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Support for children and young people with vision impairment in educational settings

Support for children and young people with vision impairment in educational settings

Audience

Parents/carers and practitioners supporting children and young people with vision impairment in educational settings.

Overview

This guide provides an overview of the extent to which interventions delivered in educational settings are effective in realising positive outcomes for children and young people with vision impairment. It was produced by the University of Birmingham. The views expressed in this guide are those of the authors and not necessarily those of the Welsh Government.

Action required

This document may be of interest to practitioners and parents/carers when planning provision to support children and young people with vision impairment.

Further information

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Related documents

A Rapid Evidence Assessment of the effectiveness of educational interventions to support children and young people with vision impairment
(Welsh Government, 2019)

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Purpose and aim of the guide

This report provides a summary of evidence about the effectiveness of approaches for supporting children and young people with vision impairment whilst in education from a commissioned rapid evidence assessment (REA). The aim of the report is to support practitioners when planning and delivering timely and effective support for children and young people with vision impairment. The report focuses on learners aged 0–25 years, but some of the findings may be transferrable to older learners.

The report may be of interest to:

- parents/carers
- teachers, classroom-based support staff, early years workers and staff in further/higher education
- special educational needs coordinators (SENCOs)/additional learning needs co-ordinators (ALNCOs)
- head teachers, principals and senior leaders in education settings
- local authority education services including specialist services such as educational psychologists
- social workers
- health professionals
- third sector organisations
- advocacy services, dispute resolution services and the Special Educational Needs Tribunal for Wales (SENTW).

The report does not set out what approaches must, or must not, be provided for children and young people with vision impairment. Practitioners do not therefore have to use the approaches set out in this report, but can use this evidence along with their own experience and knowledge when making decisions about approaches to support children and young people with vision impairment.

Not all approaches outlined in the report may be suitable for all children and young people with vision impairment. Approaches are likely to need to be tailored to each learner based on their needs and to the specific educational setting. Educators may find it useful, therefore, to monitor how well their selected approaches are working for their learners, so they know whether they are having the desired effects or whether they need to be altered.

Background

This report is based on an assessment of research studies that have considered the effectiveness of intervention approaches to support children and young people with vision impairment¹. The assessment was a commissioned REA and was undertaken in 2018 by members of the Vision Impairment Centre for Teaching and Research (VICTAR) at the University of Birmingham.

The commissioned REA summarised the findings of the most reliable research studies on this topic published between 1981 and 2017. It reviewed approaches that had been studied in any setting where children and young people receive education, such as preschools, schools and further education institutions. The literature was presented within ten core educational strategy areas: communication, literacy, low vision training, teaching strategies, access to examinations, mobility and independence, social and emotional functioning, use of technology, teaching support, and inclusion. The literature searches were carried out in four databases, using a range of search terms and inclusion/exclusion criteria.

Fifty-four studies met the criteria and these were then rated for 'quality' using standard criteria commonly used for REAs: 41 of the 54 sources (76 per cent) were judged to be of 'moderate' to 'strong' quality, while 13 sources (24 per cent) were judged to be of 'impressionistic' to 'moderate' quality.

The evidence was not found to be comprehensive; there were gaps in the evidence base and in some cases the evidence on effectiveness was considered to be inconclusive or only indicative. In addition, not all of the studies identified were robust enough to be included. Of the identified evidence-based studies, a large proportion were case studies or small sample multiple baseline studies (39 per cent), with very few studies drawing on a control group. In part, this reflects the nature of the vision impairment population which is not homogenous and relatively small in number, as well as the nature of research evidence and traditions in this field. The studies reviewed were varied in their focus and design and had relative weaknesses and strengths. Some studies involved experimental studies with comparison groups, while others detailed smaller scale case studies.

This report does not attempt to summarise all interventions and approaches available to support children and young people with vision impairment, but presents a framework of the general approaches adopted in this field.

¹ The full rapid evidence assessment is available from <https://gov.wales/sites/default/files/statistics-and-research/2019-09/effectiveness-educational-interventions-support-children-young-people-vision-impairment.pdf>

What is vision impairment?

Vision impairment is a general term describing a loss in visual function. Most children and young people with vision impairment have some useful visual function and only a small proportion are totally blind. The terms below are commonly used in the UK and involve a medical diagnosis by an ophthalmologist (a specialist eye doctor).

- Severely sight impaired/blind – although the term means that a learner is likely to function mainly through touch and hearing, it does not necessarily mean that the learner has no useful vision at all.
- Sight impaired/partially sighted – a learner will have sufficient vision to manage some tasks but may require the help of specialist teaching methods and materials in school to account for his or her vision difficulties.
- Low vision – is another commonly used term. Children described as having ‘low vision’ have restricted vision but can make use of this for learning with appropriate modification.

A broad distinction is often made between vision conditions, being either ‘ocular’ or ‘cortical’ in nature. Ocular conditions affect parts of the eye itself. The loss arising from a given ocular vision condition can include a number of areas of function such as visual acuity (the ability to resolve detail), accommodation (the ability to focus), field of vision (the area which can be seen), colour vision and adaptability to light. Cortical vision impairment (CVI) affects the child’s processing of visual information. CVI is particularly prevalent in children who have more complex needs and may be the sole diagnosis, or coexist with ocular forms of vision impairment.

It is important to note that the majority of children with a vision impairment, including those classified as ‘blind’, do have some residual vision that can potentially be used in daily activities such as reading and mobility. Medical descriptions of vision impairment (based on a clinical assessment of visual function) do not provide an accurate indication of how the child is able to use their vision in everyday life. For this reason, educational services for children and young people with vision impairment will usually make decisions about services they offer based upon learner need, which draws upon functional implications of vision impairment as well as clinical assessments.

Vision impairment is considered to be a ‘low incidence’ disability in children with approximately two children per 1,000 having a vision impairment of some kind in the UK². Further, a high proportion of children have additional disabilities in combination with a recognised vision impairment. There is a range of need within this group of children with additional disabilities with many having complex needs including severe and profound learning disabilities. It is important to recognise, therefore, that the population of children and young people with vision impairment is very diverse.

² Tate, R., Smeeth, L., Evans, J. Fletcher, A. Owen, C., & Rudnicka, A. (2006). The prevalence of sight problems in the UK: a review of the literature. Peterborough: RNIB.
Keil, S. (2003). Survey of educational provision for blind and partially sighted children in England, Scotland and Wales in 2002. *British Journal of Visual Impairment*, 21(3), 93–97.

Vision impairment is associated with reduced access to information and this can have significant developmental and educational implications. In comparison with sighted peers, children with vision impairment may, therefore, have had fewer or limited opportunities³ to:

- explore their environment
- learn through incidental and unplanned experiences
- refine motor skills by observing and copying actions of others.

Importantly, there are ways in which these challenges can be reduced or removed, including through the use of appropriate teaching approaches and modifications to the learning environment.

³ McCall, S. (1999). Accessing the curriculum in Braille. In C. Arter, H. L. Mason, S. McCall, M. McLinden and J. Stone (eds.), *Children with Visual Impairment in Mainstream Settings*. London, David Fulton Publishers.

Support for children and young people with vision impairment (approaches and interventions)

Types of intervention

Vision impairment education has a long tradition of focusing upon two broad areas of targeted support:

1. ensuring young people have fair and optimised access to the school curriculum
2. ensuring young people have opportunities to develop their independence and social inclusion.

The first area is concerned with equal access to education. The second area is concerned with developing independent learners within the school environment, as well as preparing them for adult life, independent living and employment. These areas have been considered through examining the notion of 'access' with a particular focus on:

- access to learning: inclusive practice and differentiation ensuring that the child's environment is structured and modified to promote inclusion, learning and access to the core curriculum, the culture of the educational setting and broader social inclusion
- learning to access: teaching provision which supports the child to learn independence skills and develop personal agency in order to afford more independent learning and social inclusion. This area is sometimes referred to as an 'additional' or 'specialist' curriculum. Examples of curricula frameworks that have been developed to promote these independence skills include the Expanded Core Curriculum (ECC) and the Learner Outcomes Framework (LOF)⁴.

This model is essentially a mechanism for mapping a pedagogical and curriculum response to the distinctive educational needs of children and young people with vision impairment.

For the purpose of the REA, intervention areas were categorised into 10 overlapping intervention areas, each of which requires a balance between 'access to learning' and 'learning to access,' communication, literacy, low vision training, teaching strategies, access to examinations, mobility and independence, social and emotional functioning, use of technology, teaching support, and inclusion.

Who can put the interventions into practice?

A wide range of people can effectively put these interventions into practice. Specialist teachers and professionals are often important because they have

⁴ For example, Keil, S. (2016) Learner Outcomes Framework for VI children and Young People: A framework for support for young people with vision impairment provided by a VI education service. National Sensory Impairment Partnership (NatSIP). Retrieved from <https://www.natsip.org.uk/>

specialist training to carry out assessments of need, and the technical knowledge to design and/or undertake some teaching approaches. Related to this, vision impairment is a low incidence condition with which many teachers and parents will be unfamiliar. Therefore, specialist professionals also have an important advisory and training role. These specialists include: qualified teachers of children with vision impairment (QTVI), specialist teaching assistants, habilitation specialists or low vision specialists (such as an orthoptist or optometrist).

Nevertheless, the implementers in many interventions include teachers, teaching assistants, parents and carers. This is because many approaches are implemented within the daily routines of education as well as home life, and often require consistency of implementation and practice.

Outcomes

The interventions and approaches in the area of vision impairment education commonly focus upon ensuring teaching approaches and the learning environment are accessible. By ensuring this is the case, learners will have access to what would be recognised as parts of a traditional school curriculum (i.e. through the use of 'access to learning' interventions and approaches). Therefore, these interventions and approaches commonly seek to develop communication, literacy and academic attainment more generally. Other interventions and approaches commonly focus upon developing skills, which would be recognised as independence skills. Hence, these interventions and approaches commonly seek to develop young people's ability to navigate and access their physical and social environment (i.e. through the use of 'learning to access' interventions and approaches). It is also recognised that these targeted outcomes are inter-related and are therefore considered to be complementary.

What the research says about the effectiveness of the interventions

The focus of the REA was to assess the evidence of the effectiveness of the range of interventions in the field of vision impairment education within 10 core educational strategy areas. Only 54 studies met the selection criteria and these were rated for quality using standard criteria commonly used for REAs. This suggests little evidence exists that is concerned with the relative efficacy of educational interventions in this field. This finding is in keeping with other relatively recent reviews and assessments of evidence undertaken in the field of vision impairment education⁵.

The relative lack of evidence may reflect historic concerns with educational access, which means that comparator groups are often not used in research design. Researchers and practitioners describe educational approaches they adopt in order to provide students with vision impairment with improved access to information and it is reasonably assumed that without the approach, 'access' would not be possible (or would be severely compromised). Of the evidence-based studies identified in the REA, a large proportion were case studies or small sample multiple baseline studies (39 per cent), with very few studies drawing on a control group. In part, this reflects the nature of the vision impairment population, which is not homogenous and relatively small in number, but also reflects the nature of research evidence and traditions in this field. Whilst there is broad consensus in the general literature about the importance of each of the education strategy areas, little research evidence was identified to show the effectiveness of different interventions.

In this section we present a summary of the effectiveness of the interventions identified in the REA within each of the selected ten educational strategy areas under the headings 'Description of educational area', 'Nature of evidence in this area', 'Key findings' and 'Implications'.

Communication

Description of educational area

Communication is a broad concept encompassing a wide range of approaches. For the purpose of the REA, this area was defined as studies describing interventions that were to support the development of communication skills including early communication and language development, as well as alternative and augmented communication systems. This area includes communication modes for students with additional disabilities (including tactile symbols, calendar systems, sign language and

⁵ For example, Douglas, G., McLinden, M., McCall, S., Pavey, S., Ware, J. & Farrell, A. (2009). *International review of the literature of evidence of best practice models and outcomes in the education of blind and visually impaired children*. Report for National Council for Special Education (NCSE), Ireland. <https://ncse.ie/research-reports>
McCall, S., McLinden, M. & Douglas, G. (2011). *A review of the literature into effective practice in teaching literacy through braille*. RNIB. <https://www.rnib.org.uk/knowledge-and-research-hub/research-reports/education-research/lit-review-braille>

recorded materials), as well as micro switch interventions, which are described as supportive speech-output systems or devices that are designed to support the building of communication interactions/choice-making associations. Philosophically important to these approaches is the principle that communication skills develop through the process of communicating, and some children with vision impairment (in particular those with complex needs) may find it difficult to access opportunities to meaningfully communicate.

Nature of the evidence in this area

A total of seven sources were identified in the 'moderate to strong' quality rating undertaken for this area within the REA. The general approaches taken can be summarised as follows.

- Commonly, the approaches identified in the literature with respect to this area utilised generic teaching approaches and adapted these to ensure they were accessible to children with vision impairment. This was done by means of enhancing visual presentation (e.g. high-contrast line drawings) or alternative/non-visual presentation (touch and sound), as well as a combination of the two.
- Most of the identified studies focused upon developing and facilitating the communication of young and developmentally young children, in particular those with complex communication needs.
- The use of augmentative communication systems is a relatively well evidenced area to provide access to these opportunities.
- Communication associated with self-advocacy is discussed within the area of 'mobility and independence'.

Key findings and implications

There is moderately strong evidence that tangible symbols⁶, which are specifically designed to maximise access by children with vision impairment, can have a positive impact on the development of communication. The evidence suggests that as well as the importance of selecting and designing appropriate symbols, their structured and consistent use is an important ingredient for success. Symbols appear most effective when associated with communicating relevant and motivating topics (and therefore accessible topics) – e.g. linked to singing, sensory play and choice of drink or food.

Although evidence is not as strong, the general principles of creating accessible, relevant and structured opportunities for communication are likely to also apply to the use of other augmentative communication systems. This includes using micro switches, dual communication boards and various other approaches described in the good practice literature.

The use of various augmentative communication systems with children who have vision impairment in combination with complex needs relies upon adult communication partners who are able to implement the systems

⁶ Tangible symbols (or objects of reference) include three-dimensional cards embedded with whole or partial objects to represent a person, place, activity, object, idea, or action. For example, a part of a towel to represent bath time, or part of an item of clothing to represent a particular person.

appropriately. This requires a structured and consistent approach and that the approaches are personalised to the individual learner (both in terms of their interests, accessibility needs and preferences). Such an individualised approach requires different communication partners to work together to ensure consistency of approach, and requires appropriate training. There is evidence that training of communication partners which highlights the importance of consistency, structure and personalisation of approach is an important and necessary part of the interventions.

Although limited evidence exists, wait time (the time the teacher/ communication partner waits when communicating with the young person) is also identified as important. It is recognised that optimum wait time will vary from individual to individual (and possibly from one time to another). Again, the communication partner must be able to appropriately adjust wait time, and this commonly involves waiting longer. This is likely to require training.

In the separate area of communication development of older learners and those without complex needs, some evidence exists that the teaching of listening strategies as an efficient and faster alternative to braille or print reading can improve comprehension. While evidence is limited, the links with the important areas of literacy and technology (speech technology) are relevant.

Literacy

Description of educational area

Literacy is a broad concept encompassing a wide range of intervention approaches. For the purpose of the REA, this area was defined as studies describing interventions that were designed to support the development of reading and/or writing skills. This includes print, braille and Moon (a tactile code based upon raised lines); as well as low vision access to print (e.g. CCTVs, technology). The reading development of children with vision impairment is commonly delayed compared to their sighted peers, particularly in the area of reading speed.

In terms of access to literacy, there have traditionally been two main routes for children with vision impairment. 'Print literacy' commonly requires enhancement to ensure access for the reader with low vision, whereas 'tactile literacy' (e.g. braille and Moon) offers an alternative (non-visual) modality. The emergence of speech technology in recent years means that young people with severe vision impairment can also increasingly access reading and writing through auditory means.

Nature of the evidence in this area

Literacy is one of the most researched areas in the field of vision impairment. A total of 21 sources met the inclusion criteria for the REA. In terms of quality, 16 were rated as being 'moderate to strong' and five as 'impressionistic to moderate'. Most of the identified research focused upon reading rather than writing, and this was broadly split between braille literacy, print literacy and literacy for children with complex needs.

Key findings and implications – braille literacy

There is clear evidence that braille offers a legitimate and successful route to literacy for many young people with severe vision impairment. Nevertheless, precise details of how braille literacy should be taught, is more complex. The research evidence offers the following steer.

- There is no conclusive evidence of the relative advantages associated with different timings of introducing braille contractions⁷ in teaching, i.e. there appear to be different advantages of introducing contractions from the beginning, or first teaching the uncontracted/alphabetic braille and then introducing the contractions when children are older.
- A key ingredient to progress in braille literacy appears to be high levels of teaching input in a variety of ways, commonly including: one-to-one activities on a frequent and regular basis, preparation by the teacher involved and communication with others to instil practice and consistency. Success appears not to be linked to whether contractions were introduced early or late.
- This suggests that other factors may usefully be drawn upon when making decisions about selecting approaches to teaching braille contractions, including pupil and family preferences. It may also mean that linking braille teaching to print reading schemes used by other sighted peers may be more easily achieved, and justified on grounds of inclusion and engagement while not compromising likely literacy outcomes.
- The required high levels of teaching input also suggests the importance of recruiting a range of adults and peers in addition to the specialist teacher. These people can consistently encourage and support the young person in braille use and practice.
- Although the quality of evidence is moderate, teaching approaches that focus upon associating braille letters and letter clusters with phonemes prove successful.
- There are a range of strategies which have associated moderate and impressionistic quality of evidence – arguably such strategies will be used in a varied approach to teaching (not least in motivating the learner). These include: using teaching materials and activities based upon highly motivating words and content, with attention to relevant and intrinsic meaning for the child; and using teaching materials and activities which involve tracking and discrimination-type activities with little intrinsic meaning.
- The use of refreshable braille technology has not been investigated in any great detail in terms of intervention studies. Although the evidence is not very developed, it seems clear that the technology has no negative impact upon literacy learning, while it has the pedagogical and practical advantages associated with portability as a writing device and quick

⁷ Contracted braille involves the use of the traditional alphabet braille, along with different signs and contractions that represent groups of letters or whole words. Contractions in braille include many common letter clusters (e.g. in unified English braille (UEB) 'sh', 'ou', 'ing') and common words as short forms (e.g. in UEB 'and', 'with', 'this'). Different countries (and languages) and versions of braille will have different approaches to contractions. Welsh braille uses the same general rules with regard to composition signs, punctuation signs, etc., as those stated in UEB. However, the alphabet, and the system of contractions used are specific to Welsh.

access to large volumes of braille reading materials. For older learners, there may also be the potential of using the technology to enable self-study of higher-level braille literacy/maths skills independently.

Key findings and implications – print literacy

Whilst there is evidence that print offers a successful route to literacy for many children and young people with vision impairment, it is more complex to determine what adjustments are required in order to visually optimise access to print. This is because there is variation in individual need (i.e. different functional vision) and how visual optimisation is achieved. Visual optimisation can be achieved by adjustment of the printed materials, or the use of optical or digital magnification and it is this comparison which dominates the evidence identified in the REA.

- Collectively, there is strong evidence that students with low vision who use individually prescribed low vision devices (LVDs) for reading and have associated training and support will perform as well as students with low vision who use large-print reading materials. Performance here is in relation to different aspects of reading: speed, accuracy and comprehension.
- While most of the evidence is in relation to older optical technology, these findings are likely to be transferable to electronic screen technology such as tablets and smart phones. However, more research in this regard is required. Further relevant evidence is also identified within the area of ‘low vision training’.
- Only one other intervention related to print literacy education was identified in the REA that met the inclusion criteria, and this was linked to training to improve reading speed amongst older, academically able young people. There is moderate evidence that coaching in various aspects of speed reading can improve reading speed amongst this group. Training includes speed reading exercises/practice, speed reading with a purpose (e.g. searching for specific information), and coaching/explanation of reading processes (e.g. eye movement regressions, fixation).

The REA did not identify other interventions linked to print literacy education that met the inclusion criteria, e.g. linked to developing reading comprehension and accuracy, linked to access to writing. Nevertheless, there are links with other intervention areas, most notably technology.

Key findings and implications – literacy and children with complex needs

The REA identified very few interventions linked to literacy and children with vision impairment and complex needs, although there are some helpful overviews of different approaches which researchers and practitioners have taken in this regard. As with approaches to developing communication amongst children with complex needs, a key focus of these approaches is around individually tailoring the approach taken. Whilst the evidence base is undeveloped, it does provide accounts of augmentative and alternative communication (AAC), braille, Moon and print as successful routes to literacy for young people with complex needs.

Low vision training

Description of educational area

For the purpose of the REA, this area was defined as studies describing interventions that were designed to develop the use of functional vision through structured visual training and visual stimulation programmes, including use of optical and electronic magnification devices/low vision aids.

Nature of the evidence in this area

A total of seven sources met the inclusion criteria for the REA. In terms of quality, six were rated as being 'moderate to strong' and one as 'impressionistic to moderate'.

Key findings and implications

Evidence of the positive impact of structured visual training and visual stimulation programmes upon the development of functional vision is limited. It seems most likely that visual activities which are dependent on the child's behaviour and naturally-situated are most likely to have benefit.

This is illustrated well in the example of computer-based activities in which visual stimulation can be carefully controlled and maximised to develop functional vision. Evidence of positive impact of these approaches is absent. Nevertheless, adjusting and optimising visual presentations seems a powerful and necessary way to engage young and developmentally young children. This is likely to have greatest value in developing functional vision if the presentation strategies are embedded in broader activities which encourage communication so that the visual tasks have meaning, e.g. turn-taking and decision making. Even so, the evidence is not established.

In terms of access to low vision services and training, the availability of services and equipment that can be utilised in education is crucial. Research demonstrates that low vision devices (LVDs) (and general modification to the visual environment) clearly give access to visual information for people with vision impairment. Whether the benefit of this can be practically utilised within education is a different question. Some evidence of low uptake of (optical) LVDs amongst teenagers with vision impairment suggests that this is not straightforward, but evidence in relation to literacy demonstrates it can be done.

There is evidence that young children (at the age of four years) have the control and ability to use LVDs. This suggests that starting interventions with young children is a good strategy (and may have benefits of normalising LVDs and approaches to independence). In terms of specific technology, 'dome' LVDs may be easier to use than 'stand' LVDs for young children. The REA did not identify formal investigations into the use of mainstream electronic technology such as LVDs (e.g. mobile phone screens, tablet screens), but it seems likely that this has many possible opportunities and should be the focus of practice and future research.

Teaching strategies

Description of educational area

For the purpose of the REA, this area was defined as studies describing interventions that focused on examining the use of teaching strategies/approaches to support the learning of children and young people with vision impairment.

Nature of the evidence in this area

A total of seven sources met the inclusion criteria for the REA. In terms of quality, five were rated as being 'moderate to strong' and two as 'impressionistic to moderate'. A common research design in this area was to offer formal accounts of specific teaching practice, i.e. researchers and researcher-practitioners describe the preparation work and modifications they make to their teaching strategies for given curriculum areas. The literature contains many other accounts of similar practice, although it generally does not meet the inclusion criteria of the REA.

Key findings and implications

Whilst there is a well-established philosophical position that adjusting the presentation of educational material will improve access for students with vision impairment, there is relatively little formal research that gives empirical evidence in this regard. The presentational adjustments to teaching strategies can be summarised as either enhancing the visual mode, alternative presentations (e.g. through speech or a tactile code) or combinations of the two. The research and good practice literature offers examples of both:

- enhancing the visual mode e.g. enlarged materials, simplified and enhanced diagrams, increased contrast and colour adjustments, adjusted lighting, the use of LVDs, and electronic materials (with associated enhanced visual output)
- alternative presentations e.g. tactile diagrams in science and mathematics, braille materials (including use of particular braille notation for science, music and maths), explicit verbal questioning and verbal mediation, audio description of videos, and electronic materials (with associated speech and/or electronic braille output).

Small adjustments to teaching strategies to make them more accessible can be straightforward. As an example, it is important that teachers gain the attention of a pupil or group of pupils before initiating communication. Teachers commonly do this through non-verbal communication, e.g. making eye contact. A simple approach to make this more accessible is to give a general verbal cue ("Can I have everyone's attention please...") or a more specific one (giving the pupil's name before initiating communication, "Aled,... can you tell me...").

In terms of the benefits and implementation of adjusted presentations:

- there is evidence that some changes to teaching/presentation strategy can benefit all learners, not just those with vision impairment, e.g. audio descriptions of videos and diagrams and verbal mediation in problem

solving. Nevertheless, some strategies are very specific to the learner with vision impairment, e.g. the use of braille code

- there is implicit evidence in the literature that some adjusted materials need educators with particular/specialist knowledge and/or training to prepare and create the materials, e.g. adjusted visual diagrams, tactile diagrams, braille code
- there is implicit evidence in the literature that some adjustments may take time for the young person to learn and master. This links to the concept of 'learning to access' in which the young person with vision impairment may need instruction and practice time to be able to benefit from the adjustments and the improved access they afford, e.g. learning to use software, electronic books and tactile diagrams
- some curriculum areas may need specific attention in terms of requiring particular teaching strategies to maximise access. The REA identified research evidence in relation to maths and science, but other curriculum areas have well documented good practice strategies (e.g. music, physical education⁸).

Access to assessments and examinations

Description of educational area

For the purpose of the REA, this area was defined as studies describing the relative success of different assessment accommodations/modifications.

Nature of the evidence in this area

Two sources met the inclusion criteria for the REA. In terms of quality, both were rated as being 'moderate to strong'.

Key findings and implications

There is little empirical research exploring the relative efficacy of different access arrangements for those with vision impairment. Nevertheless, descriptions of the available approaches to access arrangements are more established⁹. The literature describes approaches which seek to make accommodations and modifications to assessments to enable greater inclusion/access. The debate also includes the principle of 'inclusive' or 'universal' design which requires assessment developers to maximise the accessibility of the assessment at the design stage in order to minimise the requirement for later accommodation and modifications.

⁸ For example: Lieberman, L.J., Ponchillia, P. and Ponchillia, S. (2013). *Physical education and sports for people with visual impairments and deaf blindness: Foundations of instruction*. New York: AFB Press.

⁹ For example, <https://www.rnib.org.uk/services-we-offer-advice-professionals-education-professionals/access-exams-and-tests>
<https://www.jcq.org.uk/exams-office/access-arrangements-and-special-consideration/regulations-and-guidance/access-arrangements-and-reasonable-adjustments-2019-20>
<https://hwb.gov.wales/draft-curriculum-for-wales-2022/reading-and-numeracy-assessments/personalised-assessments/national-reading-and-numeracy-tests-test-administration-handbook-191010/>

The key implications are:

- access arrangements for assessments and examinations should be clearly defined and offer the flexibility to enable learners with vision impairment to use their available independence skills and preferred way of working so that they can appropriately access assessments and examinations
- classroom practice and access arrangements should align with one another as much as is possible and when there are differences, learners should be prepared for this ahead of the assessment or examination
- technology (e.g. word processors with specialist software) has potential value for learners with vision impairment in many examinations. It provides a means to efficiently access assessment material and express assessment responses. This assumes these approaches are taught and become embedded in standard classrooms and studying experiences.

Mobility and independence

Description of educational area

For the purpose of the REA, this area was defined as studies describing the effect of instruction/teaching/training to support orientation and mobility (including cane skills), independence and living skills.

Nature of the evidence in this area

A total of six sources met the inclusion criteria for the REA. In terms of quality, three were rated as being 'moderate to strong' and three as 'impressionistic to moderate'.

Key findings and implications

Given the centrality of mobility and independence within the field of vision impairment education, it is surprising that there is little evidence of evaluation of educational interventions that met the REA criteria. This may be because education draws upon approaches developed in the adult rehabilitation field (e.g. the use of the long cane) and the approaches have been applied to the education of children through practice and described in 'practice-based' guidance. Arguably, therefore, the successful teaching of children to be mobile and independent has been viewed as sufficient evidence of the validity of the educational approaches used.

In terms of the evidence identified, positive impact was found to be associated with:

- early preschool holistic intervention with parents and families, thereby highlighting that a broad range of activities and interaction strategies should be undertaken with young children with vision impairment to encourage mobility and independence
- combining interventions with attention to general adjustments to the environment, as well as specific adjustments to specific activities to ensure they are accessible
- the use of specialist rooms/multi-sensory environments, which may provide particularly accessible and stimulating opportunities to encourage

active movement for young and developmentally young children, in particular those with additional disabilities

- mobility instruction for older children who are learning to move around the outside environment (e.g. learning to cross roads, travel to shops and school), should take place in those authentic environments. More specifically, there is evidence that precise situated instruction involving verbal rehearsal before actions and practice appears to lead to successful learning.

Beyond these areas, the REA identified little evidence of successful interventions, or evidence of details of general principles of mobility and independence education, e.g. exactly what activity, how long an intervention should last and when interventions should take place.

In terms of key implications it is likely that:

- starting interventions as early as possible is beneficial (e.g. to develop independent mobility, dressing, food preparation), with no obvious disadvantages
- there is a need for all those involved (professionals and family) to recognise that mobility and independence are both possible and desirable and opportunities are maximised which encourage young people's engagement with these activities
- maximising mobility and independence before children enter secondary school seems particularly crucial because those environments make greater demands upon these skills and present fewer opportunities for these skills to be taught.

Social and emotional functioning

Description of educational area

For the purpose of the REA, this area was defined as studies describing the effect of instruction/teaching/training to support self-esteem, peer relationships, friendships and peer acceptance.

Nature of the evidence in this area

A total of three sources met the inclusion criteria for the REA. In terms of quality, two were rated as being 'moderate to strong' and one as 'impressionistic to moderate'.

Key findings and implications

The REA identified only three studies that investigated the quality of interventions to support the social and emotional development of children and young people with vision impairment, and all focused upon social skill development. Interventions can be usefully split into two categories: (1) socially-focused ('access to learning') strategies which seek to make adjustments to the social environment (e.g. awareness training of sighted peers); (2) individually-focused ('learning to access') strategies which seek to explicitly teach social skills to children and young people with vision impairment.

The identified evidence suggests:

- individually-focused interventions appear to have a positive impact when viewed collectively in a meta-analysis, but specific details of what works is not clear from the literature
- it is likely that individually-focused strategies are usefully combined with a broader socially-focused strategy which increases awareness of those around the child, and also addresses and encourages socially appropriate interactions in day-to-day/naturalistic activities (rather than targeted teaching)
- general activities which incorporate elements of play, turn taking and social interaction (including activities that do not have the primary purpose of developing social skills), will provide opportunities for social development.

Broader 'good practice' literature provides a range of strategies associated with improved social and emotional development of children and young people with vision impairment. These strategies include:

- improving general independence of young people (e.g. mobility) to increase opportunities for social interaction
- facilitating opportunities for social interaction during lunchtimes
- using a portfolio approach to develop self-advocacy skills to help children and young people learn how to assert themselves
- using assertiveness training to enhance the social/assertiveness skills of young people with vision impairment
- using music therapy to address the issues of social isolation including specific musical activities through which children and young people can practise socialising and interacting with one another.

Use of technology

Description of educational area

For the purpose of the REA, this area was defined as studies describing the effect of instruction/teaching/training using educational, enabling and access technology.

Nature of the evidence in this area

A total of two sources met the inclusion criteria for the REA. In terms of quality, one was rated as being 'moderate to strong' and one as 'impressionistic to moderate'.

Key findings and implications

Given the significance of assistive technology within the ECC and the field of vision impairment education, it is surprising that there is little evidence of evaluations of educational interventions that met the REA criteria. Arguably, the existence of assistive technology, and its successful use, offers strong evidence of the importance technology has as a mechanism to support students to access their learning.

There are clear benefits of being able to use technology to optimise and personalise educational activities, e.g:

- adjustments of screen-based presentation (in terms of size, contrast and colour)
- the use of speech technology and the control of the speech speed
- the use of document headings to enable rapid navigation, skim reading and searching
- the use of suitable control/input devices which are appropriate and efficient for the given learner (e.g. keyboard, voice input, switches, touch screens).

Educators have a clear role in utilising this technology. This involves ensuring appropriate technology is in place. A balance here is required between using technology as a tool for access to learning, and also recognising young people can manage and develop their own use of technology to support their independent learning.

While evidence is limited, a key implication is that children require focused teaching in relation to developing their assistive technology skills (i.e. learning to access strategies). This will vary for different children, but this will often include training in touch typing, and training in the use of particular access technology/software.

Beyond general access, technology offers the potential for supporting the teaching in particular curriculum areas (for example, visual training, braille and communication).

Teaching support

Description of educational area

For the purpose of the REA, this area was defined as studies describing the use of various teaching support techniques and configurations to support children's learning. This commonly involves support offered by non-teaching staff, e.g. learning support assistants or teaching assistants.

Nature of the evidence in this area

No sources were identified that met the inclusion criteria for the REA.

Key findings and implications

No educational interventions specifically in relation to teaching support were identified in the REA. This is surprising given the common use of teaching assistants in the support and education of children with vision impairment. Indeed, many of the interventions described throughout this report are commonly supported and implemented by teaching assistants. While empirical evidence that details the effectiveness of particular approaches in the use of teaching support has not been identified, it seems likely that teaching assistants can provide a valuable role in relation to:

- 'access to learning' (e.g. the preparation of accessible materials for pupils with vision impairment, providing access support within classroom activities)

- 'learning to access' (e.g. reinforce children's mobility skills during travel, or the use of other independence skills).

Inclusion

Description of educational area

For the purpose of the REA, this area was defined as studies describing the effect of environmental adjustments, inclusive practice, training on a range of skills and outcomes (e.g. behaviour).

Nature of the evidence in this area

Only one source met the inclusion criteria for the REA. In terms of quality, this was rated as being 'moderate to strong'.

Key findings and implications

The single study identified for the REA provided no evidence of a positive impact of an inclusion-focused intervention (in this case the training of initial teacher education trainees to improve their attitude towards teaching pupils with vision impairment in their classroom). The low incidence nature of vision impairment means it is common that specialist teachers of these children will seek to be 'agents of change' by influencing others around the child with vision impairment, e.g. the child's peers and those who are involved in their direct teaching and care. This is commonly done through environmental audits and training of educators, parents and peers.

The absence of evidence of the effectiveness of these strategies in teaching pupils with vision impairment suggests that more research is needed and that specialist educators should gather their own evidence to assess the efficacy of their practice.

Other points to consider when designing and providing intervention and support packages

While formal research is relatively underdeveloped in the field of vision impairment education, educational practice demonstrates that some specialist interventions work. For example, children with vision impairment:

- learn to use assistive technology successfully
- learn to touch type
- make use of long canes for mobility
- learn to read and write braille
- use low vision devices to access print
- benefit from optimised lighting.

This combined evidence may be persuasive, but it does not provide the precision of what works, when and with whom. This can be very difficult for classroom teachers who are working with such diverse learners and are seeking precise guidance. The implications are that broad interventions should be based upon the evidence and practice where available, and then modified and adjusted based upon assessment of progress. This requires:

- appropriate assessment tools
- an appropriate and shared understanding of progress and targeted outcomes
- a range of appropriate expert advice to draw upon.

Assessment tools

The review did not seek to identify assessment procedures (the focus was upon educational interventions). However, assessments of various relevant aspects of children's development form an important part of vision impairment education. Important examples include:

- early years general progress (e.g. Developmental Journal for babies and young children with Vision Impairment (DJVI)¹⁰)
- assessments of preferred routes to literacy (e.g. Learning Media Assessment)

¹⁰ The DJVI not only provides developmental checklist, but also provides a framework for early intervention. A previous review by Douglas et al. (2009) described an earlier edition of DJVI as 'the most contemporary and most empirically-based tool of its kind' (p.84). The OPTIMUM Vision Impairment project carried out an evaluation of the current DJVI but this was not published in time for the REA searches. Now published, Dale et al. (2019) found "Infants and young children with visual impairment receiving home-based early intervention using the DJVI with a structured developmental approach had better outcomes than those receiving 'other' home-based early interventions. Moderate to large effect improvements were found in child cognition and language, behaviour and parenting stress and the perceived practitioner-parent relationship" (p.697).

Dale, N. J., et al. (2019). Home-based early intervention in infants and young children with visual impairment using the Developmental Journal: longitudinal cohort study. *Developmental Medicine and Child Neurology*, 61(6), 697-709. doi:10.1111/dmcr.14081

- braille reading assessment (e.g. The Neale Analysis of Reading Ability, Braille Version)
- print reading assessment (e.g. The Neale Analysis of Reading Ability, Low Vision Version)
- visual development (e.g. Vision for Doing)
- checklist of assistive technology progress
- curriculum for orientation and mobility (e.g. the 'Teaching Age-Appropriate Purposeful Skills' (TAPS) curriculum¹¹).

It is important to recognise that the availability of Welsh versions of these assessments, and educational resources more generally, is often a challenge.

As well as a range of assessments of a child's developmental progress, there are also assessments of how a student is included which focuses upon the broader learning environment (e.g. environmental audit checklists).

Attention to student progression

Most teachers would recognise a learner's educational progression for many of the intervention areas discussed, e.g. learner progress in literacy, communication, mobility or use of technology.

However, the range of interventions presented means that educators are faced with dilemmas as to where to put their efforts. For example, should interventions be chosen that emphasise promoting 'equal' access (i.e. an emphasis on 'access to learning') or on developing independence and personal agency (i.e. an emphasis on 'learning to access')? Examples of these dilemmas include:

- text modification print enlargement versus development technology skills
- sighted guide versus mobility teaching
- sighted reader versus the use of computer technology
- anticipatory adjustments versus teaching of self-advocacy skills.

These decisions are not about the relative efficacy of particular interventions but what individual stakeholders and policies deem to be the 'right thing to do'. Nevertheless, these are very practical challenges for parents, teachers and young people to navigate.

A common challenge is how best to respond to the 'here and now' needs of ensuring appropriate curriculum access, while at the same time attending to the longer term targets linked to developing and promoting independence. While it can be challenging to find the balance between the immediate and longer term areas of need, the importance of doing so is highlighted in the literature, which associates independence skills with positive employment outcomes.

¹¹ Pogrud, R., Sewell, D., Anderson, H., Calaci, L., Cowart, M. F., Gonzalez, C., Marsh, R. A., & Roberson-Smith, B. (2012). *TAPS: An orientation and mobility curriculum for students with visual impairments (3rd Edition)*. Austin: Texas School for the Blind and Visually Impaired.

It is important to recognise that the 'core' and 'additional' curricula should not be considered as completely separate. Instead, they overlap, they are complementary and they must be balanced. Such a balance acknowledges that while facilitating access to areas of a 'core' academic curriculum is important (access to learning), consideration also needs to be given to promoting areas of a 'specialist' or 'expanded core curriculum' from an early age (learning to access). This attention to maximising opportunities to develop independence and agency at an early age means that good habits become established and confidence is developed. It also builds readiness for the next transition that commonly assumes these skills are in place. This drive to develop independence must be supported by available staff and resources (e.g. equipment) and also the need for appropriate and sensitive accommodations.

While focusing on the long-term aims of increasing the independence access skills of the child or young person and reducing reliance on adult partners, decisions can be navigated in a child-centred way to avoid intractable dilemmas. A key part of this decision-making process is linked to the age/developmental age of the learner with vision impairment, and accounting for the preferences of the child and parents. To some extent, the evidence identified in the review offers some steer about which approach works and at which point in the young person's development. However, the review also reveals the evidence is often absent or impressionistic, or is only based upon practice and professional judgement.

The design and implementation of the educational interventions often requires professionals with specialist training – e.g. in relation to braille, low vision, mobility and technology. However, it also requires professionals who can take a researcher-practitioner role. They must be able to assess individual children and modify interventions appropriately based upon evidence of progress. They must also design interventions that increasingly seek to promote young people's independence and agency over time.

Professional roles

The 'educator' (using the term in a general sense to refer to an appropriate adult) must make use of information from assessments and then make decisions about interventions that may be beneficial to the given child's learning and development. Drawing upon the educational strategies identified in the REA, these interventions may focus upon environmental and resource adjustments, pedagogy or curriculum (or most commonly combinations of all these things). The challenge for the educators involved is deciding upon the appropriate combination of interventions and having the appropriate skills to implement them. The complexity of navigating this range of interventions requires multi-agency and collaborative working with the families of children with vision impairment. More specifically, the range of professionals involved will include: classroom teachers (in mainstream and specialist schools), SENCos/ALNCos, teaching assistants, specialist teaching assistants, habilitation workers, mobility specialists, low vision specialists and specialist qualified teachers of children and young people with vision impairment (QTVIs).

The review did not focus upon different professional roles in undertaking different interventions, nor has it directly focused upon the different skills, experience and training those professionals may require. However, a recurring theme has been that specialist staff are commonly needed to undertake and/or advise on 'additional learning provision' (defined as special educational provision as set out in the Education Act 1996) and inclusive practice and differentiation. While the availability and organisation of professionals varies in different countries, in Wales the traditional coordination of this complex arrangement of educational support is generally undertaken by QTVIs. The QTVI has an important role in relation to additional learning provision, inclusive practice and differentiation, but also in navigating the balance between these strategies¹².

Specialist professionals such as QTVIs and habilitation workers are commonly employed as part of a local authority team (e.g. as part of a sensory support service). These services aim to support education which targets the educational outcomes highlighted in this report, and help schools, parents and children in their educational planning and delivery.

It is very important that teaching services supporting children and schools should provide support which aligns with the intentions of the access to learning/learning to access framework defined in this guide. The National Sensory Impairment Partnership (NatSIP) have offered a 'Learner Outcomes Framework for VI children and Young People'¹³ which gives suggestions for how services can construct and communicate their 'service offer' in this way.

¹² The role of the QTVI is analysed in detail in (e.g.) McLinden, M., Douglas, G., Cobb, R., Hewett, R. & Ravenscroft, J. (2016). Access to learning' and 'learning to access': Analysing the distinctive role of specialist teachers of children and young people with vision impairments in facilitating curriculum access through an ecological systems theory. *British Journal of Visual Impairment*, 34(2): 179–197.

¹³ Keil, S. (2016) Learner Outcomes Framework for VI children and Young People: A framework for support for young people with vision impairment provided by a VI education service. National Sensory Impairment Partnership (NatSIP). Retrieved from: <https://www.natsip.org.uk/>

What progress might be expected following intervention and support for young people with vision impairment?

Desired educational outcomes for all young people can be usefully considered within three areas¹⁴:

- academic attainment
- happiness
- independence.

These educational outcomes are intertwined for all young people, including those with vision impairment. Personal agency and improved mental health is associated with maximising academic achievement and maximising the ability to navigate one's physical and social environment. Such outcomes also maximise the opportunities for young people to achieve independent living, employment, inclusion in their community and ultimately well-being. Optimal outcomes for young people with vision impairment are associated with educational interventions which balance (1) 'access to learning' approaches which emphasise fair and optimised access to the school curriculum and community and (2) 'learning to access' approaches which emphasise the development of access skills, use of technology, and mobility and independence.

¹⁴ See for example an international review of educational outcomes: Douglas, G., Travers, J., McLinden, M., Robertson, C., Smith, E., Macnab, N., Powers, S., Guldberg, K., McGough, A., O'Donnell, M. and Lacey, P. (2012). *Measuring Educational Engagement, Progress and Outcomes for Children with Special Educational Needs: A Review*. National Council for Special Education (NCSE), Trim, Ireland. <http://ncse.ie/research-reports>

Information sources

- Guide dogs children and young people's services
<https://www.guidedogs.org.uk/services-we-provide/children-and-young-peoples-services/>
- National Professional body for Habilitation Practitioners, Habilitation VI UK
<https://habilitationviuk.org.uk/>
- National Sensory Impairment Partnership (NATSIP)
<https://www.natsip.org.uk/>
- The Royal National Institute of Blind People (RNIB)
<https://www.rnib.org.uk/>
- RNIB Cymru <https://www.rnib.org.uk/wales-cymru-1>
- The professional association of the vision impairment education workforce (VIEW) <https://viewweb.org.uk/>

Contacts

Further information about this document is available from the following.

- Professor Graeme Douglas
<https://www.birmingham.ac.uk/staff/profiles/education/douglas-graeme.aspx>
- Professor Mike McLinden
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Glossary

ALNCo	additional learning needs coordinator
braille	the most commonly used tactile reading and writing system by people with vision impairment who cannot access print materials
CCTV	closed-circuit television (a type of LVD)
CVI	cortical vision impairment
ECC	expanded core curriculum
educational strategy	umbrella term used to describe an area of intervention (e.g. literacy, communication)
LVD	low vision device (optical or electronic)
Moon	a tactile code used by some people with vision impairment as an alternative to print or braille
NatSIP	National Sensory Impairment Partnership
O&M	orientation and mobility
QTVI	qualified teacher of children and young people with vision impairment
REA	rapid evidence assessment
SEN	special educational needs
SENCo	special educational needs coordinator
UEB	unified English braille
VI	vision impairment

