**International review of the evidence on best practice in educational provision for children on the autism spectrum**

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**Abstract**

There is considerable debate regarding the most appropriate and effective ways of supporting the learning of children and young people on the autism spectrum. This international review provides a synthesis of empirical research and expert evidence (dated 2002-2008) to identify best practice in educational provision for these children. Five bibliographic databases were systematically searched using clearly defined key words, and abstracts assessed according to explicit inclusion and exclusion criteria; 92 research papers which focused on children and young people were included. Expert evidence was drawn from policy documents and government strategies, or research reports, from the UK and Ireland. Findings show that there is insufficiently strong evidence regarding the effectiveness of one type of intervention approach compared to another. A range of educational provision should be maintained in order to cater appropriately for a wide diversity of need. Interventions most often researched were those involving intensive behavioural techniques and some studies showed these can be successful in teaching specific skills to some children. There was limited evidence regarding the needs of older children as well as consideration of educational provision more widely, including the effects of type of setting (as distinct from a specific type of *intervention* or *learning approach*). More research is needed on other types of educational interventions currently used by parents and in schools as well as greater collaboration between researchers and practitioners to establish what works best for children and young people on the autism spectrum.

# **Key words:** educational provision; autism spectrum; children and young people; best practice; systematic review; expert evidence; interventions; outcomes

**Introduction**

As part of the Primary Review in England, Daniels and Porter (2007) examined the evidence for educational provision and support for children with special educational needs (SEN) and disabilities. They concluded there is a paucity of evidence generally regarding the existence of, as well as the need for, specialised teaching approaches for children with SEN (see also Lewis & Norwich, 2005). Nevertheless, one group of pupils suggested as being distinct in terms of the need for specialist pedagogy is pupils on the autism spectrum[[1]](#footnote-1). Indeed, the needs and abilities of children on the autism spectrum have been the focus of considerable research effort over the past two decades, alongside growing awareness of the condition amongst professionals and the general public, as well as an increase in prevalence in recent years. Children on the autism spectrum are the fastest growing group of children with a statement of special educational needs in mainstream schools in England (Frederickson, Jones & Lang, 2010) and Wales (Audit Commission, 2002) and prevalence rates now range between 1 in 167 (MRC, 2001) and 1 in 100 children (Baird et al., 2006).

Such increases have placed significant demands on educational systems in terms of equipping teachers, in both specialist and mainstream settings, with appropriate skills and knowledge to ensure children receive an effective education both in the UK (eg. Frederickson et al., 2010; Emam & Farrell, 2009) and beyond (eg. Eldar et al., 2010; Ministries of Health and Education, 2008). Moreover, debates concerning appropriate placements, support and intervention for children on the autism spectrum have abounded, not least because school placements have been unsuccessful for some, resulting in withdrawal to educate at home (eg. Parsons & Lewis, 2010); exclusion (House of Commons Education and Skills Committee on SEN, 2006); challenges at educational tribunals (Batten et al., 2006); and / or negative experiences for young people including bullying and loneliness (Humphrey & Symes, 2010; van Roekel et al, 2010; Wainscot et al., 2008; Bauminger et al., 2003). Concerns regarding such experiences in the UK were reflected in setting up the All-Party Parliamentary Group on Autism (APPGA) in 2000 which has been very active in political lobbying on behalf of these children (e.g. Balls 2008). There have been calls elsewhere too for improved support and awareness for people on the spectrum and their families (eg. Hutton & Caron, 2005).

Parents have also been active in legally challenging educational provision for their children, for example in Ireland (SOC v The Minister for Education and Science, The Minister for Health and Children, The Health Service Executive, Ireland and the Attorney General, 2007) and the US (eg. Age of Autism, 2nd July 2010; Public News Service, 8th July 2010). Often, such cases have sought specific provision in the form of Applied Behavioural Analysis (ABA) programmes which have been argued by some authors to be the only empirically validated form of educational intervention available for children with autism (eg. Keenan et al., 2006; Foxx, 2008), whilst also acknowledging methodological shortcomings (Matson & Smith, 2008). Indeed, Keenan et al. (2007) have suggested that intensive behavioural (IB) intervention is offered to all children with autism ‘…for as long as is necessary (in accord with international best practice)’ (page 129). Concurrently, different authors have suggested there is insufficient evidence to make strong claims about a specific educational programme or intervention for children on the autism spectrum (eg. Kasari, 2002) and that there are many sources of variability that can dramatically influence outcomes (Wolery, 2000). A review of early intervention research (Baker & Feinfield, 2003) comments that ‘…despite much encouraging evidence for early intervention effectiveness with autism, there is still no one approach that meets accepted criteria for an empirically validated treatment’ (p. 506).

Such contrasting messages from different authors highlight the difficulties for practitioners, as well as for providers and funders of education services. Decisions about where resources (financial, training and personnel) should best be targeted in a way that balances pedagogic expertise, effectiveness, value for money, individual need and parental preference can be hard to reach in the absence of a strong evidence base. Recognising this challenge, the National Council for Special Education (NCSE) in Ireland commissioned a review of the international literature on best practice in educational provision for children and young people on the autism spectrum in order to inform Ireland’s policy development; it is notable too that other countries are debating and changing how and where children with SEN or disabilities, including those on the autism spectrum, should be educated (e.g. Ferguson, 2008; Walker, 2010; Bourke, 2010). The full report of the review is published separately (Parsons et al., 2009, see www.ncse.ie) and includes evidence and consideration of early years provision as well as schooling and post-compulsory educational contexts; the present paper offers a summarised version of its content, focusing on the evidence on educational interventions for children and young people only.

##### Scope and methodology of the review

The Report of the Task Force on Autism in Ireland (2001) noted the lack of empirically validated studies to support positive outcomes for people on the autism spectrum and stated that:

‘Information on a variety of empirically validated methodologies should be available and the relative value of different options should be explored from the professional and parental perspectives before making decisions on educational placement’ (section 4.12, recommendation 10).

In other words, empirical evidence, in conjunction with expert views, is essential in making judgments about educational provision. Consequently, we implemented two main ‘strands’ of searching: (1) systematic searching of electronic databases focusing on empirical studies (*Empirical Strand*) and (2) collating articles, reports, reviews and guidance based on expert opinion / professional experience (*Expert Strand*). This overall search process is summarised in Figure 1 below. All documents included in the review were dated 2002-8 only [the review being carried out June-November 2008] because it was intended to update knowledge of best practice in educational provision for children and young people since the publication of the Task Force Report (DES, 2001).

\*\*\*Insert Figure 1 about here\*\*\*

# Empirical Strand

This procedure was based on guidance from the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) at the Institute of Education, University of London; in particular the systematic review on inclusive practices for SEN by Rix, Hall, Nind, Sheehy and Wearmouth (2006). Word constraints preclude full detail of the procedure (see Parsons et al., 2009 for details) but the main principles can be summarised as follows:

* A full and detailed set of terms for searching bibliographic databases; these were generated and agreed by the research team and applied in the same way to all databases searched.
* Clearly specified inclusion and exclusion criteria for research articles identified under this strand; theses were automatically excluded from the review due to the time and resource constraints of accessing and reading these. It is important to note that the review was commissioned to focus on best practice educational provision for persons on the autism spectrum that demonstrate best outcomes for the person*.* In relation to the empirical strand we therefore included evidence that provided indications of individual or group outcomes for children on the autism spectrum.
* Quality assurance of review and selection procedures involving independent ratings and comparisons between two members of the research team; throughout the review process, team members also regularly consulted each other regarding decisions to include or exclude particular articles or reports.
* Grading of the ‘weight of evidence’ (WoE) offered by particular papers for the topic of the review, according to EPPI-Centre criteria (Low, Medium or High):

A. Soundness in answering the *study* question

B. Appropriateness of design and analysis for the *review*

C. Relevance of study focus for the *review*

D. Overall WoE judgment of quality in relation to the *review*

Note that not all papers were graded for WoE because it was not feasible for more than one member of the review team to read and assess all of the papers. A small number of articles were rated as offering a ‘high’ WoE for the review; all of these were read by at least two members of the team and the grading agreed upon. These are indicated in the text and in the references section with a \*\* and (usually) include a larger number of participants, more robust methodologies and analyses, and cover particularly important or central topics.

Five main databases were searched: PsycInfo; ERIC; British Education Index (BREI); Australian Education Index (AUEI); and the ISI Web of Knowledge [covering the Social Science Citation Index (SSCI)]. Once duplicate titles had been removed from these searches, there were 499 articles requiring closer inspection. This was reduced to a final total of 100 papers for full review following a further round of applying the inclusion / exclusion criteria to paper abstracts as well as the exclusion of single case studies and other review papers for pragmatic reasons (ie. to keep the size of the review manageable within necessary time constraints and not because they were not considered valuable) (a list of excluded references is available from Parsons et al., 2009). Excluding the papers relating to adults and post-compulsory educational contexts, the following summary is based on 92 of the 100 papers which focus on children and young people only.

# Expert Strand

This strand focused only on those reports or policy guidelines which, in our professional opinion, were of central importance or relevance to the review; that is, UK and Ireland reports based on policy documents and government strategies, or research reports that were wide ranging and which involved the work of policy teams and / or expert groups / research groups consisting of members from different backgrounds and services, often interdisciplinary. The focus on UK and Ireland documents only was due to the likely greater similarities between these national educational systems compared to others internationally. Reports based only on personal opinion or on the views of an individual organisation were excluded. In total, 24 reports or papers were reviewed in this section, of which six are included below (additional reports on post-compulsory education and adult provision being excluded from this summary).

**Main findings relating to children and young people**

**Overview**

The findings are summarised below according to nine main themes that arose from considering both strands of evidence, although not all themes draw from both strands (see Table 1). The empirical strand identified more fine-grained information about specific educational interventions or learning approaches and the expert strand offered broader comment on wider aspects of provision. The main features of the empirical papers were also ‘mapped’, including the age group of the participants (or stage of schooling or provision); the number of participants included; geographical area in which the study took place, and the number of studies graded as offering a high weight of evidence. Nearly half (49%) of the empirical articles (from the full set, n=100) focused on children under five years of age, whilst only 8% considered those in post-compulsory educational, or adult, contexts. Just over half the articles (59%) originated from North America, with 26% from the UK and 3% from Ireland. More robust methodologies including multiple-baseline designs or comparison groups featured in just over half of the studies (57%), with a further 6% using randomised controlled designs. Nevertheless, 48% of the studies included 11 or fewer participants, and only 12 papers (12%) were graded as offering a high weight of evidence for this review.

\*\*\*Insert Table 1 about here\*\*\*

1. **Early assessment and intervention**

There was consensus from the expert evidence that early assessment and intervention is central to maximising opportunities for recognising children’s difficulties and needs and for improving their emotional, educational, social, and cognitive development and their health. The SEN Code of Practice for Wales (Welsh Assembly Government, 2007) advises the adoption of a range of strategies that recognise the various complexities of need and the National Autism Plan for Children (NAPC; NIASA, 2003) reports evidence that targeted interventions should begin as early as possible. Both the NAPC and the Scottish Intercollegiate Guidelines Network guidance (SIGN Report 98, 2007) recommend that a keyworker with specialist knowledge of autism take on a co-ordinating role. In terms of empirical evidence, Schwartz et al (2004\*\*) studied the effectiveness of Project DATA (Development Appropriate Treatment for Autism), a school-based, multi-component programme for young children with autism aged 3 to 6 years. The children made functional gains across skills including communication and play, and their social validity was confirmed via parental satisfaction, as expressed through interview as well as demand for the programme by families.

Other studies have also evaluated multi-component interventions for young children; two of these reported impressive gains in relation to functional communication and behaviour (Boulware et al., 2006; Stahmer & Ingersoll, 2004) but these, as well as the remainder of studies in this section (Perez-Gonalez & Williams, 2006; Panerai et al, 2008; DiPietro et al, 2002; Dyer et al, 2006) were judged as offering limited evidence to the review because their research designs led to problems in separating out the effects of the intervention from other variables (maturation, context / environment, reliance on parental reports) and the research was often conducted by personnel involved in the delivery of the programmes.

1. **Intensive behavioural interventions and comparisons**

From the expert evidence there is general agreement that a range of approaches is needed to suit individual needs and preferences (NIASA, 2003; SIGN, 2007; Jones et al, 2008; APPGA, 2005). Although interventions shown to be beneficial have some commonalities, there is to date insufficient evidence in favour of any one specific approach and the literature calls for more research in this area. The empirical evidence supported this position, based on comparisons of interventions aimed at pre-school children. Five studies compared different types of early intervention programmes for young (pre-school) children with autism and all included Intensive Behavioural (IB) programmes (based on ABA principles) as one of the intervention groups. Four out of these five studies (Reed et al., 2007\*\*; Magiati et al., 2007\*\*; Remington et al., 2007\*\*; Farrell et al., 2005) reported limited or no clinically significant benefits to IB approaches compared to other forms of provision such as specialist nursery provision or statutory local authority provision. Howard et al (2005\*\*) compared an IB approach with an eclectic treatment and found significantly greater improvements in skills and learning in the former compared to the latter. Taken together, however, the findings suggest that one particular type of intervention is unlikely to produce the best outcomes for all the children included.

A further five studies focused specifically on play; interventions included IB techniques as well as less structured approaches (eg. where the responses of the adult follow rather than direct the actions of the child). Overall, the findings suggested that structured and less structured approaches focusing on the core deficits of autism can facilitate play and joint attention skills in preschoolers with autism (Bernard-Opitz et al., 2004; Kok et al., 2002). Also, language and cognitive levels need to be taken into account when deciding which interventions may be effective and appropriate (Bernard-Opitz et al., 2004; Wong et al., 2007); child-centred, rather than adult-led, approaches may be more effective in facilitating play in young children (Kasari et al., 2006\*\*) and small group instruction may be more conducive to skill acquisition than 1:1 training (Colozzi et al., 2008).

1. **Specific learning tools and approaches**

The first group of studies looked at structured and systematic instruction based on behavioural techniques to teach a range of skills to preschool children, including reciprocal imitation skills (Ingersoll & Schreibman, 2006), play (Thomas & Smith, 2004; Morrison et al., 2002); and social communication (Hancock & Kaiser, 2002). Findings showed increases in target behaviours and positive parental ratings of satisfaction. Focusing on primary-aged children, Ledford et al. (2008) found that children with autism were able to demonstrate incidental and observational learning of language when structured instruction took place in pairs; and Polychronis et al. (2004) found that short periods of structured learning were as, or more, effective than longer sessions. Koegel et al. (2003b) reported interesting findings that children can be helped to engage more meaningfully in classroom tasks if they receive structured support with completing simpler, but related tasks beforehand (either in the evening at home or whilst at school). Other studies reported positive outcomes for structured learning approaches for ‘helping behaviours’ (Reeve et al, 2007); ball catching (Ward & Ayvazo, 2006); and reading (Balfe, 2008) but, again, these are limited due to methodological constraints and small sample sizes. Overall, however, there is evidence that structured approaches can support learning of specific skills for some children under some circumstances.

Two papers focused on strategies to develop specific cognitive skills. A concept mapping approach (Roberts & Joiner, 2007) showed a three-fold increase in retention of information but due to wide variation of scores between groups, this did not reach statistical significance. Results are nevertheless promising because the study employed a robust design, and used a method that students could quickly be trained in; this suggests it has the potential for transfer into the mainstream context. A video-based programme targeting ‘mindreading’ skills (Bell & Kirby, 2002) reported highly variable responding and low levels of engagement and therefore offers limited evidence for this review.

The third group of studies concerned research on the impact of Social Stories (Gray, 1994a) and Comic Strip Conversations (Gray, 1994b), which are designed to help children manage their own behaviour by describing particular scenarios, what might happen and how the child should respond. All three studies that employed these techniques reported positive findings (Crozier & Tincani, 2006; Scattone et al, 2002; Pierson & Glaeser, 2007). This is encouraging because these interventions are much less intrusive, and time and labour intensive, than many others and the interventions were implemented in naturalistic school environments.

Fourthly, were studies that explored the use of picture based learning approaches, including PECS (Picture Exchange Communication System), which is an educational approach developed by Bondy and Frost (1994) that uses behavioural principles (such as prompting and reinforcement) to teach spontaneous communication skills using, objects, symbols or pictures alongside the written word. Preliminary studies highlighted interesting areas for further research by considering precursor skills for understanding pictures or symbols for preschool children, although these were limited by study design (Chavez-Brown et al, 2005; Drager et al, 2006; Cihak, 2007). Findings regarding PECS were mixed overall. Some children were able to master the PECS system in Ganz and Simpson (2004), whilst a randomised controlled trial indicated modest success at best, with no generalisation to spoken language (Howlin et al, 2007\*\*); and Yoder and Stone (2006\*\*) found that PECS appeared to be more effective for children with lower levels of intentional communication. Others found that improvements in language use were greater and more consistent for children who had not used PECS before (Magiati & Howlin, 2003) and that the existing potential to imitate and produce speech was likely to be important (Charlop-Christy et al, 2002).

Finally in this section were three studies using computer-based approaches. Findings were positive regarding the extent to which computers can support the learning of vocabulary (Bosseler & Massaro, 2003); reading skills (Williams et al, 2008) and symbol recognition (Hetzroni et al, 2002) and participants were also motivated to use computers. This is promising for supporting learning in the classroom especially now that many schools are well equipped with ICT resources.

1. **Social interaction, understanding and skills**

Considerable research attention has been directed at enhancing social understanding and teaching social skills for children and young people on the autism spectrum and there were three main groups of studies in this section. Firstly, studies focusing on preschool and primary-aged children found that structured, behaviourally based instruction techniques were successful in teaching specific skills (Boyd et al, 2008; Gena, 2006; McGee & Daly, 2007; Koegel et al, 2003a; Jones et al, 2006; Yang et al. 2003). Generalisation of the findings is limited due to small sample sizes and methodological constraints; however, the Boyd et al. (2008) study is particularly interesting because it explored the naturally occurring, contextual variables that promoted social interaction between young children with autism and their typically developing peers. The study found that there were more social interactions with, and a higher rate of social initiations by, the children with autism when groups were small or in 1:1 situations; in child directed settings and activities; and with lower adult involvement. Also, Bock’s (2007) study is noteworthy because of the use of ‘social scripts’ to help four boys in their social interactions; the strategies were easy to implement and were under the control of the children, making it a potentially useful approach for use in mainstream classrooms. Four studies involved older children (adolescents), all with Asperger syndrome or High Functioning Autism (HFA); and focused on providing insights into social skills and behaviours, as well as strategies for practising and implementing these. Methodological and / or reporting limitations mean that the relative value of the different strategies employed is difficult to judge (Webb et al, 2004; Broderick et al, 2002; Mackay et al, 2007); however, social competence training, based on the principles of Cognitive Behavioural Therapy, may offer particular promise with only modest teacher input (e.g. 3 hours per week) (Bauminger, 2002).

Secondly, visual techniques or video modelling procedures were used to teach social (Johnston et al, 2003; Gena et al, 2005; Simpson et al, 2004; Nelson et al, 2007) and play behaviours (Hine & Wolery, 2006; MacDonald et al, 2005; Nikopoulos & Keenan, 2007) to preschool and primary aged children on the autism spectrum. These studies take into account the relative strength in visual skills of these children and showed some evidence for generalisation, and therefore offer some promise. However, most found substantial variation between individual children and study designs precluded isolation of the factors that impact on why there was greater generalisation in some studies than others or why some children responded better than others; more robust studies using control groups are needed in order to assess the extent to which approaches can be effective.

The third main group of studies focused on including other children (with or without autism or special educational needs) to facilitate play, social interaction and communication skills for, and with, children on the autism spectrum. Those involving preschool children showed some success at increasing communication and social behaviours but findings should be interpreted with caution due to inappropriate, group-based statistical analyses with small samples (Kalyva & Avramadis, 2005) and highly variable rates of responding (Garfinkle & Schwartz, 2002). Others, focusing on primary-aged children, were similarly limited (Thiemann & Goldstein, 2004; Harper et al, 2008; Yang, T-R et al, 2003; Grey et al, 2007). Of potentially greater merit were studies byOwen-DeSchryver et al. (2008) and Whitaker (2004); both of which described less structured, more naturalistic approaches to involving typically developing peers, encouraging them to understand more about autism and *follow the lead* of the child with autism, and reported improvements in social interactions. Finally, pairing children with autism with other children on the autism spectrum (Loncola & Craig-Unkefer, 2005) or children with SEN (Kuhn et al, 2008) suggest that social interactions can be facilitated, but that the social and cognitive abilities of the pairs or groups are likely to be important in determining success (Kuhn et al, 2008).

1. **Working with families**

Most of the research involving parent training or involvement focused on parents and families with young (preschool / early years) children on the autism spectrum. Generally, the findings highlight that parents can be supported in learning specific skills that significantly help to improve social and communicative skills in their children (Koegel et al, 2002; Wetherby & Woods, 2006). Having a keyworker available for support is important (McConkey et al, 2007) and training should take into account contextual information regarding families’ routines, beliefs, support and patterns of social interaction (Moes & Frea, 2002; Kashinath et al, 2006). Implementation in the home setting can be very challenging (Drew et al, 2002) and the stress involved can influence outcomes for children (Osborne et al, 2008). Some research provided limited evidence for the review due to weak designs and / or small samples (Baker-Ericzen et al, 2007; Ingersoll & Gergans, 2007; Seung et al, 2006; Dillenburger et al, 2004; Bibby et al, 2002). The strongest findings came from well-designed interventions that helped parents to ‘fine-tune’ their social and communicative interactions with their children (Mahoney & Perales, 2003\*\*; Aldred et al, 2004\*\*). Also, Sofronoff et al. (2004\*\*) found that children whose parents received ongoing support fared better than those whose parents who received a one-off training workshop.

The expert evidence reinforces these findings and reflects the fact that family members are often important advocates for their child and should be closely involved (NIASA, 2003; Jones et al., 2008), and provided with good information (SIGN, 2007). There is broad agreement that there should be more formal recognition of the key role played by parents and other family members with some specific reference to parent training, both in terms of general awareness-raising and parent-led interventions (APPGA, 2005).

1. **Teacher training**

Four studies in the empirical strand highlighted that training teachers and paraprofessionals can have an impact on children’s behaviour and development. Findings show that more structured, behaviourally-based interactions can lead to reductions in problematic or challenging behaviours (Dib & Sturmey, 2007; Grey et al, 2005); and help young people with autism and severe learning disabilities to access the same reading books as typically developing peers (Browder et al, 2007). Quilty (2007) showed that paraprofessionals could be effectively taught to write and implement Social Stories for children with autism with the outcome of decreasing targeted, inappropriate behaviours.

1. **Multi-agency approach**

The expert literature recognises the need for agencies to collaborate effectively in order to deliver a ‘seamless service’ and avoid the confusion, anxiety and overload that can result from multiple separate agencies attempting to support one family. A number of documents set out a framework to support multi-agency working at all levels; for example, the NAPC (NIASA, 2003) highlights the importance of multi-agency assessment as an essential means of understanding the child’s needs in the areas of health, education and social care, and the Department of Education and Science in Ireland (DES, 2006) recommends ‘...*that children with ASD in all educational placements have access to an adequate, systematic and co-ordinated multidisciplinary support structure’* (p.90). SIGN (2007) concur, suggesting that clinicians need to ensure they collaborate with educational and other types of providers in order to gain an accurate picture of the child’s level of functioning in all settings. APPGA (2005) advocate that an autism-specific multi-agency team should be available in every locality, with a named senior manager in every local authority taking over-arching responsibility for commissioning and delivery, for both children and adults. The Welsh Assembly document (2007) proposes a set of actions to map existing and future needs, an autism co-ordinating group for every area, and an ‘autism champion’ to work with key stakeholders. There was no empirical evidence on multi-agency working identified via our search strategy.

1. **Transition to Adulthood**

The consensus view is that transition processes need to be well coordinated across services and that transition should be recognised as a time of additional stress for the young person on the autism spectrum and their family. The NAPC (NIASA, 2003) makes a strong recommendation for further work to be undertaken regarding the needs of adolescents and adults with autism; and for a multi-disciplinary co-ordination of resources and opportunities for adults on the autism spectrum. They also propose that there should be a set of clear guidelines in relation to transition to secondary schools, school leaving and opportunities for further and higher education. SIGN (2007) highlights the additional stress upon children and families at times of transition and the need for services to plan ahead. The AET report (Jones et al., 2008) suggests that good practice be shared in relation to transition across educational phases and settings. There was no evidence identified through the empirical strand that looked at transitions beyond schooling.

1. **The Autistic ‘Voice’**

According to our inclusion criteria, this topic should technically be excluded as it does not concern outcomes for children and young people. However, we consider children and young people’s views to be essential to informing high quality educational provision and so include below some (rare) examples where these have been sought. Firstly, Humphrey and Lewis (2008) asked 20 students with AS or HFA, aged 11-17 years, about their everyday experiences of mainstream school in the UK. Reports of social isolation, bullying, anxiety, difficulties in accessing lessons, and negative connotations of ‘difference’, as well as the stigma associated with additional support, were common. Support from friends, quiet ‘refuges’ in the school, as well as understanding teachers were cited as helpful. Similarly, Jones et al. (2006) asked 35 young people with AS in Northern Ireland about life at school / college, friendships and future plans. Overall there were more positive ratings than negative, although 68% of the students said they would have liked their school / college to be different, with 66% saying teachers were ‘not very good’ at giving support; bullying in school / college was also a recurrent theme. Although it is not possible to claim these views are representative as the samples are small, these papers highlight the important insights that can be gained from hearing from young people directly. Moreover, this research is informative about factors that tend not to be considered in focused intervention studies (eg. the stigma of in-class support) that could nevertheless affect their efficacy.

**Discussion**

Both the empirical and expert strands of evidence highlighted the importance of early intervention (reflecting in part the bias of available evidence); 82 of the 92 included empirical papers focused on younger children under the age of 11 years. In particular, interventions that focused on early communicative behaviours (eg. joint attention), including those involving parents, showed promise regarding efficacy and outcomes for the child. Intervention programmes that used intensive behavioural techniques were successful in teaching specific skills, for some children, in some contexts (eg. joint attention and play-related skills). However, robust comparisons between different programmes for early intervention (eg. early intensive behavioural programmes based on ABA principles versus ‘eclectic’ statutory provision) produced mixed results across studies, with no evidence that any one particular approach offered consistently better outcomes than another. Thus, one particular type of intervention or approach is unlikely to produce the best outcomes for all children included. Based on these findings, in addition to the consensus view from the expert strand and policy documents, it is clear that a range of interventions should continue to be funded and provided for families. Thus, despite calls for statutory bodies to fund ABA early intervention programmes and offer them to families for ‘as long as necessary’ (eg. Keenan et al., 2007) we conclude that there is insufficiently strong evidence to promote a specific type of intervention or approach for all children and families. These findings are consistent with other recent reviews of the evidence (Spreckley & Boyd, 2009; Howlin, 2010).

Relatedly, the expert evidence strongly supports the maintenance of a range of provision to cater for the diversity of need for children and young people on the autism spectrum. There was no evidence to favour special/ist over mainstream provision or vice versa. Of course, ongoing research is required to establish the effectiveness of interventions (especially when compared to each other; Kasari, 2002) and types of provision. Crucially, pupils on the autism spectrum are not a homogeneous group and decisions regarding educational provision should be based on individual needs and preferences, in addition to the views of parents, practitioners and service providers.The important role of parents in supporting children’s education and development was reinforced by evidence from both the empirical and expert strands. Parents can make important contributions to educational interventions for their children but need to be equipped with good psycho-educational information in order to do so (Sofronoff et al., 2004\*\*). Family contexts and wishes need to be taken into account when considering any intervention (Moes & Frea, 2002; Drew et al., 2002) not least because parental stress levels are an important influence on successful outcomes for children (Osborne et al., 2008).

There were also strong emerging findings about the importance of ‘the autistic voice’ and, wherever possible, taking the views of children and young people on the autism spectrum into account. Findings relating to young people’s views and experiences of mainstream schools (Humphrey & Lewis, 2008) are of special importance, in particular around the need for friendship, and places of refuge. Pupils on the autism spectrum also want teaching staff to know about their individual needs, to be empathetic and differentiate their practice accordingly. Note, however, it is unlikely that these requirements are autism-specific and may instead reflect the needs of children requiring additional support in schools, for whatever reason (see Lewis et al., 2007).

It also became clear through undertaking the present review that there remain many gaps in knowledge with respect to the methods and interventions that demonstrate ‘best outcomes’ for the child. Moreover, determining what might be a ‘best outcome’ for an individual child is a complex judgement, and one that is often not addressed in the reviewed evidence. There is debate currently about what constitutes success and which outcomes should be measured when trying to determine the effectiveness of an intervention or educational provision more widely for those on the autism spectrum. Currently, there is a strong emphasis on academic attainment as a measure of a school’s effectiveness, yet many in the field of autism feel that other goals are equally important. These include communicative competence; social understanding; physical and emotional well-being and independence skills. Many children on the autism spectrum can achieve a high level of academic success, but without the necessary skills and understandings in other areas of their life, may fail to benefit from these in terms of their future education, employment or living arrangements. The lack of follow-up data after a main study or an intervention often limits the conclusions that can be drawn about outcomes. For some children and parents, the benefit of an intervention may not be seen for some time after the intervention or experience has ended. It is notable that out of 100 empirical research articles reviewed (in the original report), only 12 were graded as offering a high weight of evidence for the review. This underscores the difficulties in carrying out robust, meaningful and ethically appropriate research in the real-world contexts of children and families’ lives, both at home and beyond.

This means that it is often difficult to implement robust research designs in which the ‘active ingredients’ of an intervention can be adequately teased out from maturation effects and other relevant inputs (such as statutory provision of speech and language therapy; inclusion in other educational, medical or dietary programmes). Good baseline data may be hard to obtain as children have often started out on an intervention before the research work is ready to start. In addition, these issues are exacerbated by a lack of specificity in reporting. Many (though not all) of the research papers failed to include some basic details regarding, for example, the criteria used to determine diagnoses; cognitive, linguistic and developmental profiles of the participants; the number of hours input each child received; the exact context in which the intervention took place; the specific teaching approaches or procedures implemented and the fidelity of programme implementation. These factors, coupled with the (usually) small numbers of participants and high variability in responding within and across interventions means that judgements regarding effectiveness, generalisability and relevance of the described interventions should necessarily err on the side of caution.

In addition, and given the significant debate that exists in Ireland and the UK (and beyond) regarding inclusive education and where it takes place, there was a surprising lack of independent research as to how autism-specific classes (in either mainstream or specialist settings) operate and their influence on individual outcomes. It is important to emphasise, however, that the current lack of formal, published evidence about autism-specific provision does not imply that such provision is not beneficial or appropriate for some children on the autism spectrum. Rather, it is an example of educational practice developing at the ‘coal face’ for good reasons, and in response to specific needs, and outpacing formal research and evaluation. It also reflects that decisions about educational provision are often based on factors wider than what the evidence tells us, including ideas about social justice (Nind, 2006; Thomas, 1997); experiential ‘craft’ knowledge of practitioners, as well as practical, financial and family considerations.

Another significant gap in the empirical evidence base was the needs of older children and adults on the autism spectrum. Only 10% of articles focused on the needs of post primary-aged children and young people (12-16 years). Where there is research involving older students, this tends to focus on those with Asperger syndrome or High Functioning Autism and correspondingly higher-level cognitive skills such as Theory of Mind, empathy and emotions. As a result, very little is known about what constitutes appropriate provision, or an effective intervention, for older children and young people on the autism spectrum with more severe learning disabilities and how this might compare with early intervention.

In addition, effectiveness of provision (or, more usually, a specific type of intervention) has tended to be measured by quantitative data, often through changes in scores on standardised assessments (and this also reflects our inclusion criteria with a focus on outcomes). Whilst these offer important evidence, there is a significant lack of qualitative research and / or measures regarding aspects of educational provision or interventions. Qualitative research can offer important insights into (for example) contextual factors that may influence outcomes (such as environmental conditions; skills of the therapist or teacher; timetabling of lessons; reactions and support from classmates). Crucially, qualitative measures are also needed to judge the relevance and usefulness of skills learned during the course of interventions; for example, whether behaviours or language are used in contextually appropriate and meaningful ways. To help with this, there is a need for greater collaboration between researchers and practitioners to establish what works best for children and young people in real-world classrooms. There tends to be a lack of consideration of wider factors in research studies focusing on specific techniques (for example, how a particular intervention may link to general teaching, classroom context and curricula), and (sometimes) a lack of objectivity and rigour in classroom-based studies. Ideally, there needs to be a greater synthesis between applied and basic research strands.

The processes involved in following a particular intervention (ie. what is it like for all concerned to participate in the intervention) also need more consideration. It is important to evaluate the extent to which the style and principles of an intervention suit the child, the parents and the staff delivering the intervention. Where it is found that more than one type of intervention leads to the same outcomes, one can then ask the question, which of these interventions should be chosen for a particular child and on what basis? Given the lack of robust empirical evidence in many areas of practice and provision, the views of experts (including parents) remain a vital source of information and guidance. This comes across strongly in the evidence reviewed for the expert strand, where there was substantial agreement across many key themes; not least, the importance of statutory agencies working together to achieve the best outcomes for children, young people and adults on the autism spectrum, and their families.

**Conclusions**

Overall, there remains a notable lack of empirical evidence to inform practice and policy with regard to what ‘best practice’ means in real-world classrooms and how ‘joined-up working’, as well as effective and appropriate practice, can best be achieved for autism-specific schools and services. What is clear is that more quality research is needed across all stages and contexts of provision and a debate on which outcomes are important in the short and longer term for individuals on the autism spectrum. In particular, there is a need for research on educational interventions and settings to explicitly address questions of social validity and longer-term outcomes for children, young people and their families.

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**Tables and Figures**

**Empirical Strand**

**Expert Strand**

Papers / documents drawn from known sources, relevant websites and practitioner journals

One-stage screening: papers identified in ways that allow immediate screening e.g. ‘handsearching’

Two-stage screening: papers identified where there is not immediate screening e.g. electronic databases

Title and abstract screening (inclusion / exclusion criteria applied)

Identification and acquisition of reports

A second stage of selection to manage the size and scope of the review effectively; single case study papers excluded; review papers selectively included

Full document screening (duplicates removed)

Mapping of findings by keywords and description of main results / conclusions

Synthesis of main themes

Synthesis of main themes

Compare / discuss in the light of emerging findings from both strands

**Recommendations and implications for practice and policy**

**Fig 1: Search strategies for the Expert and Empirical strands of the literature review**

**Table 1: Main themes from the literature mapped according to main source (strand) of evidence**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Empirical** | **Expert: Children and young people** | **Expert: post-compulsory education and adults\*** |
| **Early assessment and intervention** | **🗸** | **🗸** | **🗸** |
| **Types of intervention** | **🗸** | **🗸** |  |
| **Working with families** | **🗸** | **🗸** |  |
| **Multi-agency approach** |  | **🗸** | **🗸** |
| **Staff training** | **🗸** | **🗸** |  |
| **Social interaction, understanding and skills** | **🗸** |  |  |
| **Specific learning tools and approaches** | **🗸** |  |  |
| **The Autistic Voice** | **🗸** | **🗸** | **🗸** |
| **Transitions** |  | **🗸** | **🗸** |
| **Improving access to Further / Higher Ed\*** |  |  | **🗸** |
| **Institutional considerations\*** |  |  | **🗸** |
| **Diagnostic disclosure\*** |  |  | **🗸** |

\* Categories not included in the present review paper but referenced in the table to show complete list

1. The term Autism Spectrum Conditions (rather than Autism Spectrum Disorder) is used here to reflect the changing perspectives and understanding of the term in the context of educational practice and disability theory in the UK, informed significantly by people on the autism spectrum and their families. This term is now much more common in the UK and is increasingly being adopted in recognition of this broader perspective which moves beyond medically-oriented diagnostic terms and views of impairment. [↑](#footnote-ref-1)
2. Due to space constraints only references included in the Introduction and Discussion are listed below. The full set of references included in the substantive literature review can be found from the original report or from the following link: [to be added once agreed with editor] [↑](#footnote-ref-2)