An Chomhairle Náisiúnta um Oideachas Speisialta
National Council for Special Education

Literature Review relating to the Role of the Special Needs Assistant

May 2018

Research conducted as part of the Comprehensive Review of the Special Needs Assistant Scheme

Contents

1. Introduction

This report is a review of the literature relating to the review of the special needs assistant scheme. It focuses in particular on published impact studies examining the role of paraprofessionals. Following this brief introduction, the research question guiding the literature search and the search process for this report is detailed, before an overview of the literature examined is outlined. This will detail the total number of articles covered in this report and the categorisation process involved to order the material. Four discrete sections then follow, each relating to the category or heading devised to order this literature. Within each section, the relevant literature is presented in a template alongside a brief review of it.

2. Research question and literature search process

There was one overarching question developed by the NCSE for this work, which guided the literature review process:

> *In the context of the Special Needs Assistant scheme, is there evidence (and if so, where) for impact of different types of support for children and students with different additional needs in an educational context/for educational purposes?*

Thus, it was decided to search for and examine literature which sought to evaluate and/or demonstrate *impact* of interventions related to the role of the special needs assistant. Impact studies generally refer to research which seeks to examine the effects of an activity/set of activities on short-term goals, attributes or outcomes for a population. Such activities can take the form of an intervention, a programme or a policy. A definition offered by Song and Herman[1] (2010a; 2010b) in relation to impact studies in educational research is useful in this regard. They refer to impact studies as "studies that are designed to assess the impact of an intervention – which may be a program, a product, a practice, or a policy — on certain outcomes, such as student achievement" (Song and Herman 2010a, p.1). It is generally recognised that studies with an experimental or quasi-experimental research design can provide evidence which demonstrates impact.

Five categories of terms were generated to guide the literature search process, for which alternative or associated terms within each category were then developed. The five categories and examples of some of the alternatives used are listed below (see appendix 1 for the complete list used):

- Impact (e.g. outcome, positive impact, negative impact, improvement, dis-improvement)
- Additional needs (e.g. complex needs, care needs, toileting, hygiene, orientation, behaviour, social)

[1] Song, M. and Herman, R. (2010a) *A Practical Guide on Designing and Conducting Impact Studies in Education: Lessons Learned from the What Works Clearinghouse (Phase 1).* Washington DC: American Institutes for Research; Song, M. and Herman, R. (2010b) Critical Issues and Common Pitfalls in Designing and Conducting Impact Studies in Education: Lessons Learned From the What Works Clearinghouse (Phase I). *Educational Evaluation and Policy Analysis,* 32 (3), pp. 351-71.

- Disability or SEN (e.g. deaf, physical disability, moderate general learning disabilities, ADHD)
- Personnel (e.g. paid aide, paraprofessional, paraeducator, auxiliary, special needs assistant)
- Support (e.g. behaviour support, care support, behaviour therapy, speech and language therapy)

Search strings combining the categories (and the terms within them) were built and used to search the following databases:

- British Education Index
- ERIC
- SOCIndex
- Psychological and Behavioural Sciences Collection
- Education Source
- Education Full Text (HW Wilson)
- Social Work Reference Centre

The number of unique citations retrieved under the different search strings used (once duplicates within each string were removed) is outlined below:

Search string	Total relevant hits
1	133
2	116
3	120
4	590
Total	959

Inclusion and exclusion criteria were applied to the literature returned from the database search. These are outlined in the table below:

Parameter	Included	Excluded
Scope	Students with special educational needs; Research relevant to an educational context/for an educational purpose.	Those other than students with special educational needs (e.g. adults with disabilities; students with no special educational needs); Research not relevant to an educational context/for an educational purpose.
Study type	Robust research design (e.g. (quasi) experimental design, single case design with some combination of pre-test and post-test comparison and/or follow-up) reporting impact, and with a sample size of more than five.	Methodological considerations (e.g. instrument/measure validity and reliability testing); Commentary or opinion (in academic or trade publication); Work not based on empirical studies; Work not (quasi)experimental in research design; Work reports perspective, views or other forms of social validity data; Sample size of less than five; No impact (measure(s)) reported.
Time	Published between January 2000 and August 2016.	Published prior to January 2000.
Place	Written in English.	Not written in English.

The title and abstract for each citation in each search string were initially examined in the context of the inclusion and exclusion criteria outlined above. In some cases the title alone permitted exclusion (e.g. “the reflections of teachers of visually impaired students on their [teachers] Assistive Technology capacities”), while in others a reading of the abstract was required. In a number of cases however, neither title nor abstract were sufficient to generate a sense of whether the article might be of relevance. Thus, the article was sourced and examined for relevance.

When these criteria were applied to each of the results of the search string, 73 citations remained:

- Search string 1: 19 citations
- Search string 2: 2 citations
- Search string 3: 7 citations
- Search string 4: 45 citations

These 73 articles were selected for further examination and in-depth review. Once examined, 59 were subsequently excluded. Reasons for the exclusions are as follows:

- Three articles were repeats not identified in the original sifting of the literature;
- Three articles focused on adults (college students), or mainly on adults (a literature review)
- One article detailed an intervention delivered in a home setting;
- Seven articles focussed or reported impact solely in relation to teachers/interventions delivered by teachers;
- Seven articles contained no detail on who was delivering the intervention/training, and/or how it related to paraprofessional support (either comparing with or replacing);
- Two articles contained insufficient or no detail on the nature of the intervention;
- Thirty-five articles had methodological issues. Thirty-one of these studies had sample sizes of less than five, while the remaining four had other particular issues (purely qualitative/case study design, no impact reported, nonexperimental design, and one literature review which included a long description of an intervention study by one of the authors of the review);
- One article could not be accessed.

Additional non-databased literature

In addition, a small number of articles (n=6) not sourced through the process outlined above were also included for review. There may be many reasons as to why they did not appear in the database search, including that their titles did not match all the categories of search criteria, the content was not indexed in the database (e.g. some book chapters or some journals), they did not have abstracts which could be searched, their keywords were limited, or they were ‘grey’ literature (non-databased literature, often produced by commercial research organisations, and/or NGOs and government bodies). Firstly, the Sage Handbook of Special Education was purposively reviewed for relevant material. This resulted in a review article by Michael Giangreco and colleagues being included on teacher assistants in inclusive classrooms published in the handbook. Secondly, a review of the bibliography in these works led to the sourcing of another Giangreco and colleagues review (2010), and other (grey literature) review work by Alborz et al (2009), which focused on the impact of

adult support staff on pupils and mainstream schools. Thirdly, a colleague in another jurisdiction provided a reference to relevant review material (Sharma and Salend, 2016), the bibliography of which provided two additional relevant references (Walker and Smith, 2015 and Brock and Carter, 2013).

These articles are included in this review as they provide useful additional information on research conducted in the area of paraprofessional support for students with disabilities. Given their 'review' nature, they are also used to contextualise the database-sourced work, which tends to be more individual study/intervention based.

3. Overview of literature and nature of the evidence produced

The total of 14 articles sourced through the database searching process and the additional 6 articles soured through the non-databased process are listed in the following sections:

- Eight relate to the role/work of paraprofessionals that report impact for the student (four databased articles and four non-databased articles);
- Five relate to specific interventions, assistive technology or environmental modifications delivered by paraprofessionals that report an impact for the student (four databased articles and one non-databased article);
- Five detail training provided to paraprofessionals on specific interventions for students that report an impact on either the student, the paraprofessional or both (four databased articles and one non-databased article);
- Two relate to interventions, assistive technology, environmental modifications or other paraprofessionals used to replace or compare paraprofessionals that report an impact for the student (both databased articles).

Eight of the 20 articles were reviews (systematic and non-systematic/ selective in nature). The focus of these reviews ranged from the broad (e.g. impact of adult support staff on student outcomes, impact of physical education on inclusion, review of themes in paraprofessional research) to the narrow (e.g. paraprofessional-delivered educational practices and student outcomes).

Twelve of the 20 articles reported the results of studies on particular interventions. The focus of these articles ranged from particular studies looking at impact of teaching assistants generally, to pre-reading interventions, to peer support arrangements to models of delivery for speech and language services in schools. As can be noted from this short description alone, even within a small number of articles, the intervention literature appears disparate.

Nature of the evidence

It should be noted that many of the eight review articles featured in this report included studies which had small sample sizes and/or did not use experimental /quasi-experimental research designs. It is possible for such studies to be included in each of these eight review articles as, despite their methodological limitations in the context of criteria used for this report, they can be weighted alongside other, more methodologically sophisticated studies to provide an overall evaluative judgement on the nature of the evidence in its totality. In such cases, these reviews were often produced by teams with extensive resources to hand.

In relation to the twelve intervention studies reviewed, while the inclusion criteria meant that only studies with certain methodological approaches were included, there are other characteristics which limit the impact of their findings and generalisability. The main issue relates to sample size: while studies with sample sizes below five participants were excluded, many of the included studies had total sample sizes of approximately fifty or less. In many cases, when particular methodological approaches were applied (e.g. randomisation and use of control groups), the effective sample size halved.

In addition, the methodological approaches used, while experimental, varied. For example, four of the twelve intervention studies used randomised control trials, which is often characterised as the gold standard methodological approach for producing policy- and practice-relevant research evidence (often termed 'causal' evidence). Greater weight can be attributed to these studies than to others featured here due to this robust methodological approach, although their power is somewhat limited by the modest sample sizes (only one study had a sample size where the intervention group was over 100). However, three others used single-subject designs, a methodological approach which at best can produce indicative evidence. Three other studies used various pre and post intervention designs with limited follow up. Finally, two of these studies had large sample sizes and were based on the well-known and well-regarded work by Blatchford and colleagues on Teaching Assistants in the UK. While based largely on observational data, the strength of the work lies in the rigorous, systematic, statistical analysis of the data and the large sample sizes and are thus strong studies.

Gaps in the evidence

Existing literature reviews of paraprofessional/adult support in the classroom for students with disabilities corroborates the experience of this review: there are significant gaps in the literature. The first observation is that there is a general paucity of high-quality impact studies examining student outcomes of paraprofessional support. While there are some well-known studies, they are few in number. It has been noted that the constantly evolving nature of school contexts may make the undertaking of rigorous definitive studies more problematic (Alborz et al., 2009).

The second gap evident in this review is the relative absence of studies focusing on students in secondary school and/or not in mainstream classrooms. The majority of the intervention studies here are based on students who are of primary age and in mainstream classes.

A third gap in the evidence is the absence of non-UK or US studies. Almost all of the studies are American in nature. While this may be understandable given population considerations, it does present a challenge to the transferability of knowledge from one education system (or in the case of the US, individual State systems) to another. Related to this point is the different in terminology used in different countries to describe individuals in education settings akin to special needs assistants, and the different tasks they undertake. For example, the roles of a teaching assistant in the United Kingdom and a special needs assistant in Ireland are not directly comparable. The generic term 'paraprofessional' is used in United States, which has the potential to cover different roles.

A fourth gap relates to the focus of the intervention studies. While language and literacy-related studies were present, along with social skills interventions, studies relating to the role

of paraprofessionals in supporting students in other aspects of school life/learning were absent.

A fifth gap stems from the content of studies which are included. In many cases, the nature of the intervention and/or training being tested or provided is not extensively described in the published articles. Similarly, the type of paraprofessional, and their relevant characteristics are often also not fully described. These absences can often prevent the reader from generating a deeper understanding of the import of the article, and the potential learning from them which may be applied in a different educational context.

4. The role/work of paraprofessionals that report impact for the child

4.1 Overview

There are eight articles in this section: four databased and four non-databased. Of the four databased articles:

- The first is a review of literature from 1990-2000 authored by Giangreco and colleagues;
- Articles two and three detail findings from the Deployment and Impact of Support Staff in schools (DISS) project (Blatchford et al);
- The fourth article focuses on examining the impact of proximity of paraprofessionals on student outcomes.

Of the four non-databased articles, which are all reviews:

- The first two provide an overviews of select literature on teaching assistants, and paraprofessionals respectively;
- The third is a systematic analysis of international research on teaching assistants;
- The final article is a systematic review examining the impact of support staff on students in mainstream schools.

These articles are summarised in the templates below.

4.2 Databased articles

<table>
<tr><td>Article no. and full title</td><td colspan="4">1. Paraprofessional support of students with disabilities: literature from the last decade. Giangreco et al, (2001)</td></tr>
<tr><td>Nature of intervention/study</td><td>Age group</td><td>Category of disability</td><td>Research design</td><td>Sample size</td></tr>
<tr><td>This is a review article of 43 pieces of research published between 1991-2000. The different pieces of research are separated into databased and non-databased articles (there is no clear articulation of what the difference is between the two categories, however more detail is provided on the databased than the non-databased pieces).</td><td>Not specified</td><td>Various: either “children with disabilities” or specified low incidence categories such as Down syndrome, moderate to severe disabilities or “significant behavioural challenges”.</td><td>Mixed, where specified at all</td><td>Wide range, from 1 to 1,100</td></tr>
<tr><td>Category of class (e.g. special class/unit, mainstream)</td><td colspan="4">Either mainstream (inclusive) education or unspecified.</td></tr>
<tr><td>Type of needs met</td><td colspan="4">Unspecified</td></tr>
<tr><td>Brief overview of findings</td><td colspan="4">The review does not address or expand on the title ‘paraprofessional’, but rather uses it globally to discuss literature relating to different types of paraprofessional. A review of the bibliography suggests that these different types include instructional aides, classroom assistants, teacher aides, teaching aides, and paraeducators.

The review does not provide individual sample sizes for each of the studies cited.

The review details few impact findings (due to the low number of studies undertaken at that stage). However, it notes the following in relation to six specific studies examining the impact of paraprofessional support:

It cites four single-subject experimental studies (no further methods details given) in which “paraprofessionals [not further specified] reported satisfaction learning [from training] and using new skills [specific instructional procedures such as cueing, reinforcement, probing, prompting, and fading of prompts] and corresponding data indicates positive student outcomes (e.g. social skills, independent task engagement) when those skills are applied)” (p55-6).

An additional, mixed-methods study looking at the Model Consultation and Paraprofessional Pull-In system (CAPPS) and which used the school as the unit of analysis noted mixed student outcome data, with “some modest improvement in reading and maths scores […] for students grades 1-4”. However “the nature of the design does not allow one to isolate</td></tr>
</table>

	what, if any, contribution the paraprofessional component of the CAPPS model had on the reported outcomes (p56); Another cited experimental study reported favourably for the use of peer support in comparison to paraprofessional support for students with profound disabilities in general education classrooms. Results included higher levels of interaction and social support activities between those without and those with disabilities. Active engagement in certain activities by students with disabilities increased (maths, social studies) but no difference in others (art, industrial crafts) (p57)
Author conclusion/assessment	"The databased literature does little to help answer questions pertaining to […] effectiveness of paraprofessional supports for students with disabilities". "As a set of literature, the reviewed studies present no discernible line of research and insufficient data on student outcomes". (p58)

Article no. and full title	**2. The impact of support staff on pupils' 'positive approach to learning' and their academic progress (Blatchford et al, 2011)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Examining the impact of amount of support given by support (TA) staff as it occurs under everyday conditions in educational settings, looking at amount of time, proximity, interaction and attention	Between ages 4-15	Not specified	Short-term longitudinal, quantitative study (1 school year), two cohorts (2005/6 and 2007/8). Adapted version of Pupil Behaviour Rating Scale used	4,716 included in the analysis. Approx. 1,236 with SEN
Category of class (e.g. special class, mainstream)	Mainstream			
Type of needs met	Unspecified, other than SEN and EAL			
Brief overview of findings	Generally inconsistent results regarding students positive approach to learning (only one group, year 9 in wave 2 showed significantly positive effects with high levels of support). (p457) More conclusive evidence in academic attainment outcomes, where "there was a negative relationship between the amount of TA support and the academic progress of pupils […] In years 1, 3 and 7 in English and [maths] there was a consistent negative relationship between the amount of such support a pupil received and the progress the made […] even when other confounding factors were taken into account" "There was some evidence that the effect [the negative relationship between support and academic progress] was more marked for pupils with a higher level of SEN, but it was still generally evident for pupils with no SEN" (p458)			
Author conclusion/assessment	"In reality, it is likely that individual characteristics and situational and structural factors will all be important and that there will be a complex interplay of relationships between the various components" (e.g. not just the role of TAs, but decisions made by teachers about how they are deployed, training).			

Article no. and full title	**3. The effect of support staff on pupil engagement and individual attention (Blatchford et al, 2009)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Looking at impact of TAs on pupil engagement and individual attention, comparing differences between TAs and teachers, students with and without SEN, and primary and secondary	5/6, 7/8, 11/12 and 14/15	Students without SEN and students with SEN (i) students with statements of SEN [severe or complex needs requiring exceptional provision] (ii) those described as having school action needs [students requiring provision different from and additional to other pupils] and (iii) those described as having school action plus needs [where help is provided or sought from those external to the school].	Systematic observation with data subjected to sophisticated statistical analysis.	686 observed in total for the article
Category of class (e.g. special class, mainstream)	Mainstream			
Type of needs met	Unspecified other than SEN			
Brief overview of findings	Data showed that the presence of support staff resulted in increased individualisation of attention (greater focus) and overall teaching (from adults as well as from teachers specifically), easier classroom control (less talk dealing and negative behaviour), and that pupils showed more engagement and a more active role in interaction with other students. However, paraprofessional presence also meant pupils' contact with teachers declined and at secondary level there was less individual and active interaction between teachers and pupils. "Perhaps the most significant finding is that the amount of contact with teachers tended to decline when support staff were present". Regression analysis revealed that there was more individualised attention for SEN students, but this led to less contact time with teachers (at second level). Students with no SEN showed more classroom engagement than those with SEN. There was more total on-task behaviour for the SEN groups, and less total off task behaviour. There is "therefore a strong suggestion that the presence of support staff at both primary and secondary school is of particular benefit in improving the attention of children in most need". (p681)			
Author conclusion/assessment	More research needed, but given that the study showed that the effects on students with SEN were more pronounced, careful consideration ought to be given to pedagogical practice and deployment of TAs, perhaps especially with students with SEN.			

Article no. and full title	**4. The Effects of Proximity on the Classroom Behaviours of Students with Autism in General Education Settings (Conroy et al, 2004)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Examining impact of proximity of adult (assistant, teacher, special education teacher) on appropriate and challenging behaviours	5-7 years (kindergarten, first grade, second grade)	ASD for all 6, each individual with other disabilities	Within subject, comparing behaviours when adult was present and not present	N=6
Category of class (e.g. special class/unit, mainstream)	Mainstream (at least 50% of the day)			
Type of needs met	Behaviour, staying on task, disruption,			
Brief overview of findings	Rate of engagement increased when adults were proximate for 5 of the 6 students, and for 4 of the 6 students when a directive was given and proximate; no difference for the 6th student.			
Author conclusion/assessment	Findings suggest "that proximity increased the rate of engagement and probability of engagement following an adult directive […yet] adult proximity at times either may have no effect or may increase the rate of problem behaviours for some individuals and decrease the rate of problem behaviours in others" (p127). More research is needed.			

4.3 Non-databased articles

Article no. and full title	**5. Paraprofessionals in inclusive schools: a review of recent research (Giangreco, Suter and Doyle, 2010).**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Follow-up literature review to their 2001 publication (see article 1 in this report), reviewing literature from 2000-2007. It is a review of 32 US studies, seven of which are experimental.	Not specified	Not specified	Not specified	Not specified
Category of class (e.g. special class/unit, mainstream)	Not specified			
Type of needs met	Unspecified			
Brief overview of findings	The review does not provide individual sample sizes for each of the studies cited. The review covers nine topics: hiring and retaining paraprofessionals; paraprofessionals training; paraprofessionals roles and responsibilities; respect and acknowledgement of paraprofessionals; interactions of paraprofessionals with pupils and staff; supervision and directing the work of paraprofessionals; students' perspectives on paraprofessional supports; paraprofessionals as part of school change; and alternatives to the use of paraprofessionals. The review notes the following in relation to impact: "The most systematic recent research extends earlier evidence that paraprofessionals can be effectively trained to undertake a variety of tasks that result in positive student outcomes" (p.45). Examples include training in embedded teacher-planned instruction, facilitating social interactions and implementing social stories. "Current research on paraprofessionals' interactions with students and staff suggests the need to establish collaborative relationships with paraprofessionals to ensure that their interactions are consistent with overall efforts to support teachers and students" (p.47). Regarding alternatives to paraprofessional support, "peer supports have been suggested as one effective alternative to overreliance on paraprofessionals" (p.49).			
Author conclusion/assessment	"The need for future research […] is substantial and wide ranging […including] more research on effective training and supervision strategies, and perhaps most important, research linked to student outcomes". (p53)			

Article no. and full title	**6. Teacher assistants in inclusive classrooms (Giangreco, Doyle and Suter, 2013).**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Book chapter provides overview of a subset of literature (total number of articles not specified) on teacher assistants and other types of paraprofessionals in classrooms supporting students with disabilities.	Not specified	Not specified	Not specified	Not specified
Category of class (e.g. special class/unit, mainstream)	Mainstream			
Type of needs met	Not specified			
Brief overview of findings	Chapter highlights findings from selected international studies on range of issues. Impact related findings detailed include: *Teacher assistant proximity*: evidence presented suggests positive and negative effects of proximity of teacher assistant to student, including (positive) promotion of participation and learning, and (negative) potential creation of unnecessary dependencies and limit use of students' own capabilities. Close proximity can also inhibit student interaction with teachers and peers. *Models of teacher assistant deployment*: very limited research, with findings from one study cited that deployment of teacher assistants in a structured, team-work based approach resulted in improved student engagement. *Teacher assistant support and academic achievement*: findings reported from the Blatchford work (detailed elsewhere in this report) and Farrell et al (2010) (equal to Alborz et al., 2009, detailed elsewhere). *Alternatives to overreliance of teacher assistants*: limited research exploring use of a package of alternatives (e.g. resource reallocation and school-wide supports).Peer support, and altered school service delivery parameters (e.g. ratios of assistants to teachers, special education teacher caseloads) point to potential improvements at the school level.			
Author conclusion/assessment	In short, more research is needed on teacher assistants, particularly within the context of school-wide delivery for all students in inclusive schools.			

Article no. and full title	**7. Teaching assistants in inclusive classrooms. A systematic analysis of the international research (Sharma and Salend, 2016)**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Review article of 61 studies which met authors' inclusion criteria for review.	Not specified	Not specified	Various: quantitative, qualitative and mixed methods	Not specified for students
Category of class (e.g. special class/unit, mainstream)	Mainstream (pre-primary to secondary)			
Type of needs met	Not specified			
Brief overview of findings	Findings in relation to studies examining impact of teaching assistants on student outcomes included: Studies which employed standardised data have raised concerns about the efficacy of teaching assistants and the practices they use which inadvertently undermine inclusion; TAs frequently taught students in small groups which led to these students rarely being included in whole-class activities and having fewer interactions with classmates and teachers; Studies also noted that students who received more support from teaching assistants made less academic progress than students who received less or no support.			
Author conclusion/assessment	"Results of this review suggest that due to the important teaching and curricular roles they are asked to perform […] teaching assistants in many classrooms inadvertently serve to undermine the goals of inclusive education".			

<table>
<tr><td>Article no. and full title</td><td colspan="4">8. Impact of adult support staff on pupils and mainstream schools (Alborz et al., 2009).</td></tr>
<tr><td>Nature of intervention</td><td>Age group</td><td>Category of disability</td><td>Research design</td><td>Sample size</td></tr>
<tr><td>Large scale systematic review of literature on impact of paraprofessionals on student and schools. 35 studies in total are included in the review (published between 1973-2008)</td><td>3-16 years</td><td>Various</td><td>Quantitative, qualitative and mixed</td><td>Not specified</td></tr>
<tr><td>Category of class (e.g. special class/unit, mainstream)</td><td colspan="4">Early years, primary and secondary (all mainstream).</td></tr>
<tr><td>Type of needs met</td><td colspan="4">Not specified</td></tr>
<tr><td>Brief overview of findings</td><td colspan="4">Findings in relation to impact of adult support on students are reported under three headings:

<u>Academic learning</u>
Seven of eight studies examining targeted literacy support noted that trained and supported teaching assistants had a positive impact on pupils' progress. The eighth study reported mixed findings;
One study produced positive findings in relation to language support provided by teaching assistants, again where training and support (to the TA) was provided;
One numeracy-related study found no impact on student outcomes, while another produced mixed results.

<u>Social/emotional</u>
Four of the six studies reported positive impacts of teaching assistant support on psychosocial development. The two remaining studies presented mixed findings.
One study suggested that teaching assistants were not successful in undertaking therapeutic tasks aimed at supporting students with emotional and behaviour problems. However, it was suggested that the intervention may have been too brief to be effective.

<u>Pupil participation</u>
Seven of 14 studies reported a negative impact of teaching assistants on pupil participation, where an overreliance on TA support or too much support hindered pupil interaction with peers and teachers and undermined opportunities for self-determination.</td></tr>
<tr><td>Author conclusion/assessment</td><td colspan="4">Findings in relation to impact of teaching assistants on pupil outcomes point to the importance of adequate training and support of teaching assistants. There is a need to promote effective programmes to enable TAs to support pupils with a wide range of abilities appropriately and in different groups (one-to-one, small group and whole class).
At the practice level, findings suggest that there is a case for deployment of well-trained teaching assistants to support pupils individually and in groups, in collaboration with the class teacher […] TAs should not, normally, work</td></tr>
</table>

	on a one-to-one basis with pupils. Support to individual pupils should be combined with group work which facilitates all pupils' participation on whole-class activities.

4.4 Section review

As outlined above, there were eight articles in this section. Five were literature review articles and three reported findings from individual research studies.

The main findings included:

- There is limited good outcome data on the impact of paraprofessionals on student outcomes.
- What data are available show mixed results for students, in relation to engagement with peers and teachers, and in academic outcomes. Where teaching assistants received training and support in targeted literacy support, students did well.
- There is evidence to suggest that the use of teaching assistants can at times undermine the inclusion of students with special educational needs.
- The proximity study also suggests that distance between paraprofessional and student can impact the student's wider engagement in the classroom.

4.5 Discussion

Of note is Giangreco et al's (2001, article number 1 in this report) comment that the evidence relating to students' outcomes arising from paraprofessional support and detailed in literature published between 1990-2000 is insufficient. More recent work from Blatchford et al (2009; 2011) seeks to address this, and points to positive and negative effects of paraprofessional support, both for students with and without special educational needs (but mainly negative for students with special educational needs).

Other general reviews of published literature points to similar findings. Giangreco, Doyle and Suter (2013) discuss both the Blatchford work and the review by Alborz et al (2009) in their contribution to the Sage Handbook of Special Education on teacher assistants, pointing to the differences between the work. While they highlight the importance of Blatchford et al.'s naturalistic design in "reflecting what actually happens in many schools" (p698), and the negative relationship between the amount of received support from TAs and student outcomes, they also note that Alborz et al (2009) pointed out that findings were ambiguous "where support was general in nature and not directed at students with identified difficulties" (ibid).

The evidence regarding proximity of paraprofessionals raises important considerations related to the role of paraprofessionals. Giangreco, Doyle and Suter (2013) note that existing research on proximity identifies both positive (academic engagement) and negative (dependency, stigmatisation, interference with teacher engagement) effects.[2] The evidence presented here suggests that an increase in the distance between paraprofessional and student resulted in improved outcomes.

[2] It should be noted that these authors cite one article which is specifically excluded for this review because of its qualitative methodology with little statistical sophistication regarding the analysis of structured observational data (article 62).

However, the general observation still holds that there is a paucity of robust evidence regarding the impact of non-teaching adult support on student outcomes. The frequent citation of the Blatchford et al (2009; 2011) work on teaching assistants is an indication of its relative strength, including its large sample size and strong analysis; however, it may also indicate the absence of similarly strong impact data from elsewhere on paraprofessionals/adult support for students.

5. Specific interventions, assistive technology or environmental modifications delivered by paraprofessionals that report impact/outcomes for the child

5.1 Overview

There are five articles in total in this section, one of which is a review article (the only non-databased article) with the remainder being intervention studies. Two articles relate to literacy (phonological awareness, and pre-reading intervention), while another examines social skills instruction for students with high incidence disabilities. The final intervention examines the impact of coaching for students with ADHD delivered by paraprofessionals. The review article reports on paraprofessional delivered educational practices to improve outcomes for students with intellectual and developmental disabilities.

It should be noted that, while this section reports on interventions delivered by paraprofessionals as opposed to training on specific interventions (which is the next section), the experimental nature of the studies and a part-focus on implementation (fidelity) by the researchers/authors often required that paraprofessionals receive training. It was not always easy to distinguish material for both categories, a point which should be borne in mind when reviewing this section and the next.

The articles for this section are summarised in the template below.

5.2 Databased articles

Article no. and full title	**9. Social skills instruction for students with high incidence disabilities: a school based intervention to address acquisition deficits (Miller, Lane and Wehby, 2005)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Examine impact of class-based social skills programme on inappropriate classroom behaviour, 12 hours of social skills training for students delivered by teacher *and* paraprofessional	6-10 (9.97) years)	EBD, SLD, ADHD, SSLD, "mental retardation"	Experimental, multiple baseline across groups, with intervention and immediate post intervention assessment, use of scales and observational data collected using computer-based system	N=7, split into two groups on gender and grade level
Category of class (e.g. special class/unit, mainstream)	Special class			
Type of needs met	Behavioural			
Brief overview of findings	Inappropriate classroom behaviour decreased between baseline and interventions for both groups, but variability in individual student performance, academic engaged time scores increased between baseline and intervention phases, but which were not sustained at post-intervention. Behavioural point scores (indicators of responsiveness) were variable across groups and phases, with little evidence of impact overall.			
Author conclusion/assessment	Promising results in relation to inappropriate classroom behaviour, increased levels of academically engaged time, demonstrate positive impact of social skills training. Author highlights a lot of limitations, including that observations which formed the basis of the main data collected were only undertaken at 15 minute intervals, and that implementation of the intervention was limited by holiday breaks.			

Article no. and full title	**10. High-school based treatment [The Challenging Horizons Program (CHP) coaching element] for adolescents with ADHD: results from a pilot study examining outcomes and dosage (Evans, Schultz and DeMars (2014)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Evaluation of paraprofessional delivered coaching/training intervention [CHP coaching element] for students with ADHD on their academic and social outcomes (also a parent, and child element to overall intervention). The intervention in the study involved the provision of parent training (10 sessions), student interpersonal skills group (10 sessions) and coaching delivered by two paraprofessionals (year-long support provided to students in school, amounting to approximately on 22-minute coaching session every seven school days).	13-17	ADHD	Randomised control trial	N=36 (n=24 in treatment group)
Category of class (e.g. special class/unit, mainstream)	School element in private office, one-to-one training between student and paraprofessional.			
Type of needs met	Attention, academic performance, interpersonal performance.			
Brief overview of findings	When dosage is not taken into account, there is little statistical significance/benefit between control and intervention groups (huge variability in dosage). However, when dosage is accounted for in statistical models, the higher the dosage the higher the benefit in academic performance and reduction of negative effects of ADHD.			
Author conclusion/assessment	Study offers preliminary evidence that intervention may be effective. Small, homogenous sample size, ratings of measure items used in statistical analysis were parent ratings of child (dis)improvement.			

Article no. and full title	**11. An investigation of the effects of a pre-reading intervention on the early literacy skills of children at risk of emotional disturbance and reading problems (Nelson, Benner and Gonzalez, 2005)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Effect of intensive, manualised pre-reading intervention (Stepping Stones to Literacy) delivered one-to-one by paraprofessional level tutors on phonological awareness, word reading and rapid naming skills. Paraprofessionals received training in the implementation of Stepping Stones in advance.	5 ½ years	Children at risk of emotional disturbance	Pre-post experimental comparison group design	N=36 (18 in each group)
Category of class (e.g. special class/unit, mainstream)	General education			
Type of needs met	Literacy			
Brief overview of findings	Results show that students in experimental group made statistically significant improvements in phonological awareness skills, word reading skills and rapid naming skills compared to students in comparison group.			
Author conclusion/assessment	"The fact that paraprofessional educators can implement Stepping Stones reliably provides evidence of its utility", alongside the evidence of its effectiveness.			

Article no. and full title	**12. Paraprofessional-led phonological awareness training with youngsters at risk of reading and behavioural concerns (Lane et al., 2007)**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Paraprofessional-led supplemental early intervention for students with poor literacy skills and behavioural concerns. 2 hrs training in phonological awareness training for reading was delivered to one paraprofessional and three teachers. Paraprofessional led the training with young people in each of the teacher's classes.	6-7 years	No formal diagnosis, but four students were receiving special education services (for learning disability, 3 for speech and language impairments)	Randomised assignment with statistical analysis	N=24 (n=13 intervention, n=11 control)
Category of class (e.g. special class/unit, mainstream)	General education			
Type of needs met	Literacy, behavioural			
Brief overview of findings	Students in the intervention group "demonstrated significant improvements in phonological skills, as measured by a standardised treatment test, with gains being sustained […However] the overall results did not suggest clear collateral effects on behaviour […] (p273).			
Author conclusion/assessment	"It may be that paraprofessionals, though able to meet the academic task demands associated with small – group interventions, need additional training or support to manage student behaviour" (p273).			

5.3. Non-databased articles

Article no. and full title	**13. A systematic review of paraprofessional-delivered educational practices to improve outcomes for students with intellectual and developmental disabilities (Brock and Carter, 2013)**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Systematic review of 13 studies examining impact of implementation of educational interventions by paraprofessionals.	4-16 years (students)	ASD; Intellectual disabilities; cerebral palsy; multiple disabilities.	Experimental design	N=40 paraprofessionals in total, N=41 students in total
Category of class (e.g. special class/unit, mainstream)	Mainstream, special class and special school			
Type of needs met	Not specified			
Brief overview of findings	Within the studies, students experienced positive effects in areas such as academic outcomes, communication outcomes, social outcomes, increased independence, reduction in number of problem behaviours. There were also positive effects on paraprofessional implementation of interventions post-training, with increased fidelity, although collection of follow-up data was limited to a few of the 13 studies.			
Author conclusion/assessment	There are limitations which need to be considered, including that the studies here focus on training small numbers of paraprofessionals. It is unclear how effective these training methods would be on a larger scale. It is also unclear whether the findings are generalizable to all paraprofessionals working with students with intellectual disabilities. It is also unclear which components of which training packages produced the best effects.			

5.4 Section review

As outlined above, there were five articles reviewed in this section. Four of these focused on different types of interventions, while one focused on implementation by paraprofessionals and impact of educational practices on student outcomes.

The main findings included:

- Findings from two studies suggest that paraprofessionals can deliver early literacy interventions with fidelity that can have positive outcomes for students with disabilities' phonological and early reading skills. While systematic review data indicates that paraprofessionals can also have a positive impact on other academic outcomes, consideration needs to be given to the small sample sizes in the studies it examined.
- There is promising evidence from the other individual studies that paraprofessionals can play a positive role in reducing inappropriate classroom behaviour and increasing

academic performance. However, the limitations of each of the studies weaken the presented evidence.

5.5 Discussion

The articles here point to mixed outcomes for students arising from interventions implemented by paraprofessionals. It appears that studies had a positive impact on the particular areas which interventions were designed to address (social interaction, literacy, phonics), but were less successful in other areas (e.g. academic performance, improved behaviour).

Alborz and colleagues (2009) point to positive academic gains for primary students where specific interventions are provided by trained teaching assistants which focused on literacy, numeracy or basic language delays, reflecting some of what has been detailed in this section. This point is also emphasised by Brock and Carter (2013) in their systematic review of paraprofessional-delivered educational practices for students with intellectual and developmental disabilities. They summarise that "paraprofessionals may be most effective in their support of students when given clear instructions, focussed training, and ongoing supervision and support to implement a specific instructional strategy for a specific student. Indeed the review demonstrates that careful planning and forethought are essential for paraprofessionals to appropriately and effectively support students with individualised goals and complex support needs" (2013, p217).

In the context of this section of this review, this summarisation points to the importance of training for intervention implementation, as well as faithfulness to the intervention itself (fidelity). However, such importance must be weighed against the point that many of the studies featured in this report do not extensively describe the nature of the intervention/and or training being tested.

6. Training provided to paraprofessionals on specific interventions for children that report on impact/outcomes (either child or professional)

6.1 Overview

Five articles in total are reported in this section, four of which were database sourced articles and one non-databased. Of the databased articles, one relates to social interaction, one to a behaviour-oriented intervention, one to a language/communication intervention, and one was a review of literature relating to inclusion of students with disabilities in physical education. The non-databased article is a review of training of paraprofessionals to support students with disabilities.

The articles for this section are summarised in the template below.

6.2 Databased articles

Article no. and full title	**14. Using paraprofessionals to teach social skills to children with ASD in the general education classroom (Mazurik-Charles and Stefanou, 2010)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Social skills training to paraprofessionals, learning how to introduce 6 particular skills (e.g how and when to interrupt, maintaining appropriate physical distance from others)	5-10 years (1st-4th grade)	ASD	Single subject, pre mid-point and end of study.	n=10, non – random selection. Data for n=7, all boys.
Category of class (e.g. special class/unit, mainstream)	Mix of fully included in general classroom and partially included			
Type of needs met	Interaction, communication			
Brief overview of findings	No difference between those partially and fully included in classroom; Range of significant effects detected, including for social awareness, social cognition, autistic mannerisms, and total score ratings. There was no significant difference in social communication scores or social motivation scores. Note scores were better (more improved) at midpoint than endpoint, indicating perhaps that the gains were not sustainable to the same degree over time.			
Author conclusion/assessment	"Children in study were able to gain social skills improvement in a short period of time, leading one to conclude that the use of immediate practice and prompting with visual cues can help a child with ASD to be perceived as more socially adept within general education. […] The results also indicate that that paraprofessionals can be effective in providing intervention in social skills and that such intervention can result in measurable gain" (p166-7).			

Article no. and full title	**15. Supporting language in schools: evaluating an intervention for children with delayed language in early school years (Lee and Pring, 2016).**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Evaluation of an intervention (language therapy groups) delivered by teaching assistants [number not provided] who were trained by a speech and language therapist in the intervention, in schools in socially disadvantaged areas to treat children's receptive and expressive language in early years.	4-7 years (reception, year 1 and year 2)	Language delay	Between schools random design used (Intervention and control groups)	N=180 (111 in treatment group (EAL sub-group included), 69 control)
Category of class (e.g. special class/unit, mainstream)	Early years settings			
Type of needs met	Language, communicative.			
Brief overview of findings	Intervention group performed positively on all measures compared to control groups, with large differences between the intervention and control group noted.			
Author conclusion/assessment	Study adds to the evidence about importance of SLT services, particularly in socially disadvantaged areas.			

Article no. and full title	**16. Inclusion in physical education: a review of the literature (Qi and Ha, 2012)**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Review of 75 qualifying studies between 1990-2009	Range not identified	Various	Various	Range not identified
Category of class (e.g. special class/unit, mainstream)	Not identified			
Type of needs met	Not identified			
Brief overview of findings	Majority of studies featured perspectives on inclusive PE. 11 studies looked at effective practices, and six strategies were identified: peer tutoring; adapted PE professionals (individuals employed to provide an adapted PE curriculum for students with disabilities); collaborative team approach; embedded instruction; cooperative learning; and paraprofessionals. In relation to paraprofessionals, one study demonstrated that support provided by trained paraprofessionals along with trained peer tutors aided the inclusion of students with disabilities without disrupting the learning of peers without disabilities. Impact studies in the review (n=3 in total) noted that inclusion did not result in better physical outcomes (motor engagement) for students with disabilities. Qualitative studies noted positive and negative social experiences/social interaction.			
Author conclusion/assessment	Most of the studies were non-experimental, none with random sampling. Search had limitations, but has enhanced knowledge of the type of studies undertaken and the reported outcomes.			

Article no. and full title	**17. Effects of training, prompting and self-monitoring on staff behaviour in a classroom for students with disabilities (Petscher and Bailey, 2006)**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Training for 3 instructional assistants to implement a token economy system, along with a package of prompting and self-monitoring with feedback from trainer to support implementation.	10-14 years	Emotionally handicapped (n=7); language impaired (n=2); Asperger (n=1) Educable mentally handicapped (n=1).	Multiple baseline across behaviours design	N=11
Category of class (e.g. special class/unit, mainstream)	Special class for severe behaviour problems			
Type of needs met	Behavioural (of students)			
Brief overview of findings	Results indicate that the use of tactile prompt and self-monitoring with accuracy feedback improved token-economy implementation for all participants in the study. Managing disruptions, prompting appropriate student behaviour and bonus-point delivery all increased {…] to consistently high rates (p.223).			
Author conclusion/assessment	"The intervention package clearly improved the participants' implementation of the token economy, but more research is needed to determine the long-term utility of this treatment" (p226).			

6.3 Non-databased articles

Article no. and full title	**18. Training paraprofessionals to support students with disabilities: a literature review (Walker and Smith, 2015).**			
Nature of intervention	Age group	Category of disability	Research design	Sample size
Article examines 30 intervention research studies (experimental or quasi-experimental design) and provides a descriptive summary. It is not a meta-analysis (it did not synthesise findings to give an overall view on outcomes or effects of intervention).	NA	NA	Experimental or quasi-experimental design	N=364 paraprofessionals across all 30 studies
Category of class (e.g. special class/unit, mainstream)	Not specified			
Type of needs met	Not specified			
Brief overview of findings	Despite the methodological design, the quality of the research was adjudged by the authors to be poor. For example, there was little focus on training fidelity and equally little focus on maintenance of any skills learned by the paraprofessional (i.e. limited follow-up). Findings suggest that paraprofessional training and subsequent implementation of intervention produced positive results.			
Author conclusion/assessment	The types of studies included in the review could be improved by providing more accurate descriptions of interventions and characteristics of participants, examining which elements of provision produce which outcomes, calculating the extent of differences achieved between groups in the studies as a result of the intervention, and having a stronger focus on fidelity, generalisation and maintenance.			

6.4 Section review

As outlined above, this section presented evidence from five articles. Two of these were reviews one on physical education and inclusion of students with disabilities and which referred to the importance of training in some studies, and one on training of paraprofessionals to support students with disabilities. The remaining three articles looked at the impact of paraprofessional training on language, behaviour and social skills.

The main findings included:

- Paraprofessionals can be trained to implement interventions to students with disabilities with positive results, however studies need to focus on long-term follow up.
- Despite the methodological design of studies examined in the review, poor quality research processes characterise much of the literature it examined on training

paraprofessionals, as outlined in the review article. There is little emphasis on describing the nature of the training and the characteristics of those being trained, and where applicable, on the subsequent interventions being delivered.

6.5 Discussion

The majority of the intervention studies reported here noted that paraprofessionals could be trained to implement interventions with fidelity, and in many cases had a positive impact on students. The literature here reflects that found in a recently published systematic review of literature on training paraprofessionals to support students with disabilities (Walker and Smith, 2015). It notes that the majority of the studies uncovered related to educational strategies or communication and social interaction. Although the discussion of outcome data in this review is limited, the authors do note that the training included strategies which "typically resulted in positive training and intervention outcomes". However, it also points to a caveat about these pieces of research – that training was often, although not always, implemented in the first instance by researchers or outside consultants (and indeed such training was often not sufficiently described), which can place a cost to schools/education providers on providing such training for their paraprofessional staff.

7. Interventions, assistive technology, environmental modifications or indeed other para professionals used to replace or compare paraprofessionals that report impact/outcomes for the child

7.1 Overview

There are two articles in total reported in this section, which are both databased articles. One article relates to the provision of peer support compared to adult support, while the second relates to speech and language intervention.

The articles for this section are summarised in the template below.

7.2 Databased articles

Article no. and full title	**19. Randomised evaluation of peer support arrangements to support the inclusion of high school students with severe disabilities (Carter et al., 2016)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Peer support vs. adult-delivered support [adult support provided by 42 paraprofessionals and nine special educators].	14-18 (approx.)	ASD, intellectual disabilities, multiple disabilities	Randomised control trial (rolling cohort (multiyear) design). Pre, post and follow-up measures.	Intervention n=51, control n=48 (Total, not each year)
Category of class (e.g. special class/unit, mainstream)	Mainstream (general education classroom was the site of the intervention).			
Type of needs met	Not specified other than disability labels as above.			
Brief overview of findings	Compared to students exclusively receiving adult-delivered support, students participating in peer support arrangements experienced increased interactions with peers, increased academic engagement, more progress on achievement of social goals, increased social participation, and greater number of new friendships. “Students spent significantly less time out of the classroom and were rated by general educators as having more active classroom participation. Such gains came even as the close proximity and direct academic assistance of special education staff diminished”. (p227) The authors also undertook an exploratory analysis to examine the extent to which the intervention impact might be different for students with ASD (methodological reasons given). This analysis found no significant differences, indicating that the intervention had a “similar impact for students with and without autism” (p226).			

Author conclusion/assessment	"Peers are not replacements for instruction for classroom teachers, but instead support involvement in shared learning opportunities provided by the classroom teacher" (p.227). "Peers and paraprofessionals together can play a valuable supplementary role in helping students with severe disabilities access the rich learning and social opportunities general education teachers provide in their classrooms. Peer support arrangements are only one component of high-quality inclusion for students with severe disabilities" (p231).

Article no. and full title	**20. Indirect language therapy for children with persistent language impairment in mainstream primary schools: outcomes from a cohort intervention (McCartney et al, 2011)**			
Nature of intervention/study	Age group	Category of disability	Research design	Sample size
Comparing results of manualised language therapy delivered by research intervention SLTs (previous RCT) with same therapy delivered by mainstream school staff [mix of teachers, learning support teachers and classroom assistants, numbers not provided]	6-11 years	SLD	Cohort study, pre and post intervention scores, comparison with RCT results of previous study	N=38
Category of class (e.g. special class, mainstream)	Mainstream			
Type of needs met	Language impairment			
Brief overview of findings	Cohort group faired about as well as the control group in the RCT design who received SLT language services 'as usual'. Gains in expressive language in RCT were not replicated in cohort study. Less language learning activity was recorded than intended, and less was delivered.			
Author conclusion/assessment	The more efficacious therapy is that delivered by SLTs or SLT assistants to children in groups or individually, as opposed to that delivered by school staff. This may be related to fidelity and to greater amount of language learning activity undertaken.			

7.3 Section review

As outlined above, this section presented evidence from two articles, which are singular in nature. The first presents findings on the use of peer support for students with severe disabilities compared to adult support while the second compares the findings of a study on speech and language service models.

The main findings included:

- Students who received peer support did significantly better on a range of measures compared to those who received adult support alone, pointing to the potentially positive impact peers can play in supplementing the work of others to support the inclusion of students with severe disabilities.
- Speech and language therapists provide a speech and language therapy intervention which appears to provide better outcomes than speech and language interventions delivered by school staff, including classroom assistants.

7.4 Discussion

There is notable variation in the articles reported here, in terms of focus. One intervention which has received attention is peer support. The study reported here, although small in sample number for a randomised control trial, detailed positive outcomes for students in social terms as well as some academic improvements.

One article points to the importance of speech and language services provided by qualified SLTs rather than by school staff supported by consultants. However, this needs to be considered against a finding in an article in the previous section that teachers and teaching assistants can be trained to deliver speech and language support to students, suggesting further research may be needed.

8. Overall summary

This report has presented a draft review of literature pertaining to the review of the special needs assistant scheme. It focused in particular on published impact studies examining the role of paraprofessionals. It involved a thorough search of available databases using a series of keywords and search strings. Over 900 citations were examined and a refined list of 73 citations were further examined as part of this work. When inclusion criteria were applied to the 73, 14 articles were reviewed and their findings presented here, along with those of six additional articles sourced in other ways (e.g. grey literature, non-indexed material).

Of the 20 articles in total, eight were systematic or select reviews of a range of themes relating to the education of students with disabilities, while the remaining twelve were reports of findings from studies on particular interventions or approaches being tested.

While the inclusion criteria required the studies to have an experimental methodological design, other aspects limited the power of the evidence produced regarding the efficacy or otherwise of the intervention. Prominent here was the small sample size in many of the studies, even where randomised methodology was used. Other studies used single case design, which limits further the ability to generalise from the findings.

There are a number of gaps in the evidence compiled here, including the general paucity of outcome evidence regarding the impact of paraprofessionals on the education of students with special educational needs. Another gap in the literature here is the general absence of a focus on students outside of mainstream primary school. A third relevant gap is the narrow focus of interventions on certain aspects of the curriculum (e.g. literacy).

The main findings from each of the sections combined are as follows:

- There is limited good outcome data on the impact of paraprofessionals on student outcomes.
- What data are available show mixed results for students, in relation to engagement with peers and teachers, and in academic outcomes. Where teaching assistants received training and support in targeted literacy support, students did well.
- There is evidence to suggest that the use of teaching assistants can at times undermine the inclusion of students with special educational needs.
- The proximity study also suggests that distance between paraprofessional and student can impact the student's wider engagement in the classroom.
- Findings from two studies suggest that paraprofessionals can deliver early literacy interventions with fidelity that can have positive outcomes for students with disabilities' phonological and early reading skills. While systematic review data indicates that paraprofessionals can also have a positive impact on other academic outcomes, consideration needs to be given to the small sample sizes in the studies it examined.
- There is promising evidence from the other individual studies that paraprofessionals can play a positive role in reducing inappropriate classroom behaviour and increasing academic performance. However, the limitations of each of the studies weaken the presented evidence.
- Paraprofessionals can be trained to implement interventions to students with disabilities with positive results, however studies need to focus on long-term follow up.

- Despite the methodological design of studies examined in the review, poor quality research processes characterise much of the literature it examined on training paraprofessionals, as outlined in the review article. There is little emphasis on describing the nature of the training and the characteristics of those being trained, and where applicable, on the subsequent interventions being delivered.
- Students who received peer support did significantly better on a range of measures compared to those who received adult support alone, pointing to the potentially positive impact peers can play in supplementing the work of others to support the inclusion of students with severe disabilities.
- Speech and language therapists provide a speech and language therapy intervention which appears to provide better outcomes than speech and language interventions delivered by school staff, including classroom assistants.

Conclusions arising from the findings presented here suggest that, while paraprofessionals can positively contribute to the education of students with disabilities in particular ways (for example, through training and implementation of particular interventions), caution needs to be exercised regarding the excessive use of paraprofessionals in the classroom. A further conclusion also relates to the need for a far greater suite of research on the different types of paraprofessional which populate these studies, and for a more accurate description of who they are and what they do, what they are trained in and how, so as to accurately assess any research evidence arising.

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Appendix 1: keywords and categories

Category	Associated terms	Search terms for database searching
Type of disability	Additional learning needs Special educational need Deaf Hard of hearing Hearing impairment Blind Visually impaired or visual impairment Physical disability Emotional disturbance OR difficulties OR disorders OR disabilities Severe emotional disturbance OR difficulties OR disorders OR disabilities Behavioural difficulties OR disorders OR disabilities Social difficulties OR disorders OR disabilities Autism (autistic spectrum disorder OR autism spectrum disorder OR ASD) Aspergers syndrome OR Asperger syndrome Attention deficit disorder OR ADD Attention deficit hyperactivity disorder OR ADHD Specific speech and language difficulties OR disorders OR disabilities General learning difficulties OR disorders OR disabilities Mild general learning difficulties OR disorders OR disabilities Moderate general learning difficulties OR disorders OR disabilities Severe general learning difficulties OR disorders OR disabilities Profound general learning difficulties OR disorders OR disabilities Profound or multiple learning difficulties OR disorders OR disabilities Specific learning difficulties OR disorders OR disabilities Borderline general learning disability	"additional needs" or "additional learning needs" or "deaf" or "hard of hearing" or "hearing impairment" or “hearing impaired” or "blind" or "visually impaired" or "visual impairment" or "physical disability" or "emotional disturbance" or "emotional difficulties" or "emotional disorders" or "emotional disabilities" or "emotional difficulty" or "emotional disorder" or "emotional disability" or "severe emotional disturbance" or "severe emotional difficulties" or “severe emotional disorders" or "severe emotional disabilities" or "severe emotional difficulty" or “severe emotional disorder" or "severe emotional disability" or "behavioural disabilities" or "behavioural disorders" or "behavioural difficulties" or "behavioural disability" or "behavioural disorder" or "behavioural difficulty" or "social difficulties" or "social disorders" or "social disabilities" or "social difficulty" or "social disorder" or "social disability" or "autism" or "ASD" or "autistic spectrum disorder" or "autism spectrum disorder" or "asperger syndrome" or "aspergers syndrome" or "asperger's syndrome" or “AS” or “attention deficit hyperactivity disorder” or “ADHD” or “attention deficit disorder” or “ADD” or “specific speech and language difficulties” or “specific speech and language disorders” or “specific speech and language disabilities” or “specific speech and language difficulty” or “specific speech and language disorder” or “specific speech and language disability” or “general learning difficulties” or “general learning disorders” or “general learning disabilities” or “general learning difficulty” or “general learning disorder” or “general learning disability” or “mild general learning difficulties” or “mild general learning disabilities” or “mild general learning disorders” or “mild general learning difficulty” or “mild general learning disability” or “mild general learning disorder” or “moderate general learning difficulties” or “moderate general learning disorders” or “moderate general learning disabilities” or

		“moderate general learning difficulty” or “moderate general learning disorder” or “moderate general learning disability” or “severe general learning disabilities” or “severe general learning disorders” or “severe general learning difficulties” or “severe general learning disability” or “severe general learning disorder” or “severe general learning difficulty” or “profound general learning disabilities” or “profound general learning disorders” or “profound general learning difficulties” or “profound general learning disability” or “profound general learning disorder” or “profound general learning difficulty” or “profound or multiple learning difficulties” or “profound or multiple learning disorders” or “profound or multiple learning disabilities” or “profound or multiple learning difficulty” or “profound or multiple learning disorder” or “profound or multiple learning disability” or “specific learning disabilities” or “specific learning disorders” or “specific learning difficulties” or “specific learning disability” or “specific learning disorder” or “specific learning difficulty” or “borderline general learning disability” or “borderline general learning difficulty” or “borderline general learning disorder” or “borderline general learning disabilities” or “borderline general learning disorders” or “borderline general learning difficulties”
Type of need/additional needs	Additional needs Complex needs Care needs Feeding Complex health or medical needs Administration of medicine Toileting Personal care Safety Hygiene/general hygiene Mobility independence, independent living, daily living, orientation, movement Withdrawal	“additional needs” or “complex needs” or “care needs” or “feeding” or “complex health needs” or “complex medical needs” or “administration of medicine” or “toileting” or “personal care” or “safety” or “hygiene” or “general hygiene” or “mobility” or “independence” or “independent living” or “daily living” or “orientation” or “movement” or “withdrawal” or “fragile health” or “seizures” or “teaching” or “learning” or “intellectual” or “behaviour” or “communication” or “sensory” or “language” or “social” or “emotional” or “attention” or “distractibility” or “hyperactivity” or “concentration” or “engagement” or “life skills” or “cognitive” or “participation”

	Fragile health Seizures Teaching Learning Intellectual Behaviour Communication Sensory Language Social Emotional Attention Distractibility Hyperactivity Concentration Engagement Life skills Cognitive Participation	
Type of support	Additional support Alternative support Para-educator support Para-professional support Pedagogical support OR pedagogical assistance Pupil assistant OR student assistant Communication worker OR Communication assistant Care support Speech and language therapy Behaviour support OR behavioural support OR behaviour therapy OR behavioural therapy Psychology OR psychological service Nursing OR nurse OR nursing aid Care aid Teaching assistant Classroom assistant Additional adult Additional support staff	"additional support" or "alternative support" or "paraeducator support" or "para-educator support" or "paraprofessional support" or "para-professional support" or "pedagogical support" or "pedagogical assistance" or "pupil assistant" or "student assistant" or "communication worker" or "communication assistant" or "care support" or "speech and language therapy" or "speech and language therapist" or "behaviour support" or "behavioural support" or "behaviour therapy" or "behavioural therapy" or "psychology" or "psychological service" or "nurse" or "nursing" or "nursing aide" or "nursing aid" or "care aid" or "care aide" or "teaching assistant" or "classroom assistant" or "additional adult" or "additional support staff"
Type/title of personnel	Teaching assistant OR teacher aide OR classroom assistant OR paraprofessional OR paraeducator OR instructional aide OR instructional assistant OR learning support assistant OR specialist teaching assistant OR support staff OR	"teaching assistant" or "teacher aide" or "classroom assistant" or "paraprofessional" or "para-professional" or "paraeducator" or "para-educator" or "instructional aide" or "instructional assistant" or "learning support assistant" or "specialist teaching assistant" or "support staff" or "additional adult" or "additional adult support" or "welfare assistant" or "auxiliary" or "ancillary" or "paid aide" or "special assistant" or

	welfare assistant OR auxiliary OR ancillary OR paid aide OR special assistant OR integration assistant OR non-teaching assistant OR school assistant OR class assistant OR pupil support assistant OR pupil/child assistant OR personal assistant OR additional support needs assistant OR special needs assistant OR pedagogical assistant OR alternative sevice OR educational technical assistant OR sign language translator OR mediators	“integration assistant” or “non-teaching assistant” or “school assistant” or “class assistant” or “pupil support assistant” or “pupil/child assistant” or “pupil child assistant” or “pupil assistant” or “child assistant” or “personal assistant” or “additional support needs assistant” or “special needs assistant” or “pedagogical assistant” or “alternative service” or “educational technical assistant” or “sign language translator” or “mediator”
Impact (note variations on term impact rather than types of impact)	Impact OR positive impact OR negative impact Outcome OR outcome assessment OR attainment Improvement Disimprovement Progress Regress Effect OR effective OR effectiveness Benefit Advantage disadvantage Success Failure Increase Decrease Achievement Gains Loss(es) Output	"impact" or "positive impact" or "negative impact" or "outcome" or "outcome assessment" or "attainment" or "improvement" or "disimprovement" or "progress" or "regress" or "effect" or "effective" or "effectiveness" or "benefit" or "advantage" or "disadvantage" or "success" or "failure" or "increase" or "decrease" or "achievement" or "gains" or "loss" or "losses" or "output"

Appendix 2: search string combinations

Search String	Combinations
Search string 1	• (All related terms for type of **impact** in quotation marks, separated by or) AND • (All related terms for type of **support** in quotation marks, separated by or) AND • (All related terms for type of **personnel** in quotation marks, separated by or) AND • (All related terms for type of **need** in quotation marks, separated by or) AND • (**students with disabilities** or **special education** or **special needs**)
Search string 2	• (All related terms for type of **impact** in quotation marks, separated by or) AND • (All related terms for type of **support** in quotation marks, separated by or) AND • (All related terms for type of **personnel** in quotation marks, separated by or) AND • (All related terms for type of **need** in quotation marks, separated by or) AND • (“students with disabilities” or “special education” or “special needs”)
Search string 3	• (All related terms for type of **impact** in quotation marks, separated by or) AND • (All related terms for type of **disability** in quotation marks, separated by or) AND • (All related terms for type of **need** in quotation marks, separated by or) AND • (All related terms for type of **personnel** in quotation marks, separated by or) AND • (All related terms for type of **support** in quotation marks, separated by or)
Search string 4	• (All related terms for type of **impact**, separated by or) AND • (All related terms for type of **disability**, separated by or) AND • (All related terms for type of **need**, separated by or) AND • (All related terms for type of **personnel**, separated by or) AND • (All related terms for type of **support**, separated by or)