Premier’s IOOF Centre for Educational and Medical Research Itinerant Support Teacher (Vision) Scholarship

Equity and Access to the Australian National Curriculum for Students with Low Vision: Using Optical Low Vision Aids in the School Environment

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With the development of access technology, there has been voiced concern in the field of low vision that traditional optical low vision aids (OLVAs) have become obsolete. In the past it has been ascertained that learners with low vision have benefited greatly from using traditional OLVAs. Farmer and Morse (2007) demonstrated that learners with low vision showed an increase in their reading speed rates and a noticeable increase in their reading comprehension skills with the use of a stand magnifier in conjunction with standard print size in comparison to students who relied solely on enlarged print. Kalloniatis & Johnston (1990) assessed student reading performance in regular classrooms with the use of OLVAs and also found that the devices also significantly improved functional vision.

My field study looked at the current role of OLVAs in supporting access to print for students with low vision in an attempt to determine whether the universally designed consumer devices that are commonly available for use in classrooms for students with low vision should replace the OLVAs produced by specialist technology providers? And should support teachers for students with vision impairment (STVs) still advocate their use?

This study examined the debate by presenting qualitative data pertaining to giving learners with low vision equitable and accessible admission to print media. The specific objectives of my study were to uncover:

* + recommendation and provision of optical low vision aids
  + the role of specialised technology versus consumer technology for print access
  + the benefits and barriers to successful use
  + common events for OLVA use
  + checklists and instructional materials used to teach OLVA use
  + successful OLVA use and the importance of early intervention
  + OLVA use and their connection to large print provision.

Research Methodology and Participants

Over a five-week period I observed OLVA use in New South Wales, Victoria, South Australia, Western Australia, Queensland and New Zealand. I collected data collection via professional interview and classroom observation. All classroom observations occurred in metropolitan areas.

I collected qualitative responses to set standardised questions from professionals in print and web accessibility, orthoptists, access technology consultants, alternate format producers, educational consultants, and STVs. I met with over 60 professionals supporting students with low vision. Thirty extended-interview responses were collated and analysed for trends in OLVA use and the ideologies related to their use in schools.

In Auckland and in each Australian state, I visited vision resource centres and participated in work shadowing events with STVs. That allowed me to collect many resources and to view first-hand the low vision devices students were using. Those observations were invaluable in supporting the qualitative data collected through the interviews of professionals supporting students with low vision.

Generally, the consistency of all responses were overwhelming, with only one or two participants delivering different responses to any of the set interview questions.

Defining Low Vision Aids

Before all interviews, I talked briefly about what defines a traditional ‘light’ or ‘low’ tech OLVA. OLVAs were defined as non-electronic magnifiers such as single-vision spectacle magnifiers (glasses), stand magnifiers, illuminated magnifiers, handheld magnifiers, monoculars and binoculars.

‘Non-optical low vision aids’ referred to environmental considerations or adjustments such as lamps, slope boards, good positioning and heavy-lined booklets.

‘Specialised electronic low vision aids’, both portable and desktop, referred to devices such as portable electronic magnifiers such as the Optelec, or video magnifiers (CCTVs) such as the Magnilink or the SmartView.

‘Consumer technology’ or ‘generic devices’ with ‘universal design features’ referred to devices such as digital cameras, laptops, generic tablets and iOS devices.

The term ‘access technology’ referred to a toolbox of low vision devices including OLVAs, non-optical low vision aids, electronic low vision aids, and consumer technology, all designed to assist learners with low vision.

Recommendation and Provision of OLVAs

Outlining processes from Corn (2000), one state resource centre identifies four factors in addition to the right prescription that need to be considered when determining suitable magnification devices for children:

* + **Motivation**: Optical devices can allow children who have low vision to participate in class activities. With a monocular, for example, a child can sit with their classmates while the teacher reads a picture story. Older students can read bulletin board postings that are not available in large print.
  + **Appearance makes a difference**: Children want to fit in with their peer group and may feel self-conscious using ‘obvious’ devices. Hand-held magnifiers and monoculars should be chosen with appearance in mind. Young children may like to decorate their devices and carrying cases.
  + **Duration of activity affects skills**: Begin with activities of short duration, such as reading a wristwatch or an item on a menu, to help children get started using near vision devices. Learning to use a device well before it’s needed in the classroom is advantageous.
  + **Quick retrieval of devices and coordination are important**: Children should be taught good mechanical skills, including one-hand focusing of monoculars, as well as how to change the angle of a hand-held magnifier to accommodate light and comfort.

All states have different models for assessing functional vision and technology and recommending low vision aids. The assessment models that participants felt worked best were statewide or national in which interdisciplinary teams of educators, orthoptists and sometimes additional therapists collaborate and use streamlined processes to choose the best access technology devices and adjustments to learning for individual students.

I received mixed responses when I asked if students were involved when selecting the low vision aids they use. Those using state models with interdisciplinary functional vision assessments commented more frequently that the students had more time trialling different devices in class before one was recommended, and that this was very beneficial.

The most common OLVAs seen in classrooms were stand magnifiers, mainly the visolette and illuminated stand magnifiers. Many inferred that this could be because of the aid’s fixed distance from the page, because the aid can keep place when working from a textbook, and that the aid leaves the student’s hands free to write or type.

The most commonly observed OLVA used for distance viewing tasks was the monocular.

Specialised Technology vs Consumer Technology for Access

All participants identified a trend in schools and in the general community that traditional OLVAs are becoming obsolete and being replaced by generic consumer technologies with universal design, such as iPads.

However, all participants believed that this is not necessarily a beneficial trend. All participants agreed that the role OLVAs play in the lives of students with low vision has changed, but that optical and non-optical low vision aids should not be viewed as redundant technologies.

All participants agreed that accessibility features on iPads have been a significant development in providing access to print for students with vision impairment. However, almost all participants were concerned that the exclusive use of iPads for print access, especially used for immediate text magnification, can result in students using images with poor resolution. Some educators are concerned that the lack of good student photography skills and, in turn, clear magnification on iPads was not allowing some young people with severe vision impairment to capture good images of print.

Most educators noted that they value OLVA use that supports distance viewing, and include instruction in monocular use in their programming. Most identified that monocular use was particularly important in the community and during Orientation and Mobility events. However, almost all support teachers reported that students are less likely to use OLVAs that support distance viewing, such as monoculars, in class compared to the OLVAs designed for near vision tasks. Some educators inferred that it could be that proficiently using a monocular requires significant skill, or that students are socially aware of the device. Also, students may prefer to use other adjustments, such as electronic magnification units like Magnilinks, splitter cables sharing interactive white board images, or iPad apps such as VNC, to access distance tasks within the classroom and project larger viewing areas with clear images.

Barriers to Successful Optical Low Vision Aid Use

Participants were asked to comment on a study by Zammitt, O'Hare, Mason, and Elliott (1999) in which 88 per cent of students with recommended OLVAs aged 12 to 13 years said they did not want to use their low vision aids in front of other children because it highlighted their vision impairment. All participants agreed this finding would be mirrored in their respective states. The same study revealed that only one-third of students who were recommended low vision aids were using them at school. Again, all participants agreed this would represent low vision aid use in their states, some indicating that OLVA use could be less than that in the identified study.

Respondents from the states that have expanded core curriculum immersion days or courses run at vision resource centres explained that teaching device use in these supportive environments, with other peers with vision impairment, encouraged and extended low vision aid use.

When asked to identify other factors that negatively affect successful OLVA use in schools, from most to least, commonly occurring barriers noted by all participants were:

* 1. reluctance to seem different to sighted peers
  2. insufficient time to teach successful low vision aid use in class
  3. students choosing different technology (generic technology with universal design) to access print
  4. insufficient in-service training for classroom teacher, or classroom teacher did not know that student used the low vision aid or was unaware of its proper use
  5. recommended optical and non optical low vision aids damaged and lost
  6. student not independently or correctly identifying times OLVA use could support access to print
  7. insufficient support of low vision aid use in early childhood settings
  8. fight for funding for OLVAs
  9. STV not valuing low vision aid use
  10. OLVA use not consistent within the home

Benefits of Successful OLVA Use

When asked about the benefit of OLVA use for students with low vision, identified from most to least commonly noted benefits by participants were:

* + great for accessing incidental print and enabling independence and the ability to interact with standard text
  + low cost adjustment
  + the ‘fall-back plan’
  + a fantastic tool for promoting functional vision programs in early intervention settings, learning to ‘look’, concepts and language surrounding magnification
  + skills are important and transfer to other devices, such as:
  + systematic scanning, tracking
  + appropriate positioning for optimal viewing
  + awareness of the dominant eye
  + systematic techniques to spot desired targets
  + locating and verifying an object
  + focusing
  + great way to introduce device use (concrete device not needing battery, teach care, etc. similar to a Perkins Brailler acting as a preliminary device for a Mountbatten, Laptop with a refreshable braille display or a Braillenote).

It was consistently noted that in an age of digital learning platforms, with very little hard copy print in use in senior years especially, OLVAs are a simple way to instantly access ‘surprise’ print. OLVAs were also found to be a great fall-back plan and were used when a student’s regular device(s) were broken, stolen, flat, had poor connection or not yet purchased.

Although it was appreciated that OLVAs could break or be lost, others noted that OLVAs did not have many issues that ‘high’ technology had and to some participants seemed to be more reliable tools of adaption. A similar view is presented by Pountis, Pogrund, Griffin-Shirley, and Lan (2015): ‘It is interesting to note that despite the high-tech boom, all open-response clauses regarding low-tech devices were positive, whereas all clauses within the teacher and high-tech assistive technology categories were negative.’

Materials Used to Teach OLVA Use

Support teachers working in states with resource centres were more likely to use streamlined resources and curriculums when designing their programs for low vision aid instruction. Excellent curriculum resources are also attached to statewide resource centre websites, which greatly support and streamline OLVA instruction.

One resource centre introduces and explains their OLVA curriculum in depth when holding professional development for classroom teachers. This was found to be a powerful strategy to identify for classroom teachers the importance of low vision aid use and the need for explicit student instruction in order to master successful OLVA use.

All participants identified that their instructional programs were based on ‘Skill Training for Use of Successful Low Vision Aid Use’, in *Foundations of Low Vision* (Corn & Erin, 2010), or in *Looking to Learn: Promoting Literacy for Students with Low Vision* (D’Andrea & Farrenkopt, 2000).

All participants agreed that students need to be taught explicit OLVA use, and that support teachers need to be aware of the hierarchy of skills relating to OLVA use:

* + care and storage
  + initiate the use, understands the use, hold the device properly, position themselves properly and stabilising the aid
  + localisation
  + scanning
  + fixation
  + stamina

Apart from textbook references, no other commercially available instructional curriculums were mentioned.

When asked ‘Do you think designing a standardised curriculum or checklist for instructional low vision aid use could help increase student use?’, most participants agreed it would be helpful. However, some participants commented that their own programming was very individualised, indicating that any generated curriculum materials would have to be very general. All participants agreed a skill training checklist would be helpful to indicate student proficiency and collect program data. Again, most STVs were using the checklists outlined in Corn and Erin’s *Foundations of Low Vision* (2010). When questioned about whether it was a fundamental part of the Expanded Core Curriculum to teach proficient OLVA use, all participants agreed that it was.

Low Vision Aid Use and the Importance of Early Intervention

D’Andrea and Farrenkopf (2000) revealed that students who received their OLVAs at the beginning of their literacy journey, and received proper instruction on how to use them, would almost always continue to use them, seeing them as invaluable and an extension of themselves. All participants agreed that teaching low vision aid use during early childhood was imperative to successful use of the devices later in life. Participants agreed that programs should use play-based structures. In those learning environments, low vision aids were described as fantastic tools for promoting functional vision programs, teaching early learners to ‘learn to look’, and teaching explicit concepts and language surrounding magnification.

Many participants suggested in that setting programs should focus on teaching visual skills and not have a print access purpose. One participant suggested that it is during this time that children are most likely to use OLVAs enthusiastically, and to uncover and make the connections to their benefits. Another participant identified that without very early instructional programs, students could adopt inappropriate strategies for OLVA use.

These responses contrasted with the Zannett et al. (1999) study that suggested that only 38 per cent of the children in early childhood settings who might have benefited from OLVAs had been issued a device. The responses were also in stark contrast to Ritchie, Sonksen, & Gould (1989), who stated that professionals who work with students with low vision often incorrectly assume that low vision aids are mechanically and conceptually too sophisticated for preschool children to use.

Common Events for OLVAs

Participants were asked to identify in which print events students with low vision may still regularly use OLVAs. The most commonly identified events were during early childhood and Stage One learning events, as a secondary line of defense when technology problems occur, when students identified a strong preference for low vision aid use, during community-based Orientation and Mobility events and during post school and work experience events.

All participants suggested that there could be times when OLVAs would not be used. Many participants suggested that during those times our role as support teachers may not be to push the device, but to make sure that learners know how to use their devices, and suggest its place and possible uses in appropriate print events in their current setting.

All participants agreed that OLVA use has significantly decreased with generalised classroom iOS device use, especially within high school settings. All participants had anecdotal stories about students who would break with this trend. All participants stated that they observe students happily interacting with OLVAs in early childhood settings, with most use extending to early primary school. But all participants agreed that as students grow and digital access increases, OLVA use generally diminishes. Many educators reflected that after school, students would return to some pre-established low vision aid use.

OLVAs and Their Connection to Large Print Use and Provision

All participants agreed that enlarged hard-copy print provision for students in infant years facilitated good beginning reading. However, most worried about standard classroom print enlargement, photocopying standard A4 blackline masters to A3. Many practitioners viewed this as concerning because the classroom A3 copies had poor viewing distances, were hard to manage, and could encourage poor quality text enlargement.

Some participants were concerned about very large recommended font sizes for hard-copy print and some participants commented that hard copy print should be ‘capped’ and further magnified with an OLVA or electronic magnification device, or should be produced in digital formats.

Discussion and Conclusion

All participants agreed that the role the OLVA now plays in the lives of students with low vision has changed. However, participants also agreed that optical and non-optical low vision aids should not necessarily be viewed as redundant technologies, but as an additional line of defence against inaccessible print.

Many reported barriers and benefits to OLVA use were consistent, regardless of state support guidelines.

In 2015, with our plethora of platforms and print media, it is more important than ever to equip our students with low vision with the skills to work with more than one digital platform or one device. Our interaction with print is changing and it has never been more important to teach our young people to be flexible and adaptable, and to feel confident about moving between many different devices and tools to access print. No line of defence against print should be discounted. With the generalised push for accessibility, we have less need for large quantities of hard copy print for adaption, but instead we need to rely on devices that can capture and access incidental print.

STVs understand that access should be based on individual preferences, classroom considerations, and individual vision impairments. It is our role to support students and their schools by generating an Access to Print Plan, and to ‘prepare the corresponding toolkit accordingly’ (DePountis et. al., 2015).

My study observed that STVs are highly organised, well informed, adaptable, creative, progressive, professional teachers. My initial aim for this project was to index a list of low vision devices for STV reference. Quickly, I realised this would be a redundant resource because of the pace of technology and because STVs are aware of the access technology available to support individual learners with low vision. What we do need is the facility to pass on this information to the classroom teachers who are educating students with low vision. As identified in Bishops (1986) study, an accepting and flexible classroom teacher was determined to be the most important factor influencing successful outcomes for students with low vision.

Empowering and educating classroom teachers is key to student success. It is the STVs’ role to support our classroom teachers to effectively support students with low vision, and elicit teachers’ enthusiasm about low vision devices, accessibility and appropriate adjustments for learning.

Recommendations

* + Multidisciplinary Functional Vision Assessments conducted by the Department of Education for students with low vision, which include trialling low vision aids and instructional support for students, their parents and classroom teachers
  + a statewide vision resource centre for New South Wales, with provision of access technology available for borrowing/trialling
  + short immersion courses for students with vision impairment, focusing on the Expanded Core Curriculum
  + professional leaders in braille, low vision, access technology or AT consultants appointed by the NSW Department of Education
  + formalised and recognised online training modules/face-to-face professional development for classroom teachers and school learning support officers supporting students with vision impairment, available to classroom teachers and school learning support officers in regional areas.
  + identified regular release times for classroom teachers to receive ongoing advice from STVs and to prepare accessible documents for students with low vision.
  + access to standardised functional vision assessment materials and current FVA training for specialist teachers of students with vision impairment

Further details available on my [blog](https://accessandequity.wordpress.com/).

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