop age-appropriate reading skills; many more do not.

Expectations for language development generally have changed in recent years for some children, irrespective of audiograms - for example, children can now be implanted with cochlear implants in early infancy, and there is increased technological skill in adjusting amplification to suit individual needs. Rather than focusing on pupils who fall into categories of hearing loss, a functional view is adopted in this chapter to include children whose hearing loss is implicated in immature language development (including reading and writing) and whose pace and competence in literacy-learning pose an exceptional challenge to both teachers and the pupils themselves.

2.2 Literacy difficulties for pupils with hearing impairment

Deafness does not impose a general intellectual deficiency and there is a consensus view that the reading difficulties of deaf individuals relate to the ways in which broader aspects of language are experienced and acquired. Researchers have tended to look to the auditory basis of language as the obvious source of difficulty for deaf children's encoding or decoding of print. It is important that reading and writing in the case of deaf children are understood in terms of language development *generally*, and not as discrete skills isolated from listening, speaking or the conceptual dimensions of language. While all children educated in oral teaching contexts acquire some knowledge of spoken language, there are very large differences amongst children in their ability to use residual hearing or lip-reading, so that some develop excellent speech and language while others do not.

It has been argued that use of sign language encourages deaf children to acquire a linguistic system earlier than their orally-educated peers, but a deaf child approaching reading with only sign language faces significant challenges. These children have to learn to process a printed code which has rules different from those of their first language: sign is a visually-based, not auditory-based, code, with a grammar different from that of written English. The picture is confounded because there is no clear relationship, as Powers *et al.* (1998) have recently concluded, between educational placement (and therefore mode of language instruction) and reading achievement, when other factors are taken into account.

In children with normal hearing we take for granted a rapid growth in vocabulary, language structure and experience, well before school entry and before reading is ever attempted. Very young children, through fluent aural-oral communication with their parents, readily symbolise and internalise auditory forms of their language experience and have explicit awareness of language structure, evidenced for example, in pre-school children's awareness of rhymes and sound-letter play. The component processes involved in reading are very complex, but include visual discrimination, sound-spelling correspondences, a store of vocabulary, knowledge of syntax, discourse and meaning. Questions remain about the order and interaction of these component skills in reading and whether children must develop proficiency in oral language before acquiring literacy, although it is now widely held that language acquisition and literacy learning occur simultaneously, reinforcing one another in development even if the levels of development are uneven at any one point. At one level, reading is a matter of acquiring the printed code for sounds, words and sentence patterns which are already familiar. Subsequently, literacy shapes children's problem-solving and self-organisation, but these higher levels of literate thinking are dependent on the early acquisition of spoken or conversational forms of language.

A severe hearing loss creates some formidable obstacles to language development. Children with hearing losses may have major problems in discriminating the auditory units of speech, be slow to acquire vocabulary or to achieve control over complex sentence structures, and have ongoing difficulties entering conversational interactions, all of which are necessary for communicative competence and for using language for critical and reflective thinking. What has come to prominence over the last twenty years of research is the potential isolation of the deaf child from meaningful interactive experiences with people as the result of the communication barriers imposed by deafness, and this has a highly significant impact in the early years. Deaf children thus approach reading and writing with two problems. First, they may never have met the printed symbols of the written code before; this is because early intervention is usually focused on oral or signed communication, with many teachers of the deaf advising parents not to introduce the child to print until a primary communication code is well established. Second, they may be unfamiliar with the sound units, words and sentence patterns the code represents. Hence learning to read becomes a language-learning process at one and the same time: an exercise in internalising aspects of oral language and also for representing the linguistic code in printed form.

Livingston (1997) outlines some of the differences in experience which are brought by deaf children to reading. In families where an oral approach is adopted it will take time before children learn to maximise their use of residual hearing and lip-reading. Since approximately 90% of deaf children are born to hearing parents who do not know how to sign, meaningful interaction may be limited in these family settings until a shared language and communication system is established. Depending on the extended family's communication skills, deaf children may have to cope with a range of very different and inconsistent ways in which language is presented in home, community and classroom contexts. The exception is in the case of deaf children born to deaf parents, where parent-child interactions will take place naturally through sign. Livingston (1997) argues that for most deaf children, everyday visual experience lacks the depth and sheer quantity of language representation which

hearing children are exposed to, through shared conversation, explanation or overhearing. Consequently, encounters with reading call for simultaneous 'knowledge creation' - discussing the significance and meaning of words - which alters the purpose and pace of reading.

Because the problem of reading development in deaf children is bound up with the quality and mode of language experience, debates about how to develop literacy skills in deaf education often distil to methods of intervening in primary aspects of communication, such as use of speech or sign.

2.3 Communication approaches in deaf education

There are three main approaches to the education of deaf children in the UK: oralism, total communication and sign-bilingualism.

2.3.1 Oralism

Oralism is based on English and excludes signs. Language is developed through use of residual hearing, use of amplification and lip-reading. The basic sound and linguistic structures of English are acquired through the medium of conversation prior to being encountered in reading. The oral/aural approach expects deaf children to learn to read through the same methods of instruction as hearing pupils.

2.3.2 Total communication

Total communication generally implies the use of a range of language modes (gesture, sign, finger-spelling, speech-reading, print). Sign Supported English is used to reflect English word order found in text and to indicate features such as tenses and plural endings. Manual codes based upon spoken English are not languages and they differ in terms of regularity and rule-governedness from English, but they were designed to reflect English syntax and permit simultaneous communication through signs and spoken English. Many parents and teachers find it difficult to use this approach and omit signs, markers and finger-spelled letters as they sign, leading to an incomplete representation of English. Literacy for pupils working within a total communication approach will be founded on a mixture of English or British Sign Language. Confusions may arise because of gaps, inconsistencies and omissions in the use of these codes (especially by hearing teachers) and the problems of their lack of correspondence with print.

2.3.3 Sign-bilingualism

Sign-bilingualism is an approach which uses both the sign language of the deaf community and the written/spoken language of the hearing community. British Sign Language (BSL) is taken to be the child's first language and oral English is taught as an additional or second language. Deaf instructors are sometimes employed as native users of BSL in families and schools and interpret from one language to another. Proponents of this approach argue that BSL forms the language base from which to develop literacy, utilising the child's knowledge of the world, vocabulary and story structure to map on to written English. BSL is a visual-gestural language governed

by rules, which uses visual and spatial representations of meaning. Modulations of movement, for example, constitute grammatical inflections. Whilst BSL has been influenced by English (eg, borrowing through finger spelling), the grammar of BSL is different from written English so that simultaneous communication in BSL and spoken English is extremely difficult. Children who use sign may gain no useful information from speech (or even be aware of it). Consequently, they may find learning to read through a speech-based code (such as phonics) extremely confusing. Other approaches, more sensitive to the way in which they communicate via sign, may have to be taken in order to develop their literacy skills. The literacy curriculum within sign-bilingualism reflects elements of deaf meaning-making, and children learn to read in ways which are different from those used by hearing pupils.

2.4 Expectations of literacy levels for deaf pupils

In a major study of a cohort of school leavers who were deaf, Conrad (1979) argued that the median reading age of deaf pupils was nine years. Effective routes to raising reading achievements in deaf children have been difficult to locate. Hence claims made over the last 20 years for the low reading levels typical of deaf school leavers remain largely uncountered (King and Quigley, 1985; Webster, 1986; Wood *et al.*, 1986). Conrad's data were collected at a time when educational approaches to deaf children were based largely on oralism and sign language was rarely used. Although there has been a shift in emphasis, with more extensive use of signing in schools and with some local education authorities adopting bilingual approaches, increasing advances in technology and cochlear implants, together with inclusive education policies, have led to a continuation of oral language supremacy in the UK education context. Proponents of natural auralism both in the UK and USA make the case that children exposed to these programmes make better literacy progress as a function of their overall raised achievements in language, learning and self-image (Lewis, 1996; Geers and Moog, 1989a and b; Simpson *et al.*, 1992).

The educational achievements of deaf children and young people were recently surveyed in a DfEE-commissioned review of research carried out by Powers *et al.* (1998). This report looks at indicators of educational achievement (spoken language, writing, reading, numeracy, social skills) together with factors affecting achievement. Over 300 studies were scrutinised from the literature, covering the period between 1980 and 1998 in mainly USA and UK contexts. In relation to literacy, this survey concludes that there has been no overall improvement in the achievement of deaf pupils since Conrad's (1979) survey. Deaf learners generally lag several years behind hearing learners in their reading, with a few exceptional children achieving levels commensurate with peers. Neither degree of hearing loss nor educational approach adopted predict reading performance, although deaf children in deaf families tend to have higher achievements. Tests of reading skill generally assess text cues involved in reading, whilst no measures exist for assessing literacy within bilingual approaches. Assessments of writing performance are scarce and generally reflect understanding of English grammatical structures. Appropriate attainment tests for deaf children have yet to be developed. Deaf pupils achieving highly in language or literacy cannot easily be accounted for in terms of degree of hearing loss, communication approach, type of placement or degree of inclusion.

2.5 Practical approaches to teaching literacy for pupils with a hearing impairment: implications for practice

In the literature which exists there are four main categories of information available with regard to literacy teaching:

- descriptive research on current practice, eg, survey studies of methods in use across schools;
- experimental research on aspects of deaf children's cognitive or linguistic functioning used to support specific kinds of intervention, eg, data on deaf children's word-processing ('bottom-up' skills) are used to justify a compensatory approach to teaching active comprehension ('top-down' skills);
- descriptive polemic prescriptions of approaches or techniques, eg, based on single case studies with weak evidence;
- experimental research on the efficacy of specific interventions, eg, outcome studies where the performance of pupils exposed to certain teaching intervention are compared with that of an untreated group or hearing controls; the cause of any apparent effect will be hard to identify.

Descriptive surveys of intervention approaches in the literature usually refer to general approaches to teaching or communication, such as the influence of natural auralism, BSL/ASL, sign-bilingualism or whole language approaches on literacy achievement (Lewis, 1998; Swanwick, 1998). Several surveys have pursued children over time in one cultural context, such as Sweden (Heiling, 1995), comparing children's achievements with cohorts from earlier time periods. Examples include 'look and sign' approaches to reading, 'natural' reading instruction, use of graphic signs or colour-cueing of syntactic rules (Evans and Edwards, 1987; Wilson and Hyde, 1997).

Some experimental or quasi-experimental research which has isolated aspects of deaf children's cognitive functioning, such as working memory capacity, subsequently using the data to support particular instructional practices (Kelly, 1995; King and Quigley, 1985). Many studies attempt to identify deaf children's deficits or differences compared with hearing controls, for example, in relying on direct lexical access rather than using phonological cues in word recognition, or the use of metacognition (Burden and Campbell, 1994; Harris and Beech, 1997; Andrews and Mason, 1991). Examples of this approach are component skills analyses of language and memory skills brought to reading by deaf children and then compared with hearing peers (Waters and Doehring, 1990).

Manipulations of text-based variables, such as deaf children's ability to deal with the phonological/orthographic structures of sight vocabulary, lexical-decision making, control of syntax or text structure, fall into this category (Merrills *et al.*, 1994). Findings from psychological or linguistics research have been used as a basis for recommendations to teachers about what they *should* do to raise language and literacy performance, without evaluating the efficacy of the interventions *per se* (Cerra *et al.*, 1997).

Much of the professional literature takes the form of polemic: largely unsubstantiated arguments proposing methods of intervention on the basis of the successful experiences of one teacher or school (Banks *et al.*, 1991b; Moore, 1987; VonTechner *et al.*, 1997). Examples include reports of how best to interpret text with children using sign for explicitness, reiteration of meanings and the provision of background knowledge, drawn from teachers' case material (Livingston, 1997). Many of the strategies for teaching active comprehension were developed with very small numbers of children in a particular school setting, with little attention to how well they can be delivered by other teachers in other contexts to similar effect (Luetke-Stahlman *et al.*, 1996; Strassman, 1997). In this category of information, practice is typically supported by 'soft' evidence (Soederbergh, 1985: 'all the children became avid readers...') and, while the literature helps to share new ideas amongst professionals looking for practical solutions (Watson, 1999), more rigorous evidence is required before the precise effects of specific literacy interventions can be determined and reproduced by other teachers.

The major weakness in the literature concerning education and deaf pupils is that very little systematic attention has been paid to the question of how teachers actually work with children in the classroom, and the relative achievements of children exposed to one specific form of intervention rather than another. Few attempts have been made to look systematically at how deaf children are taught to read, and few evaluations have been carried out to demonstrate the effectiveness of specific methods of literacy teaching. Existing studies are mostly with small samples from which it is impossible to generalise. In the extensive reviews of literacy teaching methods provided by King and Quigley (1985) or Paul (1997) only a handful of investigations of literacy teaching techniques are described whilst most proposals for instructional methods 'are not supported by research' (Paul, 1997, p76).

The few classroom observation studies which have been reported in the literature have shown a clear relationship between factors in reading environments and children's learning, such as the degree of control and direction exercised by adults on the initiative and engagement of deaf children with texts (Wood *et al.*, 1986; Webster and Wood, 1989; Webster, 1986). Some promising areas of research on the reading performance of deaf children have examined the impact of deaf adults compared with hearing teachers (Andrews and Zmijewski, 1997; Schleper, 1995; Webster and Heinemann-Gosschalk, forthcoming; Wood *et al.*, 1986). These studies suggests that reading sessions with teachers of deaf pupils are characterised by:

- work on grammar, pronunciation and vocabulary building;
- high levels of control in relation to the text and reading activity;
- many closed or display questions;
- the teacher's improvement or correction of the child's language;
- testing of comprehension.

In contrast, deaf adults working with deaf children:

- are more in tune with deaf children's eye glances, facial expression and communicative intention;
- create more opportunities for deaf pupils to exercise choice and initiative, and to ask questions;
- illustrate meaning with gestures and signs;
- have special strategies such as signing on the page, or amplified signs;
- assist the emerging construction of the meaning of text.

Studies have thus shown that deaf adults are more effective in supporting the child's meaning making because they share the child's language and perspective.

Several studies have focused on reader-based strategies for comprehending text, such as the use of story schemata or cloze inferencing techniques, with measurably improved outcomes for experimental groups compared with previous performance or non-treated subjects (Andrews and Mason, 1991; Banks *et al.*, 1991b; Cumming *et al.*, 1985; Yoshinago-Itano and Downey, 1996). However, there is no empirical evidence for the long-term impact of these effects and the amount of generalisation from one text to another, or one setting to another (Strassman, 1997).

2.5.1 Routes to acquiring literacy

There are two main thrusts in literacy research in the field of deafness. One is focused on models constructed around the unique learning characteristics of deaf individuals. The other is focused on the similarities between literacy development in hearing and deaf children, and utilises existing strategies devised for hearing groups. The first approach ('literacy different') includes strategies for by-passing areas of literacy development which are inherently problematic, such as the grapheme-phoneme correspondences which are taught to young hearing children as part of their word attack skills and which would be hard to access for deaf children whose preferred language mode is sign. To compensate, deaf students would be taught whole-word recognition skills and more active text comprehension strategies.

The second approach to literacy intervention can be described as 'literacy same' whereby reading and writing processes in deaf children are understood and approached through resources and activities which have been shown to be effective for hearing children. For example, in many mainstream pre-school contexts, reading is introduced via personal, meaningful and purposeful exposure to print-rich environments, including story reading and making, with these literacy events closely integrated with children's verbal language development. These ideas have now been applied to early intervention with deaf children in family and school contexts (Soederberg, 1985; Williams, 1994; Williams and McLean, 1997).

Another field of research draws attention to factors in the instructional context, such as time spent by teachers on literacy (Limbrick *et al.*, 1992) or the difficulties which hearing adults may face in interacting with deaf pupils around text (Bishop and Gregory, 1985; Wood *et al.*, 1986; Webster, 1986; Webster and Wood, 1989). If teachers find it difficult to engage with deaf pupils reading, they build discourse frames around text which are high in management and control, and the emphasis in

reading sessions shifts to children determining mainly what the adult, rather than the text, conveys. Literate deaf adults may be more responsive to the deaf child's attention focus, gestures and communicative intentions and facilitate the construction of meaning from text (Lartz and Lestina, 1995; Schleper, 1995; Webster and Heinemann-Gosschalk, forthcoming).

2.5.2 Literacy achievement

Much of the published research literature stressed that most children with severe to profound hearing losses do not reach functional language or literacy levels and, apart from a few exceptional children, low achievement levels have persisted over decades of research (Powers *et al.*, 1998). There may well be some children in the future who will benefit markedly from new medical or audiological interventions (more effective early screening, cochlear implantation, hearing aid technology) and achieve oral language skills sufficient to support literacy teaching based on existing good practice with hearing children (Watson, 1999). For the present time, the issue of what is *teachable* to deaf children is the key to raising achievement.

All of the published comprehensive reviews of existing research, such as Paul (1997, 1998) or King and Quigley (1985), conclude that there is no single solution, strategy or method which is guaranteed to improve literacy competence in all deaf children. Individual learning needs must be assessed and responded to.

Skill in phonics is not synonymous with reading. Some children labour so long and hard at decoding by phonics that they are prevented from grasping the meaning of words and sentences, while others master the skill of converting text to speech but still have little comprehension. Furthermore, there are many other aspects of skilled reading and writing and thus *any approach* which enables children to build large reading vocabularies is important. If children with severe hearing impairments are able to use their residual hearing to utilise some elements of a phonic approach, then this could be included. If the child's hearing loss precludes this kind of structural auditory analysis of word features, then the teachability question arises in relation to these component skills.

2.5.3 Early language and literacy

Until recently there was little research on deaf children's early literacy learning, partly because of a general belief that verbal language precedes, and is a pre-requisite for, written language development. Stimulated by emergent literacy research in hearing children, research has now shown that the delayed language acquisition of most deaf children does not prevent them from taking part in everyday literacy events, and using written language meaningfully (Williams, 1994).

In the early years, literacy is often defined as socially-constructed through interaction with others in everyday purposeful contexts - eg. writing shopping lists, bills, postcards, memos. Some writers (Soederbergh, 1985) have applied these ideas to the whole-language experience of young deaf children, such as tying written language to referents in immediate experience (food words accompanying food) or to encapsulate incidents (visits, play episodes, family events). Research indicates that the language

and literacy worlds of young deaf children are probably much more diverse than hearing peers (Williams, 1994). Young deaf children frequently have to communicate in different modes (eg sign language one moment, oral language another) according to the particular contexts. Furthermore, the people with whom they are communicating will themselves have different levels of language competence: some may make it easier than others for the young deaf child to understand what they are communicating and will vary in the way in which they help the child to respond or initiate communication.

2.5.4 Story reading

Much of what has been found to be important in the early reading of hearing children is applicable to deaf children. Story reading provides an important opportunity for exploring story schema and therefore comprehension, concepts about print (eg, directionality, alphabet awareness, elements which hold meaning), as well as connecting texts to children's prior knowledge and experience (Banks *et al.*, 1989; Gillespie and Twardosz, 1997; Schleper, 1995; Williams, 1994; Williams and McLean, 1997). Research in hearing contexts has highlighted the importance of frequent 'read-aloud' experiences mediated through discussion and question-raising about books, with repeated experiences with the same text an important factor. Also significant is the teacher's ability to build bridges between events in texts and children's lives, in patterns such as 'text-to-life' or 'life-to-text' when extra-textual information is called on to make sense of stories (Cochran-Smith, 1984).

Limited observational research suggests that deaf children in oral and sign contexts do acquire knowledge of how books work and can use print as a vehicle for learning more about language and the world (Williams and McLean, 1997). However, because of the problems of constructing a shared language with other (hearing) family members, the majority of deaf children may not have the same opportunities to converse about picture books or to acquire the concepts and structure of stories (Andrews and Zmijewski, 1997). Access to story reading (frequency) and mediation of stories by adults are critical factors for both deaf and hearing children. Research shows that there are differences in the styles of parents and teachers in the way they read with deaf children, with teachers exerting more control over conversations and using the occasion to teach pronunciation, vocabulary or word meanings (Bishop and Gregory, 1985).

Teachers who are not proficient signers will be unable to mediate a story effectively for a deaf child whose first language is BSL (Webster and Heinemann-Gosschalk, forthcoming). Research on adults reading with deaf children indicates that deaf adults tackle this process differently from hearing parents or teachers. A unique set of strategies has been identified from observations of deaf mothers and adults (eg, sign placement, elaboration, clarification) which could be adopted by hearing teachers who are working in signing contexts. There are also some important implications from this research about the role of deaf adults in supporting literacy learning in school, particularly in bilingual approaches (Schleper, 1995; Lartz and Lestina, 1995).

Research on group story reading (Gillespie and Twardosz, 1997) suggests that this is not frequently observed in some schools for the deaf and may be difficult to manage

(eg, if one child's attention wanders, efforts to re-engage may disrupt the whole group). However, this study shows that frequent story reading sessions can increase deaf children's interest, engagement and independence in story reading. With children coming to reading from a sign language foundation, the specialist skills required to interact effectively with children around stories suggests that these episodes cannot be easily integrated into group arrangements for teaching literacy in mainstream school contexts.

2.5.5 Teaching word level skills

A great deal of the published research has focused on the processing strategies of deaf compared with hearing children at word level, sometimes referred to as 'bottom-up' processing, and including skills associated with decoding words from orthographic or phonological features (Burden and Campbell, 1994; Harris and Beech, 1997; Merrills *et al.*, 1994). Debate in mainstream hearing contexts has often centred on the use of whole-word approaches versus decoding (grapheme-phoneme correspondences). Since word recognition is central to the reading process 'any technique that enables children to build a large reading vocabulary is important' (Paul, 1997, p 77), and whilst children with adequate word recognition may have comprehension problems, the reverse virtually never occurs (Stanovich, 1991).

A body of research shows that many deaf children are much more sensitive to the orthographic (visual) rather than the auditory features of words (Burden and Campbell, 1994; Merrills *et al.*, 1994; Sutcliffe *et al.*, 1999; Waters and Doehring, 1990). Young deaf children typically develop sight vocabulary without phonological mediation ('hearing' the word in their minds) and this is the case whether children are from oral or sign contexts (Harris and Beech, 1997). Whilst 'bottom-up' processing of text (working from the word) does distinguish between good and poor readers among deaf pupils, it remains the case that both skilled and average readers who are deaf tend to be better at 'top-down' processing (anticipating what the text is going to say) (Kelly, 1995).

Whether activities involving manipulation of the sound patterns of words can be meaningful to deaf children will need to be determined in relation to the particular children involved and their use of residual hearing, but the teachability of these components cannot be assumed. In any case, as has been pointed out, phonics is simply one route to word recognition. One line of investigation has tried to enhance deaf children's written vocabulary learning by using graphic signs with pictures and then print, in order to bridge between the signs children use to communicate and text (Evans and Edwards, 1987; Wilson and Hyde, 1997), but the problem of bridging between sign systems and text is highlighted when complex written sentence structures are processed.

Bi-lingual educational approaches argue that the most appropriate route involves using the deaf child's skills in sign language as a basis for developing literacy in the second language of written English (Swanwick, 1998). Because there is no straightforward transfer between BSL and the linear sequences of written English, children have to be made aware of the features of both BSL and English which map on to one another. Much can be learned here from the discourse frames which deaf

adults build with deaf children around text, such as interpreting text for explicitness, reiterating meanings, relating to children's experiences (Livingston, 1997; Webster and Heinemann-Gosschalk, forthcoming).

2.5.6 Comprehension and instruction

There is a growing evidence base for deaf education which relates to strategies for teaching comprehension, for strengthening what deaf children are already inclined to attempt: the utilising of information from outside the text (word knowledge, story schemata) in order to comprehend meaning (Webster, 1986; Webster, 1988).

Research findings support the idea that teachers should spend more classroom time on active problem-solving in relation to text (Andrews and Mason, 1991; Strassman, 1997). Partly, these strategies derive from the well-established finding that modified text materials (simplifying vocabulary, syntax or layout) actually render texts more difficult to read for many children because additional information is removed in the process (Cumming *et al.*, 1985). The comprehension of authentic, unmodified texts can be supported through a number of teaching techniques, including the activation of prior knowledge (discussion of what children already know about texts), predicting events, semantic mapping (diagrammatic representations), use of story-structure (Banks *et al.*, 1989; Banks *et al.*, 1991; Cerra *et al.*, 1997; Moore, 1987).

Metacognitive strategies have also figured in a number of investigations of deaf children's comprehension during reading. Metacognition is used to self-monitor passage comprehension and repair strategies when comprehension breaks down. The direct teaching of metacognitive strategies (making inferences, identifying mood or genre, awareness of story sequence and text cohesion) is heavily dependent on pupils having access to a sophisticated shared language for classroom discourse with teachers. Metacognition in deaf children develops alongside increasing maturity in using language generally and the stages through which these processes unfold have been documented, with story grammar the latest to emerge but directly related to reading comprehension (Yoshinaga-Itana and Downey, 1996). Although limited in scope, research indicates the importance of thinking through the relevance, purpose and structure of texts, using techniques such as mental imagery (Strassman, 1997; Andrews and Mason, 1991).

2.5.7 Spelling

Spelling is not held to be a particular problem for deaf children, relative to other language and learning needs and the stages of spelling competence parallel those of hearing pupils (Dodd, 1980). However, because of their predominantly visuo-spatial strategy, deaf children construct spellings from the cues they access (sign, finger spelling, visual shapes), and their attention to visual patterns aligns them with good spellers generally (Mayer and Moskos, 1998; Wimisner and Arnold, 1986; Sutcliffe *et al.*, 1999). The relative effectiveness of different teaching approaches to spelling have not been systematically evaluated in relation to deaf children. However, it can be assumed that methods of highlighting the orthographic features of words, are more effective than a focus on phonetic aspects in enhancing spelling in deaf children.

2.5.8 Writing

A number of research studies have examined models for the explicit teaching of writing processes with deaf students. It is argued that teachers often pay attention to the surface features or products of deaf pupils' writing (grammar, spelling, punctuation) but do not follow consistent strategies for the teaching of writing processes (Kluwin and Kelly, 1992; Luckner and Isaacson, 1990).

A very limited number of programmes for the teaching of writing have been subject to quasi-experimental evaluation, but the evidence does suggest that some form of structured process approach (pre-writing discussion, brainstorming, paired writing, analysis of text structures, preparing content maps, revising, editing, reviewing, proof-reading, peer-evaluation, preserving, publishing) improves the quality, complexity and organisation of deaf students' writing. Empirical evidence to determine the effectiveness of contrasting approaches to teaching writing, which processes should be prioritised, and the main elements which need to be preserved when programmes are replicated, is absent from the literature in the main.

2.5.9 Emerging practice

there may be some severely deaf children in the future who will benefit markedly from new medical or audiological interventions (cochlear implants, hearing aid technology) and achieve sufficient oral language to support literacy teaching based on good practice with hearing children such as phonics

deaf pupils whose first language is sign may have hearing losses which preclude the auditory analysis of sounds in words required by phonics; to compensate, deaf pupils can be taught whole word recognition skills, story schemata, active text comprehension and metacognitive strategies, all of which are promising areas for future development (but it should be noted that these have emerged from the research literature)

research on the instructional context represents best emerging practice - in particular, ways in which hearing and deaf adults build discourse frames with deaf children around texts in order to enable the child to construct meaning.

2.6 Summary: literacy and pupils with hearing impairments

The literacy difficulties of pupils with severe to profound sensori-neural hearing impairment arise from their general experience of language rather than from any cognitive impairment. Furthermore, individuals' achievement in literacy is not associated with audiometric assessment readings or degree of hearing loss: rather, in other background characteristics such as ability to use residual hearing or lip read, or the structure and nature of the language experiences to which they are exposed. It is thus important that the development of reading and writing for deaf pupils is seen in the context of language development generally, rather than in terms of discrete, isolated skills.

The foundations of a deaf child's language acquisition will be laid by, first, early years' experiences and, second, by his/her educational placement, which affects mode of instruction (one approach uses the same method of instruction as for hearing pupils; another disregards strategies which are problematic for deaf pupils and focuses on strategies which are more productive). There is no clear relationship between educational placement, teaching approach and reading achievement although deaf children who have deaf parents tend to achieve more, suggesting that the interaction of the deaf adult and the deaf child is significant. This is borne out by other studies which show that deaf teachers are more effective in supporting the meaning-making of deaf pupils in the classroom. Deaf pupils tend to be several years behind their hearing peers in reading scores, though it is argued that there are flaws in methods of assessment.

Very little is known about effective classroom approaches: studies have tended to be small-scale, often single cases with poor evidence and little attention has been paid to the detail of how teachers work with deaf pupils in the classroom. This is a major weakness of the literature given that there is consensus that no single approach works equally well with all pupils: it is essential that a pupil's individual learning preferences and mode of communication are identified and assessed and an individual programme of interaction designed based on these. If, for example, children with hearing impairment are able to use residual hearing, then a phonics approach would be appropriate although both skilled and average readers who are deaf tend to be better at 'top-down' processing - anticipating what the text is going to say. Much that has been found to be effective in developing reading in hearing children is applicable to deaf children: for example, frequent story-reading, particularly where there are opportunities to talk about the stories or pictures (something that is often neglected for deaf children), predicting events, and the activation of prior knowledge. If a child is using sign, a language in its own right, then the particular features of British Sign Language and English which map on to each other have to be made explicit.

Spelling is not, in general, particularly problematic for deaf children, relative to other literacy needs, but methods of highlighting the orthographic features of words are more effective than a focus on phonetic aspects. As regards writing, there is evidence that a structured approach improves the quality, complexity and organisation of deaf students' writing.

Chapter 3 - Pupils with visual impairment

3.1 The nature of the population

This chapter of the review considers pupils who may require braille, large print or tape in order to become literate. It does not include those children with additional learning difficulties who use other means of communication such as objects of reference instead of a written or tactile code (who are included within chapter 4 on pupils with severe and profound and multiple learning difficulties), intervention by means of signing or sign language (who are included within the previous chapter on pupils with hearing impairment). It does not include those children who may use Moon - a recent RNIB study estimated that there were only 50 pupils using Moon (Clunies-Ross and Kiel, 1999). (Moon uses small raised configurations which are based on simplified capital print letters, are larger overall than Braille and are composed of combination of lines, curves and dots; they are relatively easy to discriminate from each other so tactual acuity is not a major limitation. Some people who are visually impaired in adulthood (and thus know print) learn Moon before progressing to Braille but the overall number of users is small and it has not become an international system as has Braille.)

The same RNIB study estimated that the incidence rate for visually impaired children is 2.3 per 1,000 children nationally, with local variations above and below this figure. Within this population, more than one child in three is identified as multi-disabled visually impaired. Total figures suggest that there are some 10,500 children of statutory school age who have a visual impairment that impacts upon their learning; approximately 60% of these were, in 1997, educated within mainstream schools.

The RNIB data show that each year-cohort of children in the UK is likely to include some 70 children who use Braille as their main means of written communication; thus some 850 children between the ages of 4 and 16 will require Braille materials to support their learning. The remainder, and the majority, of visually impaired children still use print as their main medium for literacy. The style of print and means of access to it will again vary according to individual needs. It is also not unusual for a pupil to require several different media in order to access learning materials and to become literate. For example, a child may find it useful to use a mix of Braille and tape, or Braille and large print, or perhaps all three in the process of learning, reading, recording and revising work.

3.2 Literacy difficulties for pupils with a visual impairment

Stratton and Wright (1991) review the literature on the development of literacy in young visually impaired children. This highlights a number of specific key factors.

The development of literacy in young children is a gradual process interrelated with development and involves reading aloud to children, language development, first hand experiences, concept development and enjoyable experiences with books. The literature suggests the importance of the following for young pupils with a visual impairment:

- first hand experiences;

- the development of hand skills, especially for those who will be learning through the medium of Braille;
- the use of language to extend experiences and to increase the pupils' knowledge and concept development;
- asking questions for information (the need for information not available to children through vision is suggested as a probable reason for visually impaired children asking rather more questions than sighted children);
- reading aloud to children (the critical factor is selecting stories where the meaning is conveyed through text rather than pictures e.g. poetry, nursery rhymes and stories with predictable sections and repetition passages where the child can join in with the reader);
- the addition of tactile information to enhance the child's enjoyment of stories;
- development of an awareness of print or Braille to lay the foundations for literacy (children can come to realise that a story is being read from a print or Braille resource, perhaps turning the pages as the adult is reading);
- scribbling or making some connection between reading and writing (there is little or no research to indicate how this understanding and link is made by a visually impaired child using Braille).

The authors point out that more research is needed on how the link between listening to stories and awareness of Braille is made; they conclude by outlining a project in the USA which assists the emergent literacy of children with visual impairment by including tactile information alongside the Braille or printed word.

3.3 Communication approaches for pupils with visual impairment

Whilst teachers of sighted children have used a range of approaches to literacy, those teaching blind children have largely followed traditional approaches to the teaching of Braille with the adoption of graduated readers with a strong phonic emphasis and carefully controlled vocabulary and the use of contractions from the start. As regards the latter, there is some evidence that contractions make Braille learning more difficult (Dodd and Conn, 2000). Braille in the UK has not traditionally used capital letters. Relatively little attention has been given until very recently to the requirements of visually impaired children who require large print.

In the USA meanwhile, approaches have been more varied as braillists have been integrated in mainstream schools for rather longer than in the UK, joining in-class literacy activities. However, there is a lack of research on the literacy of children using Braille and large print, and technological means to access both of these media (Rex, 1992). Relevant texts, largely prescriptive and based on practitioner knowledge, include Tobin's (1993) overview of the educational implications of visual impairment, in which literacy in general and the acquisition of meaning in language, spelling, information processing and reading rates are considered as areas where the impairment exerts an impact; and research by Chapman and Stone (1988) on the effect of visual impairment on the development of children's literacy and strategies to enhance children's participation in literacy activities within the classroom.

Best (1992) draws attention to the need to include tactile as well as listening skills in order to equip visually impaired children with the literacy skills to access information that other children might gain through vision, while Mason (1995) stresses the impact of visual impairment on learning development and language, noting the importance of listening skills, Braille teaching, reading and handwriting as components of literacy.

Miller (1996) focuses upon and emphasises the importance of finding a suitable method of communication for a child who is visually impaired, exploring Braille, print and the use of listening skills and technology.

3.3.1 Language

In other sections, the relationship between language/communication and literacy has been noted. Opportunities to assess a pupil's conceptual understanding are essential in order to identify the blind pupil who may use language inaccurately and thereby appear, by his/her expressive language, to have a greater or lesser understanding of a given situation than is the case (Tobin, 1992). Webster and Roe (1998) apply current theories in the study of the acquisition of language to the life and learning of young visually impaired children.

3.3.2 Medium

Practice regarding medium is being challenged in the light of advances in technology which enable a visually impaired reader to access material through visual, tactile and auditory means. Jennings (1999) addresses the print-Braille debate and advocates a flexible approach to literacy that values different models equally and encourages pupils to see the fun, and not merely the function, of reading and writing, acknowledging the extra demands on human and financial resources. It is important to allow sufficient time for a preferred sensory channel to become evident for a particular pupil (Koenig and Holbrook, 1991). However, there is evidence that the rationale for decision-making about this is complex and many be unsystematic. Teachers studied by Craig (1997) made decisions according to criteria such as visual prognosis, tactile efficiency, portability of medium, reading rate, accuracy and fatigue.

The work of Craig *et al.* (1997) also suggests that medium affects the acquisition of literacy, with research in the US indicating that teachers' attitudes towards Braille are positive and there is no perceived decline in the use of this medium by blind children. In the UK, the use of capital letters in Braille has not been usual; the debate continues over their introduction (Poole, 1996a, 1996b). Research indicates that the likely outcome from the introduction of capital letters is slightly reduced reading speed of those using Braille (Shipway, 1999).

3.3.3 Print: Size and Contrast

Large print (i.e. 16 to 24 point print size) is not necessarily ideal for a partially sighted student and does not necessarily improve reading skills (Koenig *et al.*, 1992). Following case study work on oral reading rates and miscues, Koenig and Ross (1991) found that in most cases students accessed material most satisfactorily using Low Vision Aids (LVA) with ordinary typeface. Proper mastery of the skills in using LVAs was essential but once this had been achieved, students had more positive feelings about themselves and their own literacy if they were in a position to use regular print, accessed by Low Vision Aids.

When low vision devices are integrated into the ordinary working life of the student, they provide visually impaired students with a means of gaining access independently to the vast amount of printed information in both school and society at large and thereby a means of attaining functional literacy. This has the potential to lay the foundation for self-confidence in meeting the demands of the learning, social and work environments (Koenig *et al.*, 1992).

All children share the same need for an imaginatively written and well designed reading scheme but partially sighted children will have additional requirements. Features such as print contrast, glossy and matt paper, the range of print style and boldness, layout in terms of margins, spacing, line length and the need for an imaginative plot to maintain interest, together with a suitable vocabulary, are all factors to be borne in mind when selecting a reading scheme (Davies, 1989; Buultjens *et al.* 1999). These features have been found to be critical to making a book clear and easy to read for children who are visually impaired print readers (RNIB, 1999): contrast, type size and weight, line length, spacing, use of capital letters, paper and page design.

3.4 Practical approaches to teaching visually impaired pupils

As well as cognitive ability, language experience and a basic awareness of phonics, a touch reader will require physical control and fine motor skills to track a line of dots and to hold arms and fingers in a steady position, as well as a high level of tactual discrimination in order to distinguish the raised dots of the Braille cell (Stone, 1995). Stone refers to the ongoing debate over whether to teach Grade 2 contracted Braille from the start, enabling children to develop a touch vocabulary quickly, or to establish Grade 1 first and develop the child's vocabulary and then help the child to learn new reading skills for Grade 2. Teachers are reminded that teaching of Braille needs to be continued long after the basic mechanical skills are mastered, in order to improve speed, fluency and comprehension.

Lamb (1996) describes a whole learning approach to teaching reading and writing and applies this to Braille, presenting examples of activities that integrate critical components of literacy learning with the special skills necessary for touch reading. Lamb sees literacy as an extension of oral language learning for all children, within the whole context of sentences, words and letters. Pre-requisites are the mastery of oral language, especially receptive language, the conceptual framework to deal with text messages and immersion in everyday experiences of oral and written language.

The strategy involves enjoyment in learning Braille and working with the text interactively to achieve this. Published texts, children's writing and dictated stories can be used to capture the child's interest.

3.4.1 Standards, Speed, Accuracy and Comprehension

Lorimer (1990) describes an experiment in two UK special schools for pupils with visual impairment where rapid reading techniques were taught systematically: these had a positive effect, resulting in increased reading speeds among brailleists. Lorimer concludes that the systematic teaching of reading and practical instruction should continue after the Braille code has been mastered. In a further study, Lorimer (1994) explores the cognitive and perceptual difficulties and their impact upon the reading speed of Braille readers in a useful account designed for teachers and teachers in training. She refers to Ashcroft's study (1961) of errors in oral reading, analysing the type, frequency and level of errors in children's oral reading. The study shows the order of frequency of various types of errors, noting that perceptual problems are sometimes due to the inability of the reader to suspend judgement or maintain an adequate attention span until the end of the word, phrase or sentence. Perceptual problems can also arise from confusion over the symbols that are mirror images of each other in Braille.

Lorimer (1994) also cites the study by Nolan and Kederis (1969) which revealed that as the time taken to recognise a whole Braille word was longer than the time it took to recognise all the individual letters within it, the Braille cell, rather than the whole word, represented the perceptual unit. Their findings suggest that a bias towards a phonic approach may be the best for Braille reading. (This was a US study where the word method was most widely used; this finding thus had a profound effect on the thinking about teaching methods for blind children in USA). Nolan and Kederis (1969) also commented on other critical elements such as the effect of length and familiarity of words on recognition, the use of context clues, the number of dots within a word, the number of dots within a cell in terms of the effect of this on character recognition, the effect of open space adjacent to Braille cells with greater concentration of dots, and the order of difficulty in the recognition of Braille configurations.

Braille is a relatively slow medium for gaining information compared with ink print, so a common focus of attention has been upon increasing the speed of blind students' reading (Lorimer, 1994). While producers of Braille have sought layout and spacing conventions that reduce the distance that fingers have to travel in order to gain information, researchers have concentrated on hand and finger techniques and redundancy within the Braille code. Lorimer (1994) refers to studies of speed reading in Braille in the mid 1970s and to the work of Olson in the 1970s and 1980s (Olson with Mangold, 1981) when she became convinced that the principles of rapid reading techniques employed with adults could be incorporated into beginning Braille activities with children. Olson suggests activities for the development of tactile perception and Braille letter recognition, ideas for the development of vocabulary and comprehension skills, and opportunities for remedial work.

Fast Braille readers are often slower in reading speeds than their sighted age peers: brailleists need to use Braille daily in order to build and maintain their reading speeds

(Trent and Truan, 1997). Early Braille instruction is associated with higher reading speeds in adults (Hill *et al.*, 1999) although there are still problems of maintaining the reading speeds required in mainstream classrooms with Braille readers of secondary school age.

The reading performance of 81 visually impaired nine-year-old children was tested in a study using word recognition tests and text reading tests (Fellenius, 1999). The children used regular, large print and Braille. Fellenius identified fatigue, a lower reading speed – therefore indicating that more time was required in order to complete the tests – and use of Low Vision Aids (LVAs) as key factors. Many visually impaired children achieved excellent comprehension when no time limits were set for the tests, but outcomes were poor when time was limited. Braille readers read sequentially and at a lower speed than other pupils. Braillists and users of large print had good comprehension but both required additional time in order to complete the reading tasks set. Fellenius concluded that teachers need to be aware of the demands that different reading tasks place on visually impaired children and to provide the right kind of support. Again, individual knowledge of each child's capabilities and needs is required to assist them in developing functional reading strategies for different reading tasks.

In an earlier study, Fellenius (1996) reports that a study of reading competence of 25 partially sighted pupils in Sweden found that pupils scoring high on verbal cognition tests had more interest in, and experience of, reading for leisure. They also exhibited better reading speed, fluency and retention than other pupils. She concludes that those with poor reading skills need to be helped to improve motivation as well as technical ability.

Whilst a phonics approach may be slower, it gives the partially sighted pupil skills for word attack, and encourages accuracy - rather than prediction - and careful reading of the text. There is evidence that it is more effective than a mixed mode such as 'look and say' (Corley and Pring, 1993a). Pupils benefit from daily individual reading tuition, particularly up until the age of 8.

Layton and Koenig (1998) studied four teenage students and revealed that repeated reading techniques improved the students' reading rates, error reduction, comprehension and fluency. Appropriate instruction, cognitive capacity and motivation were also all found to be important. Improvements in reading were noted within this study which, despite its limitations (only four students) suggested that the use of suitable reading material, mastery of basic skills and one-to-one teaching for designated blocks of time are necessary for improving and maintaining success in literacy for visually impaired pupils.

Braille readers may use clauses rather than sentences to integrate information and paragraphs may not be significant boundaries as they are in print (Carreiras and Alvarez, 1999).

3.4.2 Spelling

Issues of spelling for visually impaired children receive relatively little attention in recent literature but research suggests that, as with pupils with hearing impairment, spelling is not a particular issue.

Corley and Pring (1993b) assert that, after a slow start, partially sighted children attain the same spelling levels as their chronological age peers by the age of eight. Their research involved 11 partially sighted children whose results were comparable with 22 fully sighted age peers.

Arter and Mason (1994) explore a whole school approach, following work with 24 visually impaired pupils of primary age (some with learning difficulties) in a special school. From this small population, the authors recommend a multi-mode approach for partially sighted pupils, based on a model similar to the 'look, cover and write' approach, with the addition of children saying the word and tracing its pattern. For blind children who need to spell the word in full for typing but also learn Braille contractions, word signs and abbreviations, an auditory approach is advocated with reliance on rhyme and auditory memory, reinforced by tactile and kinaesthetic senses. An effective whole school approach may involve pupils working in groups and pairs as well as the more traditional teacher-directed word list approach.

In the USA Koenig and Ashcroft (1993) reported on spelling and orthographic errors amongst Braille writing. This quantitative study involved 83 adolescent participants. 17 year olds demonstrated better mastery of rules regarding Braille contractions than younger pupils aged 9 to 13. Word level errors fell into two main categories – non-use or inappropriate use of a contraction. Numbers of true spelling errors in Braille writing were comparable with those in print amongst the same age groups.

A Canadian study (Grenier and Giroux, 1997) of spelling competency of seven Braille students compared with a matched group of sighted students aged 15-17, revealed that blind students were found to be more competent in spelling and grammar than their sighted age peers. However, it should be noted that this research was conducted through the medium of the French language so may not be transferable to English even though it reinforces other findings.

3.4.3 Writing

Swenson (1991) describes a process approach to writing instruction where children write on topics of their own choice and where teachers are less concerned with the final product, spelling and grammar, than with children's involvement in the processes of writing such as drafting, revising and proof reading. Developing a feel for the rhythm and pattern of language is important to all young children and the author asserts that blind children need to have available as much material written in Braille as possible. Daily activities such as messages, lists, letters and homework charts, together with items such as birthday cards and cassette tape labels should all be written in Braille. The author concludes that this method of teaching writing leads to the development of positive attitudes towards writing and the mastering of spelling and the author strongly recommends this method of teaching writing to brailleists as it establishes a foundation for the development of future literacy skills.

Early intervention in the teaching of handwriting to pupils who are visually impaired is important (Arter *et al.*, 1996). Acknowledging that poor handwriting amongst partially sighted children can result from poor motor skills, visual factors or mechanical difficulties, the authors acknowledge that many partially sighted children are taught keyboarding skills as a matter of course from primary age. This facilitates children's ability to write as efficiently and clearly as possible. However, handwriting is a key component within the National Curriculum and the authors explore a number of key factors which serve to support visually impaired children's ability to write as legibly as possible e.g. lined paper, pens, correct grip, letter formation, the angle at which the paper is placed, styles of handwriting and the motor movements involved in learning to write by hand. The authors advocate an individual handwriting scheme for each partially sighted child.

3.4.4 Testing and Assessment

Assessment is important in that technical factors may intrude in the process of judging the progress in literacy of pupils with visual impairments. Duckworth (1993) describes the processes undertaken in planning and producing Braille and large print versions of the Stanford Achievement Test Battery; gives the rationale behind making specific changes; and addresses all the necessary procedures such as Braille transcription, proof reading and adapting the accompanying manual. Duckworth highlights the fact that very little research has been undertaken into the reasoning behind, and the subsequent effect of, omitting from Braille papers in maths, science and social studies certain items such as maps and diagrams. The article also refers to the production of the same test battery in a large print version at 18-point print size. It was recommended that students take 1.5 times the allocated time for ordinary print readers to complete the test.

In the UK, Greaney *et al.* (1994) describe the rationale and processes involved in developing a new test of children's Braille reading ability – the Neale Analysis of Reading Ability. This diagnostic test of prose reading ability yields measures of reading speed, accuracy and comprehension and was selected as one of the most widely used assessment tools in the UK. The authors outline key areas requiring careful consideration when transcribing such a test, including assessing comparative difficulties, the issue of capitalisation and the replacement of pictures.

Consideration of the effects of size, font and style for users of large print for examination purposes is important. Using a criterion-referenced approach rather than simply administering standardised reading ability tests to participants, Buultjens *et al.* (1999) involved students in the selection of preferences of specific print and font styles and sizes. This is a complex issue as students have individual needs and personal factors; in addition, the nature of the task in hand, and environmental factors, such as lighting, a quiet environment and appropriate amount of space, were also considered. The authors identify the students' slight overall preference for Helvetica N24 plain text but indicate that more research is needed into this area. A central message from this research was that no specific font, size, style or combination suits every person who has low vision. Ideally, each student should be presented with his/her optimum print characteristics for examination papers. The opportunities

afforded by recent advances in technology to address this are noted and the needs of individual students highlighted.

3.4.5 Technology

There is as yet relatively little available on the impact of technology on the literacy development of pupils with a visual impairment, although this is clearly a key area in terms of access to written material. It is touched on by Miller (1996) in terms of classroom practice.

Lodge (1999) explores literacy in terms of access to the written word in the context of the backlit environment. There are many access challenges which remain despite advances in technology but Lodge notes the differences between screen and paper in terms of reading, recording also the importance of speech access, and providing a useful outline of the current state of the art regarding access technology for visually impaired users. This is helpful to the non-specialist reader and the impact of technology upon literacy is noted indirectly.

Mason (1998) explored the use, relevance and application of specific low vision aids in the classroom setting. He gathered information from teachers, young people with a visual impairment and the young people's fully sighted friends about the reasons for the reluctance of some visually impaired children to use low vision aids to assist with literacy and other studies. Teachers referred to the normal peer pressure of wanting to be the same as everybody else, pupils' poor self-image, issues concerned with training in the use of low vision aids, and lack of awareness by peers, staff and parents. Issues of reassessment were also important, since the visual needs of a young person can change. The pupils themselves reported a number of reasons why they were reluctant to use low vision aids, including embarrassment and self-consciousness, problems associated with teasing, the fact that the LVA did not magnify a large enough area, that it made their eyes tired and the fact that the LVA slowed them down when copying from the board or was heavy to hold for a long time. Clearly there are many concerns about the physical and ergonomic problems arising from the usage of LVAs but also about teasing. Thus Mason concludes that awareness training may need to focus on peer group awareness, training in the use of LVAs and examination of the ergonomic aspects of low vision aids as well as assertiveness training for visually impaired children themselves and strategies to boost their self-esteem.

Criteria for the successful use of LVAs in the classroom were many and included personal judgements made by teachers about the pupils in the context of their schoolwork. However, there appears to be a need for a more structured approach to the use of LVAs which enables teachers to assess and plan for the use of low vision aids using 'observable, measurable competencies to teach the skills in a timely and developmentally appropriate manner'. Mason concludes that the competency-based approach has added advantages as it is possible to involve more people in the process, including visually impaired learners and their families.

A checklist for the individual skills identified is included within the document, with a reminder that any such checklist needs to be individualised and built into the pupil's programme in a way that enables demonstration of their progress. The study set out

to give staff and parents greater understanding of the role low vision aids can play both at school and at home in supporting a young person who is visually impaired to become more independent and self-sufficient, to be positive about themselves, to be ready for their next stage of education or work and to become skilled in self-advocacy and assertiveness.

A series of helpful appendices are included on school inservice training for staff with suggestions for areas to be covered, suggested competencies for using LVAs (adapted from Watson, 1989), suggested materials to use with peer groups for awareness training, an outline for low vision aids training record and training checklists for different types of low vision aids.

3.5 Summary: literacy and pupils with visual impairments

The development of literacy for pupils with visual impairment is closely related to their general development and experience of language: factors important for all beginning readers, such as first hand experiences of language in everyday use, concept development, enjoyable experiences with books are equally important for readers with a visual impairment. More specifically, the literature suggests that a critical factor in reading aloud to these pupils is selecting stories where the meaning is conveyed through text, rather than pictures, and that the addition of tactual information enhances children's enjoyment of stories. Opportunities to assess pupils' conceptual understanding are critical as blind pupils may use language inaccurately and thus give a false impression of understanding. The development of manual skills is also important for those who will be learning through the medium of Braille and tactile skills so that children can access information that other children gain through vision.

It is important to find a suitable method of communication for a child who is visually impaired and to allow time for preferences to develop, including the use of a combination of media. Technological advances are currently challenging practice regarding medium. The literature suggests that more research needs to be done into decision-making regarding the most effective medium for a visually impaired pupil. Moreover, it is important to remember that the needs and preferences of visually impaired pupils change and there should be regular opportunities for review. Work in the last decade has cast doubts on the value of large print and there is now evidence that low vision aids are more effective in giving pupils access to normal print in school and elsewhere and increases their self-confidence. Because pupils with visual impairments report bullying about their use of low vision aids, awareness training may need to focus on peer group awareness in addition to training in the use of the aids and assertiveness training for the visually impaired pupils, and consideration of ergonomic factors in the environment which may deter pupils from use of such aids.

Pupils who use Braille need regular, frequent and systematic teaching and practical instruction long after they have mastered the Braille code in order to improve and maintain reading speeds. Braille readers, regardless of ability, are slower readers than their sighted peers and teachers should be aware that they will need additional time to complete tasks involving reading and appropriate support to develop functional reading strategies. Poor readers will probably need to be motivated. There is

evidence that early Braille instruction helps later success in this medium. Paragraphs do not seem to be perceived as significant boundaries for brailleists as for print readers, and brailleists seem to use clauses rather than sentences to integrate information. However, more research is needed into how children become literate in Braille.

A phonics approach seems to be more effective for partially sighted readers than a 'look and say' approach.

Reading schemes used by pupils with visual impairments should have all the characteristics of those used by their sighted peers - such as an imaginative plot to maintain interest and a suitable vocabulary - but, in addition, attention should be paid to presentational factors such as print contrast, glossy/matt paper, range of print style and boldness, layout in terms of margins and spacing, and line length.

To improve writing, visually impaired pupils need to develop a feel for the rhythm and pattern of language and should have available as much material written in brailled as possible. Individual handwriting schemes are necessary to accommodate the needs and preferences of partially sighted pupils.

Spelling does not constitute a particular problem for visually impaired pupils and, after a slow start, partially sighted pupils achieve the same levels as sighted peers. A multi-mode approach (look, cover, write) seems to be effective for partially sighted pupils. For blind pupils who need to spell the word in full for typing but who also learn Braille contractions, word signs and abbreviations, an auditory approach is advocated, reinforced by tactile and kinaesthetic approaches.

Chapter 4 - Pupils with severe learning difficulties

4.1 Introduction

This section considers those pupils whose cognitive impairment affects their ability to acquire literacy skills to a significant degree - that is, those pupils who would be broadly classified as having severe learning difficulties. These pupils might be expected to be those working towards level 1 or up to level 3 of the National Curriculum for the whole of their school career.

Within this chapter there is a section on pupils with Down syndrome but it should be noted that only a proportion of these pupils will have severe learning difficulties; a range of ability is found in pupils with Down syndrome. Literacy and pupils with Down syndrome has been addressed in a separate section within this present chapter as there is a specific literature focused on this cohort. Pupils with profound and multiple learning difficulties are also considered within this chapter although it is acknowledged that this cohort may never be able to acquire mastery of text. Pupils with mild and moderate learning difficulties, and those with specific learning difficulties affecting literacy, who, combined, form the majority of pupils with special educational needs in mainstream schools, are the focus of chapter 6 which looks in less depth at the relevant literature, gathering evidence from reviews of the literature rather than from first-hand analysis of the literature itself.

As was pointed out in the opening section to this review, it is pupils with severe learning difficulties who have, arguably, been most affected by recent curriculum innovations. Thus there is current practice to be found in classrooms which is of considerable interest. However, this practice has not yet been consolidated in the literature by way of systematic research or evaluation studies. Thus those familiar with current practice may find a lack of reference to what they consider innovative practice. Reference is made to this practice in the following section, by way of context, but it should be treated with caution and taken merely as an indication of the way that current trends are moving and should be measured against the evidence which has been recorded in the literature commenting on earlier practice.

4.2 The nature of the population

Measured using the performance criteria provided by the DfEE (DfEE, 1998c) in support of school target setting, attainments for pupils with severe learning difficulties will typically fall in the range from P4 to P8. Children with severe learning difficulties may progress through a range of responses characterised by the performance criteria for levels P1 to P3 in the early years of life. Some students with severe learning difficulties make sufficient progress during the later years of their compulsory schooling for their attainments to be measured using the level descriptions for the early levels of the National Curriculum (DfE, 1995). It is not uncommon for students with severe learning difficulties to demonstrate this progress by undertaking adapted versions of Key Stage 1 assessment tasks and tests when they are, chronologically, in Key Stages 3 and 4, for example.

4.3 Literacy for pupils with severe learning difficulties

It has not proved easy, over recent years, to provide access to the literate world for pupils with severe learning difficulties. Possible reasons include:

- the lack of reading schemes which provide a carefully structured but extensive range of early reading experiences at appropriate levels of attainment;
- the lack of reading materials which engage early reading skills in contexts appropriate to older pupils;
- the problems which many pupils experience with the finely discriminated elements of motor co-ordination normally associated with handwriting;
- the problems which many pupils experience with conventional forms of speaking, listening and communication.

Factors like these may have contributed to the fact that teaching literacy skills has not, until recently, been perceived as a priority for students with severe learning difficulties (Kemp, 1996). This is reflected in the available literature. Kemp (1996) cites Bowder and Snell (1993) in support of her assertion that reading programmes for pupils with severe learning difficulties are more often related to functional, rather than general literacy, activities. The UK literature tends to support the view that literacy issues, where they have been considered at all in respect of pupils with severe learning difficulties, have, until relatively recently, tended to focus on functional applications of reading and writing. Hassell's (1990) contribution to *Special Children's* resource pack on reading, for example, emphasises a 'social sight vocabulary' which pupils can use in order to read 'for information' (the examples Hassell offers include identifying the contents of a tin of beans, finding out what is on television or scanning the menu for a take-away meal).

The 'notes on the education of mentally handicapped children' developed by the Staff of Rectory Paddock School (1981) include a section on reading. These materials emphasise that 'reading should be given a practical significance whenever possible' (examples such as reading recipes or bus timetables are given) and stress the notion of a 'functional sight' vocabulary of socially useful words which pupils could learn to recognise. Interestingly, the Rectory Paddock materials also note the use of early technological aids to support reading and the authors review the research on reading in mainstream schools. The materials suggest that the 'mentally handicapped child' (who would be recognised today as having severe learning difficulties) should be enabled:

'to make use of three types of information in the reading process: (1) the shapes of whole words, (2) a limited number of phonic cues to be used when a whole word is not recognised, and (3) information obtainable from the context' (p.42).

Van Oosterom's (1991) review of literacy for pupils with learning difficulties also notes the importance of 'functional literacy' and, like the Rectory Paddock materials, comments on the importance of mainstream approaches. Van Oosterom explores the relevance of a 'language experience' approach, building on pupils' own interests; the use of carefully structured 'developmental reading schemes'; and 'phonic' or

'synthetic' programmes based on learning letter sounds or blends. She goes on, however, to note developments in the uses of 'shared book experiences' or paired reading; diacritical marks (accents such as the cedilla or grave); extended alphabets; colour codings; or symbolic accentuation to support pupils' reading. She also makes reference to 'the use of pictorially based symbolic systems' or 'rebus' as developed by Woodcock *et al.* (1969) and explored in more detail by Devereux and van Oosterom (1984) and the Staff of Blythe School (1986).

Ackerman and Mount's (1991) work also brings together many of these themes. Their materials emphasise the importance of 'functional literacy', linked to life skills and vocational activities, for senior pupils. For teaching reading, they stress the importance of using 'real' books and developing 'home-made' books focusing on specific pupils' own interests and activities, possibly at least partly because of the lack of any commercial schemes designed for the needs of readers with severe learning difficulties. Ackerman and Mount (1991) discuss the relevance of purposeful scribble and early drawing to the emergence of handwriting and emphasise the role of information and communication technology in supporting children experiencing difficulties with literacy tasks. *Literacy for All* (Ackerman and Mount, 1991), based on practice regarded at the time as innovative, focuses significantly on the importance of concept keyboards, touch screens, tactile cues, signs and symbols in developing a 'whole language' approach to the creation of a 'literate environment' in schools for pupils with severe learning difficulties. Ackerman and Mount stress perceived links between communication and literacy.

Other commentators regard the teaching of English as a subject to pupils with severe learning difficulties as being essentially concerned with the development of communication or speaking and listening skills. Hinchcliffe's (1996) contribution focuses on using drama to promote communication skills. Where authors do make reference to literacy skills, they are often seen as ways of facilitating communication (see, for example, Duffen, 1976) even though the evidence for this relationship is acknowledged as being anecdotal or correlational (Kemp, 1996). Many authors view communication for pupils with severe learning difficulties as an over-arching priority and subsume all aspects of the teaching of English beneath it. Fergusson (1994), for example, describes a 'total communication environment' in which various forms of communication co-exist alongside the use of photographs and rebus symbols on a 'communication continuum' which is seen as 'leading finally to the written word'.

The National Curriculum Council's (1992) own work on teaching English in the National Curriculum to pupils with severe learning difficulties provides guidance under attainment target sub-headings but also adopts a total communication environment approach to the use of signs, symbols, and information and communication technology in support of pupils' reading and writing. Developments since 1992 have built upon these multi-modal initiatives and a review of the literature suggests that practitioners have been experimenting with an eclectic range of approaches in the absence of any authoritative, research-driven guidance.

4.4 Practical approaches to literacy for pupils with severe learning difficulties

4.4.1 Adopting and adapting strategies from the mainstream

In contrast with the literature exploring specialist, augmentative or alternative approaches to literacy, some authors emphasise the relevance and efficacy of traditional mainstream approaches to teaching literacy to pupils with severe learning difficulties. McCartney and Wilson (1994), for example, suggest that the 'conditions that foster literacy learning in persons with developmental disabilities seem to be essentially the same as in able-bodied persons' (p.202). While their article is specifically concerned with pupils with severe speech and physical impairments rather than with pupils with severe learning difficulties, McCartney and Wilson make speculative suggestions for practice based on their work, which may have application in other contexts. They suggest, for example, that pupils with severe speech and physical impairments may be denied access to a full and rich range of the conditions which encourage early literacy skills to flourish. This may be because there are difficulties over manipulating objects such as books or crayons or because pupils experience difficulties in interacting with peers or adults, over stories, for example. Lack of appropriate early experiences could also be caused by the provision of fewer play activities and, as is the case with pupils with severe learning difficulties, by literacy being afforded a low sense of priority in the education of children with severe speech and physical impairments. Like other authors (see, for example, Ackerman and Mount, 1991; Van Oosterom, 1991) McCartney and Wilson suggest that the 'protoreading' and 'protowriting' activities with which able-bodied children engage, such as:

- learning about writing processes such as directionality;
- producing early forms of writing through scribble;
- naming letters;
- developing concepts about print such as the beginning and end of books; and
- engaging with nursery rhymes.

can be used in order to establish the components of literacy programmes for pupils with severe speech and physical impairments. They suggest that these components may then be used to develop assessment procedures for such pupils which can, in turn, lead to the development of useful literacy targets. McCartney and Wilson's speculative suggestion that there is 'no need to postulate that different learning mechanisms operate' for pupils experiencing severe speech and physical impairments could be taken as support for the application of an inclusive framework for teaching literacy in a range of settings.

Lewis *et al.* (1994), however, note a tendency for school staff to encourage pupils experiencing difficulties in literacy to engage in passive copying of text for extended periods of time. They propose techniques designed to support pupils in approaching research tasks in more active ways and suggest that these forms of support can help pupils with learning difficulties to make the most effective use of their developing literacy skills. Lewis *et al.* do not specify the nature or extent of the learning difficulties experienced by the pupils in their illustrative case studies, but it is clear

from the examples given that these are pupils with some pre-existing skills in reading and writing.

Other articles take a more detailed look at the application of particular mainstream approaches in specialist settings. Wilson and Simmons (1989) describe a small-scale project involving two families, each with a young child with severe learning difficulties. The project entailed the use of the Cleveland 'shared reading' strategy in the family home for a period of three months. Parents were interviewed at the start and finish of the project and kept diaries throughout. Wilson and Simmons report some progress, with the children appearing to develop enhanced awareness of left-right orientation and beginning to show an interest in pointing to words as well as pictures in books. The families expressed intentions to continue with the work. Simmons and Wilson articulate a need for further research and bemoan the narrow emphasis in special schools on social sight vocabulary. They argue that pupils with severe learning difficulties ought to be encouraged to read for information, instruction and pleasure and suggest that shared reading might offer one way forward.

4.4.2 Pictures and symbols

Carpenter and Detheridge's (1994) work suggests that symbols can provide access to the literate world for pupils with severe learning difficulties. Their case studies show individual pupils 'writing' symbols by hand and sequencing symbols to generate 'written' messages (sometimes at considerable length) using information and communication technology (see section 4.4.3. for more on ICT). These authors further developed work designed to enable pupils of any ability to become independent learners using techniques which surmount the barriers posed by reliance on traditional orthography. Detheridge and Detheridge (1997), for example, bring together a wide range of examples of staff using symbols with pupils with severe learning difficulties in a range of contexts.

As well as describing the use of symbols as an alternative system in their own right, Detheridge and Detheridge explore some of the ways in which symbols may be seen as 'a bridge to traditional literacy'. As yet, there seems to be no systematic research evidence to confirm the role of symbols in the acquisition of literacy skills and supporting pupils to make the 'move to reading and writing using traditional orthography', although Hassell (1990) also speculates that symbols can provide 'a useful perceptual bridge' between pictures and words. Some of the research Van Oosterom (1991) cites, however, suggests that pupils learn to recognise words more effectively without the use of pictorial cues (Walsh and Lamberts, 1979) and that pictorial cues embedded into spelled words are more effective than rebus programmes at moving pupils with severe learning difficulties into the use of traditional orthography (Worrall and Singh, 1983).

McLinden (1995) describes a single subject case study of one pupil with severe learning difficulties and a visual impairment who learned to use tactile symbols from the Moon code to enhance his communication capabilities. The author reports progress for this pupil towards 'reading' a tactile timetable and proposes that tactile symbols such as those he describes could provide a bridge between the use of objects and more conventional symbols used as communicative cues.

Merry and Peutrill (1994) conducted a small-scale enquiry into the use of 'picture associations' to enhance the learning of 'function' words for pupils with reading difficulties in mainstream schools. The researchers suggest that this technique could help to extend the 'survival' vocabularies of key words learned by pupils with severe learning difficulties. Moran *et al.* (1996), who followed up Merry and Peutrill's work through an action research project in two mainstream primary schools, also suggested further possibilities for the method in the hands of creative teachers.

4.4.3 Information and communication technology

Hopkins (1998) provides vignettes of successful practice in his positive review of the impact of information and communication technology (ICT) upon progress and achievement in literacy for pupils with learning difficulties. He enthuses about the increased role proposed for ICT in schools and lists a number of ways in which he believes that this technology can help pupils experiencing a range of difficulties. Hopkins notes the proliferation of switches, spell checkers, word predictors, concept keyboards, symbol programs, multimedia packages, Internet connections and web sites available in schools and speculates about their uses. In many of these areas, developments are at an early stage and initiatives have not yet been formally evaluated.

Other commentators are more cautious about the role of information and communication technology in promoting literacy skills for pupils with severe learning difficulties. Lewis (1999) discusses the use of Integrated Learning Systems with pupils with learning difficulties in the UK. Her review of American research and British follow-up studies, while not focused specifically on pupils with severe learning difficulties, suggests that the use of Integrated Learning Systems 'was not conspicuously more effective than other approaches' and that some initial bursts of progress noted for pupils with learning difficulties were not sustained over time. Lewis calls for a more thorough examination of the pedagogical issues raised by the use of information and communication technology.

Software extensions can facilitate the use of standard keyboards for pupils with learning difficulties using computers in support of their literacy skills. Newell *et al.* (1991) conducted a small-scale evaluation of the use of a computer-assisted writing programme with a group of nine pupils, some attending special schools but none categorically identified as having severe learning difficulties. The PAL software programme which Newell *et al.* used in this trial offered pupils an on-screen 'menu' of suggested complete words as they began typing initial letters on a standard keyboard. Pupils could then either select a word from the list provided or continue typing their own word. The software spell-checked new words and added them to the available word-bank. Beattie *et al.* noted that all the pupils in the trial developed extended vocabularies and became more confident in their use of written language. Pupils with physical disabilities were helped to overcome their difficulties in the laborious use of the standard keyboard and pupils with spelling difficulties began to spell more accurately. Potential benefits for pupils with severe learning difficulties but emerging keyboard skills are assumed.

Where standard computer keyboards seem to compound rather than alleviate the literacy difficulties that pupils with severe learning difficulties experience, adaptations such as concept keyboards or touch screens are often used. Wright *et al.* (1992) conducted two experiments with sixteen pupils from schools for pupils with severe learning difficulties. In an article which gives some insights into the methods and procedures adopted in this small-scale enquiry, Wright *et al.* compare the effectiveness of touch screens and concept keyboards in maintaining and extending pupils' social sight vocabularies. They conclude that eight minutes per day of individual, computer-assisted instruction can promote the acquisition and maintenance of social vocabulary recognised at sight in pupils with severe learning difficulties. Wright *et al.*'s results show no difference in effectiveness between touch screens and concept keyboards in helping pupils either to acquire or maintain such vocabularies, even where brief time-delays between switch activation and on-screen outcomes are involved.

Douglas and Dickens (1996) describe the use of tactile overlays with pupils with multiple disabilities, using raised Moon symbols on concept keyboards. The Moon symbols were used to help pupils to 'track' through the key elements of a story. They were also linked to phonemes, digitised and 'spoken' by the computer, and to synthesised words beginning with certain phonemes. Douglas and Dickens illustrated their work with individual case studies and expressed the hope that this work would transfer effectively out of particular contexts to become useful for a wider range of pupils with learning difficulties. As yet there is no research evidence to support this possibility.

4.5 Pupils with Down syndrome

NB In this review we use the term 'Down syndrome', which is now commonly used in all English speaking countries except the UK and by all the international publishers, including a number of UK-based one. 'Down's syndrome', is considered offensive in other countries as the implication that Langdon Down 'owned' or 'had' the syndrome is unacceptable.

4.5.1 Introduction

The literature on literacy and pupils with Down syndrome is reported separately as it represents a distinct section of the literature. Down syndrome is the single most common cause of moderate to severe learning difficulty and the majority of pupils with Down syndrome are in mainstream schools. The syndrome occurs at the rate of about one in 900 live births and there are currently estimated to be some 30,000 individuals with Down syndrome in the UK (Steele, 1996). Screening is not reducing the population as dramatically as predicted and as health care is increasing survival rates in infancy, the population of school-aged children with Down syndrome is still increasing in the UK, and is expected to continue to do so into the next decade (Nicholson and Alberman, 1992). The number of children with Down syndrome of school age (5 to 19 years) is estimated to be between 8000 and 9000 (extrapolated from Steele, 1996). This is clearly a significant population of individuals and, as their life expectancy is now 45 to 55 years with some living beyond 60 years, it is important that these children benefit from educational opportunities that equip them

for useful and semi-independent adult lives in the community. With appropriate education, training and support some 60-70% of adults with Down syndrome could be employed.

At present between about a 25 % and 80% (depending on LEA) of children with Down syndrome in the UK begin their education in mainstream infant schools and it is estimated that 70 to 80% in all LEAs could do so (Cunningham *et al.*, 1998). This gives them access to the same teaching of literacy skills as all other children and has enabled longitudinal research on the reading abilities of this population to begin (Laws *et al.*, 1995; Byrne *et al.*, 1996; Byrne, 1997). All the published studies that compare outcomes for mainstream and special schools report higher academic achievements for the children with Down syndrome who are included in the mainstream schools even when mental age is controlled for (Casey *et al.*, 1988; Sloper *et al.*, 1990; Cunningham *et al.*, 1998; Buckley *et al.*, forthcoming).

4.5.2 Literacy for pupils with Down syndrome

Children with Down syndrome are delayed in all areas of cognitive development. However, the range of developmental delay within this group of children varies considerably. Some children have severe learning difficulties while others have mild to moderate learning difficulties.

This is illustrated by the Manchester cohort studies in the UK. Sloper *et al.*, 1990 report on the progress of a representative sample of 117 children with Down syndrome in Greater Manchester. At this time the mean chronological age of the group was 9.2 years (range 6 to 14 years) and the mean mental age 43.3 months (range 8 months to 90 months). Similarly Crombie *et al.* (1991) report on two cohorts of 31 and 42 Australian children with Down syndrome - at 11 years of age the mean mental ages were 4.15 to 4.78 years, range (2 to 7 years). In both these studies a small number of children (5%) could not achieve a score on the mental ability measure used for the majority of the children as they had mental ages below 24 months. These severely affected children have very delayed development and literacy is unlikely to be an appropriate educational target for them. A study of 171 children from three studies in the US (Rynders *et al.*, 1997) suggests that one-third would, in UK terms, be regarded as having moderate learning difficulties and two-thirds as having severe learning difficulties.

While such data and terminology may give some general indication of degree of learning difficulty, it is important to note that the measures used to compute an IQ tap into a variety of cognitive skills and many of the tasks require language or motor responses to indicate understanding – both areas of delay and difficulty for children with Down syndrome. It is also important to note that academic achievements – particularly in literacy (as detailed below) – are often higher than would be predicted from children's IQ levels, and their social skills and competence are also usually higher.

While bearing in mind the variation in degree of disability for children with Down syndrome, it is possible to describe the typical profile of cognitive development for this group of children.

4.5.2.1 Sensory impairments

The children are at risk of sensory impairments, which may affect developmental progress. The incidence of mild to moderate hearing loss is significant in this group of children, with conductive losses affecting some 70–80% of children during pre-school years.

It is common for children with Down syndrome to have 25 to 40dB losses or greater due to middle ear dysfunction, either due to the presence of ‘glue’ or to the long term damaging effects of persistent ‘glue’ in the preschool years. This level of loss will certainly impair language learning in infancy and early years for these children. Even a loss of 25–30dB will impair listening ability in the classroom or in any noisy environment (Davies, 1996).

Visual defects (particularly refractive errors and squints) are also common in children with Down syndrome, though usually adequately corrected with spectacles and/or surgery (Hammond and Millis, 1996).

4.5.2.2 Speech and language

All children with Down syndrome are delayed in their acquisition of speech and language skills, and these skills are almost always more delayed than non-verbal abilities, social skills and self-help skills (Chapman, 1997; Miller *et al.*, 1999). Their production of first words is delayed and average vocabulary is about 400 to 500 words at five years compared to an average of 2000 words for typically developing children, though there is wide variation (Bates *et al.*, 1988). The rate of development of literacy skills is likely to be affected by these speech, language and cognitive delays.

Most children with Down syndrome have more difficulty learning the grammar rules than learning new vocabulary. They learn the early grammar slowly in the same order as other children (e.g. how to make plurals, past and future tenses and question forms) and are often limited to using ‘telegraphic’ sentences which contain keywords (nouns, verbs, adjectives) but omit the functional grammar (articles, auxiliaries, prepositions, pronouns) (Fowler, 1995, 1999). This is a pattern of delay and the same order of

acquisition is seen in deaf children and children with speech and language impairment - the functional grammar is the last to be mastered.

Most children with Down syndrome have verbal short-term memory difficulties and poor verbal memory spans for age (Hulme and MacKenzie, 1992, Broadley *et al.*, 1995; Jarrold *et al.*, 1999). Limited memory spans will reduce their ability to learn grammar from listening to speech (Chapman 1997; Chapman *et al.*, 1998). There is increasing evidence that children with Down syndrome can learn grammar from reading – from seeing the word endings and sentence structures – more easily than from hearing them (Buckley and Bird, 1993; Buckley, 1993, 1995; Buckley *et al.*, 1996; Oelwein, 1995; Kemp, 1996). There is evidence that all children learn about grammatical markers and function grammar from reading (Bryant *et al.*, 1998).

The typical delay in the development of auditory short-term memory (usually measured by digit span - how many digits a pupil can memorise) may lead to difficulty in following and remembering long and complex spoken instructions in the classroom or elsewhere.

4.5.2.3 Developing literacy

For the majority of children with Down syndrome, production of language lags behind comprehension – that is, their understanding of language is more advanced than their production of language. This is illustrated by the data from a study of 12 teenagers with Down syndrome (Buckley, 1993). The mean age of the group was 14:11, their mean non-verbal mental age was 7:0, their mean vocabulary comprehension age was 5:6, their mean grammar comprehension age was 5:0 and their mean expressive language age was 3:7. The young people were using ‘telegraphic’ speech or simple sentence structures. Similar profiles have been reported by other researchers (see Chapman, 1997, 1999). In addition, speech intelligibility is a problem due to difficulties in phonology and articulation (for a review, see Stoel-Gammon, 1997).

The study of reading development in young children with Down syndrome is still in its infancy. There are few published studies in the literature and these comprise of single case studies (e.g. Duffen, 1976; Carter, 1985), surveys of the reading skills of small samples of children (e.g. Lorenz *et al.*, 1985), review articles describing practical experience, case studies and discussion of the practical and theoretical significance of learning to read (e.g. Buckley, 1985; Buckley *et al.*, 1986, 1993, 1996; Buckley and Bird, 1993; Bird and Buckley, 1994) and articles addressing the issue of the cognitive strategies that the children are using to read (e.g. Cossu *et al.*, 1993; Evans, 1994; Byrne *et al.*, in preparation).

While case studies are valuable, it is not possible to predict from them the potential attainment in literacy for all children with Down syndrome. The children described have benefited from early intervention at home, continuous teaching from their parents and mainstream schooling. Researchers at Portsmouth report that they have worked with other children who made the same pre-school progress but who received no further literacy teaching in their special schools so can read no more as teenagers than they could as five year olds (Buckley *et al.*, 1996).

Two studies published in the UK in the 1980’s indicate reading progress in the first years at school. Casey *et al.*, (1988) followed the progress of 36 children with Down syndrome, chronological age 3:8 to 10 years, (mental age 2:3 to 6:8 years), 18 were in mainstream placements and 18 in schools for children with moderate learning difficulties. The children did not differ in cognitive development at the start of their schooling. After two years, 89% of the girls and 67% of the boys in the mainstream classrooms could achieve above baseline scores on both the accuracy and the comprehension components of the Neale Analysis of Reading Ability. The children in the special schools were lagging behind with 89% of the girls and 33% of the boys scoring on accuracy and only 44% of the girls and 33% of the boys scoring on comprehension. As the children were equally able at the start of the study, it is likely

that the difference in reading progress two years later is due to differences in the teaching of reading in the two school types.

In a study of 58 children with Down syndrome in Manchester, Lorenz *et al.* (1985) report that at five years of age 47% of the children could read their own name and 19% could read 5-10 words. At six years the figures for these two levels of attainment were 63% and 32% and at seven years, 75% and 44%. In a later survey of 117 children, aged six to 14 years, also from this Manchester cohort, only 20 children could achieve a score on a standardised reading test (Sloper *et al.*, 1990).

4.5.2.4 Follow up studies

Studies from Australia and New Zealand report on small samples of children followed up from early intervention programmes. For a group of eight children with Down syndrome (CA 7.2 to 9.3 years), (IQ 48 to 67), reading ages 6.1 to 9.3 years are reported (Pieterse and Center 1984; Pieterse *et al.*, 1988).

Irwin (1989) reports on 21 children with Down syndrome aged 9 years 6 months to 11 years 6 months in Auckland, New Zealand. Nine could score on standardised reading test (Neale Analysis of Reading Ability) with scores ranging from 7 years 3 months to 10 years on reading accuracy. Their Stanford Binet IQ's ranged from 36 to 63, their mean score on the Peabody Picture Vocabulary Test was 52.56 months 33-79, 50 months 67, 30-79.

4.5.2.5 Parent surveys

In a survey of 90 teenagers in the UK (Buckley and Sacks, 1987) parents reported that 66 of the teenagers could read at least a 'social sight' vocabulary. Of these 66 readers, just half could read more than 50 words and 15 (16% of the total group) could be described as quite good readers and enjoyed reading books, including adventure stories and books on sport or nature. In this study, many parents commented that their teenagers attempted to master the TV, sport and pop pages of the newspaper and that even those unable to read, enjoyed looking at books and having someone read to them. Carr and Hewitt (1982), reporting on a group of 43 16 year olds, state that seven could read quite well, about the same proportion of the group as that in the Buckley and Sacks study.

In a survey of 33 young adults with Down syndrome in the USA aged 17 to 25 years, Fowler (1995) reports reading ages of 5:7 to 16 years for word attack skills, 6:7 to 12:7 for word identification and 5:6 to 8:4 for reading comprehension. These young people had mental ages of 5:0 to 7:1, vocabulary ages of 6:1 to 11:1 and grammar ages of 5:1 to 7:8. The reader will note that reading comprehension is close to grammar comprehension and word reading close to vocabulary age. Reading performances all range above that, which might be predicted from mental age measures.

Data from studies and surveys such as those reported above must be treated with caution as: it cannot be assumed that all the young people had reached the upper limit of their reading ability; all the studies have very small sample sizes and there is no

indication of their representativeness of the total population of young people with Down syndrome; minimal details of pedagogy are given.

4.5.2.6 Practical approaches to teaching pupils with Down syndrome

In addressing the question of teaching methods, the relevant issue is whether there are any differences in the way a child with Down syndrome should be taught to read compared with the teaching methods used for typically developing children. The evidence suggests that the same methods should be used for all children but teachers will need to take account of the relative delay in language knowledge and memory skills of the children with Down syndrome when teaching them to read. The children will have smaller vocabularies and limited grammar, and with hearing difficulties and speech production difficulties they do not start school well prepared to master phonics. However, reading instruction and phonic instruction will help to improve sound discrimination and speech clarity.

Buckley and colleagues recommend teaching all children by establishing a small sight vocabulary first, choosing words and sentences that the children use everyday in their speech and encouraging them to build their own phrases and sentences with this sight vocabulary. This builds their confidence and enables them to learn that we ‘read for meaning’.

Next, while continuing to expand their sight vocabulary, they begin to teach letter-sound correspondences using the words the children can already read in order to do this in a way which shows them from the start how the letter-sound knowledge can help them to read an unfamiliar word. They encourage the children to write from the start, tracing over words and sentences with fingers and pens, before moving on to copying and free writing. This approach fits in with the research on children’s reading development that indicates that all children go from a logographic stage (when words are recognised by ‘sight’ only) to an alphabetic stage (when words can be ‘sounded out’ letter by letter) and then to an orthographic stage (Frith, 1985; Gathercole and Baddeley, 1993).

Frith (1985) emphasises that it is the activity of writing and spelling that develops the child’s use of an alphabetic strategy. Young children at the logographic stage, with little phonic knowledge, may be quite happy to guess and insert a word that is semantically correct, but not orthographically correct, so for example, reading ‘shut’ when the printed word is ‘closed’. This has been reported for typically developing readers and for children with Down syndrome (Buckley, 1985; Seymour and Elder, 1986).

Despite the very real additional difficulties experienced by the child with Down syndrome compared to typically developing children, many do progress to being able to use phonological recoding for reading and spelling and they are able to use context. It is essential that teachers understand the level of skills that the child brings to the task and that they help the child to progress slowly but steadily. It is particularly important that teachers know how much language knowledge a child has in order to avoid exposing the child to material that he or she can read aloud but cannot decode for meaning. Further, all children learn new language from reading (Garton and Pratt,

1989; Kemp, 1996; Bryant *et al.*, 1998; Catts and Kamhi, 1999) so it is very important that the teacher appreciates that reading can be a powerful way to help the children expand their language knowledge.

4.5.2.7 Early reading

The issue of early 'sight word' reading, beginning in the preschool years, needs further consideration. Some of the early readers with Down syndrome find flashcard learning very easy and it appears to develop their spoken language very considerably. Buckley identifies the need for further research here as critical period issues may be relevant. Recent work shows that children with Down syndrome aged three years are able to learn sight words just as fast as age matched typical preschoolers and at 6 years the readers in both groups who can score on reading tests (16 of 17 typically developing children and 11 of 18 children with Down syndrome) are at the same level for reading and reading comprehension on standardised tests after one year in school (Appleton, 2000).

4.5.3 The effect of literacy acquisition on the development of other cognitive skills

Research on the links between typically developing children's reading progress and other aspects of cognitive development suggest reciprocal interactions. The more language knowledge and the better the phonological awareness and working memory skills children bring to the task of reading, the faster they will learn to read in the first year of reading instruction. In the second year, reading success appears to develop working memory and phonological awareness skills (Ellis and Large 1988; Gathercole and Baddeley, 1993b). Being able to read opens up access to knowledge and the biggest vocabulary explosion for children is between the ages of about 7 and 16, when children are typically learning on average 3000 words every year (Nagy and Herman, 1987). Reading and writing also teach children correct grammar (Hutt, 1981). Data from a small longitudinal study (Laws *et al.*, 1995) indicate the same benefits of reading for language and memory skills for children with Down syndrome as the above studies report for typically developing children.

One area where there are some data is on the effect of reading on speech and language skills. Case study records of young children suggest that reading encourages progress to longer utterances and improved grammar in speech. They also suggest that reading improves articulation and speech intelligibility. For most children with Down syndrome there is a well-documented lag between comprehension and expressive speech skills, probably due to a variety of difficulties - for example, with word retrieval, sentence structuring and speech-motor control. The limited development of working memory may also be implicated so that reading may provide the opportunity to practise saying sentences that the child is unable to generate spontaneously even though s/he understands them. This hypothesis is supported by the results of work with adolescents with Down syndrome (Buckley, 1993, 1994, 1995). In a study designed to improve the productive syntax of a group of 12 teenagers, teaching which used print to support the learning was more effective in teaching correct production over six different sentence structures than speech and picture only teaching. All the teenagers did better in the reading condition (see Buckley, 1993) but there were large

individual differences. The teenagers who gained the most were those with no reading ability and the smallest digit spans. At the end of the training year, the teenagers demonstrated a significant gain in comprehension of grammar compared to a previous baseline year of no intervention beyond ordinary school practice and a significant increase in the length of the utterances that they used in everyday conversation (Buckley, 1995).

4.5.4 Emerging practice

Some studies of larger and more representative samples of children with Down syndrome in mainstream education are now underway in the UK. As far as the reviewer can ascertain, no similar research is being conducted anywhere else in the world at present.

In one longitudinal study, the Portsmouth research team are following the progress of 24 children with Down syndrome (10 girls and 14 boys, CA 4:11 to 12:7, mean 8:2) and comparing their progress with a group of their mainstream classmates who are matched with them on reading age (and are therefore slow readers for age), as well as a group of classmates who are average readers for their age (Byrne, 1997; Byrne *et al.*, 1995, 1996). The study is charting the reading, writing and spelling progress of the children, looking at the cognitive strategies they are using to read and the links between reading, language and memory skills. These children are fully included in the classroom and receive literacy teaching similar to that of their peers, with the support of a learning support assistant.

At the start of the study, all the children with Down syndrome were learning to read and their reading ages ranged from 5:0 to 8:5 for word reading, 6 to 7 years for comprehension and 6:0 to 7:2 for spelling. Vocabulary ages ranged from 3:7 to 5:4, and grammar ages from 4:0 to 5:0 years. The children with Down syndrome had reading ages higher than their language comprehension ages would predict.

The typically developing children identified by their teachers as average readers for their age demonstrated even, and age appropriate, cognitive profiles over all the measures, whereas the slower readers for their age in the same classes (matched for word reading ability to the children with Down syndrome) turned out to be significantly delayed relative to the average readers on all the language and cognitive measures. The children with Down syndrome, while matched with the slower readers on the reading measures, were significantly behind them on the number, language and memory measures. In other words, the children with Down syndrome showed advanced reading ability compared to all their other cognitive skills at this time.

By the third year of this study, the children with Down syndrome were still not significantly behind the slow readers on word reading but they were on spelling and reading comprehension. As a group, the children with Down syndrome were significantly behind the slow readers in their ability to use phonics, so appeared to be keeping up their good word recognition skills by relying on visual memory (Byrne, 1997).

However, at this point, seven of the children with Down syndrome had alphabetic skills: they could read non-words correctly, demonstrating the ability to use their phonic knowledge. These children had a mean word reading age (BAS I) of 8:8 range 7:4 to 9:10 (CA's 8:10 to 11:4), mean reading comprehension age (WORD) of 7:8, range 6:6 to 7:6, mean spelling age (BAS) of 8:5, range 6:9 to 8:4, mean vocabulary comprehension age (BPVS) 5:8, range 4:5 to 8:11, mean grammar comprehension age (TROG) of 5:0, range 4:6 to 5:9, mean number age (BAS) of 5:5, range 5:3 to 5:11. A further nine of the children with Down syndrome were described as logographic (sight) readers and they had mean reading, reading comprehension and spelling scores between 6 and 7 years on standardised tests. The remaining eight children with Down syndrome had reading, comprehension and spelling ages between 5 and 6 years. At this time, it is not possible to determine why some children with Down syndrome are making better progress with literacy. There was a tendency for the alphabetic children to be the older group, but the age differences between the three groups was not statistically significant (Byrne, 1997).

In the fifth year of this study, 17 children with Down syndrome, still in mainstream schools and in the research area, were followed up (Byrne *et al.*, in preparation). At this time their chronological ages ranged from 9:2 to 14:5 (mean 11:5). Their word reading ages ranged from 5:5 to 9:0, mean 7:2, spelling ages ranged from 6:1 to 9:11, mean 7:4, reading comprehension ages range from 6:0 to 7:6, mean 6:1, vocabulary ages ranged from 3:2 to 12:2 mean 6:0 and grammar ages ranged from 4:0 to 5:9, mean 5:0. Nine of these children had reading ages over 7:4 and eight of the nine pupils had spelling ages over 7:0, with reading comprehension for the nine pupils ranging from 6:0 to 7:6.

All of the 17 children could score on standardised word reading tests, 16 could score on spelling and 14 on reading comprehension. If these data are compared to the studies carried out in the UK with earlier cohorts of children (Sloper *et al.*, 1990; Casey *et al.*, 1988) then this Hampshire group are clearly achieving much higher rates of literacy acquisition than the cohorts of the 1980's or before.

Two conclusions may be drawn at this time. Some children with Down syndrome will achieve functional levels of literacy (8 years and above) while others will achieve a level of literacy skill which will allow them to record work in the classroom and to read with assistance. Some may not achieve any useful level of literacy skills. At present the research groups are small and access to good literacy teaching still not available to all children in the UK. Accurate estimates of what might be expected still need to be documented by studying much larger samples of children across the UK.

4.6 Conclusion: pupils with Down syndrome

The research-based evidence available on the reading development of children with Down syndrome is very limited. However, there is evidence that many children with Down syndrome (perhaps 50 to 60%) are able to achieve a useful level of literacy ability if given effective instruction and that all the children should have an opportunity to learn to read, as even a small sight vocabulary will help their speech and language skills and may improve their auditory discrimination and working memory function. Reading instruction should be provided at the same age and in the

same way as for all other children. There is also some evidence to suggest that reading should be considered as soon as the child has single word comprehension, as the earlier the child is able to establish a sight vocabulary, the greater the benefit for their language and cognitive development.

However, there has been no actual research into effective teaching strategies and the above conclusions are based on teachers' and researchers' experience of monitoring children's progress. It is clear from the limited literature available that while sight word reading is often a strength, reading comprehension at sentence and text level is more of a challenge for many children with Down syndrome and more research on how to develop reading comprehension is needed.

The evidence also indicates a wide range of individual differences for this group of children and this presents a problem for the teacher of an individual child with Down syndrome. It is not possible to provide guidance on the expected levels of achievement for individual children at the present time. A large longitudinal study is needed to provide this information.

For children with Down syndrome, the benefits of learning to read may go beyond simply acquiring a functionally useful level of reading and writing skill. Progress in reading can develop speech and language skills, auditory perceptual skills and working memory function; all areas where children with Down syndrome usually display difficulties (Fowler, 1990; Hulme and Mackenzie, 1992). This is probably also true for many other children with moderate to severe learning difficulties.

4.7 Pupils with profound and multiple learning difficulties

4.7.1 The nature of the population

Pupils with profound and multiple learning difficulties (PMLD), by definition, have a significant degree of intellectual impairment such that they are unlikely to be able to learn to read in a conventional way. About 80 per cent of pupils with profound and multiple learning difficulties also have other impairments such as visual, hearing, physical, emotional and behavioural difficulties.

4.7.2 Literacy for pupils with profound and multiple learning difficulties

These pupils will need books interpreted for them if they are to learn from them. Their profound intellectual impairment is likely to prevent them from understanding the words, even if they are read to them, while their likely additional impairments will lead to access difficulties, such as seeing the book or hearing the words read. In summary, this group is likely to have a complex profile of needs which result in significant barriers to acquiring literacy skills.

4.7.3 Practical approaches

Despite these enormous difficulties, pupils with PMLD can be involved in literacy and can progress through a series of responses at a stage that might be called 'pre-literacy' - though it is unwise to use that term of this group if it is taken to imply they

will be progressing to traditional literacy. Progression is generally difficult for this group of learners as they may not have the cognitive capacity for climbing a ladder of increasingly complex skills and understanding. They may, however, be able to increase their ability to respond to activities that are at a similar level of difficulty.

A search of the literature revealed no texts specifically on literacy and pupils with profound and multiple learning difficulties. This is unsurprising given that it is only in the past few years that this group of pupils has been considered capable of having access to books and literature. While it is recognised that pupils with profound intellectual impairment are unlikely to read books in a conventional way, it is important to point out that this does not preclude them from enjoying aspects of literacy with support.

There is a small body of literature relating to access to literature and books, and understanding and using symbols for pupils with profound and multiple learning difficulties.

Grove (1998) and Park (1998) approach literature from the importance of story: they suggest that access to story can be obtained through storytelling and drama, arguing that pupils can be involved in the story without fully understanding it. Pupils will need tangible resources to accompany the story and frequently repeated routine activities that enable them to become engaged in the atmosphere and thus the essence of the tale - for example, things to look at and listen to, smell or tactile cues and active physical participation.

As yet, such approaches to literature are unevaluated and have no research base, although they have been validated by practical work and the experience of practitioners.

4.7.3.1 Symbol

As an alternative to traditional orthography, symbols such as objects of reference or rebuses have been used with pupils with PMLD, mainly as a means of communication, but, latterly, also for access to books and stories. Again, there is no published research regarding symbols and pupils with PMLD so what literature there is, tends to be reliant upon the experience of practitioners. There are research studies on rebus symbols.

Some pupils with PMLD use objects and pictures of reference as alternatives to reading and writing all their lives. For those at the earliest stages of development, objects are non-symbolic and are directly related to the activity concerned - for example, a cup is an index for a drink and a swimming costume for swimming. Objects become symbols and thus relatable to literacy when they 'stand' for the object or activity as, for example, a coin related to shopping (an icon) or a string of beads is used in a learned association with a person (a symbol) (Park, 1997). Park (1995, 1997) suggests that objects of reference can assist pupils with PMLD to bridge the gap between the non-symbolic and the symbolic.

It is arguable that an object of reference, whether it is an index, icon or symbol, has much in common with the written word: it is permanent, capable of being ordered, and is an agreed representation of spoken language. McCall and McLinden (1997) argue that any definition of literacy must include objects of reference even if users progress no further than simple practical activities such as labelling object. Indeed, these activities could be seen to relate well to flashcards of traditional words.

McCall and McLinden (forthcoming) explore ways in which children with multiple disabilities can be included in the national literacy strategy and suggest that objects of reference and tactile symbols can be used in a functional approach to 'reading' in the environment.

4.7.4 The part played by information and communication technology in developing literacy in pupils with learning difficulties

Two points need to be made about the part played by information and communications technology (ICT) in developing literacy in pupils with learning difficulties. First, that ICT is merely a teaching device and is not a teaching approach - programmes must be grounded in theories of learning which are in use within classrooms, for example. Second, that the pace of development in ICT is such that equipment and applications tend to be out-of-date before their use in schools has been adequately evaluated.

It should also be pointed out that many of the findings in this section also relate to pupils with mild and moderate learning difficulties.

Earlier work tended to be with text-based applications which lacked sophisticated graphics and audio. Much of the available software was of the drill and practice variety, more often than not lacking a system of record-keeping or task management. Despite this, convincing effect sizes were typically obtained in intervention studies carried out in the mid 1980's. Later on, synthesised and then digitised speech systems became available, and research has shown that they can be used effectively to accelerate progress in reading and writing.

Sophisticated moving graphics using animation or video are increasingly appearing in educational applications but it is not known whether these features enhance learning by going beyond an immediate visual appeal. To take full advantage of the increased computing power available in multimedia applications, a high level of investment in software development is required. Integrated Learning Systems (ILS) are one outcome of such investment, but in this case there is very little evidence from independent evaluations (ie those commissioned by sources other than the systems' sponsors) of a payoff in terms of higher levels of attainment among pupils with learning difficulties (Lewis, 1999).

When considering the available research literature, the following points have to be borne in mind:

- most research into the use of ICT with pupils with special educational needs has been carried out in settings where there is a high staff-student

ratio, often on a one-to-one basis, but rarely in inclusive mainstream classrooms with large numbers of students

- research is often carried out in settings that have been resourced to a high level, compared with the one computer per classroom and limited range of literacy-related applications typical in English primary schools
- research accounts are often vague in portraying the role of the teacher, and adult or peer helpers
- many interventions are seen as individual activities where the computer is almost seen as replacing the teacher (although this does not always apply - for example, when computers are seen as tools for writing and project work)
- many studies fail to deal with the issue of how or whether the computer instruction forms part of a learning cycle which includes goal-setting, learning activities, presentation and evaluation (as in the Literacy Hour)
- teachers have often been trained and supported during a research project at a level which is not normally available
- despite being enthusiastic, trained and supported, teachers may not know when or how to intervene because it is difficult or there is not enough time to monitor computer-based activities
- teachers may lack the information or knowledge to appreciate how a particular computer application can contribute to teaching and learning
- effective interventions with pupils who have learning or access difficulties normally require regular sessions of intensive work over a long period
- pupils who find learning difficult usually need more time and personal support than others if they are to achieve mastery and/or understanding
- surveys have shown that some teachers are sceptical about the value of learning with machines and many lack computer skills and/or confidence
- the theoretical basis for some types of instructional software may be problematical: for example, some teachers are not convinced of the value of basic skill practice aimed at developing automaticity, seeing this as de-contextualised, passive, socially isolating or demeaning.

Brooks (1997) points out that there has been relatively little research to measure the significance of permanence of some of the effects which researchers claim to observe when pupils with special educational needs use computers. She also highlights the fact that little research examined issues of school management of information technology for pupils with learning difficulties, particularly the way in which staff accessed a range of equipment and software to provide differentiated tasks for pupils.

MacArthur *et al.* (1990) suggest that some effects may be on account of differences in instructional design when computer presentation is compared with 'pen and pencil' presentation. For example, while a group of pupils they studied using computers showed significant improvements in weekly spelling tests, a retention test and in their engagement with the subject, MacArthur *et al.* suggested that this was because the computer-assisted instruction provided immediate feedback and review of words spelt

incorrectly, where the paper-and-pencil instruction relied on prompts for student self-checking and had delayed feedback from the teacher.

4.7.4.1 Word-processing

Although pupils prefer using a word-processing package to writing by hand, there is little convincing evidence that word-processing without speech or spelling support is beneficial. However, speech feedback (which can be provided not only for the text itself, but for spell checkers, dictionaries and thesauruses) does help to improve the quantity, accuracy and quality of writing (Gavine, 1994; MacArthur *et al.*, 1995; Zhang *et al.*, 1995). Newell *et al.* (1991) described how their predictive word processor had reduced the number of spelling mistakes made by a range of pupils with learning difficulties by up to 65 per cent. The work of Zhang *et al.* (1995) shows that pupils are more willing to engage in editing when speech and spelling support are available. Although speech feedback would appear to have great potential for blind and partially-sighted writers, support for this idea remains at an anecdotal level.

Some observers recommend typing training when word-processing is introduced, but it has yet to be shown that this brings long-term benefits. There is a paucity of research concerning the value of methods of text creation that do not rely on keyboard entry, but here again the study by Zhang *et al.* (1995) is relevant.

Paired writing with computers has been advocated by some as part of a process-writing approach, but it seems that the talk that takes place does not usually result in better quality texts. However, it can result in first drafts that contain fewer spelling errors (Hine *et al.*, 1999).

When word-processing, alterations to punctuation and spelling are likely to be made at the first draft stage and pupils are typically reluctant to make more fundamental restructuring changes. However, one study with hearing-impaired pupils (Mander *et al.*, 1995) did find that the ease of making changes was beneficial in terms of organisation as well as punctuation (but the intervention had been preceded by an eight-week period of instruction in process-writing which had emphasised the importance of redrafting).

In the majority of comparisons between word-processing and writing on paper, the relevant pupils with special educational needs had not used spell checkers, as these were thought to be too complex for them. Various technological means of addressing this problem have been devised (such as speech support and predictive systems), but these have not yet been rigorously evaluated.

A small number of studies have explored the possibilities of electronic communication within classrooms, schools and via the world-wide web. There would appear to be enormous possibilities here in terms of writing for real audiences, especially for pupils for whom an important peer group is made up of those with similar low-incidence disabilities.

4.7.4.2 Digital books and reading practice systems

There is steadily accumulating evidence that the ability to hear selected words or portions of text is a valuable feature of talking books, both for competent and less competent readers. Early versions of talking books, where there was a limited range of options or little or no reader control of presentation features, were less successful. Later developments, such as animation, talking context-sensitive dictionaries, hypermedia links, study tools and comprehension checks have provided a wider range of interactive opportunities for learning and reinforcement.

Several studies in which the aim of reading practice was to prepare a passage for reading with understanding to an adult and in which readers made use of a range of presentation options have yielded positive results (Hartas and Moseley, 1993; Moseley, 1993; Lundberg, 1995; MacArthur and Haynes, 1995; Davidson *et al.*, 1996). A well-controlled Swedish study by Heimann *et al.*, (1995) suggests that in sentence-level work, reader control (in this case through sentence construction) may be an important design feature for pupils with autistic spectrum disorders and others working at low literacy levels.

A review by Higgins and Boone (1993) suggests that built-in study and comprehension activities appear to facilitate learning from information texts. Computer-administered comprehension tests of books read away from the computer are a feature of the Accelerated Reading system. A small-scale Scottish field trial of the system (Vollands *et al.*, 1999) yielded broadly positive results.

Computers can be used to vary the format and timing of visual displays, which can be helpful for a wide range of children with special educational needs. For example, phrase-presentation of text, a feature which may be especially useful for pupils with specific difficulties involving language and working memory, was shown by Casteel (1988) to improve reading comprehension.

The research literature provides little evidence to guide teachers who wish to display text to classes or groups, although there are indications that dynamic forms of text display could be very useful for work at word and sentence level. So far as pupils with visual impairment are concerned, there are likely to be continuing problems in such situations, until display devices become much larger (as with an interactive whiteboard).

4.7.4.3 Word level work in reading and spelling

Drill and practice activities can be effective in building up a sight vocabulary, provided that small practice sets are used and that from time to time appropriate adjustments to the routines are made. However, word-level work requiring more active learner involvement - for example, through the manipulation of word parts or by means of a rapid-reaction game - has yielded better results (Lovett *et al.*, 1994). Working with diverse groups of pupils with learning difficulties and medical conditions, Lovett *et al.* (1994) showed that word-assembly from graphemes was more effective than whole-word presentation in improving word recognition, while Heimann *et al.* (1995) demonstrated that phonological skills could be developed by linking word and sentence level work.

There is less evidence to support computer-based rather than paper-based drill and practice for learning spellings. Fulk and Stormont-Spurgin (1995) found essentially no difference, once they had discarded from their review studies with design faults. While this conclusion strongly suggests that the motor-kinaesthetic element of paper-based practice is unimportant, it probably reflects the unimaginative nature of spelling programs in which the computer does no more than flash words.

A thorough-going attempt to individualise spelling practice by using an expert system that recorded and analysed pupil errors was made by Fuchs *et al.* (1991). However, the research team was unable to demonstrate that value was added by means of sophisticated computer feedback and prescription.

4.7.4.4 Group work with computers

Many researchers and practitioners are interested in ways of working in groups with shared ICT resources. However, Bahr *et al.* (1991) found that although low-attaining high school students were rather negative about working in groups on reading comprehension activities, they preferred mixed-ability to homogeneous-ability groups. Yet, as Eraut (1995) pointed out, group work requires skilful management if less able pupils are not to become dependent or marginalised. Ferretti and Okolo (1996), reporting on two multimedia design projects, acknowledged that despite careful planning and considerable effort, the quality of group experience was often low, especially for students with special educational needs. On the other hand, the same researchers later claimed success for an ambitious project in which eleven year-olds worked in mixed ability groups in an inclusive classroom staffed by two teachers (Okolo and Ferretti, 1998).

Utay and Utay (1997), working with dyslexic pupils in a special school, compared cross-age peer-assisted learning with individual work on computers in an authentic writing workshop context. These authors found no between-group difference in performance. There may well be sensitive issues involved when pupils expose their learning difficulties to their peers. These need to be balanced against the confidence-boosting value of a successful public outcome, as in the Sharing Shakespeare project described by Cambridge and Abdulezer (1998).

4.7.4.5 Adult-mediated pre-reading computer activities

Howard *et al.* (1996) found that with suitable access devices, pupils responded to teacher-presented multimedia computer activities in many ways more favourably than to similar activities with toys. Children seem to engage well with interactive multimedia programs, choosing to work with applications which require multi-step rather than single-step actions and which provide animated, voice or sound feedback (Lahm, 1996).

Schery and O'Connor (1997) reviewed three studies in which parent volunteers worked with talking computers and software-related toys in training language skills in young children with Down syndrome or experiencing severe language, learning and behaviour difficulties. They concluded that computer-based intervention is useful for developing vocabulary, grammar and social communication.

The use of ICT with pupils with severe learning difficulties is applicable to those with communication difficulties and moderate learning difficulties.

4.7.5 Emergent practice: pupils with severe learning difficulties

- the implementation of the literacy hour has resulted in the establishment of a range of pupil groupings from inclusive, mixed groups to settings based on homogeneity of prior and anticipated achievement; some schools divide pupils with severe learning difficulties into ‘symbol-users’ and ‘early readers and writers’
- more schools are making serious attempts to teach pupils with severe learning difficulties using what might loosely be described as mainstream approaches to literacy, including the direct teaching of alphabetical and phonological awareness; there seems to be positive outcomes in terms of pupil attitudes and progress; however, best practice should focus on the individual needs of learners and research is needed to inform decisions about these
- the use of ICT is having a major impact on the teaching of literacy skills to pupils with severe learning difficulties: systems which scan in text and graphics and provide flexibility in accessing text in different formats can improve reading accuracy, speed and comprehension;
- there is evidence that schools are providing a mix of approaches to teaching literacy; some of these are related to pupils’ preferred styles while others are related to teachers’ preferred styles and established practice which often depend on teachers’ backgrounds or the professional colleagues with whom they happen to come into contact.

4.8 Summary: pupils with severe learning difficulties

For a number of reasons, literacy has not been a priority in the curriculum for pupils with severe learning difficulties and, where it has been taught, the focus has tended to be on the functional application of reading and writing. More attention has traditionally been directed towards communication, and speaking and listening skills. There is little research literature to support developments which have occurred since the introduction of the National Curriculum.

For some pupils, symbols can be a bridge to traditional literacy but there is also evidence that pupils can learn to recognise words more efficiently without the use of pictorial cues and that pictorial cues embedded into spelled words are more effective than rebus programmes in helping pupils with severe learning difficulties gain access to traditional orthography.

Some authors stress that mainstream approaches to literacy are relevant and effective for pupils with severe learning difficulties and point out that these pupils may fail to become literate not because of inadequate teaching at school but because of a lack of early years experiences which lay the foundations for literacy. Stress is put on family

literacy programmes and encouraging pupils to read for information, instruction and pleasure.

There is no evidence that pupils with Down syndrome, many of whom are now educated in mainstream schools, need literacy teaching that is any different from that of their peers. However, teachers need to bear in mind that these pupils may have associated sensory impairment (hearing and visual impairment), that they have more difficulty learning the grammar rules than learning new vocabulary and that, though they learn grammar in the same order as other children, their sentences tend to be 'telegraphic', with key words but no functional grammar. Children with Down syndrome can learn grammar - sentence structure and word endings - from reading more easily than from hearing it. Reading and phonic instruction will help to improve sound discrimination and speech clarity. There are very few published studies of reading development in young children with Down syndrome and data are difficult to interpret as samples are small and often unrepresentative of the population at large. It is essential that teachers understand the level of skills that individual pupils bring to the task so that they avoid presenting the child with material that s/he can read aloud but cannot decode for meaning.

Pupils with profound and multiple learning difficulties have a complex profile of needs which result in significant barriers to acquiring literacy skills; they are unlikely to be able to learn to read in a conventional way. However, the studies reviewed stress that they should, nevertheless, gain access to literature.

Developments in information technology offer a range of opportunities to pupils by way of concept keyboards and overlays, speech synthesisers and touch screens, together with software such as computer-assisted writing programmes or integrated learning systems. Published research about the use of this equipment has mostly been small scale and there is no evidence that widely applied programmes such as integrated learning systems have a sustained effect or are necessarily any more effective than other approaches. Where positive outcomes have been reported, the conditions of implementation were often particularly favourable (eg higher pupil-teacher and pupil/computer ratios, and a high level of teacher support). Furthermore, the lead and actual time needed for research often exceeds the life of a piece of soft or hardware.

Speech feedback on word processors helps to improve the quality and accuracy of writing and pupils are more willing to engage in editing when speech and spelling support are available. Built-in study and comprehension activities appear to facilitate learning from information texts and imaginative presentation can be helpful - for example, phase-presentation can improve reading comprehension.

Chapter 5 - Pupils with communications difficulties

5.1 The nature of the population

The definition of specific speech and language impairment (SLI) is not precise (Dockrell and Lindsay, 1998, 1999). The description is used for children with significant delays in developing spoken language, in the absence of hearing loss, brain damage or any condition known to be associated with language delays such as autism. Speech and language impairments can affect some or all of the components of language including phonology, grammar, semantics and pragmatics. Traditionally, specific speech and language difficulties have been defined by a discrepancy approach, where the child's non-verbal cognitive ability is considered to be within the average range, while his/her language skills are at a lower level and the discrepancy is significant. However, these criteria are not necessarily useful in identifying children in need of specialist services. It is not clear that children with speech and language difficulties, with non-verbal abilities in the average range, require services or educational support different from those with general cognitive delay (Dockrell and Lindsay 1998, Stothard *et al.*, 1998).

The difficulty in arriving at precise diagnostic criteria has led to widely differing estimates of the prevalence of specific speech and language impairments. Most studies have looked at the preschool population but a significant number of delayed preschoolers seem to catch up in the early school years, so that preschool figures probably overestimate the prevalence. Studies have produced pre-school prevalence rates ranging from 3% to 15% (Lahey, 1988). A recent survey of all 36-month old children in Cambridgeshire reported that almost 7% were identified as having language difficulties (Burden *et al.*, 1996), while in an inclusive survey of 7000 children (Chazan *et al.*, 1980), more than 8% had a severe language problem and 18% a mild problem.

In a recent survey of the Year 3 population (mean age 8:3) in two LEAs (Dockrell and Lindsay, 1998) 1% in one LEA and 0.5% in the other LEA were identified as having speech and language delay. In this group of 59 children, just under a third had non-verbal ability scores below average (mean age equivalent score 5:0). In 10 comparison children from a residential facility for children with SLI, half had below average non-verbal IQ scores. Another UK study of children with SLI identified at four years of age (Bishop and Edmondson, 1987) found that just over a fifth had general cognitive delay (non-verbal ability more than two standard deviations below the mean).

There is no reason to separate children with SLI and low non-verbal ability from those with SLI and average non-verbal ability unless it can be shown that the outcomes for the children are different. In a follow-up of the Bishop and Edmondson (1987) group at 15 years of age, there were no significant differences between those with persistent SLI and average non-verbal ability and those with SLI and general cognitive delay on any of the language and literacy measures used. Both groups of children were significantly delayed on all the literacy measures, obtaining mean

standard scores two standard deviations below average (Stothard *et al.*, 1998). The same results are reported in the Dockrell and Lindsay (1998) study.

In these studies of SLI children, non-verbal ability measures are usually in the range of mild to moderate learning difficulty, if not in the average range. If SLI has significant consequences for literacy and academic progress for these groups of children, then delayed speech and language skills in children with other difficulties in addition or with lower non-verbal abilities are likely to have similar or more serious effects. Unfortunately, when speech and language delay is not seen as the primary impairment, the child does not get the same level of speech and language therapy provided as is typically available to the child with SLI, particularly if that child is in a language unit. The amount of speech and language therapy available to children in SLD and MLD schools is usually much less than that available to pupils with SLI.

5.2 Literacy for pupils with severe language impairment

As reading and writing are language activities, it is reasonable to assume that speech and language delays at five years will impact upon children's literacy acquisition. The evidence supports this view. It may be hypothesised that the nature of a child's speech and/or language difficulty will have an impact on different aspects of literacy skills.

5.2.1 Nature of literacy difficulties

The studies reviewed suggest that children with SLI in the pre-school years which seems to have resolved in early school years may still be at risk of persistent phonological processing impairments and that these will impact on all aspects of reading acquisition in the long term (Stothard *et al.*, 1998).

Children with persistent SLI, regardless of non-verbal cognitive ability, are at risk of falling seriously behind with all aspects of literacy (Dockrell and Lindsay, 1998; Stothard *et al.*, 1998). In the early school years, there is some evidence that reading comprehension is affected to a greater extent than word recognition (Bishop and Adams, 1990). Syntactic competence in the preschool period accounted for much of the variance in reading ability seen at 8:6 in the SLI children in this study.

Children with phonological (speech) impairments score well below comparison children at seven years on phonological and literacy measures, independent of whether or not they have other language problems (Bird *et al.*, 1995). Children with severe expressive phonological problems at the time they start school are at particular risk of reading and spelling problems.

Literacy difficulties may in turn influence ongoing language development. The ability to read and write gives a child access to new vocabulary and to grammatical knowledge (Bryant *et al.*, 1998; Catts and Kamhi, 1999). In the study by Stothard *et al.* (1998), the vocabulary and verbal comprehension standard scores actually declined steadily between the ages of 8 and 15 years for the children with persistent SLI, with or without general cognitive delays. It is possible that this is the direct result of their poor literacy skills.

A consideration of typical attainment levels frames the question of how teachers could move pupils on and gives an idea of ceilings and expectations. In the Dockrell and Lindsay study (1998), the academic performance of the Year 3 children with SLI on standardised tests of reading accuracy and comprehension, spelling and number was significantly delayed with between a half and two-thirds below the 16th percentile: that is, 1:4 to 2:4 years delayed. Just over a third failed to score at a 5-year level on a spelling test (mean age of the group 8:3, range 7:6 to 8:10). Eleven of the 69 children did score within the average range, often with even performance across all measures. The results were the same regardless of school placement (mainstream, language unit or residential placement).

In the longitudinal study reported on adolescence (Stothard *et al.*, 1998), the children were divided into three groups of SLI at the age of 5:6 - resolved, persistent, and general delay. The resolved SLI group were children with SLI at 4 years but with speech and language scores in the average range at 5:6. This group appeared to have recovered and at 8:6 they showed no evidence of reading or language difficulties (Bishops and Adams, 1990). However, at 15 years (Stothard *et al.*, 1998) the resolved SLI children did show evidence of literacy difficulties. They had significantly lower scores on reading, verbal short-term memory and phonological tasks compared to a typically developing control group (mean standard scores of 85-88 with standard deviations (SD) of 14-15 on these measures). The children with persistent SLI performed significantly worse than the resolved SLI group on all measures except grammar comprehension (reading mean standard score 70.82 SD 16.10). The general delay SLI group was not significantly different from the persistent SLI group on any measures except non-verbal ability (reading mean standard score 65.25 SD 21.31). The standard scores on all other measures were in the same range as the reading scores for these two groups.

In the study by Bird *et al.* (1995) of children with phonological impairments at age seven years, the children with only phonological difficulties had a mean reading standard score of 87.6 (SD 18.3) and a mean spelling standard score of 83.4 (SD 11.03). The group with phonological and language impairments had mean standard scores of 78.8 (SD 11.5) for reading and 75.4 (SD 10.6) for spelling.

5.3 Practical approaches

There is no evidence that children with SLI require different teaching methods. They need to acquire the same range of skills as other children. However, those with phonological impairments and/or phonological processing difficulties will benefit from an explicit focus on teaching phoneme awareness, segmentation and blending. The children with predominately language impairments will require the teacher to be aware of their levels of language understanding (both vocabulary and grammar) and to provide reading materials that are within the children's language comprehension levels. Support for paired and shared reading is likely to benefit the children as they will be slower to become independent readers.

A reading scheme which is quite widely used in language units in the UK (entitled 'Language through Reading') was developed specifically for use with children with

SLI (Hutt, 1981). This scheme, complete with books and colour-coded flashcards, was designed to teach vocabulary and grammar through the teaching of reading. However, there does not seem to be any published evaluations of its effectiveness.

Children with SLI are likely to benefit from the NLS and the emphasis on the Literacy Hour. An Australian study by Center and Freeman (1997) indicates that the combination of being included in a whole class structured literacy programme (with similar elements to the NLS) was successful in increasing the literacy attainments of all the children, especially those in the lower 25% of the class for reading achievement. They recommend that significantly 'at risk' children should also receive individual literacy instruction.

5.3.1 Appropriateness of strategy for particular populations

It is widely acknowledged that children's literacy experiences begin at home and that story book reading is an important part of this. Many children also learn their alphabet names and sounds at home. Reading progress in school is influenced by parental support for reading practice, the availability of books in the home, and by the continuing shared reading experiences at home. Studies such as those of Mogford-Bevan and Summersall (1997) in the UK and Marvin and Wright (1997) in the USA have indicated that preschool activities such as shared reading, writing and drawing activities in the home are all adversely affected when children have SLI. This means that they come into school with less knowledge about literacy than their peers who do not have SLI and suggests the importance of intervention in the preschool years, which recognises the impact of SLI on the child's interactions and learning experiences in the home. Parents need to be offered support and strategies to help them to engage with their children to minimise the differences in early language and literacy experiences in the preschool period.

5.4 Pupils with autistic spectrum disorder

5.4.1 The nature of the population

Autism is a rare condition. In its classical form, identified by a triad of impairments involving social relationships, language and rigidity of thought, identifiable before three years of age (Wing, 1988), it is estimated to affect 5 in 10,000 children (Fombonne, 1997). Classical autism is almost always accompanied by moderate to severe learning difficulties. Only some 20% of autistic individuals have cognitive abilities within the normal range. Most autistic children have severe speech and language delays and difficulties (Dockrell and Messer, 1999; Howlin, 1998).

However, in recent years it has been recognised that there is a range of autistic spectrum disorders affecting perhaps almost 1% of the population (Wing, 1996). Many of these individuals will not have any obvious speech and language, or cognitive, delay although their use of language and their social interactive skills may be impaired, they may display very literal use and understanding of language - for example, having difficulty with humour and idioms.

5.4.2 Literacy and pupils with autistic spectrum disorders

Children with autism usually have severe language difficulties, with many children not developing sentence level, meaningful, spoken language. Some may have particular difficulty with the semantic and pragmatic aspects of language. As reading is a language activity, it is likely that reading comprehension will be restricted by language comprehension for these children.

5.4.2.1 Nature of literacy difficulties

There is almost no literature on the reading development of children with classical autism. Indeed, the focus of the literature (for a review of educational interventions see Jordan *et al.*, 1998) is on communication, social interaction and concept development. The majority of these children do not become literate at the present time and the teaching of reading is not a focus of the curriculum in the majority of specialist schools for autistic children. However, there is a small amount of literature on hyperlexia in autistic children. Hyperlexia is defined as word reading ability in advance of either age or cognitive ability by different authors. There are also a few studies that suggest that this reading ability can be used to teach language and communication skills to children with autism, but they report on very small samples - often only two or three children or even a single case study (e.g. Lanquetot, 1984; Shepherd, 1984; McGee *et al.*, 1986).

5.4.3 Expectations of attainment

There is little published information on the expected literacy attainments for autistic children. Snowling and Frith (1986) report word reading ages of 8 to 10 years in a group of eight high-functioning autistic children, aged 11-19, (mean IQ 78). Those with verbal cognitive ages over seven years showed reading comprehension skills commensurate with word reading skills. Ventner *et al.* (1992), in a follow up study of 58 high functioning individuals with a mean age 15 years, report mean reading accuracy of 10 years, mean reading comprehension of 8:3 years and mean spelling of 11 years. Verbal ability and speech before five years were the best predictors of reading achievement.

On the basis of the evidence across different disability groups (e.g. autism, Down syndrome and SLI), it is reasonable to predict that autistic children can learn to read with comprehension at the level that their language comprehension skills support. However, the reciprocal nature of reading and spoken language progress needs to be recognised. Children learn new vocabulary, concepts and grammar from reading books and from writing down school work, project work, stories and so forth. Therefore, being involved on reading and writing instruction, and writing in class with support, will develop language knowledge even if the child does not become an independent reader.

5.4.4 Practical approaches

There is no reason to suppose that instruction methods should be different for autistic children. They do not have difficulties with hearing or speech production, so they

should be able to master phonics. The only difference that a teacher needs to understand is the language delay, particularly in learning vocabulary and grammar. Reading materials will need to use vocabulary and concepts that are within the child's understanding and experience to ensure that comprehension is possible. It is likely that autistic children will need to be explicitly taught comprehension strategies and how to use their existing knowledge to read with comprehension (see Snowling and Frith, 1986).

There is some evidence that computer aided instruction may develop language and literacy skills for autistic children but the sample sizes are small (Heimann *et al.*, 1995; Tjus *et al.*, 1998). There is also some evidence that both the literacy and social skills of high functioning autistic children benefit from being involved in class-wide peer tutoring (Kamps *et al.*, 1994).

Many autistic children may be able to develop a sight vocabulary that can be useful to them in their daily lives: the names of classmates, the vocabulary for a timetable, days, months, weather, shopping lists etc. Minimal reading skills can be valued and made meaningful, enabling children to feel included in the literate community. Kliewer (1998) points out that while some teachers think that word reading is not reading and do not value the skill, other teachers are very skilful at making full and valued use of a pupil's sight vocabulary within the life of the classroom, school and community.

Since many autistic children have severe learning difficulties and are therefore unlikely to become skilled independent readers, they will benefit from being involved in literate activities – story reading, plays etc as recommended for other severely and profoundly disabled children (eg Grove, 1998).

5.4.5 Emerging practice (pupils with autistic spectrum disorders)

There is negligible emerging practice regarding literacy and pupils with severe autistic spectrum disorders. Those pupils at the more able end of the continuum will probably be in mainstream schools and be reading at more typical rates of progress, with ordinary instruction; they will thus be affected by general developments in literacy teaching as a result of the NLS.

5.5 Summary: literacy and pupils with severe communication difficulties

The definition of specific speech and language impairment is imprecise but is used for children with significant delays in developing spoken language, in the absence of hearing loss, brain damage or any condition known to be associated with language delay, such as autism. Phonology, grammar, semantics and pragmatics can all be affected.

There is no evidence that pupils with specific language impairment and, respectively, low or average, non-verbal ability need to be separated unless the outcomes are different - and studies do not show these. However, the profile of a child's needs affects his/her educational placement and pupils who have cognitive impairment as

well as speech and language impairment may be placed in schools where there is less speech therapy available.

Speech and language delays at the age of five will affect literacy acquisition and, even where difficulties are resolved in early school years, children may still be at risk of persistent phonological processing impairment which will have long-term effects on reading attainment. Thus teachers should be alert to the fact that children may continue to need support.

Teaching approaches can be the same as for any other child but children will benefit from an explicit focus on teaching phoneme awareness, segmentation and blending and pupils will need reading material that is within their language comprehension level. Paired and shared reading are beneficial and these pupils will be slower in becoming independent readers. They benefit from structured, whole-class literacy instruction combined with individual instruction.

As with other groups, early years experience is critical. Many children with speech and language impairment may have had poor experiences. Working with parents in the early years is thus an important preventative measure.

Most children with classic autism have speech and language impairment, as well as cognitive delay; they do not develop sentence level, meaningful, spoken language and have particular difficulty with the semantic and pragmatic aspects of language. Almost all the work on educational interventions for children with autistic spectrum disorders focuses on communication, social interaction and concept development rather than literacy acquisition. However, there is no evidence that approaches to literacy need be any different from ordinary mainstream practice and these children should be able to master phonics. However, teachers need to be aware of the language delay, particularly in learning vocabulary and grammar, and reading materials need to be within the child's understanding and experience to ensure comprehension.

In small scale studies, both peer tutoring and computer-aided instruction have been found to be effective.

Chapter 6 - Pupils with mild and moderate learning difficulties and with specific learning difficulties

Introduction

Pupils with mild and moderate learning difficulties and those with specific learning difficulties represent the largest cohort of pupils with literacy difficulties in mainstream schools. They are those pupils with special educational needs with whom many mainstream teachers will be most familiar, as most will be in mainstream classrooms without a statement of SEN. However, these groups are not included within the main focus of this review, which is on pupils with the most severe difficulties. The section that follows, thus, represents an overview of the literature on approaches to literacy for pupils in these groups and is based on reviews of the literature rather than the original texts, as in previous chapters.

6.1 The nature of the population

6.1.1 Pupils with mild and moderate learning difficulties

Croll and Moses (1985) conducted a special needs survey in which they interviewed over 400 teachers in 61 schools. They found that the teachers identified reading difficulties as by far the most important single special need, and that in most traditional remedial work the emphasis tended to be on reading skills in particular. In the 1994-95 school year, just over 2.5 million individuals aged 6 to 21 with learning disabilities were receiving assistance through special programmes in the USA (US Department of Education, cited in Snow *et al.*, 1998, p.89). This represented 4.43 per cent of all individuals in this age bracket. Given the generally accepted estimate that reading disability accounts for 80 per cent of all learning disabilities (Lerner, 1989), this meant that 3.54 per cent of students, or just over 2 million, were ostensibly receiving services for a reading disability.

6.1.2 Definition, incidence and aetiology

The Warnock Report ... suggested that children with a *mild* learning difficulty can successfully be helped to follow the normal curriculum and 'indeed the majority will be able to manage, with appropriate support, in ordinary classes.' Appropriate support includes remedial teaching and also teaching which takes account of their difficulty in mastering complex ideas; 'many require persistent personal support and encouragement if they are to make progress.'
(Gulliford, 1985, p.33)

As Gulliford points out, the Warnock Committee (Warnock Report, 1978) defined both this group and those with moderate and severe learning difficulties in terms of an appropriate *curriculum*, and not in terms of symptoms or aetiology. In line with this, children with 'milder' learning difficulties seem to be defined, currently, as those 'making slow but discernible progress within the National Curriculum' (Crowther *et al.*, 1998, p.20). Gulliford (p.41) also estimated that the proportion of pupils with

mild difficulties may be 10 to 15 per cent ‘depending on how special needs are defined’. Clark (1970, p.128) concluded from her research into ‘backward’ readers drawn from 1544 children aged 7 in Dunbartonshire that ‘The striking finding was the *diversity* of disabilities and *not* an underlying pattern to the group.’ This finding is inherently plausible, given that this group of children is in a grey area between the low end of the broad middle band of attainment on the one hand and those with more specific and identifiable disabilities on the other.

6.1.3 Pupils with specific learning difficulties

While it is recognised that specific learning difficulties embraces a wide range of difficulties relating to literacy and that pupils with dyspraxia may have difficulties with tasks associated with literacy, comment here is restricted to pupils with dyslexia.

Dyslexia is evident when accurate and fluent word reading and/or spelling develops very incompletely or with great difficulty. This focuses on literacy at the ‘word level’ and implies that the problem is severe and persistent despite appropriate learning opportunities. It provides the basis for a staged process of assessment through teaching. (British Psychological Society, 1999, p.18)

This recent definition of dyslexia is based on one suggested by a committee in the Netherlands (Gersons-Wolfensberger and Ruijsenaars, 1997, p.209), and it has been proposed by a working party of the Division of Educational and Child Psychology of the British Psychological Society (and is used for the purposes of this review) in order to avoid the controversies that have often obscured this field for a generation. Unlike many previous definitions, this one does not incorporate any causal explanation, whether neurological or cognitive: rather, it focuses on the major presenting symptom.

Many previous definitions referred to a discrepancy between literacy and other attainments or IQ, thus implying that children of below-average attainment or potential could not have dyslexia, when some plainly do. Wright *et al.* (1996) showed that discrepancy definitions did not identify pupils with dyslexia with sufficient reliability over a time-span of five years to serve as a good diagnostic tool. More generally, Stanovich (1991; Stanovich and Stanovich, 1997) demonstrated that discrepancy definitions were logically incoherent. If there is still an implied ‘discrepancy’ even in the current definition, it is only between a broad notion of ‘normal’ progress and the lack of progress in pupils with dyslexia.

The term ‘specific learning difficulties’ (SpLD) is sometimes used to refer to dyslexic difficulties and sometimes more broadly (e.g. Poustie, 1997). One of the reasons for the recent convergence on the definition of dyslexia given above seems to have been a rapprochement between the dyslexia and SpLD approaches, and the terms will be used interchangeably here.

Given the variety of definitions it is not surprising that estimates of the incidence of dyslexia/SpLD have also varied widely. Authoritative estimates from experts in the field range from over six per cent (Rutter *et al.*, 1970; Snowling, 1987) via ‘two to four per cent’ (Purcell-Gates, 1999) to two per cent (Miles, 1991). Miles and Miles

(1999) point out that the condition represents a spectrum and estimates rise steeply if 'partial' and 'marginal' manifestations of dyslexia are included.

Though underlying causes are no longer included in the definition, there is now considerable agreement over the major cognitive cause of dyslexia/SpLD (see Miles and Miles, 1999, chapter 4, pp 30-43). This is a deficit in what Stanovich (1988), based on wide analysis of the literature and his own empirical studies, dubbed the 'phonological core variable'. In this theory, what all pupils with dyslexia have in common is a problem with perceiving and remembering sounds in words. This affects a range of abilities: for example, to sound words out, to hold a sequence of sounded-out phonemes in memory long enough to blend them, or to hold a string of slowly decoded/identified words in memory long enough to integrate their meanings into a sentence.

The area of specific learning difficulties has been characterised by a series of interventions that have not proved effective. Prior (1996, pp.134-5, 142) lists a range of non-language-related strategies including: visual perceptual training, 'eye-skilling', special diets, motor activities (e.g. trampolining and balancing practice), drug treatment (e.g. with sea-sickness tablets), 'teaching to the right hemisphere', kinesiology, placement in a special class, and 'modality training' (teaching supposedly designed to fit children's preferred mode of learning, e.g. visual or auditory). To these should be added the use of spectacles or patches which occlude one eye, coloured lenses and coloured overlays. While there is empirical evidence that overlays help a small minority of readers (Tyrrell *et al.*, 1995) those who are helped by this approach are sufferers of dyslexia, but suffer from 'Meares-Irlen' or 'scotopic sensitivity' syndrome. The messages here are that, while each of these approaches may give benefit to some young people, none of them addresses the central language problem which requires language-related treatment.

6.2 Practical approaches

6.2.1 Pupils with mild and moderate learning difficulties

Both Clark (1970) and Morris (1966) long ago stressed the importance of well-organised teaching, and especially the crucial role of strong leadership by headteachers - an insight confirmed by all recent research on effective schools. For many children with special needs this leadership is particularly necessary to ease their social integration within the mainstream.

The curricular emphasis for this whole group in recent years has been on 'mainstream with support'. Gulliford (1985, pp.43-7) laid out what this might mean in practice, under three headings. Above all, it implies help with poor reading and writing. Where this once mainly (especially in secondary schools) meant withdrawal for remedial teaching, increasingly it has taken the form of support in the classroom, so that the help can relate more directly to the current lesson. Secondly, children with mild learning difficulties need support 'aimed at improving mental functioning - observing, reasoning and acquiring appropriate language' (p.44). Thirdly, these children, along with many other lower attainers, need personal and emotional support,

especially if their experience of failure has resulted in frustration, low self-esteem and even hostility to learning.

6.2.1.1 Literacy instruction

In 1990, Marston *et al.* (1995) conducted a field test in Minneapolis, of six research-based strategies for teaching reading to children with mild learning disabilities. They worked with 31 special education teachers and 176 children. The children were given a reading comprehension test before the intervention, their average standard score was at the 5th percentile. The experimental methods were implemented for 45 minutes per day for 10 weeks. The approaches which Marston *et al.* investigated (with the numbers and age range of their subjects, and the effect size calculated by dividing each group's gain score by its pre-test standard deviation) were:

- computer-assisted instruction (N = 25; ages 8-10; effect size = 1.11);
- reciprocal teaching (N = 24; ages 7-10; effect size = 0.84 after correcting a misprint in the stated gain score);
- effective teaching principles (N = 22; ages 8-10; effect size = 0.78);
- direct Instruction using promoter's materials (N = 30; ages 6-11; effect size = 0.59);
- direct Instruction using other materials (N = 25; ages 7-11; effect size = 0.47);
- peer tutoring (N = 27; ages 7-11; effect size = 0.39).

These results need to be interpreted with some caution because of the small numbers involved, and because no control or valid comparison groups were involved. However, the overall impression is that the more structured and targeted the approach, without focusing too narrowly on the mechanics of reading, the more effective it was.

Peer tutoring was, by definition, the only one of these methods not delivered directly by teachers. The 'tutoring' peers were said to have been trained in a structured approach and to have been supervised by teachers trained to do so, but it seems inevitable that the structure was looser and the focus narrower than in the approaches delivered by teachers. Better results with the similar 'Paired Reading' technique were reported by Topping and Lindsay (1992), principally on the basis of Topping's (1990) large-scale research in Kirklees. Here, the 'tutors' were all trained in a very specific technique designed to be helpful to the 'tutee'.

Direct Instruction (see also below under 'self-esteem') focuses heavily on phonics and is less broad than the approaches above it in Marston *et al.*'s (1995) list. A similarly focused Phonological Awareness Training approach developed and evaluated in Buckinghamshire (Wilson and Frederickson, 1995) is one of the few pieces of British research to mention children with *moderate* learning difficulties explicitly – 12 of the 48 children in the experimental condition of the study had MLD (the other 36 were pupils with dyslexia). From the reported results it is not possible to disentangle the children with moderate learning difficulties from those with dyslexia. However, the results were at best modest: the overall effect size was 0.16, and the 48 children in the experimental condition made only slightly greater than

‘standard’ progress – 5.5 months of reading age in 5 months. Even though this was significantly greater than the progress made by the controls, this was primarily because the controls had made less than standard progress (4.4 months of reading age in 5 months).

From Marston *et al.*'s (1995) description, ‘effective teaching principles’ seems to have consisted of applying very general principles of such teaching (for example, time on task and guided practice) to the teaching of reading.

Reciprocal teaching is a heavily cognitive rather than a literacy-focused approach. It is therefore directly relevant to the second category of support mentioned by Gulliford (1995), namely that ‘aimed at improving [children’s] mental functioning’ (see below).

The computers and programs used in the ‘computer-assisted instruction’ condition of Marston *et al.*'s (1995) research may, from the date, have been less flexible and sophisticated than those now available. However, it seems that effectiveness then, as more recently, depends on how the technology is used. The programs used in Minneapolis included instruction in decoding, sight word recognition and comprehension, and all aspects were closely supervised by the teachers, including creation of their own comprehension questions.

6.2.1.2 Support for cognitive functioning

The only relevant piece of research located was the reciprocal teaching condition in Marston *et al.*'s experiment. In effect, the technique consists of encouraging critical thinking guided by text – hence close and attentive reading is of the essence, plus the skill on the teacher’s part of asking open-ended and not just literal comprehension questions, with patience in waiting for thoughtful answers. It was perhaps the combination of close attention and patient openness which gave this technique its effectiveness.

6.2.1.3 Emotional factors (self-esteem)

No directly relevant research was found on the need to boost the self-esteem of readers with mild learning disabilities. However, there is the powerful but neglected work of Lawrence (1985, 1988) which focuses on increasing both the self-esteem and the reading attainment of pupils with general reading difficulties. Working with 8-to 9-year-old children in Somerset all ‘considered to be retarded in reading’, he showed that self-esteem counselling by non-professionals *plus* a specific reading treatment can be effective in significantly increasing both reading attainment and self-esteem, and that the improvement to self-esteem can also (and perhaps more cost-effectively) be delivered through appropriate drama teaching.

Interestingly, in his main study, Lawrence used Direct Instruction as the specific reading intervention. Though moderately effective, it was no more so in this case than the no-treatment control condition. But when used in conjunction with self-esteem training it was highly effective.

6.2.1.4 Pupils with general reading difficulties

Brooks *et al.* (1998) analysed the available British research on intervention schemes designed to raise the attainment of lower-achieving but non-dyslexic children in Years 1-4. Based on 20 studies reporting about 30 approaches (including the Buckinghamshire study, Topping's Paired Reading study (and the work of Lawrence just mentioned) their main conclusions (p.14) were:

- normal schooling ('no treatment') does not enable slow readers to catch up;
- work on phonological skills should be embedded within a broad approach;
- children's comprehension skills can be improved if directly targeted;
- working on children's self-esteem and reading in parallel has definite potential;
- IT approaches only work if they are precisely targeted;
- large-scale schemes, like the Basic Skills Agency's Family Literacy programmes and Reading Recovery, though expensive, can give good value for money;
- where reading partners are available and can be given appropriate training, partnership approaches such as Paired Reading can be very effective;
- most of the schemes which incorporated follow-up studies continued to show gains.

These conclusions are very much in line with more detailed analyses conducted in the USA.

6.2.1.5 Pupils with dyslexia

The most recent comprehensive review of the literature on dyslexia appears to be Tansley and Panckhurst (1981). By far the largest section of their book concerned aetiology, with the section on experimental research on pedagogy occupying four pages. This imbalance in the field seems to have continued to the present. For example, in Pumfrey and Elliott (1990), just three relevant experiments were found, two of which had previously been published elsewhere; and in the two volumes edited by Reid (1996a,1996b), the number of relevant experiments reported also appears to be three, of which again two had been published before.

Tansley and Panckhurst (1981) summarised their four pages dealing with experimental research as follows: 'The evidence on the efficacy of remedial teaching is not encouraging' (p.203) However, they mentioned a study by Hornsby and Miles (1979, 1980; also reported in Hornsby and Farrer, 1990), who examined the records of three dyslexia centres in Britain; it should be noted that none of these was a regular school. The programmes in the centres were regarded as basically the same, being structured, sequential, cumulative and thorough: these are the characteristics identified by the authors from their review of the literature (mostly texts published in the 1970s) as the critical ones for literacy programmes for pupils with dyslexia (Hornsby and Miles, 1980, pp.236-7). Success was judged by comparing children's rate of progress from age 5 until treatment began, with their rate of progress during

treatment. The 107 children studied had an average age of 10:7; all had an IQ of 95 or above and a spelling age of less than 80 per cent of chronological age; their reading ages were also mainly below their chronological ages. Before the programme started, all the pupils in the sample had received various interventions, none of which had been successful. The average length of teaching was 17.5 months, while the average reading age gain and average spelling age gain were both 27.7 months – ratio gains (see Topping and Lindsay, 1992; Brooks *et al.*, 1998, pp.62-3) of 1.6; any ratio gain over 1.4 represents significantly greater than expected progress.

Topping (1996) summarised two small studies which used the Paired Reading technique already mentioned. The first, by Young and Tyre (1983), reported a study of 15 children aged between 8 and 13 whose reading ages were all at least two years below their chronological ages. A number of Paired Reading schemes were employed either simultaneously or sequentially, according to the needs of the individual children. These were further supported by parent-tutored writing and spelling activities, as well as three one-week ‘holiday schools’. After one year’s Paired Reading with their parents (and other support), the sample pupils had gained on average 1.8 years of reading age, while a matched control group had gained 0.8 of a year, and a matched comparison group of reading-delayed but non-dyslexic pupils had gained 2.0 years.

The second study mentioned, Evans (1984), reported a study of six children aged 10 to 13 whose reading ages were between 1.5 and 5.5 years below their chronological ages. Parent tutors were recruited and two training meetings were held prior to the implementation of a Reading Together programme before training for a Reading Alone programme. There was an initial seven week commitment, during which time home-school record sheets were used to keep a diary of activity and progress; weekly home visits were made. After seven weeks of Paired Reading with their parents, the sample pupils had gained on average 2.8 months in reading accuracy and 15.5 months in reading comprehension on the Neale Analysis of Reading Ability. Topping and Lindsay (1992) comment that, ‘although home visits do tend to improve the effectiveness of a project as measured by reading test gains, nevertheless very good results are obtainable with no home visits whatsoever’.

These two studies represent a total sample of 21 children which can support only the tentative conclusion that Paired Reading can work for pupils with dyslexia as well as for other pupils with reading difficulties. Paired Reading is just one of the techniques available. Topping (1989) refers to various options, including Shared Reading, the Pause Prompt Praise technique, parent workshops, token reinforcement procedures, precision teaching methods, and Direct Instruction programme.

Thomson (1988a, 1988b, 1990) reported the results of a teaching programme for pupils with dyslexia based on three principles: phonetic teaching, overlearning and multi-sensory teaching. Most approaches for teaching phonetics include sorting words into ‘word families’ - aurally, by visual inspection or by using tactile sense. The second principle, overlearning, implies that the same material should be presented to the child repeatedly. In addition, a particular letter pattern or sound unit is taught separately and not with others that are similar, which overcomes some of the

interference created between different sounds that can subsequently have an impact on the child's memory and organisation._

The final principle - multi-sensory teaching - focuses on making links between sound, symbol and written form. This may be done by using a technique such as 'simultaneous oral spelling' which reinforces the following:

- hearing the word;
- organising the sounds in it;
- feeling the structure of the word;
- hearing the sound patterns again;
- seeing the word on the page;
- re-visualising it.

The 68 children studied were aged 10:11 on average at entry and 12:10 on leaving. In an average of 23 months they made average ratio gains of between 1.2 and 1.8 on three measures of reading and one of spelling, compared to ratio gains of 0.4 for reading and 0.3 for spelling of pupils with dyslexia who were not exposed to the programme (Thomson, 1988b). The results showed that these sample pupils were not only doing better than pupils with dyslexia who were not given help, but were achieving results better than the 'norm'.

Lane (1990, pp.251-2) reported a small experiment based on his ARROW (Aural-Read-Respond-Oral-Write) technique. Ten children aged 9:9-12:11 (average: 11:1) practised ARROW 15 minutes a day for a year. The study involved four procedures of which the children had to meet at least one. They were:

- ARROW spellings;
- ARROW curriculum material;
- commercial reading scheme material appropriate for readers of all ability levels;
- factual informative readers with comprehension cards using cloze procedures for the less able child and open-ended questions for the more able child

Prior to beginning the ARROW programme, the children were given three tests: a Schonell sight recognition test; Daniels and Diack contextual reading test; and Schonell spelling age test. Results after one year showed a marked increase in their performance in all three tests.

Lane also considered the organisation of this programme within the classroom and suggests that success is best achieved on an extraction basis within a vacant room. He goes on to say that the pupil should be able to see the teacher's face clearly and that care should be taken by the teacher not to dominate the pupil too much within the session.

Calcluth (1996) described her own PASS (Phonic Attack Structured Skills) Programme as 'a multi-sensory structured phonics programme for children with dyslexic-type difficulties'. She gave basic data on a study of 24 children, of whom nine had marked specific difficulties (Group 1, who received between six and 13 sessions), 10 had minor difficulties (Group 2, between one and three sessions), and five had none (Group 3, no sessions). In six months, the average reading age gains were 9.6 months for Group 1 (RG = 1.6), 15.2 months for Group 2 (RG = 2.5), and 7.4 months for Group 3 (RG = 1.2). The untreated group had made standard progress, while those with minor difficulties had made excellent progress, and those with marked difficulties had made better than expected progress. But again, the numbers were very small.

A number of writers advocate a multi-sensory approach (Orton, 1989; Miles and Miles, 1999). The literature suggests that pupils with dyslexia find it easier to recognise word-divisions if they are larger than phonemes. For example, Liberman (1973) found that nearly half of a sample of 40 pupils aged 6-7 could tap out syllables but only 17 per cent could tap out phonemes. A focus on onset (initial consonant) and rime (vowel and final consonant/s) has been found to be effective (Trieman, 1985; Goswami, 1986, 1988; Miles, 1998).

Corroborating evidence comes from the experiment conducted in Cumbria by Hatcher *et al.* (1994) on pupils who found reading difficult but did not necessarily have dyslexic difficulties. This experiment had four conditions: a Reading Recovery-like remedial reading programme which included multi-sensory elements; a programme of Phonological Training (which included analysis at the onset-rime level); a condition in which children received both; and a control condition in which children received neither. Only the combined Reading and Phonology programme produced significant gains. Each programme involved the children being taught individually for 40 half hour sessions spread over 20 weeks. _

The results suggested that, in order to be effective in boosting reading skills, the training of phonological and reading skills needs to be integrated. Groups given the integrated training improved more in reading skills than did the other groups who were given equal amounts of teaching concentrated solely on either reading or phonological training.

Essentially the same result emerged from a very similar study in Rhode Island (Iversen and Tunmer, 1993). In a later article, Tunmer (1994) noted the characteristics of the approach which made it appropriate for pupils with dyslexia: onset-rime precedes the development of phonemic segmentation ability and assists in the process of isolating and recognising individual phonemes; vowel sounds in rimes are more stable; using onset-rime divisions delays the need for blending individual phonemes within rime patterns (something that pupils with dyslexia find difficult); it is useful for establishing sublexical relationships between spoken and written words.

An implication of the copious research on the role of phonology (and of the theory behind multi-sensory approaches – these are much less well researched) is that reading should not be tackled in isolation from writing. In particular, learning to spell can provide much of the necessary multi-sensory and phonological input to progress

in reading. Multi-sensory input can be provided through, for instance, handling letter blocks or writing letters in sand trays.

The phonological aspect needs to be tackled from the most fundamental level – the identification and segmentation of phonemes, which together constitute phonemic awareness (Byrne, 1998; Brooks, 1999). Once auditory discrimination and identification of phonemes are achieved, links between phonemes and graphemes (phoneme-grapheme correspondences) need to be established for spelling words by sounding out phonemes and writing the graphemes in sequence. According to the theory of Frith (1985), based on analyses of the literature and her own research, this appears to be easier and earlier, at least in normal learners, than the establishment of grapheme-phoneme correspondences needed in reading aloud by phonic methods; and the establishment of this process in spelling seems to facilitate the development of the mirror-image process in reading.

The principle of early intervention applies to pupils with moderate learning difficulties and specific learning difficulties as it does to pupils with all other types of special educational needs. While the reviews considered in this chapter did not mention comparison studies, there is some evidence from a report from Her Majesty's Inspectorate (Ofsted, 1999) that, of the pupils whom they observed in their study, the most progress was made when appropriate specialist intervention had followed early identification. Slower progress in reading among pupils identified as having specific learning difficulties was associated more strongly with late diagnosis and intervention than with any particular form or organisation of support. It should be remembered that other sections of this literature review make the point that pupils who do not receive appropriate support as soon as their difficulties emerge are liable to experience failure and thus lose confidence and develop low self-esteem, which, in turn, has a negative impact on their learning.

6.3 Summary: pupils with moderate learning difficulties and pupils with specific learning difficulties

Pupils with moderate learning difficulties and with specific learning difficulties form the largest group of pupils with special educational needs and will be those with whom teachers working in mainstream schools will probably be most familiar. Most of this cohort will be in mainstream classrooms.

The evidence suggests that pupils in both groups will progress most rapidly where management systems allow for early identification followed by appropriate interventions. The latter involve ordinary approaches but highly structured and targeted, with support for general learning (study skills) as well as for the lack of confidence that will arise if pupils experience repeated failure. There is evidence that the application of general principles of good classroom practice (for example, time on task, guided practice, rapid feedback) is as important as particular approaches focused on elements of literacy such as paired reading (studies show that both parents and peers can be effective if trained). Studies also put emphasis on teachers' ability to assess comprehension by skilled questioning, so that attention is paid to meaning-making as well as the mechanics of decoding.

Effective programmes for pupils with dyslexia are characterised by being structured, sequential, cumulative and thorough. Pupils with dyslexia also benefit from phonetics teaching (though onset-rime awareness precedes the development of phonemic segmentation ability), overlearning and a multi-sensory approach, making the link between sound, symbol and written form.

Classroom interventions can be effectively reinforced by such approaches as parental interventions (including home visits) and summer schools.

Chapter 7 - Conclusion

7.1 Overview of the research literature

There are four points to be made about the whole corpus of literature on literacy and pupils with special educational needs.

7.1.2 The quality of the literature

First, and most importantly, each reviewer independently observed that, in general, the relevant research literature on literacy and pupils with significant special educational needs in his/her particular field was partial and insubstantial. This is partly explained by historic circumstances and other factors including:

- the relatively late introduction of literacy into the curriculum for pupils with severe and profound and multiple learning difficulties;
- the relatively recent use of information and communication technology and the rapid development of the field making longitudinal evaluation difficult;
- the partial nature of the evidence within particular fields making comparisons between approaches difficult - eg in the field of visual impairment, more research has been done on the use of braille text than on the use of large print text, largely because it is only relatively recently that technological developments have made the latter readily accessible in the field of ICT, word-processing has attracted the most attention and relatively few research studies have focussed on access technology for groups with low-incidence conditions, or on more complex applications such as expert systems, assessment tools, simulations, multimedia design or web-based communication;
- the difficulty in 'matching' cohorts of pupils with special educational needs in order to do rigorous comparative studies;
- the absence, until very recently, of large sets of reliable comparative attainment data to assess the outcomes of different pedagogic approaches;
- the small numbers in cohorts, particularly of 'low incidence' special educational needs.

The result of these factors is that much of the literature is based on teacher/practitioner experience and opinion rather than on rigorous research studies. Practitioner experience is extremely valuable and may be authenticated by research; however, it cannot be accepted with confidence without scrutiny. At present, much of the work in the field of literacy and pupils with special educational needs is at an early stage of development, with small numbers and particular contexts.

This has implications not only for generalisability but also for quality. Single case and 'small N' studies are, by definition, usually highly context-specific and, in the case of the former, individualised. Thus the rigour of the investigation is very different from that which would have to be applied to a large sample. Furthermore, many of the idiosyncrasies and particularities of the context - for example, the detail

of the teaching approach - are not commented on by the researchers; these background variables would be thrown more sharply into focus were studies larger. Very few researchers report significant gains from a particular approach across very different contexts (Hornsby and Miles (1980), studied an intervention in three very different, environments, but none of these was a regular school).

7.1.3 Links with mainstream approaches

Secondly, much of the existing literature confirmed or reinforced what is known about the acquisition of literacy with the 'normal' cohort of pupils. Yet some of these findings are presented as though they are unique to pupils with learning difficulties. Cases tend to be, unsurprisingly, where 'findings' are conceptual rather than empirical. For example, a study in the US on reading achievement of partially sighted pupils found that those who did not read at home read less well than those who had books at home and therefore read more. Other studies - for example, showing the necessity of prerequisites for literacy (reading to children so that they are motivated to acquire reading skills themselves) - also relate closely to those for the majority population. Similarly, some studies suggest that it is difference in pacing or the degree of one-to-one attention, rather than qualitative differences in approach, that are beneficial to the acquisition of literacy skills for pupils with significant learning difficulties. Commentators make the point repeatedly that teachers need to differentiate material and to be aware that, because of the nature of his/her difficulties, a pupil's skills may be out of balance - that is, some may be more developed than others and the pattern may not be one normally encountered.

7.1.4 The focus of the research

Thirdly, within relatively limited research areas, there is competition for attention. Some of the literature, though highly relevant to the wider field, is yet at the margins of relevance to this review which focuses on teaching strategies. For example, in the field of visual impairment, there is work on tactile perception, which may affect a pupil's ability to read in Braille; or, in the field of hearing impairment, work on the maximum utilisation of residual hearing. Similarly, work in the field of dyslexia has involved interventions with coloured overlays, tinted glasses, eye patches and physical balance. There is much description of the impairments which result in difficulties acquiring literacy, comparisons of progress between those with and without particular difficulties, and analyses of present levels of attainment by cohorts. There is far less on evaluated interventions.

7.1.5 Differentiated approaches

Fourthly, while different studies make claims about the effectiveness of various interventions, there is consensus in the literature across the different areas of special educational needs, that there is no single approach that is effective for all pupils, even within one area of difficulty. A sensory impairment interacts with a pupil's learning style, motivation, environment and previous experience. The essential message is, thus, that needs should be assessed individually and that the value of particular approaches should be assessed in relation to individual progress. There is also agreement that prediction of performance rests on frail grounds at present. Thus it is

not possible to predict if a certain child will progress from symbols to text and, while there is a corpus of achievement data (a corpus which is likely to grow with more efficient recording procedures), these data can, and should, be challenged by different approaches to pedagogy and different teacher expectations.

The outcome of these characteristics of the literature is that it is apparent that craft knowledge, rather than research findings, is the principal influence on teaching strategies in this area. The review suggests that research is needed to confirm and/or systematise this craft knowledge and to explore issues which it does not address. The review has presented best evidence currently available and highlights areas which are worth exploring in greater detail.

7.2 Messages for Practitioners

7.2.1 Teaching approaches

There is no cogent evidence that, as a broad group, pupils with special educational needs which interfere with literacy acquisition require teaching approaches that are qualitatively or significantly different from those used for all pupils. However, there *is* evidence that pupils' effective learning in literacy depends on appropriate differentiation which will, in itself, often mean that the actual structure of the literacy teaching either has to be more explicit or composed/balanced differently. As the brief for this review was on the severe end of the continuum of special educational needs as regards learning and communication difficulties and sensory impairment, it is assumed (as was pointed out in the introduction) that the majority of the pupils to whom this review applies will have a statement of special educational needs or will be receiving special educational needs school-based provision as set out in the Code of Practice. The suggestions which flow from this review are made in the light of this fact. What follows is not a repetition of the very particular strategies which are valuable in particular circumstances for particular pupils: for these recommendations, readers are referred to the summaries at the end of each of the sections as well as the full reports which precede them. Rather, what follows considers the general management strategies which need to be in place for the young people concerned to benefit from the recommendations.

7.2.2 Initial assessment

The authors of the different sections of this review all suggest that the personal characteristics necessary for the acquisition of literacy are so wide-ranging that, first and foremost, the individual profile of the child must be assessed. A group of children with the same level of sensory impairment will respond to literacy tasks differently, for example pupils with Down syndrome have a range of ability levels.

The first clear message is, thus, that initial assessment is critical for establishing a child's entry point, strengths and weaknesses which will inform the literacy programme which s/he will follow. There is evidence from the review that the initial assessment needs to be undertaken by someone who is familiar with the child's particular difficulty and can assess the child's abilities in functional, as well as purely technical, terms. However, there is also evidence that, as the child's interpersonal

skills and interactions will also be critical to his or her acquisition of literacy, the class teacher should also be involved in the assessment. Furthermore, it will be the class teacher, more than the specialist teacher, who will be aware of the existing language programme in operation in the particular class in which the child is placed and thus know what differentiation may be necessary.

7.2.3 On-going assessment

Sections of the review also gave evidence that assessment needs to be on-going and the position regularly reviewed. Experts made the point that it is not possible to make accurate judgements of a child's potential from an initial assessment. This is, first, because a child's needs change and, secondly, because existing data about levels of achievement are either insufficiently rigorous, or are based on very small samples, or are rendered out-of-date, being based on situations which have now been overtaken by new approaches to teaching or placement (eg the Literacy Hour and greater inclusion) or are descriptive and do not give challenges as to whether the levels of attainment could be higher given greater knowledge about effective teaching.

There is evidence that the collaborative approach to initial assessment needs to be maintained.

7.2.4 Early years experience

All sections of this review made mention of the fact that many of the difficulties that children experience when starting more formal literacy activities in school arise from the rather different language-related experiences that they have had in the early years. Various things can happen. For example, adults, siblings and other children may respond to the child with special educational needs differently so that the latter is isolated from the normal interactions around language that occur in the normal situation. Furthermore, stress may be put upon other aspects of the child's development (for example, signing or physical skills) so that less time is spent on pre-literacy activities and the child thus arrives at school with less (as well as different) experience of these.

The message here is that early intervention is critical to the ease with which a child with special educational needs will later acquire formal literacy. As pointed out before, this review is concerned with children with severe difficulties. It is likely, thus, that many will have been identified as being at risk before they reach the age of statutory schooling (the exception may be those who were a subsidiary focus of this review - those with specific learning difficulties). Within the multi-agency approach practised in early years' interventions, there needs to be a place for collaboration between relevant specialists, including those who are aware of the potential effect of the particular condition on the child's literacy acquisition and can advise parents of appropriate approaches within the home. Were this implemented, although the children concerned would arrive at school having had different early experiences, they might yet have richer ones than commentators suggest is often the case.

7.2.5 Working with parents

Early years interventions, very obviously, involve working with parents. There was evidence from the review that this needs to be maintained through a pupil's educational career with respect to literacy acquisition. Parental partnership is, of course, expected within routine 'good practice' relating to provision for special educational needs. However, it may be the case that particular focus needs to be put on literacy, rather than just issues of general development. Again, this relates to good practice in family literacy schemes and highlights the fact that enhancing the literacy acquisition of pupils with special educational needs may be more to do with capitalising on present mechanisms and practices rather than establishing new ones.

7.2.6 Differentiation

As noted earlier, there is evidence that adjustments to 'normal' practice have to be made in the light of the profile of the needs of an individual. For example, while experts concur that a phonetic approach is generally acceptable, exceptions were pointed out in the course of the review such as where a hearing impaired child was unable to make use of residual hearing or before a child with dyslexia had worked on onset-rime patterns. Equally, because children with visual impairment can use language inaccurately, additional attention has to be put on ascertaining their level of comprehension; and children with Down syndrome need explicit work on functional grammar. In most cases, the evidence is that there may have to be different priorities at different stages for pupils with particular special educational needs. Equally, there is evidence that some aspects of literacy do not pose a particular problem for some groups of pupils - for example, spelling for pupils with a sensory impairment; teachers thus need to be aware that these areas can be a lower priority.

7.2.7 Classroom practice

It has already been pointed out that the majority of the research studies relevant to literacy and pupils with severe special educational needs are small-scale or of doubtful quality methodologically. The literature was further noticeable for the fact that day-to-day classroom practice was rarely described or reported. While there is evidence, thus, that different emphases have to be placed upon the language curriculum for different pupils, there is negligible *research* evidence about ways of making appropriate provision within the classroom - particularly the mainstream, integrated classroom in which increasing numbers of pupils with severe difficulties are being educated. There is thus a challenge as regards implementing the research findings in the classroom so that pupils benefit.

7.2.8 A research culture

The establishment of a research culture has various dimensions.

7.2.8.1 Seeking evidence

First, there needs to be a culture within the school and the classroom in which practitioners actively seek research evidence. There are indications that special educational needs co-ordinators, who will probably be the initial contact point for the pupils with whom this review is concerned, are accustomed to this culture. There is a vast amount of literature relating to interventions for pupils with special educational needs published by local education authorities, voluntary organisations, professional associations and commercial publishers. The SENCO-forum within the National Grid for Learning is a very practical indication of the level of involvement of special educational needs co-ordinators in a very wide range of special needs. However, there is, perhaps, a tendency to direct research towards containment within the classroom or meeting needs at a general level rather than, specifically, towards literacy acquisition for these pupils. Again, there is evidence that a collaborative approach is necessary so that the situation arises whereby questions and information about literacy with respect to a particular pupil become standard expectations.

7.2.8.2 Facilitating information exchange

Secondly, there have to be opportunities for the provision and exchange of information: specialists have to be able to answer the specific questions posed by special educational needs co-ordinators, or class teachers, about particular pupils. This will affect interactions with both external colleagues (eg the specialist support services) and internal colleagues (eg between departmental or curriculum leaders).

7.2.8.3 Emerging practice

Thirdly, practitioners need to be aware that they can generate evidence, particularly in the absence of authoritative previous studies on implementation. There is a challenge for groups of teachers, across schools/services, to share ideas about the implementation of practice that has been shown to be effective as well as evidence about the efficacy of practice which has not been hitherto practised or evaluated in a form publicly accessible. It will be remembered that each section of the review ended with a brief consideration of 'emergent practice' in the particular area. It should also be noted that strong caveats were made about the status of this practice in the introduction. The present challenge is to lay the foundations for the rigorous evaluation of this emergent practice and for systematic quantification and comparison.

7.2.9 Overall management issues

There is a set of general management issues which need to be recognised by senior managers in schools and relevant local education authority support services.

7.2.9.1 Time for collaboration

Timetables and schedules for peripatetic staff need to take account of the fact that time is needed for liaison about issues to do with literacy. Practitioners need to build up a picture of 'critical times' - such as following an assessment or at transition points - when a substantial amount of time is needed, as well as the regular 'maintenance' time needed to check a pupil's progress. As was stated above, the latter is necessary in the light of pupils' changing needs.

7.2.9.2 Training

Specialist teachers need to keep abreast of developments in the field, as well as familiarise themselves with the existing literature if that constitutes a gap in their knowledge. Furthermore, they need to be aware of how these data affect classroom practice with respect to an individual pupil's learning. In addition, the review suggests that there is a wide range of awareness-raising, which may include parents as well as all the teachers and classroom assistants working with a particular pupil with special educational needs (eg for appropriate presentation of materials or so that appropriate comments can be made on the pupil's written work).

7.2.9.3 The location of specialists

Mention has been made of 'specialists' giving advice. But there is a prior question as to the location of relevant expertise. The review suggested that research had been carried out in a range of settings and with a range of pupils. Thus, other than a specialist who has an overview of research findings, it is not entirely clear where expertise is located. It may be a question of auditing experience of literacy and pupils with special educational needs and using this as a basis for sharing information and establishing the framework for further investigations (see section on research culture above). Clearly, the changing role of the special school is pertinent here.

7.2.9.4 Opportunities for sharing information and teaching approaches

A related point is that senior managers have to ensure opportunities for the exchange of ideas. The literature has pointed to the isolation of many research initiatives (significantly, a major longitudinal study of the literacy development of pupils with Down syndrome is unique internationally - see section 4). This may be attributable as much to the lack of opportunity for interchange as to researchers' own deficiencies as regards dissemination.

7.2.10 Links with Inclusion

Currently, with the introduction of the NLS and the government's focusing of attention on the literacy skills of all pupils, the time is opportune for this focus to be put within the context of another policy of the present government - that of inclusion - so that all pupils have similar opportunities to acquire a level of literacy which will equip them for as high a degree of independence as possible and to gain access to the world of literature which is largely - though not solely - dependent on efficient literacy skills.

7.3 Summary of Recommendations

7.3.1 The literacy needs of all pupils with identified special educational needs should be specifically considered as part of the general process of identification and assessment (as established in the Code of Practice), particularly with respect to pupils with severe needs.

7.3.2 Mention should be made in a pupil's individual education plan of suitable approaches to facilitate his/her progress in literacy - over and above any other targets that the pupil might have in relation to the curriculum.

7.3.3 Assessment should be a collaborative activity involving all or some of: the appropriate literacy specialist (eg the literacy co-ordinator), the class teacher, the special educational needs co-ordinator, a specialist in the pupil's particular learning difficulty (eg a teacher for deaf children) and, where relevant, the learning support assistant working with the pupil concerned.

7.3.4 Initial assessment should be followed by frequent review of specific literacy needs, involving the personnel mentioned in 7.3.3 (this is merely applying the practice well established by the Code of Practice so that there is a specific consideration of literacy needs).

7.3.5 Teachers should base expectations of pupil performance on rigorous assessment and scrutiny of progress rather than on past studies which show poor performance but which may give an inaccurate account of what pupils can achieve given effectively structured teaching.

7.3.6 Teachers should assume that all pupils can be included within the normal structure of the Literacy Hour unless there is evidence (from the collaborative assessment indicated above) that the particular difficulties of certain pupils warrant a different approach. However, at the same time, teachers need to be aware that classroom approaches will have to be differentiated in order to accommodate what is often an abnormal profile of skills in pupils with identified special educational needs, particularly those with severe needs. This will probably involve all the well established strategies for differentiation.

7.3.7 Early years' teams and relevant specialists working with the families of children with severe learning or communication difficulties or sensory impairments should be cognisant of the importance of early environment and experiences for the child's acquisition of literacy. Working collaboratively, they should identify aspects of the child's environment or experience which may need attention, and work with the family in order to compensate for aspects arising from the child's difficulties which may disadvantage the child later.

7.3.8 Senior managers at both school and local authority level (and nationally) should facilitate dialogue between practitioners working with literacy and pupils with severe special educational needs in order to raise levels of awareness and pupil achievement.

7.3.9 Practitioners should be made aware that evidence about the effect of the NLS on pupils with severe special educational needs is only evolving gradually and that all rigorously collected data can contribute to a larger corpus of evidence about practice and performance.

7.3.10 Senior managers in schools and the line managers of relevant support service personnel should facilitate co-ordination time for the collaborative planning needed to address pupils' literacy needs. The involvement of learning support assistants in collaborative planning should be encouraged wherever possible.

7.3.11 The professional development needs of specialists in local authority support services with regard to literacy and pupils with special educational needs should be considered within service development plans.

7.3.12 Within local authorities (and regionally) 'expertise' in the area of literacy and special educational needs should be audited; in many cases, this may mean that teams have to be identified.

7.3.13 The development of the literacy skills of all pupils should be regarded as a whole-school issue but due respect should be paid to the necessity of involving appropriate expertise.

7.3.14 Research should be encouraged: in particular, first, specific and detailed studies of classroom practice and, second, evaluations of different approaches with different groups of pupils.

Bibliography

- ACKERMAN, D. and MOUNT, H. (1991). *Literacy for All: a 'Whole Language Approach' to the English National Curriculum for Pupils with Severe and Complex Learning Difficulties*. London: David Fulton.
- ANDREWS, J.F. and MASON, J.M. (1991). 'Strategy usage among deaf and hearing readers', *Exceptional Children*, **57**, 6, 536-45.
- ANDREWS, J.F. and ZMIJEWSKI, G. (1997). 'How parents support home literacy with deaf children', *Early Child Development and Care*, **127-8**, 131-9.
- APPLETON, M. (2000). Reading and its relationship to language development: a comparison of pre-school children with Down syndrome, hearing impairment or typical development. Unpublished MPhil Thesis, University of Portsmouth.
- ARTER, C. and MASON, H. (1994). 'Spelling for the visually impaired child', *British Journal of Visual Impairment*, **12**, 1, 17-20.
- ARTER, C., McCALL, S. and BOWYER, T. (1996). 'Handwriting and children with visual impairments', *British Journal of Special Education*, **21**, 1, 25-9.
- ASHCROFT, S.C. (1961). 'Errors in oral reading of Braille at elementary grade levels.' In: AMERICAN FOUNDATION FOR THE BLIND *Proceedings of Conference on Research Needs in Braille*. New York, NY: American Foundation for the Blind. Cited in: LORIMER, P. (1994). *Reading in Braille: an Introductory Source Book for Teachers*. London: RNIB.
- BAGLEY, C. and MALLICK, K. (1996). 'Towards achievement of reading skill potential through peer tutoring in mainstreamed 13-year-olds', *Disability & Society*, **11**, 1, 83-9.
- BAHR, C.M., KINZER, C.K. and RIETH, H.J. (1991). 'An analysis of the effects of teacher training and student grouping on reading comprehension skills among mildly handicapped high school students using computer-assisted instruction', *Journal of Special Education Technology*, **11**, 3, 136-54.
- BANKS, J., FRASER, P., FYFE, R., GRANT, J., GRAY, M., MACAULAY, M. and WILLIAMS, S. (1989). 'Teaching deaf children to read: a pilot study of a method', *Journal of the British Association of Teachers of the Deaf*, **13**, 5, 129-41.
- BANKS, J., GRAY, C., FYFE, R. and MORRIS, A. (1991). 'An investigation of story schemata in deaf children using a new picture arrangement test', *Journal of the British Association of Teachers of the Deaf*, **15**, 1, 9-19.
- BANKS, J., MACAULAY, M. and GRAY, C. (1991). 'The use of semantic mapping and cloze inferencing in the reading instruction of deaf children: an exploratory study', *Journal of the British Association of Teachers of the Deaf*, **15**, 2, 46-59.

- BATES, E., BRETHERTON, I. and SNYDER, L. (1988). *From First Words to Grammar: Individual Differences and Dissociable Mechanisms*. New York, NY: Cambridge University Press.
- BEARD, R. (1998). *National Literacy Strategy: Review of Research and Other Related Evidence*. London: DfEE.
- BERGER, A., HENDERSON, J. and MORRIS, D. (1999). *Implementing the Literacy Hour for Pupils with Learning Difficulties*. London: David Fulton.
- BEST, A.B. (1992). *Teaching Children with Visual Impairments*. Milton Keynes: Open University Press.
- BIRD, J., BISHOP, D.V.M. and FREEMAN, N.H. (1995). 'Phonological awareness and literacy development in children with expressive phonological impairments', *Journal of Speech and Hearing Research*, **38**, 2, 446-62.
- BIRD, G. and BUCKLEY, S.J. (1994). *Meeting the Educational Needs of Children with Down's Syndrome: a Resource for Teachers*. Portsmouth: University of Portsmouth.
- BISHOP, D.V.M. and ADAMS, C. (1990). 'A prospective study of the relationship between specific language impairment, phonological disorders and reading retardation', *Journal of Child Psychology and Psychiatry*, **31**, 7, 1027-50.
- BISHOP, D.V.M. and EDMUNDSON, A. (1987). 'Language impaired 4-year olds: distinguishing transient from persistent impairment', *Journal of Speech and Hearing Disorders*, **52**, 2, 156-73.
- BISHOP, J. and GREGORY, S. (1985). 'Mothers and teachers looking at books with deaf children', *Child Language Teaching and Therapy*, **1**, 2, 149-61.
- BLOOM, L. and LAHEY, M. (1988). *Language Disorders and Language Development*. New York, NY: Collier MacMillan.
- BLYTHE SCHOOL (1986). *Working with Makaton at Blythe School*. Camberley: Makaton Development Project.
- BOWDER, D.M. and SNELL, M. (1993). 'Functional academics.' In: SNELL, M. E. (Ed) *Systematic Instruction of Students with Severe Disabilities*. Fourth edn. Columbus, OH: Charles E. Merrill. Cited in: KEMP, C. (1996). 'Does teaching young children with disabilities to read facilitate their language development? A critical review of current theory and empirical evidence', *International Journal of Disability, Development and Education*, **43**, 2, 175-87.
- BRITISH PSYCHOLOGICAL SOCIETY. WORKING PARTY OF THE DIVISION OF EDUCATIONAL AND CHILD PSYCHOLOGY (1999). *Dyslexia, Literacy and Psychological Assessment*. Leicester: British Psychological Society.

- BROADLEY, I., MacDONALD, J. and BUCKLEY, S.J. (1995). 'Working memory in children with Down's syndrome', *Down's Syndrome: Research and Practice*, **3**, 3-8.
- BROOKS, G. (1999). 'Phonemic awareness is a key factor in learning to be literate – how best should it be taught?' Paper presented at the Ofsted Invitation Seminar on 'The Importance of Phonics in Learning to Read and Write', Strand Palace Hotel, London, 29 March.
- BROOKS, G., FLANAGAN, N., HENKHUZENS, Z. and HUTCHISON, D. (1998). *What Works for Slow Readers? The Effectiveness of Early Intervention Schemes*. Slough: NFER.
- BROOKS, R. (1997). *Special Educational Needs and Information Technology: Effective Strategies for Mainstream Schools*. Slough: NFER.
- BRYANT, P., NUNES, T. and BINDMAN, M. (1998). 'Awareness of language in children who have reading difficulties: historical comparisons in a longitudinal study', *Journal of Child Psychology and Psychiatry*, **39**, 4, 501-10.
- BUCKLEY, S. (1985). 'Attaining basic educational skills: reading, writing and number.' In: LANE, D. and STRATFORD, B. *Current Approaches to Down's Syndrome*. Eastbourne: Holt, Rinehart & Winston.
- BUCKLEY, S. and BIRD, G. (1993). 'Teaching children with Down syndrome to read', *Down Syndrome: Research and Practice*, **1**, 1, 34-9.
- BUCKLEY, S., BIRD, G. and BYRNE, A. (1996). 'Reading acquisition by young children with Down syndrome.' In: GUNN, P. and STRATFORD, B. (Eds) *New Approaches to Down Syndrome*. Second edn. London: Cassell.
- BUCKLEY, S.J. (1993). 'Improving the expressive grammar of teenagers with Down's syndrome.' In: CLIBBENS, J. and PENDLETON, B. (Eds) *Proceedings of the Child Language Seminar*. Plymouth: University of Plymouth.
- BUCKLEY, S.J. (1995). 'Teaching children with Down syndrome to read and write.' In: NADEL, L. and ROSENTHAL, D. (Eds) *Down Syndrome: Living and Learning in the Community*. New York, NY: Wiley.
- BUCKLEY, S.J., BIRD, G., SACKS, B.I. and ARCHER, T. (forthcoming, 2000). 'A comparison of mainstream and special school education for teenagers with Down syndrome: effects on social and academic development', *Down Syndrome: Research and Practice*, **7**, 1.
- BUCKLEY, S.J., EMSLIE, M., HASLEGRAVE, G. and LEPREVOST, P. (1986). *The Development of Language and Reading Skills in Children with Down's Syndrome*. Portsmouth: Portsmouth Polytechnic.

- BUCKLEY, S.J. and SACKS, B.I. (1987). *The Adolescent with Down Syndrome - Life for the Teenager and for the Family*. Portsmouth: Portsmouth Polytechnic.
- BURDEN, V. and CAMPBELL, R. (1994). 'The development of word-coding skills in the born-deaf: an experimental study of deaf school-leavers', *British Journal of Developmental Psychology*, **12**, 3, 331-49.
- BURDEN, V., STOTT, C.M., FORGE, J. and GOODYER, I. (1996). 'The Cambridge Language and Speech Project (CLASP): detection of language difficulties at 36-39 months', *Developmental Medicine and Child Neurology*, **38**, 613-31.
- BUULTJENS, M., AITKEN, S., RAVENSCROFT, J. and CAREY, K. (1999). 'Size counts: the significance of size, font and style of print for readers with low vision sitting examinations', *British Journal of Visual Impairment*, **17**, 1, 5-10.
- BYRNE, A. (1997). The development of reading skills in children with Down syndrome. Unpublished Ph.D. thesis, University of Portsmouth.
- BYRNE, A., BUCKLEY, S., MacDONALD, J. and BIRD, G. (1995). 'Investigating the literacy, language and memory skills of children with Down's syndrome', *Down Syndrome: Research and Practice*, **3**, 2, 53-8.
- BYRNE, A., MacDONALD, J. and BUCKLEY, S.J. (1996). 'A cognitive analysis of reading strategies in Down's syndrome.' Paper presented at the BPS Cognitive Psychology Section 13th Annual Conference, University of Keele, 16-18 September.
- BYRNE, A., MacDONALD, J. and BUCKLEY, S. (in preparation). The Development of Reading Strategies over Time for Children with Down Syndrome and their Mainstream Peers.
- BYRNE, B. (1998). *The Foundation of Literacy: the Child's Acquisition of the Alphabetic Principle*. Hove: Psychology Press.
- CALCLUTH, H. (1996). 'A Phonic Attack Structured Skills Programme (P.A.S.S.).' In: REID, G. (Ed) *Dimensions of Dyslexia, Volume 1: Assessment, Teaching and the Curriculum*. Edinburgh: Moray House Publications.
- CAMBRIDGE, T. and ABDULEZER, S. (1998). 'Sharing Shakespeare: integrating literature, technology, and American sign language', *NASSP Bulletin*, **82**, 594, 19-23.
- CARPENTER, B. and DETHERIDGE, T. (1994). 'Writing with symbols', *Support for Learning*, **9**, 1, 27-32.
- CARR, J. and HEWITT, S. (1982). 'Children with Down syndrome growing up', *Association for Child Psychology and Psychiatry News*, **10**, 10-13.
- CARREIRAS, M. and ALVAREZ, C.J. (1999). 'Comprehension processes in Braille reading', *Journal of Visual Impairment and Blindness*, **93**, 9, 589-95.

- CARTER, S. (1985). 'Darling's world of books', *The Exceptional Parent*, May, 23-5.
- CASEY, W., JONES, D., KUGLER, B. and WATKINS, B. (1988). 'Integration of Down's syndrome children in the primary school: a longitudinal study of cognitive development and academic attainments', *British Journal of Educational Psychology*, **58**, 4, 279-86.
- CASTEEL, C.A. (1988) 'Effects of chunked reading among learning disabled students: an experimental comparison of computer and traditional chunked passages', *Journal of Educational Technology Systems*, **17**, 2, 115-21.
- CATTS, H.W. and KAMHI, A.G. (1999). *Language and Reading Difficulties*. Boston: Allyn & Bacon.
- CENTER, Y. and FREEMAN, L. (1997). 'The use of a structured literacy program to facilitate the inclusion of marginal and special education students into regular classes', *Australasian Journal of Special Education*, **21**, 1, 45-62.
- CERRA, K.K., WATTS-TAFFE, S. and ROSE, S. (1997). 'Fostering reader response and developing comprehension strategies in deaf and hard of hearing children', *American Annals of the Deaf*, **142**, 5, 379-85.
- CHAPMAN, E.K. and STONE, J.M. (1988). *The Visually Handicapped Child in Your Classroom*. London: Cassell.
- CHAPMAN, R. (1999). 'Language development in children and adolescents with Down syndrome.' In: MILLER, J.F., LEDDY, M. and LEAVITT, L.A. (Eds) *Improving the Communication of People with Down Syndrome*. Baltimore, MD: Paul H. Brookes Publications.
- CHAPMAN, R.S. (1997). 'Language development in children and adolescents with Down syndrome', *Mental Retardation and Developmental Disabilities Research Reviews*, **3**, 307-12.
- CHAPMAN, R.S., SEUNG, H-K., SCHWARTZ, S.E. and KAY RAINING BIRD, E. (1998). 'Language skills of children and adolescents with Down syndrome: II. Production deficits', *Journal of Speech, Language, and Hearing Research*, **41**, 4, 861-73.
- CHAZAN, M., LAING, A., SHACKLETON BAILEY, M. and JONES, G. (1980). *Some of Our Children: the Early Education of Children with Special Needs*. London: Open Books.
- CLARK, M.M. (1970). *Reading Difficulties in Schools* (Penguin Papers in Education). London: Heinemann Educational.
- CLINE, T. and SHAMSI, T. (2000). *Language Needs or Special Needs? The Assessment of Learning Difficulties in Literacy Among Children Learning English as*

an Additional Language: a Literature Review (DfEE Research Report 184). London: DfEE.

CLUNIES-ROSS, L. and KEIL, S. (1999). *Blind and Partially Sighted Children in Britain: their Incidence and Special Needs at a Time of Change*. London: RNIB.

COCHRAN-SMITH, M. (1984). *The Making of a Reader*. Norwood, NJ: Ablex.

COHEN, M.J., HALL, J. and RICCIO, C.A. (1997). 'Neuropsychological profiles of children diagnosed as specific language impaired with and without hyperlexia', *Archives of Clinical Neurology*, **12**, 3, 223-9.

CONRAD, R. (1979). *The Deaf School Child*. London: Harper & Row.

CONTI-RAMSDEN, G., DONLAN, C. and GROVE, J. (1992). 'Characteristics of children with specific language impairments attending language units', *European Journal of Disorders of Communication*, **27**, 4, 325-42.

CORLEY, G. and PRING, L. (1993). 'The oral reading errors of partially sighted children', *British Journal of Visual Impairment*, **11**, 1, 24-7.

CORLEY, G. and PRING, L. (1993). 'Reading strategies in partially sighted children', *International Journal of Rehabilitation Research*, **16**, 3, 209-20.

COSSU, G., ROSSINI, F. and MARSHALL, J.C. (1993). 'When reading is acquired but phonemic awareness is not: a study of literacy in Down's syndrome', *Cognition*, **46**, 2, 129-38.

CRAIG, C.J., DEPRIEST, L. and HARNACK, K. (1997). 'Teachers' perspectives on selecting literacy media for children with visual impairments', *Journal of Visual Impairment and Blindness*, **91**, 6, 539-45.

CROLL, P. and MOSES, D. (1985). *One in Five: the Assessment and Incidence of Special Educational Needs*. London: Routledge & Kegan Paul.

CROMBIE, M., GUNN, P. and HAYES, A. (1991). 'A longitudinal study of two cohorts of children with Down syndrome.' In: DENHOM, C.J. (Ed) *Adolescents with Down Syndrome: an International Perspective on Research and Programme Development*. Victoria, BC: University of Victoria.

CROWTHER, D., DYSON, A. and MILLWARD, A. (1998). *Costs and Outcomes for Pupils with Moderate Learning Difficulties in Special and Mainstream Schools* (DfEE Research Report 89). London: DfEE.

CUMMING, C.E., GROVE, C. and RODDA, M. (1985). 'A note on reading comprehension in hearing-impaired adolescents', *Journal of the British Association of Teachers of the Deaf*, **9**, 3, 57-60.

CUNNINGHAM, C.C., GLENN, S., LORENZ, S., CUCKLE, P. and SHEPPERDSON, B. (1998). 'Trends and outcomes in educational placements for

children with Down syndrome', *European Journal of Special Needs Education*, **13**, 3, 225-37.

DAVIDSON, J., ELCOCK, J. and NOYES, P. (1996). 'A preliminary study of the effect of computer-assisted practice on reading attainment', *Journal of Research in Reading*, **19**, 2, 102-10.

DAVIES, B. (1996). 'Auditory disorders.' In: STRATFORD, B. and GUNN, P. (Eds) *New Approaches to Down Syndrome*. London: Cassell.

DAVIES, J. (1989). 'Reading schemes for partially sighted beginning readers', *British Journal of Visual Impairment*, **7**, 1, 19-21.

DEPARTMENT FOR EDUCATION (1994). *Code of Practice on the Identification and Assessment of Special Educational Needs*. London: DfE.

DEPARTMENT FOR EDUCATION (1995). *The National Curriculum*. London: HMSO.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT (1998). *Meeting Special Educational Needs: a Programme of Action*. London: DfEE.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT (1998). *The National Literacy Strategy: Framework for Teaching*. London: DfEE.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT (1998). *Supporting the Target Setting Process: Guidance for Effective Target Setting for Pupils with Special Educational Needs*. London: DfEE.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT (1999). *Statistics of Education. Special Educational Needs in England: January 1999* (Statistical Bulletin 12/99). London: The Stationery Office.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT (2000). *Statistics of Education. National Curriculum Assessment of 7, 11 and 14 year olds in England - 1999*. London: The Stationery Office.

DEPARTMENT FOR EDUCATION AND EMPLOYMENT. STANDARDS AND EFFECTIVENESS UNIT (1998). *The National Literacy Strategy: Framework for Teaching*. London: DfEE.

DEATHERIDGE, T. and DEATHERIDGE, M. (1997). *Literacy Through Symbols: Improving Access for Children and Adults*. London: David Fulton.

DEVEREUX, K. and VAN OOSTEROM, J. (1984). *Learning with Rebuses: Read, Think and Do*. Stratford upon Avon: National Council for Special Education.

- DOCKRELL, J. and LINDSAY, G. (1998). 'The ways in which speech and language difficulties impact on children's access to the curriculum', *Child Language Teaching and Therapy*, **14**, 2, 117-33.
- DOCKRELL, J. and LINDSAY, G. (1999). *Children's Language and Communication Difficulties: Understanding, Identification and Intervention*. London: Cassell.
- DOCKRELL, J. and MESSER, D. (1999). *Understanding Children's Language and Communication Difficulties*. London: Cassell.
- DODD, B. (1980). 'The spelling abilities of profoundly, prelingually deaf children.' In: FRITH, U. (Ed) *Cognitive Process in Spelling*. London: Academic Press.
- DOUGLAS, G. and DICKENS, J. (1996). 'The development of early tactile reading skills.' In: BOZIC, N. and MURDOCH, H. (Eds) *Learning Through Interaction: Technology and Children with Multiple Disabilities*. London: David Fulton.
- DUCKWORTH, B.J. (1993). 'Adapting standardized academic tests in Braille and large tests', *Journal of Visual Impairment and Blindness*, **87**, 12, 405-7.
- DUFFEN, L. (1976). 'Teaching reading to children with little or no language', *Remedial Education*, **11**, 3, 139-42.
- ELBAUM, B., VAUGHN, S., HUGHES, M. and MOODY, S.W. (1999). 'Grouping practices and reading outcomes for students with disabilities', *Exceptional Children*, **65**, 3, 399-415.
- ELLIS, N. and LARGE, B. (1988). 'The early stages of reading: a longitudinal study', *Applied Cognitive Psychology*, **2**, 1, 47-76.
- ERAUT, M. (1995). 'Groupwork with computers in British primary schools', *Journal of Educational Computing Research*, **13**, 1, 61-87.
- EVANS, A. (1984). Paired Reading: a Report on Two Projects. Unpublished paper. Cited in: TOPPING, K. (1996). 'Parents and peers as tutors for dyslexic children.' In: REID, G. (Ed) *Dimensions of Dyslexia, Volume 2: Literacy, Language and Learning*. Edinburgh: Moray House Publications.
- EVANS, L. and EDWARDS, D. (1987). 'A "look and sign" approach to reading for deaf children', *Journal of the British Association of Teachers of the Deaf*, **11**, 5, 137-42.
- EVANS, R. (1994). 'Phonological awareness in children with Down's syndrome', *Down's Syndrome: Research and Practice*, **2**, 3, 102-5.
- EZELL, H.K., KOHLER, F.W. and STRAIN, P.S. (1994). 'A program description and evaluation of academic peer tutoring for reading skills of children with special needs', *Education and Treatment of Children*, **17**, 1, 52-67.

- FELLENIOUS, K. (1996). 'Reading competence of visually impaired pupils in Sweden', *Journal of Visual Impairment and Blindness*, **90**, 3, 237-56.
- FELLENIOUS, K. (1999). 'Swedish 9-year-old readers with visual impairments: a heterogeneous group', *Journal of Visual Impairment and Blindness*, **93**, 6, 370-80.
- FERGUSSON, A. (1994). 'Planning for communication.' In: ROSE, R., FERGUSSON, A., COLES, C., BYERS, R. and BANES, D. (Eds) *Implementing the Whole Curriculum for Pupils with Learning Difficulties*. London: David Fulton.
- FERRETTI, R.P. and OKOLO, C.M. (1996). 'Authenticity in learning: multimedia design projects in the social studies for students with disabilities', *Journal of Learning Disabilities*, **29**, 5, 450-60.
- FOMBONNE, E. (1997) 'Epidemiological studies of autism.' In: VOLKMAR, F. (Ed) *Autism and Developmental Disorders*. New York, NY: Cambridge University Press.
- FOWLER, A. (1990). 'Language abilities in children with Down's syndrome: evidence for specific syntactic delay.' In: CICCHETTI, D. and BEEGHLY, M. (Eds) *Children with Down's Syndrome: a Developmental Perspective*. Cambridge: Cambridge University Press.
- FOWLER, A.E. (1995). 'Linguistic variability in persons with Down syndrome: research and implications.' In: NADEL, L. and ROSENTHAL, D.M. (Eds) *Down Syndrome: Living and Learning in the Community*. New York, NY: Wiley-Liss.
- FOWLER, A.E. (1999). 'The challenge of linguistic mastery in Down syndrome.' In: HASSOLD, T.J. and PATTERSON, D.M. (Eds) *Down Syndrome: a Promising Future, Together*. New York, NY: Wiley-Liss.
- FRITH, U. (1985). 'Beneath the surface of developmental dyslexia.' In: PATTERSON, K.E., MARSHALL, J.C. and COLTHEART, M. (Eds) *Surface Dyslexia: Neuropsychological and Cognitive Studies of Phonological Reading*. London: Lawrence Erlbaum.
- FUCHS, L.S., FUCHS, D., HAMLETT, C.L. and ALLINDER, R.M. (1991). 'Effects of expert system advice within curriculum-based measurement on teacher planning and student achievement in spelling', *School Psychology Review*, **20**, 1, 49-66.
- FULK, B. and STORMONT-SPURGIN, M. (1995) 'Spelling interventions for students with disabilities: a review', *Journal of Special Education*, **28**, 4, 488-513.
- GARTON, A. and PRATT, C. (1989). *Learning to be Literate: the Development of Spoken and Written Language*. Oxford: Blackwell.
- GAVINE, D. (1994). *The "Somerset Talking Computer" Project - a Pilot Study in Tayside*. Dundee: Tayside Educational Psychology Service.

- GEERS, A. and MOOG, J. (1989). 'Factors predictive of the development of literacy in profoundly hearing-impaired adolescents', *The Volta Review*, **91**, 2, 69-86.
- GEERS, A. and MOOG, J. (1989). 'Factors predictive of literacy in profoundly hearing-impaired children', *Journal of Speech and Hearing Disorders*, **52**, 1, 84-94.
- GERSONS-WOLFENSBERGER, D.C.M. and RUIJSSENAARS, W.A.J.J.M. (1997). 'Definition and treatment of dyslexia: a report by the Committee on Dyslexia of the Health Council of the Netherlands', *Journal of Learning Disabilities*, **30**, 2, 209-13. Cited in: BRITISH PSYCHOLOGICAL SOCIETY. WORKING PARTY OF THE DIVISION OF EDUCATIONAL AND CHILD PSYCHOLOGY (1999). *Dyslexia, Literacy and Psychological Assessment*. Leicester: British Psychological Society.
- GILLAM, R.B. and CARLILE, R.M. (1997). 'Oral reading and story retelling of students with specific language impairment', *Language, Speech and Hearing Services in Schools*, **28**, 1, 30-42.
- GILLESPIE, C.W. and TWARDOSZ, S. (1997). 'A group story-book reading intervention with children at a residential school for the deaf', *American Annals of the Deaf*, **142**, 4, 320-32.
- GOSWAMI, U. (1986). 'Children's use of analogy in learning to read: a developmental study', *Journal of Experimental Child Psychology*, **42**, 1, 73-83.
- GOSWAMI, U. (1988). 'Orthographic analogies and reading development', *Quarterly Journal of Experimental Psychology: Human Experimental Psychology*, **40A**, 2, 239-68.
- GREANEY, J., ARTER, C., HILL, E., MASON, H., McCALL, S., STONE, J. and TOBIN, M. (1994). 'The development of a new test of children's Braille-reading ability', *British Journal of Visual Impairment*, **12**, 2, 54-6.
- GRENIER, D. and GIROUX, N. (1997). 'A comparative study of spelling performance of sighted and blind students in senior high school', *Journal of Visual Impairment and Blindness*, **91**, 4, 393-400.
- GROVE, N. (1998). *Literature for All*. London: David Fulton.
- GULLIFORD, R. (1985). *Teaching Children with Learning Difficulties*. Windsor: NFER-NELSON.
- HAMMOND, C.J. and MILLIS, E.A. (1996). 'Ocular findings in children.' In: STRATFORD, B. and GUNN, P. (Eds) *New Approaches to Down Syndrome*. London: Cassell.
- HARRIS, M. and BEECH, J.R. (1997). 'The prelingually deaf young reader: a case of reliance on direct lexical access?' *Journal of Research in Reading*, **20**, 2, 105-21.

HARTAS, C. and MOSELEY, D. (1993). “‘Say that again please’”: a scheme to boost reading skills using a computer with digitised speech’, *Support for Learning*, **8**, 1, 16-21.

HASSELL, J. (1990). ‘Marks, setting and context’ (Resource Pack Part Four: Reading), *Special Children*, **38**, (insert, 5-6).

HATCHER, P.J., HULME, C. and ELLIS, A.W. (1994). ‘Ameliorating early reading failure by integrating the teaching of reading and phonological skills: the phonological linkage hypothesis’, *Child Development*, **65**, 1, 41-57.

HEILING, K. (1995). *The Development of Deaf Children: Academic Achievement Levels and Social Processes*. Hamburg: Signum.

HEIMANN, M., NELSON, K., TJUS, T. and GILLBERG, C. (1995). ‘Increasing reading and communication skills in children with autism through an interactive multimedia computer program’, *Journal of Autism and Developmental Disorders*, **25**, 5, 459-80.

HIGGINS, K. and BOONE, R.A. (1993). ‘Technology as a tutor, tool, and agent for reading’, *Journal of Special Education Technology*, **12**, 1, 28-37.

HILL, E.W., HILL, J.F. and TOBIN, M.J. (1999). ‘Braille: oral and silent reading speeds’, *New Beacon*, **980**, 4-6.

HINCHCLIFFE, V. (1996). ‘English.’ In CARPENTER, B., ASHDOWN, R. and BOVAIR, K. (Eds) *Enabling Access: Effective Teaching and Learning for Pupils with Learning Difficulties*. London: David Fulton.

HINE, M.S., GOLDMAN, S.R. and COSDEN, M.A. (1999). ‘Error monitoring by learning handicapped students engaged in collaborative microcomputer-based writing’, *The Journal of Special Education*, **23**, 4, 407-22.

HOPKINS, C. (1998). ‘The role of information and communication technology in providing access for all’, *Support for Learning*, **13**, 4, 163-6.

HORNSBY, B. and FARRER, M. (1990). ‘Some effects of a dyslexia-centred teaching programme.’ In: PUMFREY, P.D. and ELLIOTT, C.D. *Children’s Difficulties in Reading, Spelling and Writing*. London: Falmer Press.

HORNSBY, B. and MILES, T.R. (1980). ‘The effects of a dyslexia-centred teaching programme’, *British Journal of Child Psychology*, **50**, 3, 136-42.

HOWARD, J., GREYROSE, E. and KEHR, K. (1996). ‘Teacher-facilitated microcomputer activities: enhancing social play and affect in young children with disabilities’, *Journal of Special Education Technology*, **13**, 1, 36-47.

HOWLIN, P. (1998). ‘Psychological and educational treatments for autism’, *Journal of Child Psychology and Psychiatry*, **39**, 3, 307-22.

- HULME, C. and MacKENZIE, S. (1992). *Working Memory and Severe Learning Difficulty*. Hove: Hove Local Education Authority.
- HUTT, E.L. (1981). *Teaching Language Disordered Children: a Structured Curriculum*. London: Edward Arnold.
- IRWIN, K.C. (1989). 'The school achievement of children with Down syndrome' *New Zealand Medical Journal*, **102**, 11-13.
- IVERSEN, A. and TUNMER, W. (1993). 'Phonological processing skills and the Reading Recovery program', *Journal of Educational Psychology*, **85**, 1, 112-26.
- JARROLD, C., BADDELEY, A. and PHILLIPS, C. (1999). 'Down syndrome and the phonological loop: the evidence for and the importance of, a specific short-term memory deficit', *Down Syndrome: Research and Practice*, **6**, 2, 61-75.
- JENNINGS, J. (1999). 'Print or Braille: decision-making in the choice of the primary literacy medium for pupils with a severe visual impairment', *British Journal of Visual Impairment*, **17**, 1, 11-16.
- JORDAN, R., JONES, G. and MURRAY, D. (1998). *Educational Interventions for Children with Autism: a Literature Review of Recent and Current Research* (DfEE Research Report 77). London: The Stationery Office.
- KAMPS, D.M., BARBETTA, P.M., LEONARD, B.R. and DELQUARDRI, J. (1994). 'Classwide peer tutoring: an integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers', *Journal of Applied Behavior Analysis*, **27**, 1, 49-61.
- KELLY, L.P. (1995). 'Processing of bottom-up and top-down information by skilled and average deaf readers and implications for whole language instruction', *Exceptional Children*, **61**, 4, 318-34.
- KEMP, C. (1996). 'Does teaching young children with disabilities to read facilitate their language development? A critical review of current theory and empirical evidence', *International Journal of Disability, Development and Education*, **43**, 2, 175-87.
- KING, C.M. and QUIGLEY, S.P. (1985). *Reading and Deafness*. London: Taylor & Francis.
- KLIEWER, C. (1998). 'Citizenship of the literate community: Down syndrome, communication and the written word.' In: KLIEWER, C. *Schooling Children with Down Syndrome: Towards an Understanding of Possibility*. New York, NY: Teachers College Press.

- KLUWIN, T.N. and KELLY, A.B. (1992). 'Implementing a successful writing program in public schools for students who are deaf', *Exceptional Children*, **59**, 1, 41-53.
- KOENIG, A.J. and ASHCROFT, S.C. (1993). 'An analysis of errors in Braille writing samples', *Journal of Visual Impairment and Blindness*, **87**, 1, 12-18.
- KOENIG, A.J. and HOLBROOK, M.C. (1991). 'Determining the reading medium for visually impaired students via diagnostic teaching', *Journal of Visual Impairment and Blindness*, **85**, 2, 61-8.
- KOENIG, A.J., LAYTON, C.A. and ROSS, D.B. (1992). 'The relative effectiveness of reading in large print and with low vision devices for students with low vision', *Journal of Visual Impairment and Blindness*, **86**, 1, 48-53.
- KOENIG, A.J. and ROSS, D.B. (1991). 'A procedure to evaluate the relative effectiveness of reading in large and regular print', *Journal of Visual Impairment and Blindness*, **85**, 5, 198-204.
- LAHM, E.A. (1996). 'Software that engages young children with disabilities: a study of design features', *Focus on Autism and Other Developmental Disabilities*, **11**, 2, 115-24.
- LAMB, G. (1996). 'Beginning Braille: a whole-language-based strategy', *Journal of Visual Impairment and Blindness*, **90**, 3, 184-9.
- LANE, C. (1990). 'ARROW: alleviating children's reading and spelling difficulties.' In: PUMFREY, P.D. and ELLIOTT, C.D. (Eds) *Children's Difficulties in Reading, Spelling and Writing. Challenges and Responses*. London: Falmer Press.
- LANQUETOT, R. (1984). 'Autistic children and reading', *The Reading Teacher*, **38**, 2, 182-6.
- LARTZ, M.N. and LESTINA, L.J. (1995). 'Strategies deaf mothers use when reading to their young deaf or hard of hearing children', *American Annals of the Deaf*, **140**, 4, 358-62.
- LAWRENCE, D. (1985). 'Improving self-esteem and reading', *Educational Research*, **27**, 3, 194-200.
- LAWRENCE, D. (1988). *Enhancing Self-esteem in the Classroom*. London: Paul Chapman.
- LAWS, G., BUCKLEY, S., BIRD, G., MacDONALD, J. and BROADLEY, I. (1995). 'The influence of reading instruction on language and memory development in children with Down's syndrome', *Down's Syndrome: Research and Practice*, **3**, 2, 59-64.

LAYTON, C.A. and KOENIG, A.J. (1998). 'Increasing reading fluency in elementary students with low vision through repeated readings', *Journal of Visual Impairment and Blindness*, **92**, 5, 276-92.

LERNER, J.W. (1989). 'Educational interventions in learning disabilities', *Journal of the American Academy of Child and Adolescent Psychiatry*, **28**, 326-31. Cited in: SNOW, C.E., BURNS, M. S. and GRIFFIN, P. (Eds) (1998). *Preventing Reading Difficulties in Young Children*. Washington, DC: National Academy Press.

LEWIS, A. (1999). 'Integrated Learning Systems and pupils with low attainments in reading', *British Journal of Special Education*, **26**, 3, 153-7.

LEWIS, M., WRAY, D. and ROSPIGLIOSI, P. (1994). 'Making reading for information more accessible to children with learning difficulties', *Support for Learning*, **9**, 4, 155-61.

LEWIS, S. (1996). 'The reading achievements of a group of severely and profoundly hearing-impaired school leavers educated within a natural aural approach', *Journal of the British Association of Teachers of the Deaf*, **20**, 1, 1-7.

LEWIS, S. (1998). 'Reading and writing within an oral/aural approach.' In: GREGORY, S., KNIGHT, P., McCracken, W., POWERS, S. and WATSON, L. (Eds) *Issues in Deaf Education*. London: David Fulton.

LIBERMAN, I.Y., SHANKWEILER, O., ORLANDO, C., HARRIS, K.S and BERTI, F.B. (1971). 'Letter confusions and reversals of sequence in the beginning reader: implications for Orthon's theory of developmental dyslexia', *Cortex*, **7**, 127-42. Cited in: PUMFREY, P.D. and REASON, R. (1991). *Specific Learning Difficulties (Dyslexia): Challenges and Responses*. Windsor: NFER-NELSON.

LIMBRICK, E., McNAUGHTON, S. and CLAY, M.M. (1992). 'Time engaged in reading: a critical factor in reading achievement', *American Annals of the Deaf*, **137**, 4, 309-14.

LIVINGSTON, S. (1997). *Rethinking the Education of Deaf Students*. Portsmouth, NH: Heinemann.

LODGE, J. (1999). 'Developing curriculum access based on sensory approaches: partial sight and blindness.' In: BLAMIRE, M. (Ed) *Enabling Technology for Inclusion*. London: Paul Chapman.

LORENZ, S., SLOPER, T. and CUNNINGHAM, C. (1985). 'Reading and Down syndrome', *British Journal of Special Education*, **12**, 2, 65-7.

LORIMER, J. (1990). 'Improving Braille reading skills; the case for extending the teaching of Braille reading to upper primary and lower senior classes', *British Journal of Visual Impairment*, **8**, 3, 87-9.

LORIMER, P. (1994). *Reading in Braille: an Introductory Source Book for Teachers*. London: RNIB.

LOVETT, M.W., BARRON, R.W., FORBES, J.E., CUSKTS, B. and STEINBACH, K.A. (1994). 'Computer-based training of literacy skills in neurologically impaired children: a controlled evaluation', *Brain and Language*, **47**, 1, 117-54.

LUCKNER, J.L. and ISAACSON, S.L. (1990). 'Teaching expressive writing to hearing-impaired students', *Journal of Childhood Communication Disorders*, **13**, 2, 135-52.

LUETKE-STAHLMAN, B., HAYES, P. and NIELSEN, D. (1996). 'Essential practices as adults read to meet the needs of deaf or hard of hearing students', *American Annals of the Deaf*, **141**, 4, 309-20.

LUNDBERG, I. (1995). 'The computer as a tool of remediation in the education of students with reading disabilities- -a theory-based approach', *Learning Disability Quarterly*, **18**, 2, 89-99.

MacARTHUR, C.A. and HAYNES, J. (1995). 'Student Assistant for Learning from Text (SALT): a hypermedia reading aid', *Journal of Learning Disabilities*, **28**, 3, 150-9.

MacARTHUR, C.A., HAYNES, J.A., MALOUF, D.B., HARRIS, K. and OWINGS, M. (1990). 'Computer Assisted Instruction with learning disabled students: achievement, engagement and other factors that influence achievement', *Journal of Educational Computing Research*, **6**, 3, 311-28. Cited in: BROOKS, R. (1997). *Special Educational Needs and Information Technology: Effective Strategies for Mainstream Schools*. Slough: NFER.

MacARTHUR, C.A., STEVEN, G. and SCHWARTZ, S.S. (1995). 'Evaluation of a writing instruction model that integrated a process approach, strategy instruction, and word processing', *Learning Disability Quarterly*, **18**, 4, 278-91.

MANDER, R., WILTON, K.M., TOWNSEND, M.A.R. and THOMSON, P. (1995). 'Personal computers and process writing: a written language intervention for deaf children', *British Journal of Educational Psychology*, **65**, 4, 441-53.

MARSTON, D., DENO, S.L., KIM, D., DIMENT, K. and ROGERS, D. (1995). 'Comparison of reading intervention approaches for students with mild disabilities', *Exceptional Children*, **62**, 1, 20-37.

MARVIN, C.A. and WRIGHT, D. (1997). 'Literacy socialization in the homes of preschool children', *Language, Speech and Hearing Services in Schools*, **28**, 2, 154-63.

MASON, H. (1999). 'Blurred vision: a study of the use of low vision aids by visually impaired secondary school pupils', *British Journal of Visual Impairment*, **17**, 3, 94-7.

- MASON, H.L. (1995). *Visual Impairment: Spotlight on Special Educational Needs*. Tamworth: NASEN Enterprises.
- MAYER, C. and MOSKOS, E. (1998). 'Deaf children learning to spell', *Research in the Teaching of English*, **33**, 2, 158-80.
- McCALL, S. and McLINDEN, M. (1997). 'Towards an inclusive model of literacy for people who are blind and who have additional learning difficulties', *British Journal of Visual Impairment*, **15**, 3, 117-20.
- McCALL, S. and McLINDEN, M. (forthcoming). 'Accessing the National Literacy Strategy: the use of Moon with children who are blind in combination with severe learning difficulties', *British Journal of Visual Impairment*.
- McCARTNEY, E. and WILSON, S. (1994). 'Research report: early literacy and children with severe speech and physical impairment: a review', *European Journal of Special Needs Education*, **9**, 2, 200-14.
- McGEE, G.G., KRANTZ, P.J. and McCLANNAHAN, L.E. (1986). 'An extension of incidental teaching procedures to reading instruction for autistic children', *Journal of Applied Behavior Analysis*, **19**, 2, 147-57.
- McLINDEN, M. (1995). 'Touching the Moon', *British Journal of Special Education*, **22**, 2, 64-9.
- MERRILLS, J.D., UNDERWOOD, G. and WOOD, D.J. (1994). 'The word recognition skills of profoundly, prelingually deaf children', *British Journal of Developmental Psychology*, **12**, 3, 365-84.
- MERRY, R. and PEUTRILL, I. (1994). 'Improving word recognition for children with reading difficulties', *British Journal of Special Education*, **21**, 3, 121-3.
- MILES, E. (1989). *The Bangor Dyslexia Teaching System*. Third edn. London: Whurr.
- MILES, T.R. (1991). *Dyslexia: Integrating Theory and Practice*. London: Granada.
- MILES, T.R. and MILES, E. (1999). *Dyslexia: a Hundred Year On*. Second edn. Buckingham: Open University Press.
- MILLER, J.F., LEDDY, M.G. and LEAVITT, L.A. (Eds) (1999). *Improving the Communication of People with Down Syndrome*. Baltimore, MD: Paul H. Brookes Publications.
- MILLER, O. (1996). *Supporting Children with Visual Impairments in Mainstream Schools*. London: Franklin Watts.

- MOGFORD-BEVAN, K.P. and SUMMERSALL, J. (1997). 'Emerging literacy in children with delayed speech and language development: assessment and Intervention', *Child Language Teaching and Therapy*, **13**, 2, 141-59.
- MOORE, J. (1987). 'Spiders, arrows and trees: how a greater knowledge of reading comprehension skills can improve the reading of learning-impaired children', *Journal of the British Association of Teachers of the Deaf*, **11**, 2, 37-41.
- MORAN, H., SMITH, K., MEADS, J. and BECK, M. (1996). "'Let's try that word again in a new way!'" Helping failed readers to learn high frequency words', *British Journal of Special Education*, **23**, 4, 172-5.
- MORRIS, J.M. (1966). *Standards and Progress in Reading: Studies of Children's Reading Standards and Progress in Relation to their Individual Attributes, Home Circumstances and Primary School Conditions*. Slough: NFER.
- MOSELEY, D.V. (1993). 'Visual and linguistic determinants of reading fluency in dyslexics: a classroom study.' In: WRIGHT, S.F. and GRONER, R. (Eds) *Facets of Dyslexia and its Remediation*, Amsterdam: North Holland.
- NAGY, W.E. and HERMAN, P.A (1987). 'Breadth and depth of vocabulary knowledge: implications for acquisition and instruction.' In: McKEOWN, M.G. and CURTIS, M.E. (Eds) *The Nature of Vocabulary Acquisition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- NATIONAL CURRICULUM COUNCIL (1992). *The National Curriculum and Pupils with Severe Learning Difficulties* (Curriculum Guidance 9). York: NCC.
- NEWELL, A.F., BOOTH, L. and BEATTIE, W. (1991). 'Predictive text entry with PAL and children with learning difficulties', *British Journal of Educational Technology*, **22**, 1, 23-40.
- NICHOLSON, A. and ALBERMAN, E. (1992). 'Prediction of the number of Down's syndrome infants to be born in England and Wales up to the year 2000 and their likely survival rates', *Journal of Intellectual Disability Research*, **36**, 6, 505-17.
- NOLAN, C.Y. and KEDERIS, C.J. (1969). *Perceptual Factors in Braille Word Recognition* (Research Series No.20). New York, NY: American Foundation for the Blind. Cited in: LORIMER, P. (1994). *Reading in Braille: an Introductory Source Book for Teachers*. London: RNIB.
- OELWEIN, P.L. (1995). *Teaching Reading to Children with Down Syndrome: a Guide for Parents and Teachers*. Bethesda, MD: Woodbine House.
- OFFICE FOR STANDARDS IN EDUCATION (1999). *The National Literacy Strategy: an Evaluation of the First Year of the National Literacy Strategy*. London: OFSTED.

OFFICE FOR STANDARDS IN EDUCATION (1999). *Pupils with Specific Learning Difficulties in Mainstream Schools: a Survey of the Provision in Mainstream Primary and Secondary Schools for Pupils with a Statement of Special Educational Needs Relating to Specific Learning Difficulties*. London: OFSTED.

OKOLO, C.M. and FERRETTI, R. (1998). 'Multimedia design projects in an inclusive social studies classroom', *Teaching Exceptional Children*, **31**, 1, 50-7.

OLSON, M.R. with MANGOLD, S.S. (1981). *Guidelines and Games for Teaching Efficient Braille Reading*. New York, NY: American Foundation for the Blind. Cited in: LORIMER, P. (1994). *Reading in Braille: an Introductory Source Book for Teachers*. London: RNIB.

ORTON, S.T. (1989). *Reading, Writing, and Speech Problems in Children and Selected Papers*. Austin, TX: Pro-Ed.

PARK, K. (1995). 'Using objects of reference: a review of the literature', *European Journal of Special Needs Education*, **10**, 1, 40-6.

PARK, K. (1997). 'How do objects become objects of reference? A review of the literature on objects of reference and a proposed model for the use of objects in communication', *British Journal of Special Education*, **24**, 3, 108-14.

PARK, K. (1998). 'Dickens for all: inclusive approaches to literature and communication with people with severe and profound learning disabilities', *British Journal of Special Education*, **25**, 3, 114-18.

PAUL, P.V. (1997). 'Reading for students with hearing impairments: research review and implications', *The Volta Review*, **99**, 2, 73-87.

PAUL, P.V. (1998). *Literacy and Deafness: the Development of Reading, Writing and Literate Thought*. Needham Heights, MA: Allyn & Bacon.

PIETERSE, M., BOCHNER, S. and BETTISON, S. (Eds) (1988). *Early Intervention for Children with Disabilities: the Australian Experience*. Sydney: Macquarie University.

PIETERSE, M. and CENTER, Y. (1984). 'The integration of eight Down's syndrome children into regular schools', *Australia and New Zealand Journal of Developmental Disabilities*, **10**, 1, 11-20.

POOLE, B. (1998). 'Capitalisation in British Braille – 1', *New Beacon*, **962**, 4-8.

POOLE, B. (1998). 'Capitalisation in British Braille – 2', *New Beacon*, **963**, 4-6.

POUSTIE, J. (1997). *Solutions for Specific Learning Difficulties: Identification Guide*. Taunton: Next Generation.

POWERS, S., GREGORY, S. and THOUTENHOOFD, E.D. (1998). *The Educational Achievements of Deaf Children: a Literature Review* (DfEE Research Report 65). London: DfEE.

PRIOR, M. (1996). *Understanding Specific Learning Difficulties*. Hove: Psychology Press.

PUMFREY, P.D. and ELLIOTT, C.D. (Eds) (1990). *Children's Difficulties in Reading, Spelling and Writing. Challenges and Responses*. London: Falmer Press.

PURCELL-GATES, V. (1999). 'The irrelevancy and danger of the "simple view of reading" to meaningful standards.' Paper presented at the 'Raising Standards in Literacy' ESRC Research Seminar Series, Seminar 2 'What Counts as Evidence?' NFER, Slough, 18 November.

RECTORY PADDOCK SCHOOL (1981). *In Search of a Curriculum: Notes on the Education of Mentally Handicapped Children*. Sidcup: Robin Wren Publications.

REID, G. (Ed) (1996). *Dimensions of Dyslexia, Volume 1: Assessment, Teaching and the Curriculum*. Edinburgh: Moray House Publications.

REID, G. (Ed) (1996). *Dimensions of Dyslexia, Volume 2: Literacy, Language and Learning*. Edinburgh: Moray House Publications.

REX, E.J. (1992). 'The education of visually handicapped learners: an overview of research – research issues', *Peabody Journal of Education*, **67**, 2, 54-73.

ROYAL NATIONAL INSTITUTE FOR THE BLIND. CHILDREN'S POLICY AND RESEARCH UNIT (1999). *Clearly a Better Read*. London: RNIB.

RUTTER, M., TIZARD, J. and WHITEMORE, K. (1970). *Education, Health and Behaviour*. London: Longman.

RYNDERS, J., ALBERY, B.H., SPIKER, D., OLIVE, M.L., SHERAN, C.P. and ZAJAC, R.J. (1997). 'Improving the educational programming for individuals with Down syndrome: engaging the fuller competence', *Down Syndrome Quarterly*, **2**, 1, 1-11.

SAINSBURY, M., SCHAGEN, I. and WHETTON, C. with HAGUES, N. and MINNIS, M. (1998). *Evaluation of the National Literacy Project: Cohort 1, 1996-1998*. Slough: NFER.

SCHERY, T. and O'CONNOR, L. (1997). 'Language intervention: computer training for young children with special needs', *British Journal of Educational Technology*, **28**, 4, 271-79.

SCHLEPER, D.R. (1995). 'Reading to deaf children: learning from deaf adults', *Perspectives in Education and Deafness*, **13**, 4, 4-8.

- SEYMOUR, P.H. and ELDER, L. (1986). 'Beginning reading without phonology', *Cognitive Neuropsychology*, **3**, 1, 1-36.
- SHEPHERD, T.R. (1984). 'Using experience language (LEA variation) to teach an autistic-like child with a visual disorder to read (and write and talk)' (ED243289). Paper presented at the Conference of the Great Lakes Regional International Reading Association, Springfield, Illinois, 5-8 October.
- SHIPWAY, J. (1999). 'Capital offence: does Braille capitalisation affect reading performance?' *British Journal of Visual Impairment*, **17**, 2, 54-8.
- SIMPSON, P.A., HARRISON, D.R. and STUART, A. (1992). 'The reading abilities of a population of hearing-impaired children', *Journal of the British Association of Teachers of the Deaf*, **16**, 2, 47-53.
- SLOPER, P., CUNNINGHAM, C., TURNER, S. and KNUSSEN, C. (1990). 'Factors related to the academic attainments of children with Down's syndrome', *British Journal of Educational Psychology*, **60**, 284-98.
- SNOW, C.E., BURNS, M. S. and GRIFFIN, P. (Eds) (1998). *Preventing Reading Difficulties in Young Children*. Washington, DC: National Academy Press.
- SNOWLING, M. (1987). *Dyslexia – a Cognitive Developmental Perspective*. Oxford: Blackwell.
- SNOWLING, M. and FRITH, U. (1986). 'Comprehension in "hyperlexic" readers', *Journal of Experimental Child Psychology*, **42**, 3, 392-415.
- SOEDERBERGH, R. (1985). 'Early reading with deaf children', *Prospects*, **15**, 1, 77-85.
- STANOVICH, K. (1991). 'Word recognition: changing perspectives.' In: BARR, R., KAMIL, M., MOSENTHAL, P. and PEARSON P. (Eds) *Handbook of Reading Research*. New York, NY: Longman.
- STANOVICH, K.E. (1988). 'Explaining the difference between the dyslexic and the garden-variety poor readers: the phonological core model', *Journal of Learning Disabilities*, **21**, 10, 590-604.
- STANOVICH, K.E. (1991). 'Discrepancy definitions of reading disability: has intelligence led us astray?' *Reading Research Quarterly*, **26**, 1, 7-29.
- STANOVICH, K.E. and STANOVICH, P.J. (1997). 'Further thoughts on aptitude/achievement discrepancy', *Educational Psychology in Practice*, **13**, 1, 3-8.
- STEELE, J. (1996). 'Epidemiology: incidence, prevalence and size of the Down's syndrome population.' In: STRATFORD, B. and GUNN, P. (Eds) *New Approaches to Down Syndrome*. London: Cassell.

- STOEL-GAMMON, C. (1997). 'Phonological development in Down syndrome', *Mental Retardation and Developmental Disabilities Research Reviews*, **3**, 4, 300-6.
- STONE, J. (1995). 'Reading through braille', *Visability*, **13**, 5-6.
- STOTHARD, S.E., SNOWLING, M.J., BISHOP, D.V.M., CHIPCHASE, B.B. and KAPLAN, C.A. (1998). 'Language-impaired preschoolers: a follow-up into adolescence', *Journal of Speech, Language, and Hearing Research*, **41**, 2, 407-18.
- STRASSMAN, B. (1997). 'Metacognition and reading in children who are deaf: a review of the research', *Journal of Deaf Studies and Deaf Education*, **2**, 3, 139-49.
- STRATTON, J.M. and WRIGHT, S. (1991). 'On the way to literacy: early experiences for young visually impaired children', *RE:View*, **23**, 2, 55-62.
- SUTCLIFFE, A., DOWKER, A. and CAMPBELL, R. (1999). 'Deaf children's spelling: does it show sensitivity to phonology?' *Journal of Deaf Studies and Deaf Education*, **4**, 2, 111-23.
- SWANWICK, R. (1998). 'The teaching and learning of literacy within a sign bilingual approach.' In: GREGORY, S., KNIGHT, P., McCracken, W., POWERS, S. and WATSON, L. (Eds) *Issues in Deaf Education*. London: David Fulton.
- SWENSON, A.M. (1991). 'A process approach to teaching Braille writing at the primary level', *Journal of Visual Impairment and Blindness*, **85**, 5, 217-21.
- TANSLEY, P. and PANCKHURST, J. (1981). *Children with Specific Learning Difficulties: a Critical Review of Research*. Windsor: NFER-NELSON.
- THOMSON, M. (1988). *Developmental Dyslexia: Its Nature, Assessment and Remediation*. Third edn. London: Cole & Whurr.
- THOMSON, M. (1988). 'Preliminary findings concerning the effects of specialized teaching on dyslexic children', *Applied Cognitive Psychology*, **2**, 1, 19-31.
- THOMSON, M. (1990). 'Evaluating teaching programmes for children with specific learning difficulties.' In: PUMFREY, P.D. and ELLIOTT, C.D. *Children's Difficulties in Reading, Spelling and Writing*. London: Falmer Press.
- TJUS, T., HEIMANN, M. and NELSON, K. (1998). 'Gains in literacy through the use of a specially developed multimedia computer strategy: positive findings from 13 children with autism', *Autism*, **2**, 2, 139-56.
- TOBIN, M.J. (1992). 'The language of blind children: communication, words, and meanings', *Language and Education*, **6**, 2, 3&4, 177-82.
- TOBIN, M.J. (1993). 'The educational implications of visual impairment.' In: FIELDER, A.R., BEST, A.B. and BAX, M.C.O. (Eds) *The Management of Visual Impairment in Childhood*. Cambridge: Cambridge University Press.

- TOPPING, K. (1996). 'Parents and peers as tutors for dyslexic children.' In: REID, G. (Ed) *Dimensions of Dyslexia, Volume 2: Literacy, Language and Learning*. Edinburgh: Moray House Publications.
- TOPPING, K.J. (1989). 'Parents as reading tutors for children with special needs.' In: JONES, N. (Ed) *Special Educational Needs Review, Volume 1*. London: Falmer Press.
- TOPPING, K.J. (1990). Outcome evaluation of the Kirklees Paired Reading Project. Unpublished Ph.D. thesis, University of Sheffield.
- TOPPING, K.J. and LINDSAY, G.A. (1992). 'Paired reading: a review of the literature', *Research Papers in Education*, **7**, 3, 199-246.
- TREIMAN, R. (1985). 'Onsets and rimes as units of spoken syllables: evidence from children', *Journal of Experimental Child Psychology*, **39**, 1, 161-81.
- TRENT, S.D. and TRUAN, M.B. (1997). 'Speed, accuracy and comprehension of adolescent Braille readers in a specialized school', *Journal of Visual Impairment and Blindness*, **91**, 5, 494-500.
- TUNMER, W.E. (1994). 'Phonological processing skills and reading remediation.' In: HULME, C. and SNOWLING, M. (Eds) *Reading Development and Dyslexia. Selected Papers from the Third International Conference of the British Dyslexia Association 'Dyslexia: Towards a Wider Understanding'*, Manchester, 1994. London: Whurr.
- TUTTLE, D.W. and HATLEN, P. (1996). 'Is listening literacy?' *Journal of Visual Impairment and Blindness*, **90**, 3, 173-5.
- TYRRELL, R., HOLLAND, K., DENNIS, D. and WILKINS, A. (1995). 'Coloured overlays, visual discomfort, visual search and classroom reading', *Journal of Research in Reading*, **18**, 1, 10-23.
- UTAY, C. and UTAY, O. (1997). 'Peer-assisted learning: the effects of cooperative learning and cross-age peer tutoring with word processing on writing skills of students with learning disabilities', *Journal of Computing in Childhood Education*, **8**, 2-3, 165-85.
- VAN OOSTEROM, J. (1991). 'Aspects of English.' In: ASHDOWN, R., CARPENTER, B. and BOVAIR, K. (Eds) *The Curriculum Challenge: Access to the National Curriculum for Pupils with Learning Difficulties*. London: Falmer Press.
- VENTER, A., LORD, C. and SCHOPLER, E. (1992). 'A follow-up study of high-functioning autistic children', *Journal of Child Psychology and Psychiatry*, **33**, 3, 489-507.

- VOLLANDS, S.R., TOPPING, K.J. and EVANS, R.M. (1999). 'Computerized self-assessment of reading comprehension with the Accelerated Reader: action research', *Reading and Writing Quarterly*, **15**, 3, 197-211.
- VON TETZCHNER, S., ROGNE, S. and LILLEENG, M. (1997). 'Literacy intervention for a deaf child with severe reading disorder', *Journal of Literacy Research*, **29**, 1, 25-46.
- WALSH, B.F. and LAMBERTS, F. (1979). 'Errorless discrimination and picture fading as techniques for teaching sight words to TMR students', *American Journal of Mental Deficiency*, **83**, 5, 473-9.
- WARNOCK REPORT. GREAT BRITAIN. DEPARTMENT OF EDUCATION AND SCIENCE. COMMITTEE OF ENQUIRY INTO THE EDUCATION OF HANDICAPPED CHILDREN AND YOUNG PEOPLE (1978). *Special Educational Needs* (Cmnd. 7212). London: HMSO.
- WATERS, G. and DOEHRING, D. (1990). 'Reading acquisition in congenitally deaf children who communicate orally: insights from an analysis of component reading, language and memory skills.' In: CARR, T. and LEVY, B. (Eds) *Reading and Its Development*. New York, NY: Academic Press.
- WATSON, L.M. (1999). 'Literacy and deafness: the challenge continues', *Deafness and Education International*, **1**, 2, 96-107.
- WEBSTER, A. (1986). *Deafness, Development and Literacy*. London: Methuen.
- WEBSTER, A. (1988). 'Deafness and learning to read 2: teaching strategies', *Journal of the British Association of Teachers of the Deaf*, **12**, 5, 93-101.
- WEBSTER, A. and HEINEMANN-GOSSCHALK, R. (forthcoming). 'Deaf children's encounters with written texts: contrasts between hearing teachers and deaf adults in supporting reading', *Deafness and Education International*.
- WEBSTER, A. and WOOD, D. (1989). *Children with Hearing Difficulties* (Special Needs in Ordinary Schools). London: Cassell.
- WEBSTER, J. and ROE, A. (1998). *Children with Visual Impairment: Social Interaction, Language and Learning*. London: Routledge.
- WILLIAMS, C.L. (1994). 'The language and literacy worlds of three profoundly deaf preschool children', *Reading Research Quarterly*, **29**, 2, 124-55.
- WILLIAMS, C.L. and McLEAN, M.M. (1997). 'Young deaf children's response to picture book reading in a preschool setting', *Research in the Teaching of English*, **31**, 3, 337-66.
- WILSON, J. and FREDERICKSON, N. (1995). 'Phonological awareness training: an evaluation', *Educational and Child Psychology*, **12**, 1, 68-79.

WILSON, J. and SIMMONS, K. (1989). 'Right to read? Shared reading and children with severe learning difficulties', *Educational Psychology in Practice*, **5**, 1, 30-3.

WILSON, T. and HYDE, M. (1997). 'The use of signed English pictures to facilitate reading comprehension by deaf students', *American Annals of the Deaf*, **142**, 4, 333-41.

WIMISNER, S. and ARNOLD, P. (1986). 'The spelling strategies of deaf, partially hearing and hearing children', *Journal of the British Association of Teachers of the Deaf*, **10**, 6, 146-52.

WING, L. (1988). 'The continuum of autistic characteristics.' In: SCHOPLER, E. and MESIBOV, G. (Eds). *Diagnosis and Assessment in Autism*. New York, NY: Plenum Press.

WING, L. (1996). 'Autistic spectrum disorders', *British Medical Journal*, **312**, 327-8.

WOOD, D., WOOD, H., GRIFFITHS, A. and HOWARTH, I. (1986). *Teaching and Talking with Deaf Children* (Developmental Psychology Series). Chichester: John Wiley.

WOODCOCK, R.W., CLARK, C. R. and DAVIES, C.O. (1969). *Teacher's Guide: Peabody Rebus Reading Program*. Circle Pines, MN: American Guidance Service.

WORRAL, N. and SINGH, Y. (1983). 'Teaching TMR children to read using integrated picture cueing', *American Journal of Mental Deficiency*, **87**, 4, 422-9.

WRIGHT, A., READ, P. and ANDERSON, M. (1992). 'Contrasting computer input devices for teaching children with severe learning difficulties to read', *British Journal of Educational Technology*, **23**, 2, 106-12.

WRIGHT, S.F., FIELDS, H. and NEWMAN, S.P. (1996). 'Dyslexia: stability of definition over a five year period', *Journal of Research in Reading*, **19**, 1, 46-60.

YOSHINAGA-ITANO, C. and DOWNEY, D.M. (1996). 'The effect of hearing loss on the development of metacognitive strategies in written language', *The Volta Review*, **98**, 1, 97-143.

YOUNG, P. and TYRE, C. (1983). *Dyslexia or Illiteracy? Realising the Right to Read*. Milton Keynes: Open University Press.

ZHANG, Y., BROOKS, D.W., FRIELDS, T. and REDELFS, M. (1995). 'Quality of writing by elementary students with learning disabilities', *Journal of Research on Computing in Education*, **27**, 4, 483-99.

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Appendix 2 - Literacy and special educational needs pro forma for research based texts

Author and Title	Details of author and title of book, journal article
Publication details	Details of publisher, place and date of publication
Country of origin	From what country did research/publication originate?
Commission details	Who was the research commissioned by (e.g. government body, research council, local authority, voluntary organisation)
Purpose of research	What was main aim/purpose of the research (particularly in relation to the proposed literature review)?
Type of research	Qualitative, quantitative, longitudinal study, literature review, discussion of research findings etc.
Methodology	Explanation/justification of the research rationale, design etc.
Sample	Population characteristics (size, age, geographical location, socio-economic factors, ethnic mix, nature of SEN etc.) Sampling method employed, sample size, response rate etc.
Method of research	Type and quality of instruments used – questionnaires, interviews, observation etc.
Main findings	Summary of main findings/conclusions drawn from the research
Evaluative commentary	Comments on the quality/limitations of the research. Did the author/s address their initial questions? Reliability of methods used? Quality of evidence? Bias? Findings of particular interest. Implications for policy.
Keywords	Significant words emanating from the research. A draft list of these would be provided in advance from the literature search process.