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in
Vision Impairment

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Role of the SPEVI Journal

The South Pacific Educators in Vision Impairment (SPEVI) Inc. is the major professional association for educators of students with vision impairments in Australia, New Zealand and the South Pacific region. SPEVI acts as the professional body in matters pertaining to the education and support of preschool and school-age students who are blind, have low vision, deaf-blindness, or additional disabilities.

The Editorial Committee intends the Journal to be a vehicle for informing researchers, administrators and educators working in government and non-government education organisations, as well as specialist and generic teachers, orientation and mobility (O&M) instructors, allied professionals, parents and others in our communities about research, issues, policies and their implications for practice in Australia, New Zealand and the Pacific Region.

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Opinions expressed in this publication do not necessarily represent the views or policies of SPEVI, but have been presented to stimulate informed debate.

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SPEVI Journal Subscription and Membership

SPEVI membership is open to educators, professionals and parent groups supporting children and adults with vision impairments. This Journal is provided free to SPEVI members as part of their annual membership benefits. There is an A\$25.00 subscription fee per volume for non-members (A\$35.00 for subscriptions outside the Pacific region). Membership information and forms are available on the SPEVI website, <http://www.spevi.net/spevi/index.php>. Please direct all correspondence regarding JSPEVI subscriptions to the Convening Editor, Frances Gentle.

Call for Articles

Original manuscripts, reports and news items are sought for the refereed and non-refereed sections of the next issue of JSPEVI. Topics appropriate for the journal include, but are not limited to the following:

- original research studies, with practical relevance to education of persons who are blind or vision impaired,
- literature and book reviews,
- conceptual, policy or position papers,
- descriptions, reviews or evaluations of innovative instructional curricula, programs or models of education for persons who are blind or vision impaired, and
- letters to the Editor

Letters to the Editor

Members of the editorial committee wish to encourage discussions of important issues that affect the education of children and adults with vision impairments. The journal should be a vehicle for continuing dialogue about current and future directions. The editorial committee invites letters that explore the many issues facing professionals and families supporting learning with sensory disabilities, particularly those arising from articles in the journal.

Guidelines for Contributors

Manuscripts that are of a scholarly nature should be submitted electronically, with the content subdivided into the following two files:

File 1 Author information

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Manuscript presentation: Manuscripts should be submitted in Arial 11-point font, double line spaced, with left aligned paragraphs, 2.54cm page margins (normal margin setting) and numbered pages. A running title header should be included on each page (with no authorship information included).

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Abstract: Academic manuscripts should include an abstract of 120 words or less, giving a brief summary of the overall content. The abstract may be followed by a list of key words.

Figures and tables: Numbered figures and tables should be included in the manuscript. Tables should be created using a table function, and figures submitted in Black and White, with consideration to the readability of the figure when reduced for publication.

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Manuscript review process: Manuscripts will be acknowledged upon receipt. Following preliminary editorial review, articles will be sent to members of the Editorial Advisory Panel and where warranted, to consulting reviewers who have particular expertise in the subject. This journal uses the "blind review" system. Reviewer feedback will be sent to the author/s with an invitation to revise the manuscript content and/or respond to the reviewers' comments. The review process may sometimes take up to three to four months. The names of consulting reviewers will periodically be published in the journal. Reviewed manuscripts will remain the property of South Pacific Educators in Vision Impairment (SPEVI). Authors will be advised in writing if their manuscripts are not accepted for publication.

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Manuscript submission: Please forward your contributions for the 2018 issue of JSPEVI to the Convening Editor, Dr Bronwen Scott, **Email:** bronscott@inet.net.au

President's Message

Dear Readers

It is my privilege to contribute to the JSPEVI volume in a year that has seen many challenges, which with the support of our members and their commitment, I am positive we will work through to ensure we deliver on the professional goals.

The recent implementation of the National Disability Insurance Scheme (NDIS) has marked a fundamental change in the way schools receive funding to support students with additional needs. The NDIS presents unique challenges for Specialist Teachers (Vision Impairment), in particular the challenge of ensuring that children with vision impairment receive the technology, resources and support they need throughout their educational journey in order to achieve their goals in education and life.

Another challenge in late 2017 was associated with implementation of the NAPLAN online tests. Several Specialist Teachers (VI) communicated their concerns about test accessibility for students with vision impairment to ACARA and the NSW Department of Education. We are optimistic that the accessible functionality of these tests will be improved.

SPEVI continues to raise concerns on behalf of its members, including the ongoing technical problems associated with NESA accreditation for some Specialist Teachers (VI) who were employed prior to 2004. This group of specialist professionals did not receive their kit form containing a certificate declaring them proficient in teaching, or a map detailing the teacher accreditation process. The NSW Education Standards Authority (NESA) has apologised and advised that they are working to resolve this problem.

On a positive note, SPEVI has seen a marked increase in membership subscriptions as a result of the introduction of free membership for new and renewing members. The goal of the free membership promotion is to establish one due membership date, which will be 30th May every two years, commencing in 2019. The free membership promotion closes on May 30th 2018, and the application form is available on the SPEVI website. Thank you to those who have joined or renewed their membership. On behalf of the SPEVI Committee of Management, I wish to extend a warm welcome to all our new members and look forward to further increasing our membership numbers in 2018/2019. The Committee will continue to share updates via the SPEVI website, JSPEVI, Facebook and email lists.

As specialist professionals we are reminded daily of the importance of our role in ensuring that students with vision impairment receive equitable access to quality education. I am proud to be associated with the publication of the JSPEVI which gives

voice to the issues facing our students and members and helps to ensure that our concerns as specialist professionals are brought to the attention of the school community, politicians, educators and associated professionals and families.

Pranitha Moodley

Vice President, SPEVI

Editorial

Welcome to JSPEVI's tenth volume. It has been my pleasure to act as Guest Convening Editor for this volume, and to accept the ongoing Convening Editor position into the future. Many thanks to Dr. Frances Gentle for her outstanding work in editing recent volumes of the journal, which aims to provide a forum for scholarly exchange among organisations and individuals who support and promote education for learners with vision impairment. In our lead article, Silveira discusses a range of approaches to disability support, and how these approaches have changed over time. This includes a discussion and analysis of Australia's new National Disability Insurance Scheme (NDIS), and how this impacts support to those with blindness and low vision – a subject that is relevant to us all. In our second lead article, Gentle provides an overview of a preliminary research study exploring braille instruction to young learners prior to the introduction of the Smart braille to Australia. The article provides a number of recommendations as well as discussing the limitations impacting on the research study, including hardware and software issues with the technology.

There are two papers included in this volume that were presented at the SPEVI Biennial Conference held in Brisbane in January 2017. The first is longer than our regular article length, but provides a fascinating insight from the perspective of neuroanthropologist Greg Downey into the sensory world of echolocation. Downey challenges those of us with vision to consider alternative ways of perceiving our world, a 'blind style of perception'. The article has been modified from the original conference presentation due to its length, and is highly recommended as a thought-provoking 'long read'. The second paper included from the SPEVI Conference from Pagliano was a delightful aural experience for those of us attending. It begins with two vignettes on listening, where Pagliano encouraged us to close our eyes and listen to the descriptions. The article goes on to discuss five principles of neuroplasticity and the implications these have for classroom practice, and, like Downey's paper, provides some valuable insights into the adaptability of the brain.

Ben Clare and Frances Gentle provide an update on a number of projects that the International Council for Education of People with Visual Impairment (ICEVI) was involved with during 2017. These include a Mathematics Project and a Higher Education Project in partnership with a range of organisations, along with a Perkins braille machine repair workshop held in Papua New Guinea. It is always wonderful to hear about the important work that is going on in our South Pacific region through ICEVI.

Additionally, this year's volume includes reports by World Access for the Blind, Sonokids, and an update from Monash University on the exciting changes in the world of tactile graphics.

In conclusion, I invite you to explore the articles and reports that are presented in this tenth volume of JSPEVI. Thanks are extended to the JSPEVI Editorial Committee, Advisory Panel and authors for their work in ensuring the quality and scholarship of the articles and reports featured in the volume. I would also encourage you to consider submitting an article for the 2018 Journal. A goal for the upcoming year is to explore more accessible online versions of the journal so we can continue to share our knowledge and support our colleagues and the individuals that we provide support to

Bronwen Scott
Guest Convening Editor

Vision impairment and disability support, the road travelled - Sue Silveira

Abstract

Australia has travelled a long road to reach the new National Disability Insurance Scheme (NDIS). This journey has been influenced by shifting global and local approaches to supporting people with disability, including those with vision impairment. This paper will provide perspectives from the literature that appraise these approaches, including how contemporary attitudes and practices have led to a reformation of disability support. The influences of model-style approaches to disability support from medical, social and biopsychosocial perspectives will be discussed. The influence of the World Health Organization frameworks will also be explored in the context of disability support and the NDIS.

Key words: Vision impairment, disability, World Health Organization, model

Introduction

Australians with vision impairment live in a time when there is cause for optimism regarding the government funded disability support they can expect to receive. The National Disability Insurance Agency has pronounced that the new National Disability Insurance Scheme (NDIS) will “provide all Australians under the age of 65 who have a permanent and significant disability with the reasonable and necessary supports they need to enjoy an ordinary life” (NDIA, n.d.). The new approach reflects a coming of age for a disability support system that has been traditionally “...inequitable, inefficient, not cost-effective and not accountable” (Australian Government Productivity Commission, 2011, p. 7). This paper will provide a review of the journey that Australia has taken, from pre-NDIS times when the medical domination of disability services existed, to the present time when a novel scheme is being rolled out that promises to support people to realise their personal and life goals. Several of the key global events and activities that have influenced and have therefore moulded Australia’s evolving journey will be presented and discussed.

Medicalisation of disability

The philosophical underpinnings of support offered to people with disability including those with vision impairment, have been influenced by popular belief, and in the last two centuries by the theory and practice of medicine. A medical model has been constructed around health states and measures of normalcy, then applied to disability including vision impairment. This medical model asserts that:

Health and disease can be explained through an engineering metaphor in which the body comprises a series of separate but interdependent systems. Ill health is the mechanical failure of some part of one or more of the components of this engine, and the medical task is to repair the damage. (Morgan, 2012, p. 69)

Medical models have been applied to all areas of disability with the presumption that a person's state of health is a biological fact used to categorise their health, measured by the presence of illness, rather than the health the person experiences (Taylor & Hawley, 2010). In the case of vision impairment, an example is found in the application of clinical measurements such as visual acuity and visual fields. These clinical measurements result from ophthalmological or medically focussed eye examinations, and are applied to predefined criteria in standardised conditions to determine the severity of a person's vision impairment.

The notion of 'measurement' has been described as a key strategy within a medical model to identify deviation from normal states. However, such an approach was criticised for the "...focus on one aspect of the person with a disability – their deficiencies" (Dempsey & Nankervis 2006, p. 12). Davis (2006) identified the inadequacy of applying health-related measures to disability, commenting that "the problem is not the person with the disability, the problem is the way 'normalcy' is constructed to create the problem of the disabled person" (p. 1). Guscia, Harries, Kirby, Nettlebeck and Taplin (2006) described the medical approach to disability as one concerned with the nature of an individual's disability and associated deficits, typically in terms of maladaptation rather than adaptation, or as described by Terzi (2004), the divergence from what is seen as normal. Medical approaches to disability fostered the view that disability was an illness, and as such "...if we could treat all forms of illness we could do away with disability" (Taylor & Hawley 2010, p. 15).

Application of a medical model to disability as a policy-related concept has been criticised for creating disempowering attitudes and reactions to people with disability, placing them at risk of exclusion due to their impairment (Guscia et al, 2006). The World Health Organization (WHO, 2007) commented that a medical model of disability was inadequate as it "views disability as a feature of the person, directly caused by disease, trauma or other health condition, which requires medical care" (p. 8). This notion is represented in Figure 1, using the example of vision impairment, where a person experiences the onset of vision impairment, but does not receive disability support.

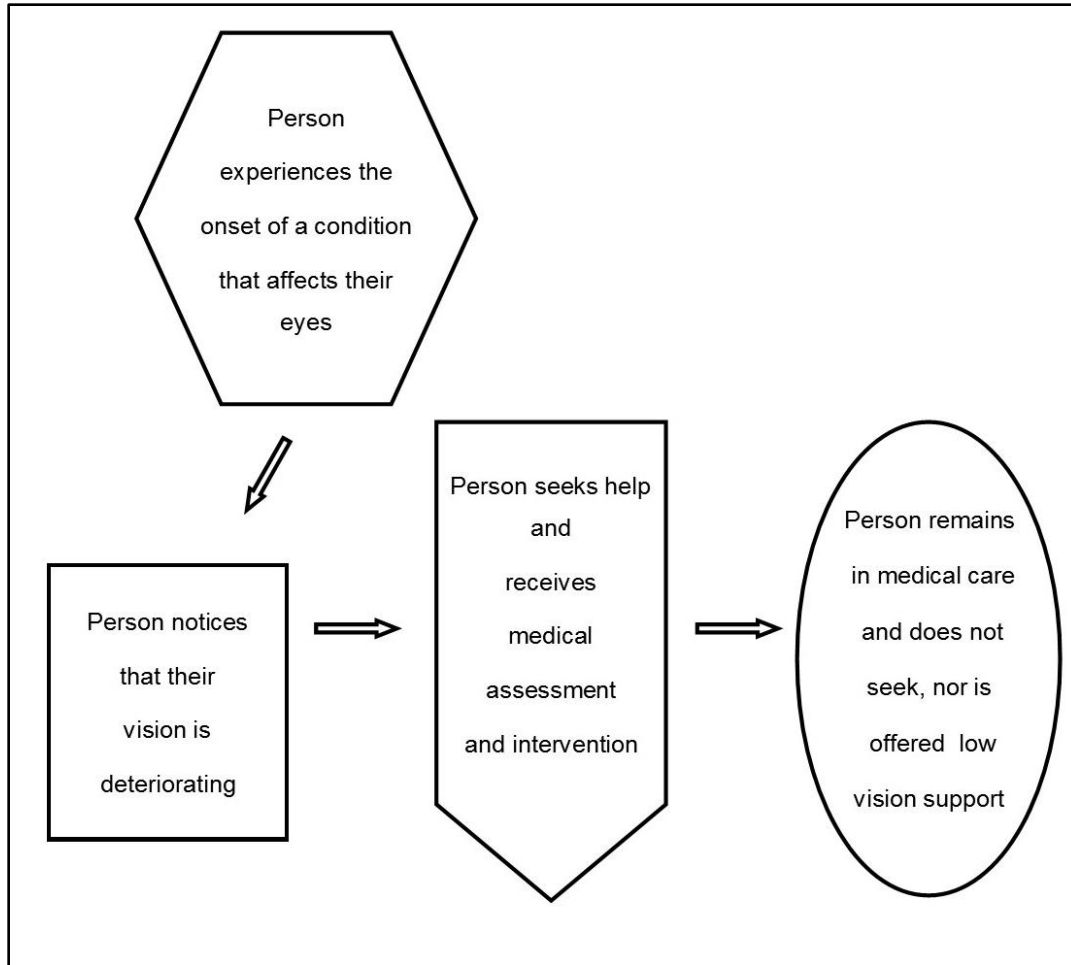


Figure 1. The application of the medical model of health to vision impairment

Movement towards a person-centred approach

There is good cause to question the application of a medical model to the disability paradigm, and the 20th century heralded a shift in policy and service provision away from medicine, with attempts at applying a social focus to supporting people with disability (Laragy, 2004). After World War II, the general approach by society to people with disability was to treat them as victims (Kirkman 2010), with medicine dominating service provision until the 1960s. However, during the 1970s a rights-based movement emerged, evident in deinstitutionalisation and the prominence of independent living schemes for people with disability (Terzi, 2004).

During this important period, major global initiatives contributed to the reconceptualisation of people with disability, towards the perception that they were people with rights equivalent to those of the general population. In 1974, the United Nations (UN) Declaration of the Rights of Disabled Persons was promulgated (UN,

1975). This outlined the rights of people with disability to expect respect for their human dignity and to “enjoy a ‘decent life’, as normal and full as possible” (UN, 1975).

The principle of “normalisation” or the proposition “that all people are entitled to live a lifestyle that other people in the community would describe as ‘normal’ ” (Foreman & Arthur-Kelly 2008, p.111) became increasingly adopted by governments and service provision agencies. A policy shift from focusing on patient/client dependence to independence also occurred (Pricewaterhouse Coopers, 2011). This was manifested in the concept of individualised planning, and assistance for people with disability “to live like others in the community” (Laragy 2004, p. 520). Guscia et al (2006) described this increasing awareness of disability rights as a time when policy and service provision moved from a deficit model to a support-based model of disability.

Late in the 20th century an increased recognition of the civil liberties of people with disability (Laragy, 2004) and the rise of organised disability rights movements occurred (Hurst, 2003), that moved people with disability from the “margins of society into the mainstream” (Longmore & Umansky 2001, p. 1). The emergence of disability rights movements emancipated people with disability to take on roles other than “recipients of institutional practice” (Bredberg 1999, p. 189). The International Year for Disabled Persons (IYDP) was celebrated in 1981. It facilitated the “common commitment in the universal freedoms and rights for disabled people and in fighting discrimination” (Hurst 2003, p. 753). A major outcome of IYDP was the World Program of Action Concerning Disabled Persons (WPACDP) that focussed on the equalisation of opportunities for people with disability, to facilitate full participation in social and economic life from a human rights perspective (UN, 1982).

The period from 1982-1993 was declared the Decade of Disabled Persons by the UN, to provide time for governments and organisations to implement the national and international activities recommended in the WPACDP. During the mid-1980s legislation was enacted to address the issues of social injustice and discrimination against people with disability. This period saw the emergence of the social model of disability that responded to the idea that disability was “culturally produced and socially structured” (Terzi 2004, p. 145). This new model attempted to “advance the view that disability is not a medical problem but one stemming from cultural and material forces (Taylor & Hawley 2010, p. 15), and one that advocated society’s need to adapt for and accommodate people with disabilities (Pricewaterhouse Coopers, 2011). It shifted the public debate on disability away from a medically focussed agenda to a “discourse about politics and citizenship” (Hughes & Paterson 1997, p. 325), and one that overcame barriers to independent living, education, employment and other life opportunities for people with disability (Taylor & Hawley, 2010).

During the late 1980s, significant change was also occurring in the field of education. The normalisation of the 1970s led to the increased enrolment of children with disability, including those with vision impairment, in schools catering for non-disabled children, with practices such as mainstreaming and integration (Foreman, 2011). The Salamanca Statement and Framework for Action on Special Needs Education (United Nations Educational, Scientific and Cultural Organisation, 1994) was signed at the World Conference on Special Needs Education in 1994, reinforcing the view that “education in a regular school should be available as a first option for all students” (Foreman 2011, p. 24). Australia, a signatory to the Salamanca Statement, showed evidence of adopting the Statement by gradually developing inclusive education policies. However, this period was not without censure. Despite its evident successes, normalisation was heavily criticised as a ‘business-type’ model because it seemed to its critics to retain “the pivotal role of the professional...and a bureaucratic style for life planning and emphasised quality program delivery and not quality lifestyles” (Laragy 2004, p. 1).

During the late 1990s the principle of social role valorization (SRV) succeeded the normalisation principle as one that promoted the “creation, support and defence of valued social roles for people who are at risk of social devaluation” (Race 2003, p. 81). However, the social model of disability had its critics and Hughes & Paterson (1997) suggested that it proposed “an untenable separation between body and culture, impairment and disability” (p. 326). At the same time approaches to disability were being influenced by existing anti-discrimination laws, with the result being the establishment of the Disability Discrimination Act 1992 (Dempsey & Nankervis, 2006).

Towards the last part of the 20th century a new movement emerged, focussed on Person Centered Planning (PCP) or “a family of approaches to organising and guiding community change in alliance with people with disabilities and their families and friends” (O’Brien and Lovett, 1993, p. 1). McKay, McDonald, Lie and McGowan (2012) suggested that PCP evolved in response to “adverse institutional experiences related to limited attention paid to psychosocial needs and the individual’s right to autonomy” (p. 493). They described PCP as holistic and humanistic, defined by the “promotion of personhood...where the rights and respect for the person as an individual are paramount” (p. 493). O’Brien and Lovett (1993) suggested that the measure of success of PCP was the tension created between “what is desirable for a person and what exists now for the person” (p. 14), and heralded this tension as the catalyst for positive change.

The most recent approach to PCP has been termed “self-determination”. This is an approach in which the person with a disability determines “what she or he needs rather than accepting what professionals think is required” (Kirkman 2010, p. 9). Laragy (2004) reported on the application of self-determination in Australian school transition programs

for students with a disability, with the student and family reporting “increased service responsiveness and greater achievement of preferred outcomes” (p. 519). This work also identified the barriers to self-determination as financial, accessibility and the need for services to be responsive and flexible to people’s needs. However, PCP was criticised for the potential risk that existing services and choices would be diminished (Laragy 2004), and perhaps for the assumption that the person had “the capacity to behave as a consumer” (DiRita, Parmenter & Stancliffe 2008, p. 619).

In 2006 the UN released the Convention on the Rights of Persons with Disabilities, a key global initiative that reframed the needs of persons with disability in terms of human rights (Kayess & French, 2008). It addressed the principles of respect, non-discrimination, participation and inclusion in society, opportunity, and accessibility for people with disability (UN, 2009). The Convention marked “a new era in the disability rights movement and arguably the greatest shift away from the medical model” (Kemple, Ahmad & Girijashanker 2011, p. 357).

Influences of the World Health Organization

The shift in approaches to disability are also evident in the work conducted by the WHO (2016). WHO has attempted to address the demedicalisation of classifications used for disability by developing a series of classification frameworks, known as the WHO Family of International Classifications (WHO-FIC). These frameworks are recommended for use to ensure consistency when describing health and health states, to generate consistent data and ultimately improve global health and health care (Madden, Sykes & Ustun, n.d.). The application of key frameworks within the WHO-FIC to disability will now be explored.

The involvement of WHO in the movement to demedicalise approaches to disability began over 30 years ago with the release of the International Classification of Impairment, Disability and Handicap ([ICIDH], 1980), a manual of classification relating to the consequences of disease (WHO, 1980). The ICIDH had evolved from the WHO International Statistical Classification of Diseases and Health Related Problems (ICD), which had been the standard diagnostic tool for epidemiology, health management and clinical purposes (WHO, 2010). Heerkens, Van der Brug, Napels and Ravensberg (2003) noted that the terminology used in ICIDH had helpfully begun to describe the functional status of a person. Van Hof and Looijestijn (1995) when applying the ICIDH to an interdisciplinary model used in the rehabilitation of visually impaired people, commented that the ICIDH provided “unity of language, unity of concept and unity of conceptual framework” (p. 393).

However, the ICIDH was roundly criticised by people within disability movements who objected to the ICIDH for its “casual, linear approach with roots in disease and

impairments” (Hurst 2003, p. 573). Schneider, Hurst, Miller and Ustun (2003) described the inefficiencies of the ICIDH, and found that it did not move beyond the medical approach, but rather “presented disability as a static state, and violated its situational and experiential components” leading to “interventions medical in nature and policies targeting individuals rather than social organisation and the environment” (p. 590). Despite this criticism the ICIDH led to the reconceptualisation of disability classifications by WHO to the context of the person, by identifying the environmental factors that strongly contributed to the impact of disability. These included poverty, lack of assistance, society’s attitudes and unemployment.

Due to general criticism that the ICIDH was “too deterministic, failing to reflect the dynamic nature of functioning and disablement” (Simeonsson et al 2006, p. 602), and due to the “inadequate recognition given to the role of the environment in the creation of disability” (Australian Institute of Health and Welfare [AIHW] 2003, p. 15), a revision of the ICIDH occurred during the 1990s. In 2001, the International Classification of Functioning, Disability and Health (ICF) became available, as the international framework to describe and measure health and disability (WHO, 2002), seen in Figure 2.

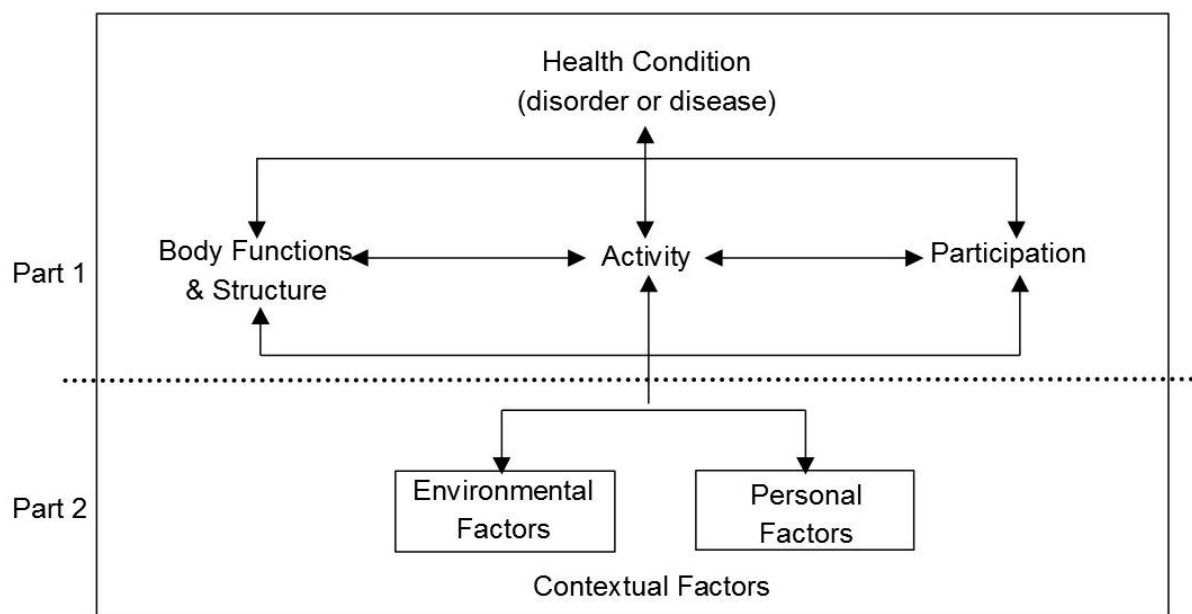


Figure 2. The International Classification of Functioning, Disability and Health (WHO 2002, p. 9).

The ICF organises information about the person into two parts. Part 1 addresses the person’s functioning and disability, including body functions and body structures, activities and participation. Part 2 addresses contextual factors including those related

to the person's environment and culture (Sullivan, Msall and Miller, 2012). Table 1 shows how the ICF categories can be applied to vision impairment.

Table 1

Application of the ICF Framework to vision impairment

| | Domain | Application to Vision Impairment |
|--|-----------------------|--|
| Part1 Functioning and Disability | Body functions | Visual acuity or a measure of how much can be seen by a person |
| | Body structures | Specific diagnosis related to the eye |
| | Activities | Activities of daily living Use of low vision aids |
| | Participation | Involvement in employment Involvement in community |
| Part 2 Contextual factors | Environmental factors | Barriers to travel that impact safety, access, achievement of purpose |
| | Personal factors | Ethnicity and gender Status within own family Motivation, independence |

In introducing the ICF, WHO (2007) stated that an awareness of the interrelationship between the ICF parts supported reaching conclusions regarding the functional impact of disability on an individual (WHO, 2007). Further, Peterson, Mpofu & Oakland (2010) suggested that the broad representational approach taken by the ICF was vital for bringing relevance in terms of “the individual, societal and body-related aspects of impairments, activity limitations and participation restrictions in the environment” (p. 8).

The ICF (WHO, 2002) has been described as a “biopsychosocial” model of disability that does not reduce the complex notion of disability to an aspect of medical or social construct, but rather one that provides “...a coherent view of different perspectives of health: biological, individual and social” (p. 9); see Figure 3.

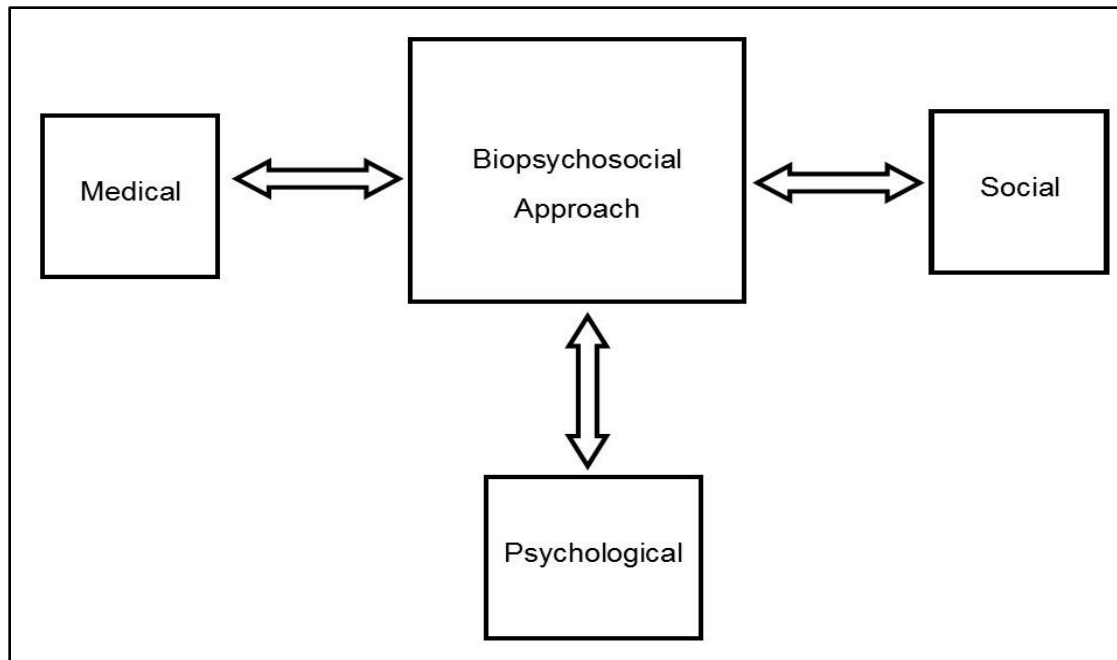


Figure 3. The Biopsychosocial Model

A biopsychosocial model represents disability as an outcome of interaction between health conditions and contextual factors including environmental and personal factors (WHO, 2002) and can be applied to understand the functional impact of disability on an individual. This approach was first introduced in its literature by Engel (1977) who discussed the dilemma faced by psychiatry in the emerging incongruence with medicine. Engel (1977) proposed that adherence to a medical model of disease was “no longer adequate for the scientific tasks and social responsibilities of psychiatry” (p. 129). He perceived that the biopsychosocial model provided “a blueprint for research, a framework for teaching and a design for action in the real world of health care” (Engel 1977, p. 135). WHO documentation in 2002 suggested that the biopsychosocial approach to disability provided “...a coherent view of different perspectives of health: biological, individual and social” (p. 9), by not reducing the complex notion of disability to an aspect of medical or social construct. Figure 4 shows the application of a biopsychosocial model to vision impairment.

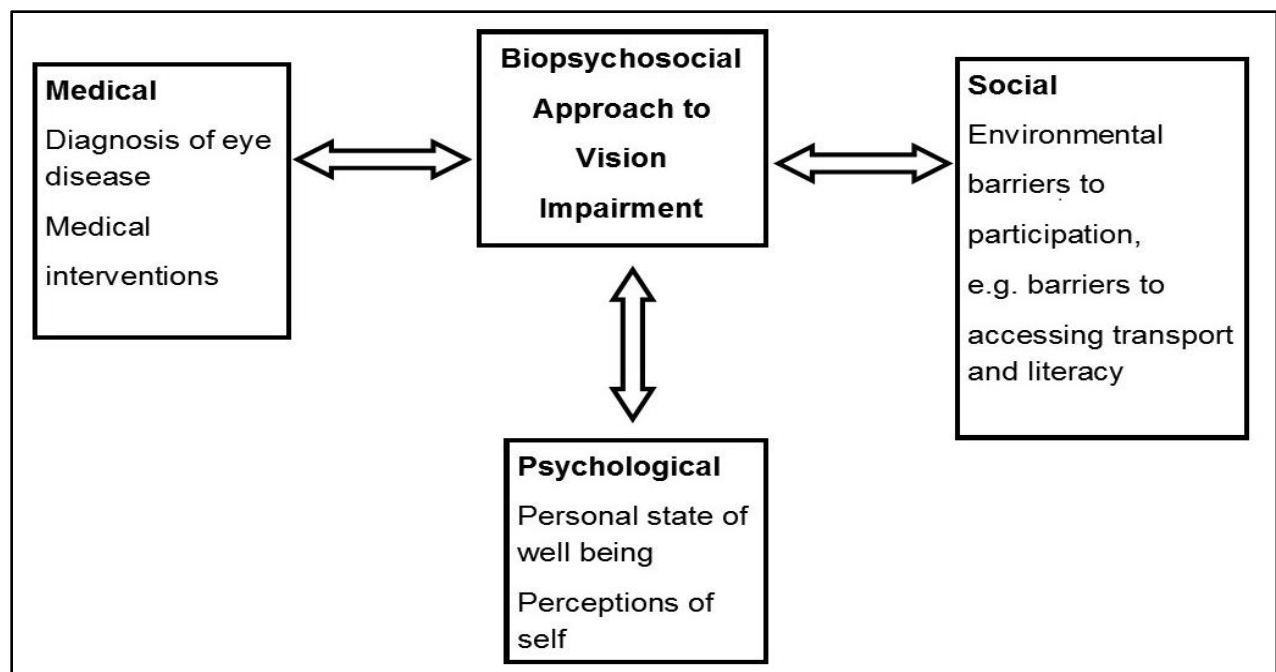


Figure 4. Application of the Biopsychosocial model to vision impairment

Evolution of the Australian disability paradigm

Since 2008, the approach to supporting Australians with disability has undergone a transformational shift, summarised in the timeline presented in Figure 5. In 2009, the Disability Investment Group (DIG), a group of Australians with experience in philanthropic investment, proposed a new disability policy framework that moved from a welfare model to a person-centered, inclusive disability framework to "...assist people with disability to manage their own lives and maximize their independence and contribution to the community" (DIG 2009, p. 3). In the same year the National Disability Agreement (NDA) was signed by Australian Commonwealth, State and Territory governments. The NDA committed Australia to a long-term, overarching aspiration to provide disability services that enhanced the quality of life and participation in community by Australians with disability (Australian Government Department of Social Services [DSS], 2011). Following the NDA, in 2011 the National Disability Strategy (NDS) was endorsed by the Council of Australian Governments (COAG), with the goal of complementing the NDA, to focus efforts "...towards achieving a society that is inclusive and enabling, providing equality and the opportunity for each person to fulfill their potential" (DSS, 2011, p. 3).

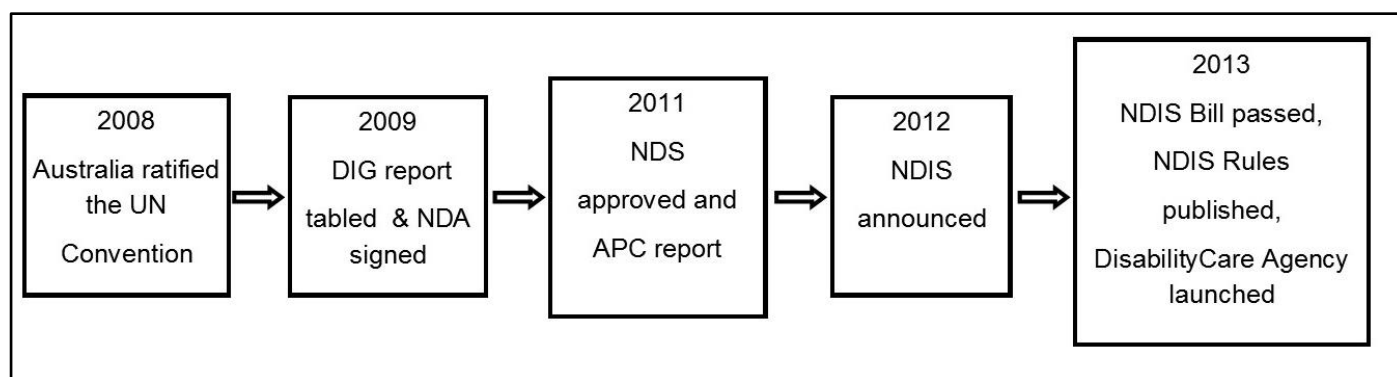


Figure 5. Timeline of key events that led to transformational shifts in support of Australians with disability.

The momentum for change in Australia that followed the endorsement of the NDS saw a comprehensive review of disability support, conducted and reported on by the Australian Productivity Commission in 2011. This report highlighted the existing limitations faced by people with disability, and “...emphasized human wellbeing rather than GDP as the appropriate measure of economic progress” (Innes 2016, p. 253). The APC described the existing disability support network as “...underfunded, unfair, fragmented, and inefficient” (APC 2011, p. 2). The report identified the need for a new government funded national insurance scheme for Australians with disability, modelled on Medicare, that moved disability issues from a welfare-charity model to one based on rights and entitlements (Innes, 2016).

In 2012, the National Disability Insurance Scheme (NDIS) became a reality for Australians with disability aged from birth to 65 years, described as “a new way of providing community linking and individualised support for people with permanent and significant disability, their families and carers” (Commonwealth of Australia, 2013). The Scheme began as a trial at four locations in July 2013, and was rolled out across Australia from July 2016, with full implementation anticipated by the end of 2019, except in Western Australia (Australian Department of Human Services, n.d.). The Western Australian government opted for a continuation of a trial of the NDIS in certain locations whilst implementing a parallel trial of an additional disability support model. This resulted in a state administered NDIS that incorporated the existing disability services in Western Australia (Government of Western Australia, 2016).

NDIS guiding principles

The generalised global shift in approaches to the support of people with disability, the UN and WHO initiatives, and the local Australian initiatives, have created the philosophical underpinnings of the NDIS. For example, the NDIS reflects a rights-based, person-centered approach that strongly aligns with the values expressed in the UN

Convention of the Rights of Person with Disability, and the philosophies of PCP. With NDIS support, people with disability will have “control over how, when and where they receive support. This includes choosing how much they want to control the management of any funding, who supports them and how” (Commonwealth of Australia, 2013). This signals a dramatic shift from funding being re-directed from agencies to the person who will plan and select their preferred services and providers (Reddihough, Meehan, Stott & Delacy, 2016). Treanor (2014) described the NDIS as a social change agent that will alter organizational and corporate accountability.

Parallels exist in the way the ICF and the NDIS both highlight the functional impact of disability. The ICF re-conceptualises disability by de-emphasising the medical diagnosis and reframing the focus to functional outcomes (Peterson, Mpofu & Oakland, 2010; Saebu & Sorensen, 2011). Through the NDIS, support for Australians with disability will be offered according to the impact of their impairment on their functional capacity (NDIS Bill, 2013), “specifically when the impairment substantially reduces functional capacity to undertake, or the psychosocial functioning in, communication, social interaction, learning mobility, self-care and/or self-management” (NDIA, n.d.).

Despite the laudable aims of the NDIS, the scheme has been criticised. The Australian Blindness Forum (ABF), the peak body that represents people who are blind or vision impaired in Australia, raised concerns regarding the impact of the NDIS for people with vision impairment, in their 2013 response to the NDIS Act. The ABF described the low vision sector as one that was heavily dependent on philanthropy to provide services, rather than primarily relying on government income. The ABF identified risk to the low vision sector and people with vision impairment with the potential collapse of this philanthropic support as a spin-off of the implementation of the NDIS. Further, the ABF expressed concern regarding “...an aged care system incapable and unfunded to meet the specific needs of people aged over 65 who are blind or vision impaired” (ABF 2013, p. 7).

Conclusion

The evolution of global attitudes towards people with disability and practices that eventuate in disability support have influenced the Australian situation. Over time, the World Health Organization and other countries have established new paradigms, disability frameworks and finally disability support schemes, and Australia has been the beneficiary of the lessons learned. However, Australia’s preparedness to offer suitable support to people with vision impairment is unclear. Time will reveal whether the goals described in the NDIS Act are met. There is a role for the Australian low vision sector to critically monitor the implementation of NDIS and subsequent disability support offered,

to ensure that disability services are tailored to meet the needs of people with vision impairment.

References

- Australian Blindness Forum. (2013). Response to the draft National Disability Insurance Scheme Bill 2012. <http://www.australianblindnessforum.org.au/>
- Australian Department of Human Services. (n.d.). NDIS our sites. Retrieved 16 January, 2017, from <https://www.ndis.gov.au/about-us/our-sites>
- Australian Government Department of Social Services. (2011). *2010-2020 National Disability Strategy*. Retrieved from <https://www.dss.gov.au/our-responsibilities/disability-and-carers/publications-articles/policy-research/national-disability-strategy-2010-2020>
- Australian Government Productivity Commission. (2011). *Disability Care and Support*. Canberra. Retrieved from <http://www.pc.gov.au/inquiries/completed/disability-support/report>.
- Australian Institute of Health and Welfare. (2003). ICF Australian User Guide version 1.0. Disability Series. Cat. no. DIS 33. <http://www.aihw.gov.au/publication-detail/?id=6442467517>
- Bredberg, E. (1999). Writing disability history: Problems, perspectives & sources. *Disability & Society*, 14(2), 189-201.
- Commonwealth of Australia. (2013). *DisabilityCare Australia*. Retrieved from <http://www.budget.gov.au>.
- Davis, L. J. (2006). *The Disability Studies Reader*. Retrieved from <http://ebookcentral.proquest.com.ezproxy.newcastle.edu.au/lib/newcastle/detail.action?docID=1125176>.
- Dempsey, I., & Nankervis, K. (2006). Conceptions of disability. In I. Dempsey & K. Nankervis (Eds.), *Community disability services an evidenced based approach to practice* (pp. 3-26). Sydney, Australia: University of New South Wales Press.
- DiRita, P., Parmenter, P., & Stancliffe, R. (2008). Utility, economic rationalism and the circumscription of agency. *Journal of Intellectual Disability Research*, 52(7), 618-625. doi: 10.1111/j.1365-2788.2008.01069.x
- Disability Investment Group. (2009). *The Way Forward: A New Disability Policy Framework for Australia*. <https://www.dss.gov.au/our-responsibilities/disability-and-carers/program-services/for-people-with-disability/disability-investment-group/the-way-forward-a-new-disability-policy-framework-for-australia>

- Engel, G. (1977). The need for a new medical model: A challenge for Biomedicine. *Science*, 196(4286), 129-136.
- Foreman, P. (2011). Introducing inclusion in education. In P. Foreman (Ed.), *Inclusion in Action* (3rd ed., pp. 2-41). Melbourne: Cengage Learning Australia.
- Foreman, P., & Arthur-Kelly, M. (2008). Social justice principles, the law and research, as bases for inclusion. *Australasian Journal of Special Education*, 32(1), 109-124.
- Government of Western Australia. (2016). Joint media statement - governments agree the way forward for NDIS in WA. Retrieved 16 January, 2017, from <https://www.mediastatements.wa.gov.au/Pages/Barnett/2016/12/Governments-agree-the-way-forward-for-NDIS-in-WA.aspx>
- Guscia, R., Harries, J., Kirkby, N., Nettlebeck, T., & Taplin, J. (2006). Construct and criterion validities of the Service Need Assessment Profile (SNAP): A measure of support for people with disabilities. *Journal of Intellectual and Developmental Disability*, 31, 148-155. doi: 10.1080/13668250600876442
- Heerkens, Y., Van der Brug, Y., Napels, H., & Ravensberg, D. (2003). Past and future use of the ICF (former ICIDH) by nursing and allied health professionals. *Disability & Rehabilitation*, 25(11-12), 620-627.
- Hughes, B., & Paterson, K. (1997). The social model of disability and the disappearing body: towards a sociology of impairment. *Disability & Society*, 12(3), 325-340. doi: 10.1080/09687599727209
- Hurst, R. (2003). The International Disability Rights Movement and the ICF. *Disability and Rehabilitation*, 25(11-12), 572-576. doi: 10.1080/0963828031000137072
- Innes, G. (2016). *Finding a way*. Queensland, Australia: University of Queensland Press.
- Kayess, R., & French, P. (2008). Out of darkness into light? Introducing the Convention on the Rights of Persons with Disabilities. *Journal of Human Rights Practice*, 8(1), 1-34. doi: 10.1093/hrlr/ngm044
- Kemple, M., Ahmad, F., & Girijashanker, S. (2011). Shaping disability rights through shaping the disability movement. *Journal of Human Rights Practice*, 3(3), 355-363. doi: 10.1093/jhuman/hur019
- Kirkman, M. (2010). *Literature review: person-centred approaches to disability service provision*. Melbourne, Australia: Melbourne CityMission.

- Laragy, C. (2004). Self-determination within Australian school transition programmes for students with a disability. *Disability and Society*, 19, 519-530.
- Longmore, P., & Umansky, L. (2001). Disability history: from the margins to the mainstream. In P. Longmore & L. Umansky (Eds.), *The New Disability History American Perspectives* (pp. 1-17). New York, United States of America: New York University Press.
- Madden, R., Sykes, C., & Ustun, B. T. (n.d.). World Health Organization Family of International Classifications: definition, scope and purpose. 1-26.
<http://www.who.int/classifications/network/en/>
- McKay, R., McDonald, R., Lie, D., & McGowan, H. (2012). Reclaiming the best of the biopsychosocial model of mental health care and 'recovery' for older people through a person-centred' approach. *Australasian Psychiatry*, 20(6), 492-495. doi: 10.1177/1039856212460286
- Morgan, D. (2012). *Issues in medical law and ethics*. Retrieved from <http://ebookcentral.proquest.com.ezproxy.newcastle.edu.au/lib/newcastle/detail.action?docID=220111>.
- National Disability Insurance Agency. (n.d.). National Disability Insurance Scheme. Retrieved 17 March 2017, from www.ndis.gov.au/index.html
- National Disability Insurance Scheme Bill. (2013). Retrieved from <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22legislation%2Fbillhome%2Fr4946%22>.
- O'Brien, J., & Lovett, H. (1993). *Finding a way towards everyday lives: the contribution of Person Centered Planning*. Harrisburg, Pennsylvania: Pennsylvania Office of Mental Retardation.
- Peterson, D., Mpofu, E., & Oakland, T. (2010). Concepts and models in disability, functioning and health. In E. Mpofu & T. Oakland (Eds.), *Rehabilitation and Health Assessment: applying ICF guidelines*. New York, NY: Springer..
- Pricewaterhouse Coopers. (2011). Disability expectations investing in a better life, a stronger Australia. <http://www.pwc.com/gx/en/industries/government-public-services/public-sector-research-centre/australia/investing-in-a-better-life-a-stronger-australia.html>
- Race, D. (2003). *Leadership and change in human services: selected readings from Wolf Wolfensberger*. London, United Kingdom: Taylor & Francis.

Articles

- Reddihough, D. S., Meehan, E., Stott, N. S., & Delacy, M. (2016). The National Disability Insurance Scheme: a time for real change in Australia. *Developmental Medicine and Child Neurology*, 58 (Supp. 2), 66-70. doi: 10.1111/dmcn.13007
- Saebu, M., & Sorensen, M. (2011). Factors associated with physical disability among young adults with a disability. *Scandinavian Journal of Medicine and Science in Sports*, 21(5), 730-738. doi: 10.1111/j.1600-0838.2010.01097.x
- Schneider, T., Hurst, R., Miller, J., & Ustun, B. (2003). The role of environment in the International Classification of Functioning, Disability and Health (ICF). *Disability & Rehabilitation*, 25(11-12), 588-595.
- Simeonsson, R., Leonardi, M., Bjorck-Akesson, E., Hollenweger, J., Lollar, D., Martinuzzi, A., & TenNapel, H. (2006). ICF-CY: a universal tool for practice policy & research.
<http://apps.who.int/classifications/apps/icd/meetings/2006meeting/WHOFIC2006%20-%20P107%20-%20ICF-CY%20a%20universal%20tool%20for%20practice%20policy%20and%20research.pdf>
- Sullivan, M., Msall, M., & Miller, R. (2012). 17 year outcome of preterm infants with diverse neonatal morbidities. Part 1- Impact on physical, neurological and psychological status. *Journal for Specialists in Pediatric Nursing*, 17(3), 226-241. doi: 10.1111/j.1744-6155.2012.00337.x
- Taylor, G., & Hawley, H. (2010). *Health and society: key debates in healthcare*. United Kingdom: McGraw-Hill Education.
- Terzi, L. (2004). The Social Model of Disability: A Philosophical Critique. *Journal of Applied Philosophy*, 21(2), 148-155.
- Treanor, D. (2014). Disability, critical thinking and personalism. *Appraisal: The Journal of the British Personalist Forum*, 10(2), 4-20.
- United Nations. (1975). Declaration on the Rights of Disabled Persons. Retrieved 12 January 2017 from
<http://www.ohchr.org/EN/ProfessionalInterest/Pages/RightsOfDisabledPersons.aspx>
- United Nations. (1982). World programme of action concerning disabled persons.
<http://www.independentliving.org/files/WPACDP.pdf>
- United Nations. (2009). Convention on the Rights of Persons with Disabilities.
<https://www.legislation.gov.au/Details/F2009L02620>

- Van Hof, C., & Looijestijn, P. (1995). An interdisciplinary model for the rehabilitation of visually impaired and blind people: Application of the ICIDH concepts. *Disability & Rehabilitation*, 17(7), 391-399.
- World Health Organization. (1980). International Classification of Impairments, Disabilities and Handicaps: A manual of classification relating to the consequences of disease.
http://apps.who.int/iris/bitstream/10665/41003/1/9241541261_eng.pdf
- World Health Organization. (2002). Towards a Common Language for Functioning, Disability and Health: ICF The International Classification of Functioning, Disability and Health. <http://www.who.int/classifications/icf/icfappttraining/en/>
- World Health Organization. (2007). *International Classification of Functioning, Disability and Health Children and Youth Version (ICF-CY)*. Retrieved from http://apps.who.int/iris/bitstream/10665/43737/1/9789241547321_eng.pdf?ua=1
- World Health Organization. (2016). World Health Organization: the global guardian of public health. Retrieved 19 January 2017, from www.who.int

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Introducing the next generation of Perkins braille to the next generation of Australian braille consumers - Frances Gentle

Abstract

This article presents an overview of a preliminary research study that was jointly conducted by RIDBC Renwick Centre, Royal Institute for Deaf and Blind Children; the NSW Department of Education and Communities; and Perkins Solutions (USA). The study explored braille writing instruction using the Perkins Classic and Perkins Smart braille prior to introduction of the Smart braille to Australia. Participants included 11 specialist teachers (vision impairment) [STVIs] and early childhood consultants, five class teachers, and six parents of 11 young braille learners who were aged 4 – 8 years situated in New South Wales.

Conclusions drawn from the study were limited due to such factors as technical issues with the Smart braille, the disability profiles and absenteeism levels of the participating children, limitations in the professional learning offered to the STVIs and consultants, and an emphasis on classroom withdrawal for braille writing instruction. The results, though limited, highlighted the potential of the visual and audio feedback features of the Smart braille to enhance the learners' experience and engagement with braille writing and to enhance inclusion of braille learners in classroom-based writing activities.

Introduction

The Perkins School for the Blind is an internationally renowned leader in the field of vision impairment. Established in 1832 in Watertown Massachusetts, Perkins School's global reputation is associated with its release of the Perkins braille in the 1950s and more recently, with its partner international programs in approximately 65 countries. Perkins Solutions (formerly Howe Press) is the division of Perkins School which created the Perkins braille and manufactures and distributes assistive technology globally.

The impetus for the present study was discussion between staff of Perkins Solutions and Frances Gentle of the Royal Institute for Deaf and Blind Children (RIDBC) during 2013. Discussion centred on the possibility of conducting a preliminary study of the Perkins new generation "Smart braille™" prior to its planned release in Australia in 2014. The discussions culminated in a research partnership involving Perkins Solutions, RIDBC Renwick Centre, and the NSW Department of Education and Communities. The research team consisted of Frances Gentle as Chief Investigator, with Co-Investigators Ms Harzita Hashim, Manager of RIDBC VisionEd and Ms Josie Howse, Manager of

braille and Large Print Service, NSW Department of Education and Communities (NSW DEC).

Purpose and aims of the study

The purpose of the study was to assess the claims of Perkins Solutions that the Smart braille added features of audio and visual feedback would (a) enhance the learner's experience and engagement with braille, and (b) foster greater involvement of teachers, parents, siblings and classmates during braille learning experience.

- To achieve the study's purpose, the following aims were addressed:
- To investigate the introduction of the Classic and Smart braille to a select group of NSW braille learners aged 3-8 years; and
- To explore the perspectives of the children's STVIs or early childhood consultants, class teachers and parents/guardians regarding their impressions of the relative merits of the Smart braille and Classic braille, and whether or not the additional features of the Smart braille promoted greater learner interaction with teachers and sighted classmates.

Method

The study was undertaken in four interconnected design phases, as presented in Figure 1 and described in greater detail below.

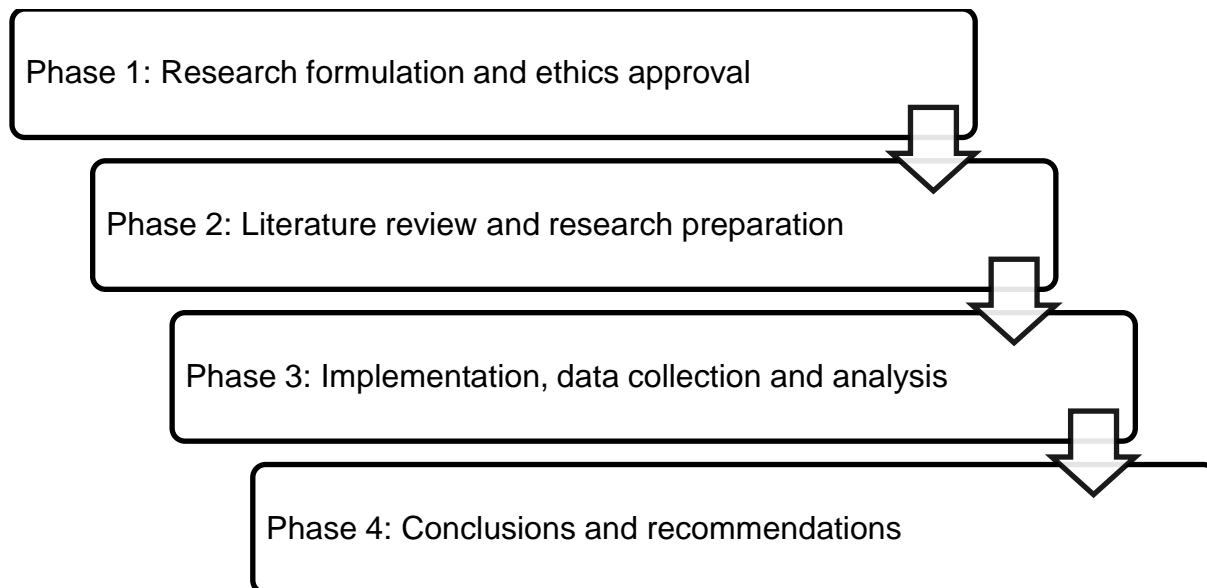


Figure 1 Design phases

Research formulation and ethics approval

A case study research approach (Punch, 2009) was selected as a potentially effective means of addressing the study's purpose and research questions. Punch (p. 123) emphasised the merits of a case study approach in contexts where knowledge is incomplete or non-existent. This was the situation in the present study as the Smart braille had not been introduced in Australia, and the select group of young children had little or no prior experience of the Classic braille or other braille writing devices. The participants were grouped into "cases", consisting of each child's specialist teacher (vision impairment) or early childhood consultant, class teacher, and parents/guardian.

The following research questions were posed in relation to each "case":

1. What, if any, were the differences identified by the specialist teachers (vision impairment), early childhood consultants and general class teachers between the children's use of the Classic braille and Smart braille during the period of the study, in relation to (a) development of braille writing skills, (b) engagement, interest or motivation to learn to write braille, (c) participation in class writing activities (whole class or small group activities), and (d) interaction with the class teacher or sighted classmates during writing activities?
2. In home settings, what, if any, were the differences noted by the parents or guardian between their child's use of the Classic braille and Smart braille during the period of the study, in relation to the following areas: (a) progress in learning to write braille, (b) participation in braille writing activities at home, (c) interest or motivation to learn to write braille, and (d) parent/carer or sibling interaction with the child during braille writing activities?
3. Which, if any, were the specific features of the Classic or Smart braille (positive or negative) noted by the specialist teachers (vision impairment), early childhood consultants, class teachers and parents/guardians during the period of the study?
4. Considering the small and exploratory nature of the study, what results, if any, suggest specific benefits in using the Classic or Smart braille with regard to children whose primary literacy medium is braille or a combination of braille and print?

The research proposal was submitted to the Human Research Ethics Committee (HREC) of the University of Newcastle (UoN); and also the Policy, Planning and Reporting Directorate of the NSW Department of Education and Communities (NSW DEC) in May 2014. The proposal included detailed overviews of the study, together with

draft copies of the Information Statements and Consent Forms for participating educators and parents/guardians of the target group of children.

The Information Statements provided detailed information about the purpose of the study, the voluntary nature of participation, participants' rights to withdraw at any time from the study, and procedures for data collection and management that ensured participant privacy, confidentiality and anonymity. The documented information enabled each participant to be fully informed about the nature of the study prior to completing the consent form.

Ethics approval was granted by the Human Research Ethics Committee (HREC) of the University of Newcastle in June 2014; and the Policy, Planning and Reporting Directorate of the NSW Department of Education and Communities in July 2014. The final versions of the Information Statements and Consent forms were then dispatched to the relevant managers and principals for distribution to class teachers, specialist teachers or consultants and parents who met the study's participant selection criteria. The completed and signed consent forms were returned to the research team.

Development of data collection instruments

Data dependability and reliability were enhanced through the development of a comprehensive set of data collection instruments that addressed the study's purpose and research questions (see Table 1). The content of the instruments was adapted from Koenig and Holbrook (2001), Swenson (1999), Wormsley (2000), and Wormsley and D'Andrea (1997). Triangulation methods (Punch, 2009; Wiersma, 2000) included data collection from a range of sources and by means of the different assessment instruments.

Table 1

Data collection instruments

| Instrument No. | | Research question |
|----------------|---|-------------------|
| 1 | Braille Learner Profile | 1 |
| 2 | Observations of Braille Writing Behaviours (at beginning, middle and end of implementation phase) | 1 |
| 3 | Checklist of Perkins Smart Brailier Skills (at beginning and end of the implementation phase) | 1 |
| 4 | Checklist of Perkins Smart Brailier Skills (at beginning and end of the implementation phase) | 1 |

| Instrument No. | | Research question |
|----------------|---|-------------------|
| 5 | Weekly Observation of Learner's Braille Writing using the Classic or Smart Brailleurs | 1 |
| 6 | Questionnaire for Braille Learner | 1, 3, 4 |
| 7 | Questionnaire for Parents (or Guardian) | 2, 3 |
| 8 | Questionnaire for STVI or consultant | 1, 3 |
| 9 | Questionnaire for Child's Teacher | 1, 3 |
| 10 | Anecdotal Notes | 1,2,3,4 |

The participating specialist teachers (vision impairment) and early childhood consultants were asked to take responsibility for data collection during the implementation phase of the study. This included completion of the braille learner profiles (Instrument 1), assessment of the children's braille writing behaviours and skills in using the Perkins Smart and Classic brailleurs at the beginning, middle and end of the implementation phase (Instruments 2-4), recording of progress in braille writing development (Instruments 5 and 10), and the distribution and completion of questionnaires at the end of the instruction period (Instruments 6-9).

Literature review and research preparation

An extensive review of the professional literature explored the following interrelated topics that have relevance to the present study: (a) braille usage in Australia, (b) the implications of blindness and vision impairment for early learners' development of concepts and emergent literacy skills, (c) braille as a literacy medium, (d) instructional approaches to braille writing, and (e) publications describing mechanical braille writing devices, including the Perkins Classic and Smart brailleurs.

Conclusions drawn from the literature review included the importance of braille reading and writing for children with blindness and severe vision impairment, and the limited body of knowledge on the use and efficacy of the Perkins Classic and Smart brailleurs as writing tools for young learners.

Participant selection

Research preparation included use of criterion sampling procedures as an effective approach to participant selection (Mertens, 2010; Wiersma, 2000). The following participant selection criteria were used:

NSW Department of Education and Communities and RIDBC specialist teachers (vision impairment) and early childhood consultants, and parents or guardians of girls and boys with vision impairment or blindness aged between three and eight years who are enrolled in early childhood, preschool or primary school (Kindergarten to Year 2) settings, who are at the emergent (pre-writing) or early writing stage of braille literacy development, and who did not have intellectual disability or developmental delays.

The participants were (a) 11 specialist teachers (vision impairment) and early childhood consultants, (b) five teachers who were employed by the NSW Department of Education and Communities (NSW DEC) or RIDBC VisionEd; and (c) six parents. The participant group supported 11 children whose ages ranged from 4 to 8 years and who were enrolled in either the RIDBC VisionEd Early Learning Program (Vision Impairment), the RIDBC VisionEd Preschool, or NSW DEC schools in urban and non-urban regions of NSW.

The child profiles (Instrument 1) indicated that three of the children were braille learners, six children were print and braille learners (i.e. dual media), and two were braille and audio learners. The profiles revealed that all children had been exposed to sensory experiences prior to the study, including braille and tactile literacy experiences, and exposure to braille writing devices in home, preschool or school settings. The most common braille writing devices used were the Mountbatten, Perkins Classic and Tetrapoint brailers.

The specialist teachers (vision impairment) and early childhood consultants were central to the study. They assisted with the identification of young braille learners and parents who met the selection criteria and expressed interest in participating in the study. They also served as the point of contact between the researchers and the preschools and schools, and were instrumental in completion of the data collection instruments.

Resource acquisition

The Perkins Smart brailers required for the study were provided by Perkins Solutions on an on-loan basis. The Classic brailers were sourced locally for the duration of the study.

Implementation, data collection and data analysis

The major activities undertaken by the STVIs and early childhood consultants during the implementation phase of the study were online professional learning, assessment and teaching of braille writing instruction, and data collection.

Online professional learning

Perkins Solutions developed an online webinar for the participating STVIs and consultants. The webinar included demonstration of the components of the Smart braille and how it is used as a writing device. Professional learning was limited to the Smart braille as the STVIs and consultants advised they were sufficiently knowledgeable in the use of Classic braille.

Implementation schedule

An implementation schedule was established during the research formulation phase of the study. However, substantial adjustments were made to the schedule once implementation commenced, due to a range of impediments that are described in the data analysis and reporting section below. Table 2 presents a summary of the implementation activities that took place during terms 3 and 4 of the 2014 NSW school year.

Table 2

Summary of activities undertaken by the STVIs and early childhood consultants

| |
|--|
| <p>Preliminary data collection (2 weeks)</p> <p>STVIs and early childhood consultants complete braille Learner Profile (Instrument 1) and assess each child's braille writing abilities using Instruments 2-4.</p> |
| <p>Round 1 Braille writing instruction and data collection (5 weeks)</p> <p>Half of the participating children receive Braille writing instruction from their STVI/consultant using the Smart braille and the half receive instruction using the Perkins Classic braille.</p> <p>Weekly observation of learner's braille writing behaviours using Instruments 5 and 10.</p> |
| <p>Mid-point assessment of participating children (2 weeks)</p> <p>STVIs and consultants re-assess the children's braille writing skills before commencing Round 2 of braille writing instruction.</p> |
| <p>Round 2: Braille writing instruction and data collection (5 weeks)</p> <p>Continuation of braille writing instruction and data collection, with changeover of Classic and Smart braille between the participating children.</p> <p>Weekly observation of learner's braille writing behaviours continued.</p> |
| <p>Final assessment (2 weeks)</p> <p>Children's braille writing skill development re-assessed by STVIs and consultants at the end of the braille writing instruction period using Instruments 2-4.</p> |

Observational Questionnaires

STVIs and consultants, class teachers and parents/guardians complete observational questionnaires (Instruments 6-9). Questionnaires offered to the children when appropriate.

Anecdotal notetaking using Instrument 10 is optional throughout the study.

Changeover of the Classic and Smart brailers between the first and second rounds of braille writing instruction enabled maximum use of the small number of Smart brailers that were on-loan from Perkins Solutions. The changeover also served to minimise any potential writing behaviours that were associated with the order of introduction of the Smart and Classic brailers.

Data coding, analysis and reporting

The researchers recruited an external consultant, Ms Emily White of Melbourne University, to digitise the raw data using MS Excel and Word. The digitisation process included transcription of handwritten information that was recorded by participants during the study's implementation. MS Excel spreadsheets were created for each participant and contained the information collected using the ten data collection instruments (see Table 1). This information was then synthesised into a master file that was used for within-case and across-case comparisons of braille writing instruction using the two braille machines, together with a review of the questionnaire responses of the STVIs, teachers and parents.

In accordance with the ethics requirements of the University of Newcastle and NSW Department of Education and Communities, participant information was de-identified and all raw and digitised data were entered into a secure database in an archival storage area at the RIDBC Renwick Centre.

Preliminary analysis of the individual and synthesised data highlighted several significant impediments to achieving the study's purpose and aims. The researchers concluded that the data were not reliable or dependable and as a result, in-depth analysis was not undertaken. The major impediments are summarised below and are reflected in the conclusions and recommendations drawn from the study.

1. Software and hardware issues with the Smart brailers: delays of up to five weeks in commencing braille writing instruction were caused by a range of Smart brailer software and hardware issues that rendered the devices unsafe or unusable by children. Issues reported by participants included non-compliance of the battery chargers and outlet plugs with Australian standards, frequent paper jams, inaccurate on non-synchronised voice output with child's writing, and batteries not charging properly. There was an absence of technical support for the Smart

brailers in Australia, and online technical support from Perkins Solutions was frequently delayed due to time zone differences. The researchers and participants sought technical advice and assistance from NSW technology company, Pentronics. In some instances, Pentronics undertook repairs with the approval of Perkins Solutions, including fitting the replacement batteries and outlet plugs that were provided by Perkins Solutions. However, further delays occurred as the replacement plugs also did not meet Australian standards due to the absence of a safety covering over the metal prongs.

2. Insufficient professional learning prior to the implementation phase: the online webinar session provided by Perkins Solutions proved insufficient training for the STVIs and consultants to deal with the software and hardware issues encountered with the Smart brailers. In some instances, the lack of technical competence impacted negatively on parents' attitudes about braille and their perception of the professionalism of the early childhood consultants.
3. Child and family-related factors: the children who received braille writing instruction had a diverse range of eye conditions, including Microphthalmia, Optic atrophy, Retinal or Rod Cone Dystrophy, Oculomotor Apraxia, Oculocutaneous Albinism, Norrie's Disease and Jubert's Syndrome. Two of the children also had developmental delays, one child had a moderate intellectual disability, and several had low tone or physical limitations. The presence of intellectual disability and developmental delays were not anticipated and prevented across-case comparisons of braille writing development using the two brailers.

The two rounds of braille writing instruction were interrupted due to the absence of the children and families as a result of illness or overseas travel. Furthermore, the children's young age impacted on the way they engaged with the devices, for example, one child become excited when s/he heard the voice over; and another child's finger placement was inaccurate and braille would not accurately read back what had been typed. One participant speculated that because the children were young, their finger pressure on the keys was uneven or insufficient to activate the voice over. This may have caused the initial delay or lack of synchronisation between braille writing and the voice over.

4. Instruction-related factors: the data collected indicated a high level of class withdrawal for braille writing instruction, and variability in the amount of contact time that each child had with the STVI or consultant. Contact time ranged from one hour per fortnight to 12 hours per week. This variability directly impacted upon the time allocated to implementing the braille writing instruction using the Classic and Smart brailers.

Analysis of the questionnaires completed by the STVIs and consultants, class teachers, parents and children suggested that despite the limitations listed above, six of the 11 children indicated a preference for the Smart braille. Presented below is a selection of positive comments about the Smart braille that were included in the questionnaire and anecdotal responses of the STVIs and consultants, class teachers and participating children.

Smart braille...ideal for the regular classroom setting to be more inclusive for the class teacher and other students. Instant feedback for the developing braille user gives confirmation and confidence. Smart is lighter and therefore more portable. (STVI of Kindergarten student).

The learner really enjoyed that she could hear what she was brailleing and thought of new words to braille to see how the braille would say them. (STVI of Kindergarten student)

I am somewhat excluded by the Perkins braille... unless the ISTV is there to transcribe, I have no idea what the student has written. The Smart braille allowed me to give instant feedback! Other students were also able to support and the learner felt very proud! (Class teacher of Kindergarten student)

My other children were interested in what my son was brailleing due to the display screen on the Smart braille. (Parent of Year 1 child aged 7 years)

The Smart braille...screen is helpful for the class teacher or SLSO [student learning support officer] as they can see what the learner is writing as it appears on the screen. He also likes the screen but stares at it so much that it slows his work. It is an easy button press to turn the screen off if it is causing student inefficiency. The screen would probably assist with spelling long term as the student would receive feedback from the teacher faster. The SLSO has commented that the screen assists with efficiency when teaching. They work faster and therefore get through more work faster. The screen is good when the class teacher or SLSO is with him as they can see what he is writing. The Smart braille charges quickly. The battery lasts a school day if fully charged (4 hours). The operation of the Smart braille is very quiet when producing braille compared to the regular Classic braille. (STVI of Year 3 student)

The learner's spelling and writing improved- the audio feedback helped to reinforce and motivate. (Class teacher of Year 3 student)

Articles

Presented below is a selection of children's comments about why they liked the Smart brailier:

It talks to you. (Preschool child, aged 5 years)]

I like doing fiddly stuff to find the right braille cells. Just mucking about with it. That it can talk. And it can change names. We changed it into a boy's voice! (Kindergarten child aged 5 years)

It tells me where I am, main menu, braille entry, screen on/off, simbraille...and it talks. (Year 2 child aged 8 years)

He tells me what I braille. (Year 3 child, aged 8 years)

The reasons cited by children who preferred the Perkins Classic brailier included:

...the bell. (Four children, aged 4, 5, 5 and 8 years)

Mr Smart can say the word when you press the key, and we could see the letters. I didn't love Mr Smart because he'd say "braille tracking off"... but maybe that's because I was pressing really lightly.

(Kindergarten child aged 6 years)

Mrs Perkins - cause she has stickers all over her. Mrs Smart would be my favourite if she worked properly because she has a screen.

(Kindergarten child aged 6 years)

It is grey. (Year 1 child aged 7 years)

Conclusions and recommendations

The study's results highlight that research preparation, supported by ethics approval and development of a comprehensive battery of assessment instruments, cannot guarantee successful implementation in situations where new technology is being used for the first time. The study failed to achieve its purpose and aims due to such factors as the high variability of child-specialist contact hours for braille instruction; an emphasis on classroom withdrawal rather than inclusive writing instruction; lengthy delays in braille writing instruction and assessment due to software and hardware issues with the Smart brailiers; and the unpredictable implications of specific eye conditions, additional disabilities or developmental delays for braille writing development.

The questionnaire responses suggested that the Smart brailier's added features of audio and visual feedback enhance the learner's experience of braille writing. However, it could not be concluded from the study whether or not these features contributed to improvements in braille writing skills, as compared with the writing skills developed using the Perkins Classic brailier. The questionnaire responses of the STVIs, early

childhood consultants and class teachers suggested that the added features of the Smart brailier may foster greater involvement of teachers, parents, siblings and classmates with the child's braille learning experience.

Recommendations

The following recommendations were drawn from the present study:

1. Development of comprehensive training programs for educators, families and technology specialists. Online training should be accompanied with hands-on practice with the braille writing device prior to its introduction to braille learners in home, preschool or school settings. Such training will help to ensure that professionals and parents can competently address any technical issues that arise, and promote a positive attitude about braille writing development learning among children, parents and teachers.
2. Establishment of technical support mechanisms in Australia, accompanied by compliance with Australian standards prior to the device's sale or use.
3. Future Australian studies involving the introduction of braille writing devices should include:
 - a. Consideration of participants' disabilities and their potential impact on braille writing development;
 - b. Setting of instructional time to ensure that all participants receive the same amount of training from the STVIs or consultants;
 - c. Increased emphasis on inclusive, classroom based braille writing instruction, including small group and whole group instruction and learning activities.
4. Piloting of the assessment instruments by STVIs and early childhood consultants, with a view to their adoption in a range of educational settings. It is noteworthy that the data assessment instruments were positively received by the participants and facilitated the collection of detailed information.

In conclusion, the purpose and aims of the study were not achieved due to a range of technical, instructional and participant factors. Preliminary data analysis suggested the potential effectiveness of the Smart brailier as an inclusive device for promoting class teacher and peer engagement with the child's braille writing development. Introduction of the Smart brailier to Australia should be contingent on resolution of the software and hardware issues encountered during the study, provision of comprehensive online and practical training modules, and establishment of Australian based technical support for families and professionals.

References

- Koenig, A., & Holbrook, M.C. (2001). *Low vision, learning media and literacy: Conference papers presented at RIDBC Renwick Centre and The University of Newcastle, 29-30 November and 1 December 2001*. North Rocks, NSW: Royal Institute for Deaf and Blind Children.
- Mertens, D.M. (2010). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Punch, K. F. (2009). *Introduction to research methods in education*. Thousand Oaks, CA: Sage Publications, Inc.
- Swenson, A. M. (1999). *Beginning with braille: Firsthand experiences with a balanced approach to literacy*. New York, NY: AFB Press.
- Wiersma, W. (2000). *Research methods in education: An introduction* (7th ed.). Needham Heights, MA: Pearson Education Co.
- Wormsley, D. P. (2000). *Braille literacy curriculum*. Philadelphia, PA: Overbrook School for the Blind, Towers Press.
- Wormsley, D. P. & D'Andrea, F.M. (Eds.). (1997). *Instructional strategies for braille literacy*. New York, NY: AFB Press.

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Scaffolding sensory learning: How other people shape our perceptions - Greg Downey

Abstract

All sensory experience is shaped by culture; as we grow, people direct our attention, encourage us to notice important aspects of our environment, and shape our perceptions. Drawing on examples from anthropology, this presentation shows how adults especially 'scaffold' or shape the development of children's senses, including in ways that are peculiar to individual cultures. Like scaffolding, this training starts out to support an activity but then, as a child learns, is withdrawn so that he or she becomes more and more independent. One implication for working with the vision impaired is that, in many cases, they do not share entirely the sensory environments of people around them. How can this scaffolding process take place if we do not share the same sensory capacities, or need to notice very different key details in the environment in order to navigate in daily life? Drawing on the work of blind sociologist and disabilities scholar Sigmund Saerberg, this article suggests techniques for scaffolding the better understanding of a 'blind style of perception' by the sighted.

The slides that accompanied this presentation are available at: <https://prezi.com/-ufqsobspwtk/edit/>

Introduction

Highly skilled individuals often have refined sensory skills; the more elite or accomplished the individual, the more extraordinary the neurological, psychological and behavioural adaptations that underwrite these sensory abilities. From my perspective as a neuroanthropologist, interested in the relationship of human cultural variability to human biological malleability, those with exceptional skills often let us study the degree to which sensory systems are malleable, the envelope of human possibility in perception. Although they are unusual, these highly accomplished individuals can show us the path to exceptional configurations of the nervous system, the training, coaching, and self-discipline required to shape oneself in extraordinary ways.

Over the course of my career, I have studied with athletes and highly skilled people as test cases, especially martial artists and dancers in Brazil, cage fighters in the United States, free divers, and increasingly, with vision impaired people who echolocate. That is, blind people who use sound to perceive space – something virtually all of us do, whether we're blind or not, and whether we're conscious of it or not – can show us how much refinement this sensory faculty can achieve. And some vision impaired people

can perceive through echolocation with *astounding* acuity, as a whole range of recent research reveals. This research depends heavily on collaboration with members of World Access for the Blind Australia and World Access for the Blind (the US-based parent organisation, <http://www.worldaccessfortheblind.org>). For this reason, I also sometimes use the word 'blind' to describe the vision impaired, especially when discussing those with the most profound and complete vision impairments.

This article does not review the evidence of human capacity for perception through echolocation in the vision impaired, which has shown that increased acuity in echolocation correlates with distinctive patterns of brain behaviour in the vision impaired, even in those who are temporarily blindfolded and trained to echolocate in experimental conditions. My research explores the social correlates that go along with skill: under what conditions do some vision impaired people develop highly refined perceptual abilities that not every vision impaired person develops? One reason for this is, as an anthropologist, my work is to study perception in natural settings, not in the laboratory. Some of the refined skills that might teach us the most about the limits of the human nervous system cannot be demonstrated while lying stationary in an expensive, multiple-ton piece of equipment used for brain imaging.

To understand echolocation at the sensory skills of the vision impaired in natural settings, we need to consider what the vision impaired tell us about their distinctive ways of perceiving, what one vision impaired scholar called a 'blind style of perception' (Saerberg, 2010). In this sense, the discussion will highlight the distinction between what scholars of disabilities studies call 'impairment' – a physiological or neurological difference, like not being able to see well, or at all – and 'disability,' which is all the other limitations put upon people with impairments by the societies in which they live. For example, a society can make it more or less difficult for someone with a vision impairment to catch transportation, find a job, marry, or get a place to live; these additional elements constitute the 'disability' of blindness.

In particular, the way we raise children with vision impairments or complete blindness encourages or discourages their other sensory development, their navigational skills, and other skills that they might need to get around. The social disabilities added to an impairment can, over time, lead to greater neurological or sensory impairment. Ian Hacking (1995, 1999) has referred to this phenomenon as 'looping,' when the behaviour or experience a person engages in cycles back, over time, and affects the biological or psychological basis of that behaviour or experience. Like a bodybuilder, whose pattern of behaviour can compound over time into a radical change in physique, encouraging someone to develop their sensory skills, paying attention to subtle differences, giving them names, and refining these capacities, can change the subtlety and power of a perceptual system. At the same time, I want to suggest that we might *share* with the

vision impaired so that we can better understand the sophisticated ways that they can perceive the environment, letting them teach those without an impairment how to better perceive with our other senses. In a sense, the analysis of echolocation in the vision impaired, like the study of sensory skills in other cultures, shows us that we are all simultaneously teachers and students in learning how to perceive, but also offers a cautionary example that we can just as easily discourage sensory development.

Scaffolding perceptual learning

When a child is born, he or she enters into a complex social dance of sensory perception. Bright colours, distinctive, relentlessly upbeat music, educational television, cartoon images, special forms of speech – ‘babytalk’ (or ‘motherese’) – the infant’s sensory world is rich, vivid and dramatically structured to grab an infant’s attention. Adults and older children show things to the child, direct its attention both visually and aurally, give it things to grasp, hold and touch the infant, rock it, and interact with its senses, making noises, hiding things, commenting on aromas. All of this engagement facilitates the infant’s growing sense of the environment, saturating it with social interaction. As we grow, people around us direct our senses, encourage us to notice what is important, and help to shape our perceptions. Infants and young children are active and hungry for stimulation, but the people around them supply them with a diet of sensations, direct them away from unremarkable perceptions, and simultaneously shield them from certain kinds of experience entirely.

Cross-cultural evidence demonstrates quite clearly that this sensory education process varies profoundly across societies (Rogoff, 2003). In some groups, infants are bombarded with ‘babytalk’; in others, they are not spoken to much. In some societies, a young child is not allowed to handle dangerous objects, like a knife or tool, and never left alone; in others, a child is let to do adult activities, even if that means getting burned in a fire or cutting oneself. In one society, a child is expected to sleep alone through the night; in another, the infant sleeps alongside its mother, sharing a bed and nursing whenever hungry.

Anthropologist Lisa Law (2005) warns that “the senses are often assumed to be an intrinsic property of the body – a natural and unmediated aspect of human being” (p. 225). Anthropological research tells us otherwise, that our perceptions of colours are shaped by our native language’s repertoire of colour terms; if our language has more, we can reliably identify a broader range of hues (Berlin & Kay, 1991). In cultures with few colour terms, it may be difficult for people to discern a difference between blue and green or remember one of those colours, but in English, with one fewer colour term than Russian, the difference between dark and light blue is not stable. For Russian speakers, it is, because they are separate colours (Winawer et al., 2007). Our pain perception

varies, as cage fighters taught me (Downey, 2007), and early training in musical performance or dance can profoundly affect how we perceive sound, as studies with child musicians show (Kraus & Chandrasekaran, 2010). Perfect pitch, for example, is more common in societies where musical training starts young, even though some people think of it as 'innate' (Chin, 2003). In the parts of Brazil where I work, nobody has 'no rhythm,' as children are expected to dance as soon as they can stand up, and likely already experienced dancing when their mothers danced when the babies were *in utero*.

As a *neuro*-anthropologist, I am interested in the biological, neurological and psychological consequences of these patterns of sensory training (Downey, 2012). That is, not just how we interpret the same sensations, but how the very sensations we might feel vary between groups, affecting how our sense organs work. Our eyes and ears become better attuned for the tasks our cultures train us to do; we know that this is the case with language. By about six months of age, a child is already starting to attend better to sounds that appear in their native language, until it becomes difficult to even discern the phonemes in another language if you're not accustomed to hearing them (Kuhl *et al.*, 1992; Werker & Tees, 1984). This is why, for example, speakers of Japanese have a hard time hearing the difference between 'r' and 'l' (Miyawaki *et al.*, 1975), and speakers of English can't hear the difference between the first sound of the words 'this' and 'that,' even though those two sounds *are* distinguished by German speakers. There are actually more *descending* neurons going from the brain to the ear, than the other way around, possibly because screening out irrelevant information is as important as taking in the information one needs.

To borrow a concept from educational theory to explain the developmental environment, adults 'scaffold' perception early in a child's life to help the child perceive accurately and appropriately (Downey, 2008). Over time, this educational scaffolding is slowly withdrawn as the child learns how to do so independently. When an infant can barely hold his or her head up and attention is in short supply, when sensory fields are a buzzing, blooming confusion, adults help support the child to focus and perceive, and give them feedback on what they are noticing. We simplify our language, offer visual stimuli that we know are easier to detect (and harder to ignore), and shelter children from certain kinds of sensations. But we don't have to speak babytalk with a child forever, under the majority of circumstances; their nervous systems become fine-tuned by this scaffolding so that some sensations are quite sensitive while others are blunted.

The concept of educational scaffolding was introduced by psychologists Wood, Bruner and Ross (1976) to highlight that much of learning was not the transmission of knowledge but support for action. That is, outside the classroom, when children are learning, they often do so by *doing* – that is, they learn by attempting the tasks that they

will eventually do as adults, with some skilled person supporting them or making the task easier. In sports, we simplify a task so that a novice can develop the skill; we play three-on-three and do drills on particular tasks before we put novices into a fully-fledged game situation. In carpentry, novices are assigned tasks that are not complicated or that, if they do them incorrectly, will not too badly damage the overall project (Marchand, 2008). And in sensory learning, experts simplify the environment, give novices cues or guidance, and let them attempt the task in a safe environment, shielded from dire consequences.

As the novice becomes skilful, the scaffolding is withdrawn bit by bit until the individual functions without support. The model of teaching that emerges from this approach to scaffolding is not like the “information transmission” model that dominates a lot of education; instead, Wood, Bruner and Ross (1976) highlighted how learning requires a kind of facilitated or supported exploration, in which the learner leans on the expertise of a more advanced individual while attempting to do meaningful tasks (see also Wood & Middleton, 1975). With scaffolding, the learner is not receiving the lesson *from* the teacher, but learning alongside an advanced practitioner, depending on intermittent, tactical support or guidance.

The Belarusian educational theorist Lev Vygotsky (1978) highlighted that, for this type of situated learning to function, a novice has to be working in his or her “zone of proximal development” (p. 86) that is, the frontier of capacity, the stage of proficiency just beyond where the novice is already competent and can operate alone. If scaffolding allows a learner to extend his or her capacities, it facilitates growth. The kinds of support we can provide are many, facilitate the development of a wide range of sensory skills. But scaffolding can also infantilise or stymie development, especially if it substitutes for the novice’s own capabilities or holds the individual rigidly in an immature or underdeveloped state.

The blind and vision impaired offer us a strong lesson in how this scaffolding works, but also how it can break down, especially when the sensory worlds of the novice and the person supporting that individual do not completely overlap. To put it another way: to teach, we must know what people are capable of, support them to go beyond their current limits, and be willing to withdraw support as it is no longer necessary. But the sensory gap between the sighted and the vision impaired makes this kind of assessment challenging. The sighted often do not really know what the vision impaired can do, nor do the sighted understand or share their nonvisual sensory skills.

Those with vision impairments most often dwell largely among those with comparatively better sight, many of whom, we know from a number of surveys and opinion polls, fear blindness as much as virtually any other physical impairment. In some cases,

bureaucratic rules about who can be qualified to teach the vision impaired how to use their senses — guidelines governing the field of orientation and mobility (O&M) — ensure that, not only the parents, siblings and other close friends of the vision impaired person, but even the *specialists* seeking to scaffold the experiential learning of the vision impaired are *not* themselves vision impaired. This is not to denigrate the skills of O&M specialists, the vast majority of whom are remarkably sensitive to the vision impaired people with whom they work. But the inescapable fact is that, although we would likely not trust a music teacher who could not sing or play an instrument, or consult a batting coach who had never played cricket, we in fact do precisely this when it comes to teaching perceptual skills to the blind. A significant gap exists between a sensory world built with vision and one built with reduced or no vision at all. The perceptual strategies available and the skills useful to the vision impaired are not those of the sighted (or, more accurately, ‘more sighted’ since a *lot* of us, arguably the majority of those in Western cultures, have vision impairments of varying degrees (Dolgin, 2015).

To understand that gap better, the gap that scaffolding must span between the sighted and what our colleague Julee-Anne Bell terms the ‘light dependent’, we can turn to the research of blind sociologist and disability studies scholar Siegfried Saerberg (2010). Saerberg, who is vision impaired, discusses the problem of communicating between the vision impaired and sighted. He highlights the fact that their normalcy is taken for granted so much by the sighted that they are ‘disabled’ when trying to communicate with those who inhabit other sensory worlds; that is, the social world has persuaded them that their way of living is the only way so they are discouraged from developing the capacity to imagine other ways of perceiving. In a wonderful example of transforming life’s small indignities into research, Saerberg asked sighted people in public places for directions.

As Saerberg (2010) describes, their first problem is pointing: “Pointing, a mostly visual gesture, is constantly used in route descriptions by sighted people” (p. 374). According to Saerberg, once they realize that pointing was not working, sighted people resorted to unconventional ways of pointing: trying to point with his cane, touching him. They could find no substitute.

Then, sighted people run up against the problem of landmarks, and the inability to find shared sensory ground about noteworthy places in the environment. According to Saerberg, the sighted people he asked for directions could not figure out how to inhabit or even visit a sensory world that did not rely upon vision, so they struggled to find any landmarks that the vision impaired might also perceive.

Third, Saerberg found that sighted people thought that directions were self-evident, and they would switch from the perspective of the person that they were talking to to their own perspective without warning. They said things like ‘right in front of you’ and ‘go straight ahead’ without any clear communication of which point of reference they were using, which person or part of their body was serving to align the direction. The body-to-body communication used by sighted people, the way sighted people use gesture and reference to each other’s positioning, is so ingrained that the sighted Saerberg asked to help could not figure out another way to communicate directions, nor did they notice the confusing shifts of frames of reference in which they engaged.

In the end, the effort, over 300 requests for assistance, was fairly unsuccessful. As Saerberg writes:

In most cases, no useful route description was given, because no methods to construct a mutual and interchangeable standpoint and no relevant sensually based knowledge of use to both sides were discovered (such as non-visual pointing, landmarks, and spatial directions). In most situations, the sighted person wound up simply escorting the blind person... (p. 376)

Saerberg (2010) concludes, on the basis of his research, that the “interchangeability of standpoints”, the way that communication depends on the basic intersubjective fact that the people conversing can understand each other, what they know, can perceive, and will assume, “doesn’t usually hold for encounters between sighted and blind pedestrians, and that while there are strategies to repair the communication by way of negotiating a shared space, they were not very effective” (p. 375).

If this were all Saerberg had to share, the prognosis would be fairly depressing. But what he does instead is to describe concretely and very richly a ‘blind style of perception’ that contrasts with a ‘sighted style of perception.’ He describes how he experiences his hometown. As he walks through Cologne, he detects shops by their distinctive sounds, cross streets by the flow of air and shifts in ambient sounds, the shift from one type of pavement to another, traffic stopping at lights, the flow of foot traffic around him and even temperature changes as he moves from shade to sunlight and back. He remembers his favourite places by key sonic landmarks and experiences an entire landscape marked indelibly by distinctive sounds, smells, temperatures, air patterns and textures.

He cannot see the socially *conventional* signs that other people use to get around, the changing colours of traffic lights, the directional signs or names and numbers on shop fronts, but he does have a wide range of sensory cues around himself that help him to orient as he moves along familiar streets. The world, he writes, is full of ‘orientation cues,’ but they are *personal*, not the conventional ones that sighted society agrees upon

(Saerberg, 2010, p. 336). The problem for him is that the 'sighted style' and 'blind style' of perception are so different, and the 'sighted style' is normalised, entrenched into the way that society designs and builds space, how sighted people communicate and know the world, with little allowance made for the 'blind style of perception.'

This normalization, Saerberg tells us, "creates difficulties for blind people" (p. 377):

Its sense of normalcy depends on a knowledge base that is taken for granted. Taken for granted knowledge hinders the acquisition of typical knowledge about the blind style of perception that would inform sighted people about the relevances of blind people. This neglect leads in turn to social oppression. In the present study, this disconnect and this problem has been illustrated through an analysis of the ways in which sighted persons assume they can describe routes to anyone, whether sighted or blind. Normalcy fails in the case of blind strangers. (p. 378)

Saerberg's (2010) account suggests that, when sighted and non-sighted meet, it is the *sighted* who need scaffolding to perceive in a 'blind style,' not just the vision impaired who need to learn how to function in a world where having vision is normalised. As Saerberg suggests, and I would agree as an anthropologist, the learning needs to flow to the sighted as much as the other way around because the 'disabling' entailments of a vision impairment flow, not just from the individual's condition, but also from the larger society's inability to imagine the world with a blind style of perception. In fact, in most encounters between the sighted and the vision impaired, it is inevitable that the sighted, shielded by the shell of normalcy, will be much less familiar with the other's style of perceiving. The blind understand the sighted better than the sighted understand the blind. Saerberg's (2010) work suggests that the sighted, if they listen to the words of the vision impaired and walk alongside them, can learn other ways of being that are possible with a human brain and senses, a foundational mission of anthropology.

For the vision impaired, practitioners of O&M, those who work with the blind or parents or family members of individuals with vision impairments, this point may be fairly obvious. But so often, in education surrounding vision impairment, we assume that it is the vision impaired who must learn, not those with sight. I hope these comments and this analysis reinforce the desire of people in this field, with and without vision, to be evangelical, to share an interest in vision impairment and what a blind style of perception can teach us all about the world. And I can encourage parents and people who work with the blind to listen carefully, to feel and smell alongside our blind colleagues, to pay attention to how they perceive so that learning flows in two directions.

As an anthropologist, this rhetorical strategy is familiar: telling a dominant group – in this

case, the sighted, a group to which I belong – a group used to shaping the world and ignoring other ways of being, that there is much to learn from those who dwell in the world in different ways, whether they are the disabled or differently abled or language minorities whose distinctive vocabularies most members of a society cannot understand. Anthropologists frequently have to point out that one of the sad effects of cultural domination is that the dominant lose the capacity to imagine that other worlds are possible, other ways of doing things are an option. Instead, the world is shaped to reinforce the sense that the way that the dominant do things is simply the only way. There are no alternatives. Over and over again, anthropology shows us that is not the case.

For the parent or adult working with a vision impaired child or young person as a *teacher*, that person is likely to be most effective when he or she is also open to learning, to perceiving in a blind style as much as possible. The teacher or guide must simultaneously be a student, constantly willing to learn, educating his or her senses in the process of exchange. Certainly, I have learned an immense amount about sensing from working with World Access for the Blind and World Access for the Blind Australia. I cannot perceive as they do, but the research clearly shows that, yes, the vision impaired cannot see as well, but that have other perceptual skills and techniques that we all can learn from.

The exercise is not entirely academic or a purely scientific way to learn about the neuroanthropological limits of human adaptation. Learning from the vision impaired, taking into account a blind style of perception when we build houses, design schools, organize events, and everything else, means creating a landscape that is more accessible for all of us. While more than a half-million vision impaired people reside in Australia today, that number is estimated to climb to 800,000 by 2020 (Ah Tong, Duff, Mullen, & O'Neill, 2015). Australia's population is aging, and the chance of vision impairment triples each decade as we age. Paying close attention to a blind style of perception means learning from these experts how we might better adapt to that reality – as a society and as individuals.

In order to help the sighted understand a blind style of perception, however, simulating a vision impairment is problematic. For a sighted person, putting on a blindfold produces greater anxiety and helplessness than the blind experience, because a sighted person with a blindfold has none of the skills which the vision impaired develop, none of the creative solutions and life hacks that allow those with low or no vision to navigate or function (Grond & Devos, 2016, p. 2). The helplessness of the suddenly, artificially blinded, the fact that they do not have the sensory skills of those who are actually vision impaired, can *reinforce* stereotypes about blindness among the sighted, who are prone

to thinking that loss of vision is a catastrophic disability. Blindfolding sighted people makes them more impaired than the vision impaired.

Vision impaired sociology professor Rod Michalko (1999) similarly writes that, “Blindness is not simply the negation of sight: It is a way of sensing the world and a way of being in the world” (p. 107). Being blindfolded temporarily cannot recreate this positive way of sensing. Rather than producing greater awareness of what the vision impaired are capable of doing, the experience of simulated blindness can exacerbate the tendency toward thinking the vision impaired are tragic unfortunates, bereft of hope and utterly dependent upon charity and assistance because that is how most sighted people would be when first blindfolded.

On the other hand, a temporarily blindfolded individual may have a vision impairment, but he or she does not really experience the *disability* of being blind because none of the social stigma or other disabling barriers that society imposes on those with vision impairments are experienced by the temporarily sightless. A blindfolded person does not have to worry about the staggering rate of unemployment, the likelihood of experiencing prejudice, the accumulated effect of being treated as a problem, or any other issues that those with vision disability have to face. A blindfolded person does not have to confront inadequate accessibility in online services, educational programs that offer no accessible alternative formats, or the raft of other barriers to full participation in society faced by the vision impaired.

In order to bridge the gap between seeing and non-seeing, Saerberg (2010) recommends art to communicate a blind style of perception. In his own writing, he discusses productions in which he has been involved, including experiences of dining and attending museums and galleries in the dark. The experiences are guided, and in them, the vision impaired serve as experts who help to scaffold the perception of the novice ‘blind style’ perceivers, like a parent directing the attention of a child to the most important sensory cues. The point is that just eating in the dark does not teach someone the blind style of perception; having one’s sight impaired and then being guided in techniques to perceive by someone who is expert in that style of perception starts to scaffold new sensory skills.

Drawing inspiration from Saerberg, Florian Grond, a researcher specialising in recording technology and music, and Piet Devos, a writer and researcher who lost his sight due to retinoblastoma, collaborated to produce what they call ‘sonic boundary objects’ to broaden the understanding of a blind style of perception (Grond & Devos, 2016). ‘Boundary objects’ are tools that provide a door between expert perception and a broader public, like a map or diagram that allows a geologist to explain to non-specialists a feature of the landscape or a diagram that allows a tracker to show novices

what to look for when trying to follow game in the bush. The boundary object typically means more for the expert who encounters it than for the novice. The expert can read quite a bit from the boundary object. But it also provides a platform to try to share highly skilled forms of perception, knowledge and awareness.

Grond and Devos (2016) advocate creating binaural sound recordings on walking tours with the blind person wearing a chest-mounted video camera (p. 3). A binaural recording is created by wearing a tiny microphone on each side of the head where the ears are. Using this type of equipment, highly life-like recordings can be made that capture the three-dimensional distribution of sounds, the ambient noise that a person hears, and even the sonic effects of the head motions of the person wearing the binaural microphones (although sometimes a mannequin head is used to mount the microphones).

Wearing headphones, a sighted person can then be shown the video with the binaural recording, which gives a vivid sense of the audio environment. The vision impaired guide who made the recording can listen together and explain key details, highlighting what is relevant and scaffold the perception of space from sound (Grond & Devos, 2016, p. 4). The key is joint listening and discussion, which is where the scaffolding can take place. The video helps, and Grond and Devos suggest that sighted people just become too disoriented without video. But the binaural audio recording is really what the exercise is meant to teach the sighted person to perceive, and it requires the overlay of the guide's scaffolding. Samples of the resulting recordings can be found on Florian Grond's Vimeo video channel (<https://vimeo.com/album/4120513>) The goal is not to simulate impairment, but to share techniques for perception through the boundary object.

As Devos explains in the article that accompanies these videos:

Thanks to the very realistic reproduction of my own auditory experiences, I felt for the first time capable of giving a very accurate [first hand]... account of my blind navigation style to a sighted person... when entering the food court in the underground city close to the place where I live, an untrained listener will be overwhelmed by the cacophony of music, chatter and machine noises. In the comments to the recordings I can make it clear, however that I focus on the spatial configurations of the sounds to find my way through this apparent chaos, by paying attention to the clients' and vendors' voices in the food stalls on both sides of the central corridor as well as on the loudspeakers above my head which, like lanterns in the dark, indicate the route to follow. (Grond & Devos, 2016, p. 10)

The collaboration between Grond and Devos produces a sonic boundary object that helps to show the distinctive sensory abilities that are possible with a human nervous system, some of which are essential in the daily lives of the vision impaired. Instead of approaching vision impairment entirely as a cause of dis-ability, the recordings that Devos makes show the distinctive abilities he has and even helps the 'light dependent' to better approach a blind style of perception.

Concern about 'blindisms' and anti-scaffolding

If sonic boundary objects can serve as a door between two different perceptual worlds, a way that the vision impaired can scaffold the sighted to achieve greater sensory awareness, than anxiety about 'blindisms' is a kind of opposing case, an example where fears about behaviour difference and stigma enlarge the disability attaching to vision impairment. One of the ways that sighted parents and teachers can impede sensory skill development in blind individuals – the opposite of scaffolding – is that they curtail any behaviour that they do not understand. In particular, repression of sensory learning can be inspired by a fear of 'blindisms,' patterns of behaviour that, according to the web page of the Texas School for the Blind and Visually Impaired (<http://www.tsbvi.edu>), 'provide some kind of stimulation or enable them [the blind] to communicate somehow.' 'Blindisms' include rocking, pressing the eyes, and flapping the hands. Some blindisms or characteristic gestures, especially repetitive ones, have been explained by researchers as responses to sensory deprivation or other mental disability (Abang, 1985; Eichel, 1978; Molloy & Rowe, 2011).

In extreme cases with the vision impaired, especially when coupled with mental disability, blindisms are extremely upsetting to parents and constitute a kind of self-harm. In these most severe cases, clearly, support people would seek to find ways to mitigate the behaviour, especially if it is a symptom of underlying distress. But the antipathy toward blindisms goes far beyond concern about physical harm or the underlying distress, to a worry about stigma, a socially imposed additional cost of blindness. 'Gwen B.,' who describes herself as 'President, Michigan Parents of Children with Visual Impairments' and 'mom of 17-year-old son who is blind' writes:

Blindisms are those characteristic movements that some blind people make that appear unusual to sighted people. These movements may be some kind of compensation for the lack of visual input, although no one really seems to know. (Botting, 2011).

She cites hand flapping, rocking, jumping and eye pressing, but she goes on to highlight:

Another less frustrating blindism is not looking at a person speaking to them, preferring to have the person speak to their ear, which makes perfect sense, but doesn't work very well in a world of sighted people who expect someone to look at them if they are paying attention. (Botting, 2011).

That is, even when a particular behaviour makes sense to Gwen B., when she can understand how the posture improves the perception of the vision impaired individual, she is more concerned about the expectations of the sighted.

In later paragraphs, Gwen B. details the potential dangers of blindisms, how the idiosyncratic behaviours may be acceptable in the exceptionally talented, but will not be acceptable if a vision impaired person is not exceptional. And perhaps worst of all, blindisms may lead to ugliness and an inability to find employment:

A blind or vision impaired person has historically had a very difficult time getting gainful, full employment. Visualize your child going to a job interview and doing whatever blindism is their particular choice. Imagine him or her, dressed in suit and tie, jumping, or rocking back and forth so hard in their chair they look like they are on an amusement park ride. Or what if your child flaps their hands constantly in front of their face, or if they drill their fingers into their eyes? What if your darling child becomes, well, ugly to sighted people, because their eyes are sunken into their eye sockets? How would a prospective employer feel about this? Would he or she find this behavior distracting, annoying, or disgusting - even revolting? Would you hire someone like that? Be honest with yourself! (Botting, 2011).

Her concern is understandable. For the parents of all children, those with impairments or without, anxiety about their futures is great, but the prognosis is entirely one of individual adaptation and behavioural change, not of broader social change. Gwen concludes her column:

As parents we need to visualize the future and act on that vision to make it happen. If we visualize a future for our child in which they stand up straight, look people in the eye, and appear to be paying close attention to what is being said to them, then we need to help them learn behaviors that will get them to that goal. (Botting, 2011).

Gwen B.'s imagination (specifically, a visualization) of the future, her attempt to make sure that her child, no matter his needs, can fit into a majority culture that is hostile to any form of difference, should make us stop and pause. These concerns about stigma are certainly justified in parents, but they highlight the necessity of social change to create a more tolerant, less 'disabling' society (Oliver, 1983, 2013; UPIAS, 1976).

In fact, some 'blindisms' are sensory techniques for improving perception of the environment; they are adaptive strategies that vision impaired individuals use to sharpen their ability to hear or otherwise perceive. Moving the head, for example, increases a person's ability to detect the location of a sound source. Without head movement, it can be difficult to differentiate whether a sound source is in front of or behind us (as the environmental information is ambiguous with only a single head location), and virtually everyone instinctually moves their heads in order to increase their ability to discriminate sound source location.

In research done with expert echolocators, those with extraordinary skill to perceive the environment through reflected sound, the ability to move the head increased their capacity to distinguish two-dimensional shapes from the echoes they produced. Milne, Goodale and Thaler (2014) found that expert echolocators could reliably tell which way a rectangle was turned and whether they were 'hearing' reflected sound from a triangle or a circle. The more well developed a person's ability to perceive shape through echoes, the greater the drop-off in ability when researchers restricted head movement.

Head movements, in other words, are a strategy for sharpening perception, like turning on the light in a dark room or moving a book closer when a sighted person tries to read. Although these strategies of blind auditory perception may lead to stigma in some settings, so too does putting on my glasses in some situations! To privilege the need to fit in over the need to perceive is a classic example of a social disability, where society, through force of stigma and prejudice, prevents a person from acting in a way that makes a task easier, clearer, or more likely to succeed.

But the problem is not just that it becomes harder to hear where a sound is coming from if we force a person with a vision impairment to behave just like a sighted person – to 'stand up straight, look people in the eye, and appear to be paying close attention' (ironically in a posture that is actually paying less attention to the details the vision impaired person *can* perceive). The problem is also that, especially as children are developing or people are adapting to increasing vision impairment, every act of perception is also an act of learning and neurological sculpting. The biological-behavioural 'looping' process means that curtailing sensory behaviour also interrupts and suppresses sensory skill acquisition. Listening and moving the head does not just help a person in the moment; the movement trains and refines the perceptual system for the future. Forcing a child to stand still and pretend to look someone in the eye prevents a blind child from doing the sorts of sensory exploratory behaviours that will help them become better and better at getting information about the environment from sound.

My point is not that every person with a vision impairment will become an expert echolocator, or that every behaviour should be encouraged. Rather, expert echolocators can show us what is possible and the routes to get there. Research on echolocation skills, such as the ability to discern shapes, shows us how really good listeners do what they do. Just like virtuoso athletes can teach us all a bit about getting into shape by showing us the path to the Olympics or to professional sports. If anything, we should initially tolerate and learn from the behaviours that the vision impaired use, try them ourselves, and recognise that we should not just ask those who are different to adapt to us. We should also adapt to them, including our expectations.

Scaffolding learners' senses means studying them, realising what individuals' frontiers for development are, the techniques that they are using to perceive, and how they are going to get to greater skill and ability. One of the greatest tools we have for helping other people is curiosity and support for the ways that they are trying to help themselves. If anthropology has anything to share with the study of physical impairments like low vision or blindness, it is that how an impairment turns into a range of disabilities is very much subject to the way society treats the individuals with impairments.

References

- Abang, T.B. (1985). Blindisms: Likely causes and preventive measures. *Journal of Visual Impairment & Blindness*, 3, 91-93.
- Ah Tong, B., Duff, G., Mullen, G., & O'Neill, M. (2015). *A Snapshot of Blindness and Low Vision Services in Australia*. Vision 2020 Australia, National Disability Services, Australian Blindness Forum, Sydney.
- Berlin, B. & Kay, P. (1991). *Basic Color Terms: Their Universality and Evolution*. University of California Press.
- Botting, G. (2011). Blindisms – What they are and why we need our children not to do them! Gwen's Things Unseen weblog. Retrieved from <http://gwensthingsunseen.blogspot.com.au/2011/04/blindisms-what-they-are-and-why-we-need.html>
- Chin, C.S. (2003). The development of absolute pitch: A theory concerning the roles of music training at an early developmental age and individual cognitive style. *Psychology of Music*, 31(2), 155-171.
- Dolgin, E. (2015). The myopia boom. *Nature*, 519(7543), 276.
- Downey, G. (2007). Producing pain: Techniques and technologies in no-holds-barred fighting. *Social Studies of Science*, 37(2), 201-226.
- Downey, G. (2008). Scaffolding imitation in Capoeira: Physical education and enculturation in an Afro-Brazilian Art. *American Anthropologist*, 110(2), 204-213.

- Downey, G. (2012). Balancing between cultures: Equilibrium in capoeira. In D. Lende and G. Downey (eds.), *The Encultured Brain: An Introduction to Neuroanthropology* (pp.169-94). MIT Press.
- Eichel, V. J. (1978). Mannerisms of the blind: a review of the literature. *Journal of Visual Impairment & Blindness*, 72, 125–130.
- Grond, F., & P. Devos. (2016). Sonic boundary objects: negotiating disability, technology and simulation. *Digital Creativity* DOI: 10.1080/14626268.2016.1250012.
- Hacking, I. (1995). *Rewriting the Soul: Multiple Personality and the Science of Memory*. Princeton, NJ: Princeton University Press.
- Hacking, I. (1998). *Mad Travelers: Reflections on the Reality of a Transient Mental Illness*. London: Free Association Books.
- Kraus, N. & Chandrasekaran, B. (2010). Music training for the development of auditory skills. *Nature Reviews Neuroscience*, 11(8), 599-605.
- Kuhl, P.K., Williams, K.A., Lacerda, F., Stevens, K.N., 7 Lindblom, B. (1992). Linguistic experience alters phonetic perception in infants by 6 months of age. *Science*, 255, 606–608.
- Law, L. 2(005). Home Cooking: Filipino women and geographies of the senses in Hong Kong. In D. Howes (ed.), *Empire of the Senses: The Sensory Culture Reader* (pp. 224–41). Oxford: Berg.
- Marchand, T.H. (2008). Muscles, morals and mind: Craft apprenticeship and the formation of person. *British Journal of Educational Studies*, 56(3), 245-271.
- Michalko, R. (1999). *The Two in One: Walking with Smokie, Walking with Blindness*. Philadelphia: Temple University Press.
- Milne, J.L., Goodale, M.A. and Thaler, L. (2014). The role of head movements in the discrimination of 2-D shape by blind echolocation experts. *Attention, Perception, & Psychophysics*, 76(6), 1828-1837.
- Miyawaki, K., Jenkins, J.J., Strange, W., Liberman, A.M., Verbrugge, R. & Fujimura, O. (1975). An effect of linguistic experience: The discrimination of [r] and [l] by native speakers of Japanese and English. *Perception & Psychophysics* 18(5), 331-340.
- Molloy, A., & Rowe, F. J. (2011). Manneristic behaviors of visually impaired children. *Strabismus*, 19, 77–84.
- Oliver, M. (1983). *Social work with disabled people*. Basingstoke: Macmillan. Oliver, M. (2013). The social model of disability: Thirty years on. *Disability & Society*, 28(7), 1024-1026.
- Rogoff, B. (2003). *The cultural nature of human development*. Oxford University Press.
- Saerberg, S. (2010). Just go straight ahead. *The Senses and Society*, 5(3), 364-381.
- UPIAS. (1976). *Fundamental principles of disability*. London: Union of the Physically Impaired Against Segregation.

- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Werker, J.F. & Tees, R.C. (1984). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. *Infant behavior and development*, 7(1), 49-63.
- Winawer, J., Witthoft, N., Frank, M.C., Wu, L., Wade, A.R. & Boroditsky, L. (2007). Russian blues reveal effects of language on color discrimination. *Proceedings of the National Academy of Sciences*, 104(19): 7780-7785.
- Wood, D., Bruner, J., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Child Psychiatry*, 17, 89-100.
- Wood, D., & Middleton, D. 1975. A study of assisted problem-solving. *British Journal of Psychology*, 66(2), 181-191.

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Shining a light on new thinking in neuroplasticity: Lessons for the classroom – Paul Pagliano

Abstract

In simple terms, the extremely complex process called neuroplasticity, refers to the human brain's lifelong ability to change and adapt in response to the amount and type of stimulation it receives. Like all change, depending on the circumstances, responses can be positive or negative, helpful or unhelpful. Teachers of children with vision impairment and associated disabilities therefore need to be well informed in the current thinking around neuroplasticity and acutely aware of the implications for their teaching. A key principle of neuroplasticity that helps inform pedagogical design is the idea that positive neuroplastic development results from careful management of stimulation, particularly for children with profound multiple disabilities. Stimulation that is more multisensory and gratifying naturally has greater potency, although this varies with age and type of disability. This is because the child goes through different neuroplastic stages and prior experience and capability influence the nature and potentiality for future change. Other factors that help reinforce positive change are social interaction, exercise, sleep hygiene and a healthy diet. Another consideration when working with children with profound disabilities is the idea of compensatory neuroplasticity, which occurs when one function is lost or missing and another function is introduced to take its place.

Introduction

Greetings everyone. I was delighted when I received the invitation to deliver this keynote for the SPEVI conference. It gives me an opportunity to share with you the work I've been doing in the area of multisensory stimulation and neuroplasticity. In simple terms, the extremely complex process called neuroplasticity, refers to the human brain's lifelong ability to change and adapt in response to the amount and type of stimulation it receives.

As many of you already know my research interest has been primarily in the education of children with vision impairment and associated disabilities. I've published three books (Pagliano, 1999, 2001, 2012) on this topic and my talk today comes largely from this material, although there's some new ideas as well. Actually it's been a lot of fun for me preparing this paper and learning new things. I now get to share them with you and see what you think – whether they're useful or not for your teaching. I sincerely hope so.

Two vignettes on listening

I want to start by reading part of an Italian poem “La pioggia nel pineto”. The English title is “Rain in the pinewood” (D’Annunzio, 2014). The poem was written in 1902 by Gabriele D’Annunzio. When he wrote it he wanted the Italian words to create musical sound patterns that resemble the falling of raindrops on different vegetation. The English translation doesn’t quite manage this but still the words themselves and their meaning give you an idea of what he was trying to achieve. Now I’d like you to close your eyes and just listen to the poem. Try to hear the sounds of the rain in the pine wood.

Do you hear? The rain is falling
 On the solitary
 Vegetation
 With a crackling that persists
 And varies in the air
 According to the foliage
 Sparser, less sparse.
 Listen. Nature’s weeping is answered
 By the song
 Of the cicadas
 Which are not frightened
 By the south wind’s tears
 Or the ashen sky.
 And the pine tree
 Has one sound, and the myrtle
 Another, and the juniper
 Yet another, instruments
 Different
 Under numberless fingers.

--Gabriele d’Annunzio (English translation by Stefi, modified by Paul)

It’s lovely isn’t it! This poem reminds me of another description of rain by John Hull.

The late John Hull was born in Australia in 1935 but moved to the UK in 1959 to study at Cambridge University. He became blind at the age of 45. Three years later in his book “*Touching the Rock*” (1990) he describes how the rain enables him to hear the surrounding environment. Once again I’d like you to close your eyes and listen to his description.

RAIN 9 September 1983

This evening, at about nine o'clock, I was getting ready to leave the house. I opened the front door, and rain was falling. I stood for a few minutes, lost in the beauty of it. Rain has a way of bringing out the contours of everything; it throws a coloured blanket over previously invisible things; instead of an intermittent and thus fragmented world, the steadily falling rain creates continuity of acoustic experience.

I hear the rain pattering on the roof above me, dripping down the walls to my left and right, splashing from the drainpipe at ground level on my left, while further over to the left there is a lighter patch as the rain falls almost inaudibly upon a large leafy shrub.

On the right, it is drumming, with a deeper, steadier sound upon the lawn. I can even make out the contours of the lawn, which rises to the right in a little hill. The sound of the rain is different and shapes out the curvature for me. Still further to the right, I hear the rain sounding upon the fence which divides our property from that next door.

In front, the contours of the path and the steps are marked out, right down to the garden gate. Here the rain is striking the concrete, here it is splashing into the shallow pools which have already formed. Here and there is a light cascade as it drips from step to step. (SPCK, 1990)

It's interesting how John Hull describes his auditory experience of rain, one that many sighted people somehow miss. That is, until someone points out to them what can be heard when one closely listens. Then when it rains again they too can enjoy the soundscape it creates. It's like vision masks our other senses. It takes precedence. It over rides them. In the process sighted people often neglect to take the time to use their other senses to their fullest extent. This is a problem if a teacher who is vision dominant is teaching a child with vision impairment and associated disabilities.

The point I'm trying to make with these two vignettes about hearing is that our senses shape the way we experience the world. Different sense abilities mean that we experience the world in different ways.

This in turn shapes who we are and how our brains are wired. To quote Aristotle "We are what we repeatedly do". The point here is if we repeatedly experience the world in predominately visual ways then our brains are wired in predominately visual ways. This is a concern in 2017 when young children are spending so much of their time in screen based activities.

So neuroplastically speaking different sense experiences translate into different brain architecture. When I read John Hull's description of the rain to my son Chris he said that it reminds him of "Daredevil". Daredevil is a blind superhero who uses his incredible hearing to fight injustice. He first appeared in Marvel Comics in 1964, then there was a film in 2003 and more recently in 2015 it became a TV series. The story taps into the idea that if a person loses one sense then their other senses develop extraordinary capabilities to compensate. The part my son was referring to in the film was where the rain enables Daredevil to gain an auditory picture of his love interest's face.

Neuroplasticity

So now it's time to move onto neuroplasticity. Remember I said at the beginning that in simple terms, the extremely complex process called neuroplasticity, refers to the human brain's lifelong ability to change and adapt in response to the amount and type of stimulation it receives. The main principle of neuroplasticity is Hebb's law, namely "Neurons that fire together wire together" (Doidge, 2007, p. 63)

When two neurons repeatedly simultaneously fire, chemical changes happen that forge connections between them. These changes happen where the neurons meet at the synapse, the "junction between one neuron and another, across which nerve impulses travel" (PositScience Companion Guide, 2005-2007, p. 82).

The interaction between the two neurons is dynamic. It involves both facilitation (helping - speeding up) and inhibition (hindering - slowing down). The process translates into behaviour that can be modulated and re-modulated. Because it is constantly changing - if it is used the connection strengthens and becomes more sophisticated - if it is not used the connection shrinks. Like all change, depending on the circumstances, responses can be positive or negative, helpful or unhelpful.

To recap – Hebb's law informs us that neurons that fire together wire together. That's a positive change because connections between neurons are forged. Then with repetition these connections are strengthened and new skills are learnt. When the opposite occurs the change is negative. Lack of firing together means connections fade and skills previously learnt diminish.

So stimulation is the key. Use your brain (that is, keep it occupied) or lose it (that is, the skills you already have start to diminish). It's precisely because of these changes that teachers of children with vision impairment and associated disabilities need to be well informed about neuroplasticity and its implications for the classroom.

Five principles of neuroplasticity

So what do we know about neuroplasticity that is relevant for us as teachers of children with vision impairment and associated disabilities? I've come up with five principles (Pagliano, 2012) although the ideas originally come from Doidge (2007).

The first is use. Remember I just said that we need to use it or lose it and the most important way of exercising the brain is through sensory stimulation. Sensory stimulation is essential for neuroplasticity particularly in early childhood. Also it's not just any form of sensory stimulation. The best form is multisensory stimulation where all the senses are working together as a team.

1. Use – sensory stimulation is essential.

Of course, we already have a complication because, for children with vision impairment and associated disabilities, engaging in sensory stimulation can be problematic, especially if the sensory stimulation they are experiencing is neither meaningful nor pleasant.

The second principle is social interaction. Social interaction is essential, especially during the development period (that is, while the child is growing up).

Remember Vygotsky's (1978) zone of proximal development and the vital role a more knowledgeable other (MKO) plays in learning. Well this is very much the case for neuroplasticity. The child needs a more knowledgeable other (MKO) to promote brain development. This is particularly the case for the child with vision impairment and associated disabilities. They need a MKO to help them learn how to make sense of (i.e., be able to understand) the sensory stimulation they are experiencing.

2. Social interaction.

Once again though there's a problem for the child with vision impairment and associated disabilities because the MKO must have specialist knowledge about the senses. Clearly it's not good if the teacher is over focused on the visual.

3. Age related.

The third principle of neuroplasticity is that it is age related. Different types of neuroplasticity come into play throughout the lifespan.

There are two different types of age related neuroplasticity. During childhood there are waves of synaptic pruning where only those synapses that are used, and continue to be used, survive. This is called the critical period of plasticity. Synapses not established during this time are much more difficult to obtain (which explains why it's so difficult to learn a new language in adulthood if you only learnt one language as a child). After childhood, lack of use of established

pathways results in them fading, becoming dormant. They are not entirely eliminated so they are easier to re-ignite.

The critical period of plasticity during childhood occurs in three stages (waves of synaptic pruning). First there is the sensory stage, then the motor/language stage, and finally the higher cognition stage. A key consideration for teachers of children with vision impairment and associated disabilities is the initial critical period of plasticity, the sensory. This is the optimum time for sensory stimulation.

The point here is that for children with vision impairment and associated disabilities the sensory plays a foundational role in neuroplasticity so it is fundamentally important. Furthermore as this is a critical period of plasticity there is a limited window of opportunity. This is particularly significant because the next thing we know about neuroplasticity is there's a knock on effect.

4. Changes over time.

The fourth principle of neuroplasticity is that it changes over time. Neuroplastic changes that occurred in the past influence the nature of current neuroplastic changes and these then have an impact on future changes.

Therefore it's vital to ensure the child has the best sensory foundation experiences possible in early childhood. This includes early prescription of glasses and any other augmentative prosthetic device needed to maximise the child's ability to effectively use their senses.

It also means recognising the powerful role rewards play in encouraging the child to stay engaged. The child must find these foundation sensory experiences enjoyable, interesting, meaningful and rewarding, otherwise they might choose not to continue to engage in them.

So to recap, we now we have four principles of neuroplasticity: use, social interaction, age related, and changes over time.

5. Two strands: Developmental and compensatory.

A fifth principle of neuroplasticity is there are two strands: developmental and compensatory. Developmental neuroplasticity describes brain changes during normal development (i.e., when no problems are encountered and everything is working well).

The assumption with developmental neuroplasticity is there's a spontaneous innate process of development. One thing leads to another and so on and so forth throughout the individual's life. So there's strong sensory development, and this lays the foundation for strong motor and language development, and this lays the foundation for strong cognitive development.

To sum up, with developmental neuroplasticity there's the assumption that the person has all their senses and faculties and that for the most part the brain is developing in spontaneous and innate ways along the lines already described.

The second strand is called compensatory neuroplasticity.

With compensatory neuroplasticity the assumption is that the person experienced developmental neuroplasticity for a period of time until something happened that caused a problem (Doidge, 2016). For example, the person had a stroke and part of the brain was damaged. The brain then started to rewire in new ways to compensate for the loss. Here loss is the operative word.

So now we have five principles of neuroplasticity: use, social interaction, age related, changes over time, and two strands: developmental and compensatory (See Figure 1).

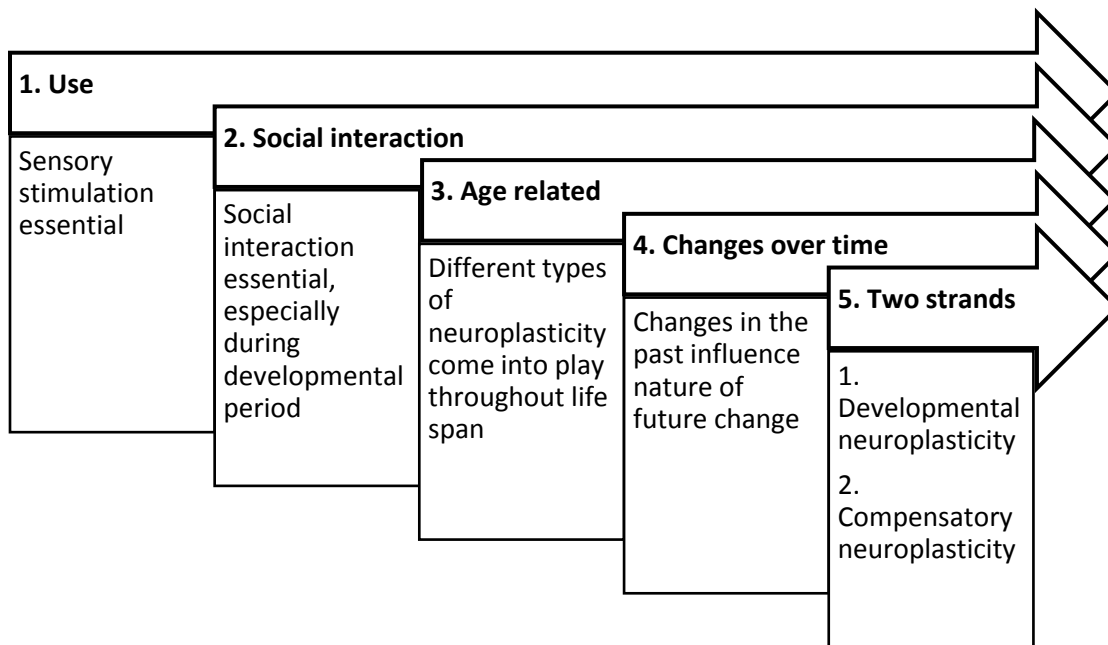


Figure 1. Five principles of neuroplasticity

Exception to the rule

This is where it gets more complicated. The children we're focusing on don't neatly fit into either strand. They were not born with all their senses. As a consequence, their brain development does not always neatly follow the developmental path. Some parts might but there's no guarantee that all areas of the brain will develop in spontaneous and innate ways.

Furthermore, there wasn't a time when their brains were experiencing developmental neuroplasticity before something went wrong so compensatory neuroplasticity doesn't neatly apply either. Remember I said loss was the operative word. These children might not have lost a sense ability. They just simply never had the ability from the start so it's not loss and compensation. I'd therefore like to propose a third stand of neuroplasticity, one that more closely aligns with children with vision impairment and associated disabilities.

I've called this third strand radical neuroplasticity. The word radical comes from the Latin *radix* meaning a root. Radical means affecting the fundamental nature of something, characterised by a departure from what usually occurs.

With radical neuroplasticity we can't be making any clear assumptions. Given the vital importance of the sensory during the critical period of plasticity we must go back to the source and follow the child's sensory processing progress to determine where it is at, and if there's anything we can do to help. We can't just assume that development is going to occur. We need to be much more proactive.

I use the term sensory processing to describe the idea of the senses and perception working together. Sensory processing is an umbrella term that refers to the interface where a sense ends (i.e., the sense ability) and where perception begins (i.e., the interpretation of the sense information).

For sensory processing to occur there are three thresholds that must be crossed. The first is the *detection* or *baseline* threshold. It refers to the lowest level of stimuli required for the individual's brain to become consciously aware of the stimuli, to notice it.

The second is the *recognition* threshold. This is the lowest level at which stimulus is identified by the brain as being familiar in some way.

The third is the *differentiation* threshold. It refers to the lowest level at which the brain can begin to compare and contrast that stimuli. For example, with hearing, crossing this threshold enables the child to determine whether a noise is louder or softer, higher or lower in pitch, faster or slower than another sound. The child must pass through this threshold in order to be able to understand language.

Okay. So now we've talked about the sensory processing interface, the interface between a sense organ and perception, now I want to talk about another interface, this time between the neurons. It's called the *neuroplastic threshold*.

The neuroplastic threshold refers to the uppermost limits of one's cognitive ability. Working on a skill at or near threshold, challenges the brain to adapt. This is when the brain changes itself in positive ways. The three sensory thresholds are all examples of the brain adapting to accommodate the added experience.

Implications for the classroom

It's now time to list some implications for teaching children with vision impairment and associated disabilities.

To start with I'd like to revisit the *use it or lose it* idea. Put simply it's like we have a triangle. If a child uses their brain then the skills keep on developing and strengthening. You're on the positive slope. Alternatively, if the child doesn't use their brain then the skills diminish and you're on the negative side. So your goal as teachers is to keep the child on the positive side of the apex of the triangle.

Kleim and Jones (2008) list nine implications that build on the use it or lose it idea. The first is use it to improve it. Encourage your students to not only use their skills but to improve them. Link the skills with functional activities. Inspire your students to do these activities more accurately, faster, with less assistance.

The second is specificity. For optimal results focus in on a specific functional task. For example, think about a particular sense ability and determine where the child is at. Can he or she detect the sense stimuli, recognise it, differentiate it from other stimuli? Try to be specific with regards to the new skill being taught. For example, at lunch time you might discover that your student is not able to visually differentiate between an orange and an apple. You could then check whether the student can differentiate the two by touch, taste, smell. Use a multisensory approach.

The third is repetition. Remember Hebb's law

(http://web.mit.edu/mcraegroup/wwwfiles/ChuangChuang/thesis_files/Appendix%20D_Artificial%20Neural%20Network.pdf): neurons that fire together wire together. Repetition is extremely important because it's the repetition that leads to the acquisition of a new skill. Also when you're trying to teach a new skill be careful to make certain that you're repeating the specific task exactly the same way each time, otherwise it's not actually repetition. Each change makes it different so then it's not repetition.

The fourth point is intensity. Remember we talked about the four thresholds. In order for change to take place there needs to be sufficient intensity for the connection to be made. You therefore need to closely observe how well the child is able to tolerate the stimuli and gradually increase it once the child is ready. For these children even mild levels of intensity can be overwhelming and tiring at first. The message here is increase the intensity gradually and don't give up. Persistence is the key.

The fifth point is time. Making connections takes time. These things can't be rushed. Also carefully observe when is the best time of the day for the child to be doing this training. Often the child is more open to such activities in the morning.

The sixth point is salience. We've already talked about this as well. For the activity to be effective it must be meaningful for the child. The activity must make sense to the child otherwise he or she won't continue doing it. So the activity needs to be meaningful, relevant, novel and rewarding.

The seventh point is age. Remember we talked about the critical period of neuroplasticity in childhood and the three stages of optimum development. Neuroplasticity occurs more easily in younger brains and during the critical periods. That said it's never too late for change to take place so it's important to maintain an optimistic attitude.

The eighth point is transference. Once a new skill has been learnt then this provides a foundation opportunity for the acquisition of a similar but new skill. It's a kind of grafting process.

The ninth point is interference. The teacher needs to be aware that sometimes a particular skill may be hindering the development of new skills. Doidge (2007) talks about plasticity having a downside in so far as we can get caught in ruts. Teachers therefore need to be careful that children are not repeating behaviours that are unproductive. An example of this would be stereotypical behaviours.

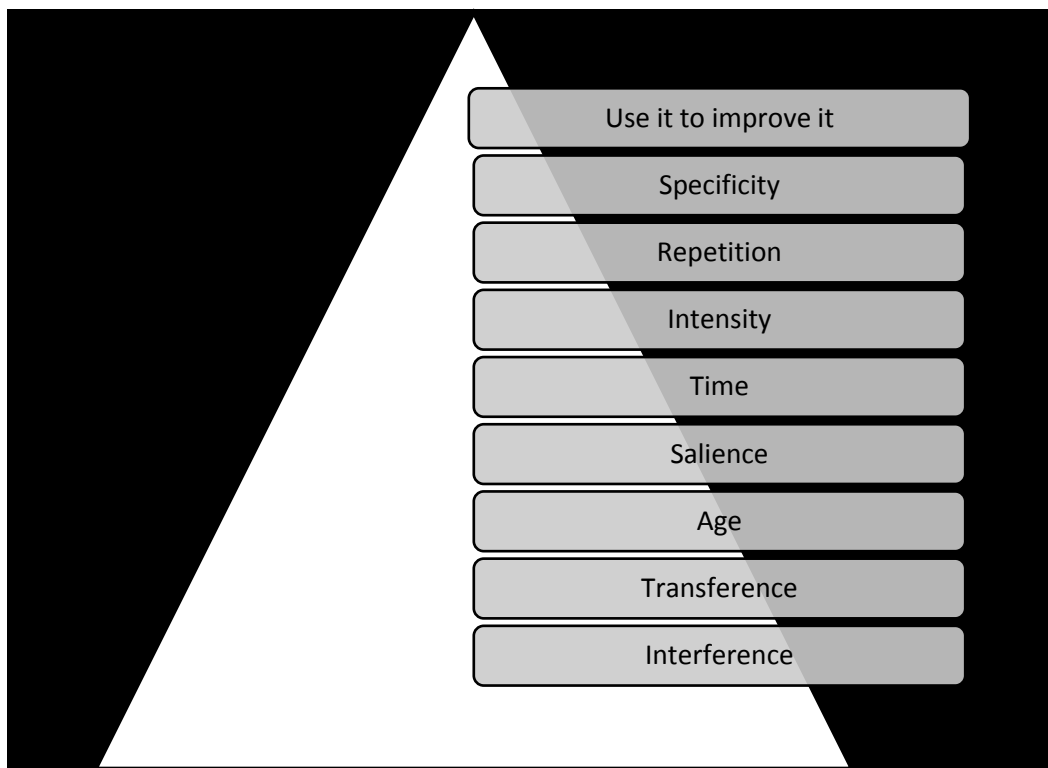


Figure 2. Neuroplasticity implications for the classroom

So there's always new things to learn about neuroplasticity but unfortunately we've run out of time. I'll therefore finish with Figure 3, which provides a brief summary of today's talk.

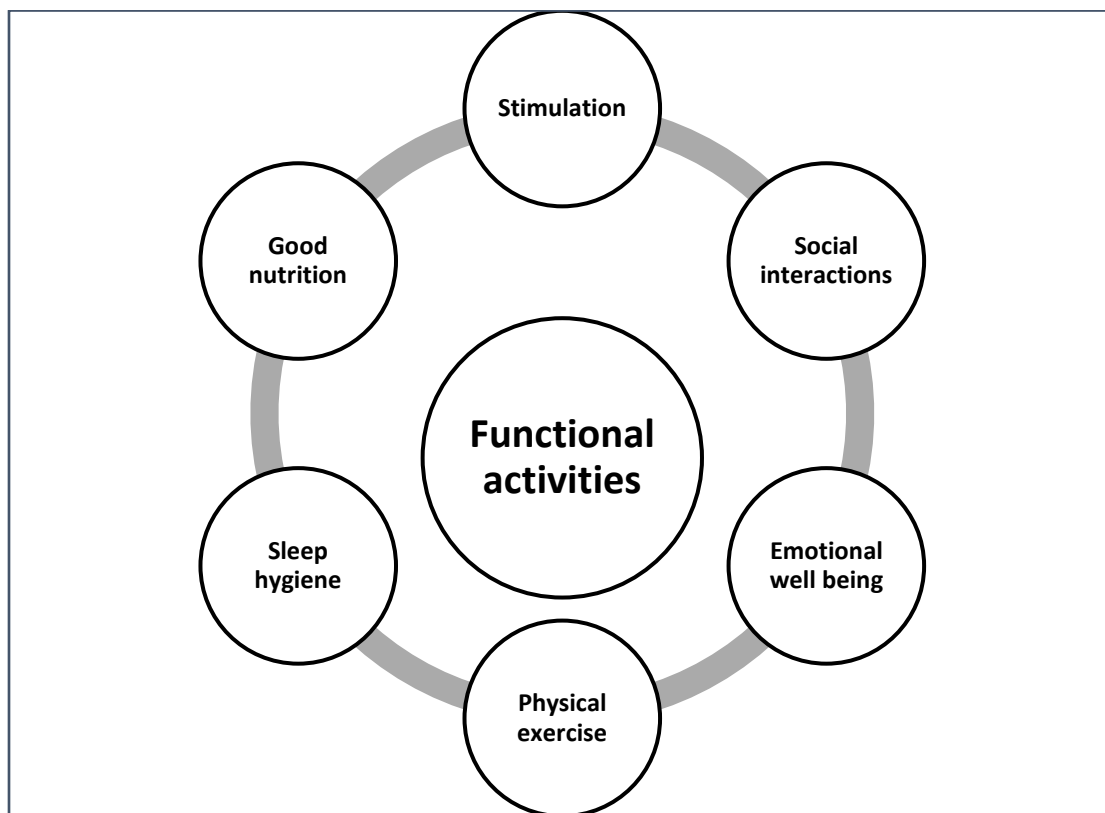


Figure 3. Summary of factors that reinforce positive change

References

- D'Annunzio, G. (2014). *Translating literature. La pioggia nel pineto. English translation by Stefi*. Retrieved from <http://literatureandtranslation.blogspot.com.au/2014/02/la-pioggia-nel-pineto-una-poesia-di.html>
- Cattaneo, Z., & Vecchi, T. (2011). *Blind vision: The neuroscience of visual impairment*. Cambridge, MA: MIT Press.
- Doidge, N. (2007). *The brain that changes itself: stories of personal triumph from the frontiers of brain science*. New York, NY: Viking (Penguin).
- Doidge, N. (2016). *The brain's way of healing: stories of remarkable recoveries and discoveries*. New York, NY: Penguin.
- Hull, J. M. (1990). *Touching the rock: An experience of blindness*. New York, NY: Pantheon Books.
- Kleim, J. A., & Jones, T. A. (2008). Principles of experience-dependent neural plasticity: implications for rehabilitation after brain damage. *Journal of Speech Language Hearing Research*, 51(1), S225-39. doi: 10.1044/1092-4388(2008/018).

- Pagliano, P. J. (1999). *Multisensory environments*. London: David Fulton Publishers (Routledge).
- Pagliano, P. J. (2001). *Using a multisensory environment: A practical guide for teachers*. London: David Fulton (Routledge).
- Pagliano, P. J. (2012). *The multisensory handbook: A guide for children and adults with sensory learning disabilities*. London: A David Fulton Book (Routledge). Paperback and eBook.
- Posit Science Companion Guide. (2005-2007). San Francisco, CA. Posit Science.
- SPCK. (1990). *Touching the rock: An experience of blindness*. Retrieved from <http://www.johnmhull.biz/Touching%20the%20Rock.html>
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. [Kindle edition]. Retrieved from <http://www.amazon.com>

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Paper presented at the Biennial Conference of the South Pacific Educators in Vision Impairment (SPEVI), Brisbane, January 2016

(Editor's Note: This paper has been edited from the original conference presentation)

Report: International Council for Education of People with Visual Impairment - Frances Gentle, President; and Ben Clare, Chair of ICEVI Pacific

The International Council for Education of People with Visual Impairment (ICEVI) is an international organisation that shares with SPEVI the goal of promoting equitable access to education for children and young people who are blind, have low vision, deafblindness or additional disabilities. At the global level and within its seven world regions, ICEVI works closely with the World Blind Union, the International Agency for the Prevention of Blindness, United Nations agencies, the World Health Organization, international development organisations, and government and non-government service providers for children with disabilities.

ICEVI held its strategic planning meeting for the 2017-2020 quadrennium in Pretoria, South Africa in February 2017. The ICEVI Executive Committee (EXCO) reaffirmed its commitment to the ICEVI Mission and set a bold agenda to promote equitable, quality education for children and young people with vision impairment in under-resourced developing countries. The challenges in achieving ICEVI's Mission of education for all children with vision impairment include the decline in global and national funding for education and the rising numbers of out of school children due to conflict and displacement. It is of great concern that in the developing countries of Africa, Asia and Latin America, where 90% of all children with vision impairment live, less than half of these children have access to any type of formal or non-formal education.

The role of ICEVI President involves regular teleconferences with the Principal Officers and the Chairpersons of ICEVI's seven global regions. At the global level, the role also includes advocating for the education rights of people with vision impairment and representing ICEVI at meetings and working groups of UN agencies and global organisations, including the Global Campaign for Education and the International Disability and Development task groups. At global, regional and national levels, my role includes delivering national and regional presentations and practical workshops at conferences and forums for parents and education, health and rehabilitation professionals. Information about the activities of ICEVI are published in The Educator and the ICEVI E-News – see <http://icevi.org/publications/>.

This report focusses on three ICEVI projects that took place during 2017. The Mathematics and Higher Education projects were conducted at the global level of ICEVI, and the Perkins Repairs project in Papua New Guinea was conducted at the ICEVI Pacific Regional level.

Mathematics Project

The aim of the Project is to develop approximately 150 to 200 training videos that explore the mathematical concepts presented in the ICEVI publication, “Mathematics made easy for children with visual impairment” (ICEVI, 2005, available from <http://icevi.org/publications/index.htm>). Each training video will include an explanation of the specific concept, how the concept is generally taught to sighted students, and what adaptations are required for students with vision impairment, including teaching techniques and teaching aids. The ICEVI Mathematics Project is supported by The Nippon Foundation, and technical guidance is provided by the Perkins School for the Blind, Overbrook-Nippon Network for Educational Technology (ONNET) and the Texas School for the Blind and Visually Impaired. Meetings of the Academic and Core teams of the Mathematics Project were held this year at the Texas School for the Blind and Visually Impaired and Overbrook School.

Higher Education Project

The aims of the Higher Education Project is to promote higher education institutions that are inclusive of students with disabilities and to develop the performance of tertiary-age students with vision impairment by training them adequately in using technology. Since the project began in Indonesia in 2006, ICEVI has partnered with the Nippon Foundation and leading disability organisations in Cambodia, Philippines, Indonesia, Vietnam, Myanmar and Lao PDR. Over the past decade, the project has resulted in more than 2000 higher education enrolments of students with vision impairment. In 2017, the project was extended to Mongolia where the focus will include teacher preparation in tertiary institutions, creation of a unified Mongolian braille code, assistive technology training and development, and public education programs for universities and communities.

PNG Perkins braille machine repair workshop, 29 May to 2 June 2017

The Network of Callan Services, a special ministry of the Christian Brothers works closely with disability resource centres in the majority of provinces in Papua New Guinea (PNG), offering a wide variety of services to children and adults with varying disabilities. The first of these centres is the Mount Sion Resource Centre, formally known as Mount Sion School for the Blind. The Mount Sion Resource Centre is situated in the Eastern Highlands Province and has been assisting blind and vision impaired children since its establishment as a boarding school in 1982. Since the early 1980s, service provision for blind and low vision students, as well as people with other disabilities has expanded to more than twenty locations across PNG, and includes education, community based rehabilitation and early intervention services.

As service provision for people with vision impairment has expanded and diversified, the range of equipment needed for educational and daily living services has increased, leading to the importation of expensive but essential items from various countries where adaptive equipment is manufactured. One such item is the Perkins braille, produced by Perkins Products, a division of the renowned Perkins School for the Blind in Boston, United States. This low tech, mechanical braille is the most widely used technology in PNG for braille writing and production of braille texts.

Partnerships involving the Network of Callan Services, CBM and other donors has resulted in a large number of Perkins brailers brought into PNG. The first brailers were purchased for the blind students enrolled at Mount Sion School for the Blind, with increasing numbers of brailers purchases as resource centres were established across the country. The Perkins braille, although not mechanically complicated, is prone to malfunction and inoperability in the hot, humid and dusty environments of PNG. The lack of suitably qualified braille technicians in the country, combined with the low level of use of braille slates and styles, often meant that brailers remained out of service for long periods of time. As a result, students and others not having access to braille and braille production tools. This situation was further exacerbated by the cost and time involved in sending brailers overseas for repairs.

When I assumed the role of ICEVI Pacific Regional Chairperson in 2016, I sought to establish contacts with Perkins Solutions in an attempt to get technicians trained in PNG. With my ongoing connections to PNG and the presence of functioning and well-funded disability service organisation supporting blind and vision impaired people, I realized it would be a good location to test whether a program of this magnitude could be successfully delivered and would remain sustainable.

The trainees involved in the one-week workshop were drawn from Callan staff working at resource centres throughout the country. The four women and three men had some experience with operating a braille but no prior knowledge of maintenance procedures. The workshop focused on practical activities where participants were given malfunctioning brailers to repair. The brailers belonged to the University of Goroka and Mt Sion Resource Centre, and I delivered the training through a series of presentations, supported by printed documentation and videos acquired from Perkins and the Internet. As one of the participants was vision impaired, and the printed materials were made available in accessible Microsoft Word format which he could read with his laptop and screen reader, and the videos were audio narrated.

The workshop was a major success with a total of 16 brailers repaired to a degree they could be useful to students and others who require them. Two additional brailers could not be repaired as they require spare parts which were not available during the

workshop. However, the trainees were able to identify the problems with the brailers and suggest the parts needed for the repairs to take place. Participants were asked to complete evaluations at the close of the workshop, inquiring about their knowledge of brailers prior to and after the training had taken place. Perkins data sheets were provided for the participants to record the repairs carried following their return home.

In conclusion, I would like to express my sincere gratitude to the Network of Callan Services, Perkins Solutions, CBM, NZAID and the trainees for a productive and successful workshop that has the potential to increase educational opportunities for blind and low vision learners. I also recognize the significant contribution made by ICEVI, specifically its Executive Committee for its support and endorsement of this project. If an ongoing partnership is established between CBM, Callan Services and Perkins Products, I am confident this project will continue to produce positive results.

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World Access for the Blind – Australia. Our Work, Our Vision – Julee-Anne Bell

World Access for the Blind – Australia is a not for profit company that aims to raise funds to facilitate the self-directed achievement of people with all forms of blindness. We strive to increase public awareness of the strengths and capabilities of blind people through education and community involvement.

WAFBTA has been operating for just over four years and I am thrilled to say that we have come a long way in a relatively short time. Our main function has been to support clients in their work with visiting FlashSonar specialist and qualified O&M instructor, Daniel Kish. However, we have been able to broaden our brief to provide clients and their families with numerous other services including educational consultancy, obtaining high quality canes and other mobility aids and providing ongoing support to our clients and their families.

Daniel's most recent visit took place in April/May of this year and encompassed four states, Queensland, New South Wales, Victoria and South Australia. Our work was not restricted to metropolitan areas with Newcastle and Ballarat being included in Daniel's busy schedule. Our clients ranged in age from 18 months to 60+ years. Reports from clients, families and professionals range in their descriptions of their time with Daniel from educational to life-changing. Everyone went away with new information and some went away with a whole new outlook on the rest of their lives.

We also offered families a chance to spend an intensive weekend with us to improve their FlashSonar skills and strengthen family networks. This was our third such camp and this year, we welcomed four families from Victoria to join our Queensland campers for a weekend of learning and laughter. We invited several professionals to work with our parents, our blind campers and our sighted siblings to create a busy programme for the 2.5 days of the camp. These professionals included Daniel Kish, (this was a part of his visit to Australia), Penny Stevenson, (O&M instructor, formerly with Vision Australia), Nicole Donaldson, (vision impairment teacher), Linda Conyard, (a trauma therapist with experience in family counselling) and Melissa Fanshawe, (educational advocacy specialist and parent of a child with a vision impairment). The skills of these professionals were supplemented and overseen by me. My own lived experience served as both a powerful role-model for blind campers and a resource for parents with many questions about the challenges faced by their children as they move through life. All camp participants let us know that this was our best camp ever which makes the prospect of planning for next year quite daunting.

As we move forward, our main focus is on being ready to deal with the challenges and benefits of the NDIS. We are working to become a service provider although we have already provided training and equipment to clients who are self-managed or plan-managed. We hope to have our service provider status in place by the beginning of 2018.

World Access for the Blind – Australia sees itself as a growing presence in the blindness service field. We are an organisation serving the blind and we are led by the blind which sets us apart from many of the major players in the industry. We know that clients respond well to this difference and we will continue to utilise the skills of blind professionals wherever possible, however, we respect and value the skills of our sighted peers. While our sister company in the US only employs sighted people in administrative and marketing roles, we are open to the idea of employing sighted O&M instructors and other specialists when we have the resources to do so. However, such specialists would have to demonstrate a full understanding of our philosophy.

In 2018, we plan to offer another family camp, our fourth, which will take place from the 8th to the 10th of June. We are also launching a youth group in Brisbane called WAY, World Access Youth and we plan to have several youth activities on the calendar. We also plan to engage either Daniel Kish or one of his competent team of navigational specialists in the second quarter of 2018 with a view to having this instructor attend our family camp. We look forward to working with our clients, their families and professionals in the vision impairment field in 2018 and into the future.

Julee-anne Bell

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Report: Accessible, fun, and educational: Sonokids' audio based game apps are specifically designed to support learners with visual impairments and blindness in building digital skills – Phia Damsma

'Ballyland' is a series of software designed for children who are blind or have low vision. This popular series consists of Ballyland keyboarding software, "Stay Still, Squeaky!", Ballyland Magic and Ballyland Rotor. Recently new apps have been developed specifically for adolescents and older learners as well. The Sonokids apps have been featured in the AppStore's Special Education apps.

New release: Ballyland Sound Memory

A fun sound-matching game for children, building basic understanding of a math grid on a touch screen, and supporting the development of Locating, Memory, Listening, and Spatial Awareness skills. Prerequisite skills: foundation VoiceOver finger gestures (single finger flick, finger drag and double tap). These skills can be acquired with the acclaimed 'Ballyland Magic' iPad game app.



New release: VO Lab

An educational iPad game app designed for adolescents who are blind or have low vision to learn and explore touch gestures for VoiceOver, Apple's built-in screen reader on iOS Devices. The app is both entertaining and educational, and provides beginning learners of VoiceOver with opportunities to gain the required foundation skills to use the iPad or iPhone independently. Follow the instructions of a strange professor in his chemical lab. Help with the experiment in which (fictional) chemicals will react with spectacular sound effects!



Look out for the upcoming release of "Sound Memory XL" app for teenagers, with challenging sounds and memory games.

To subscribe to the **Sonokids newsletter** and to keep up-to-date with all the latest developments, check the website: <http://www.sonokids.org>.

From the website you can also download **free files to 3D print** fun learning tools of the Ballylanders. Currently available: Ballicopter, Squeaky and Wheelie.

Phia Damsma

Creative Director of Sonokids

SPEVI Web Administrator and List Moderator

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Report: Monash University - Leona Holloway

Over the past ten years, a small team of researchers at Monash University have been investigating technologies and presentation methods for making graphics accessible to people who are blind or have low vision. The team works within the Faculty of Information Technology's Creative Technologies and HCI discipline group, making use of the group's expertise in data visualisation. The group also encompasses sensiLab, a maker space with cutting edge technologies for quick prototyping and creation of tangible interfaces.

Partnerships with the vision impairment community are key to ensuring that our research is focused on user needs.

Accessible Graphics website

Monash have established a new website at <http://accessiblegraphics.org> as an information hub on accessible graphics. It provides information and resources to assist people in choosing a format for access to graphics and learn more about these formats, including new or under-used strategies such as sonification freeware. The website also provides updates on our research and international developments relating to accessible graphics.

Insight Education projects

Two projects were undertaken with Insight Education to investigate the use of the GraVVITAS system for incorporating audio-labelled images in iBooks, and 3D printing to create classroom resources. A range of sample materials specific to the school's needs were produced and trialled with staff and students. As a result of this work, Insight is now developing the skills to create their own custom designed 3D objects to support learning in the school and their mobile classroom.

Accessible artworks with Bendigo Art Gallery

Monash have partnered with the Bendigo Art Gallery to enhance inclusivity of the gallery experience. As a supplement to the gallery's existing guided audio tours, vision impaired visitors will be able to request access to tactile and 3D representations of some of the key artworks from the gallery's highly regarded permanent collection. This project has been supported by Creative Victoria.

Vision Australia Map

As part of their major refurbishment of the Kooyong head office, Vision Australia have asked Monash to produce accessible maps of the premises with interactive audio

labels. User testing with the maps will help inform ongoing research into touch strategies and best practice design considerations for 3-dimensional maps.

Future work

Looking forward, Monash is hoping to attain a grant to conduct a three year project investigating 3D printing to improve access to graphics by people with a vision impairment. The Victorian Department of Education and the Round Table on Information Access for People with Print Disabilities Inc. will serve as major partners along with RIDBC, RSB and Guide Dogs Victoria. The project will focus on the use of 3D prints for teaching tactile literacy, STEM materials in the classroom, and mapping for orientation and mobility.

Researchers from Monash University's Faculty of IT in the Immersive Analytics and sensiLab research groups have been undertaking several projects related to the provision of accessible graphics to students. These include a major Office for Learning and Teaching (OLT) funded project understanding the current challenges in provision of accessible materials along with the development of a practical model for improving delivery to university students with severe vision-impairment, as well as a number of smaller projects investigating specific technologies to improve access to graphics by people who are blind or have low vision.

Improving vision impaired students' access to graphics in higher education

This two-year project aims to improve vision impaired students' access to graphics in higher education. It began with a national online survey of vision impaired students in higher education and semi-structured interviews with students, their disability support staff, academics and accessible formats producers to determine and evaluate current practices. It was found that most vision impaired students at university miss out on at least some potentially important graphics, and that lack of access impacts on their choice of study area and ability to participate in group work. Full results and analysis are available at <http://www.tandfonline.com/doi/full/10.1080/07294360.2016.1177001>.

A series of pilot studies were then conducted with a small number of students and their support staff to trial strategies for improved access to graphics. Enhanced communication, use of tutors to provide on-the-spot access, and a broad array of graphics accessibility options proved successful.

Finally, a workshop was held with representatives from all stakeholder groups. Difficulty in transitioning from school to university was highlighted as an issue, with students being expected to arrive at university with the assistive technology skills and equipment

they require as well as the confidence to advocate on their own behalf. A full project report will be made available through the OLT.

GraVVITAS

GraVVITAS is a system for quick and easy creation and distribution of graphics with audio feedback, developed by Cagatay Goncu. It consists of a simple online tool for creating the graphics, and an iOS app for access via touch, sound and audio labels. A graphing function has recently been added to the authoring tool, allowing automated creation of line, bar, pie and scatter graphs from an equation or data. Development work continues on added functionality for automated recognition and conversion of floorplans. Also in development is a haptic ring that provides feedback in the form of vibrations for the Reader app and can potentially be used for other purposes. The GraAuthor tool is located at <http://raisedpixels.com/author> and the Raised Pixels Reader app can be downloaded from the iTunes store. Both are free to use and queries and feedback are welcomed.

3D printing

Use of both GraVVITAS and 3D printing have been tested with vision impaired school children, university students and adults. 3D printing offers a new and increasingly affordable option for creation of accessible graphics. It is said to be useful for anything too large, too small, too fragile, too rare or too dangerous to touch. Objects of greatest interest to our participants were maps, topography, landmarks and biology. Touch readers reported being able to form a more complete and memorable mental image using a 3D model compared with a tactile graphic. 3D-printed objects also present an opportunity to teach concepts of abstraction from the real world to abstract, two-dimensional representations.

Labelling presents a particular challenge for 3D-printed objects. Braille labels can be added but spacing is limited. We created several talking maps with audio labels for points of interest and we are exploring a range of affordable options for associating audio descriptions with 3D-printed objects. More work is planned in this area.

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Addendum

Two similar copies of the Aiwa and Pagliano paper "Equity and access for children with vision impairment: where is Papua New Guinea now and where should it be in 2015?" have been published. The first was of a conference paper initially presented at the 2011 Inaugural National Universal Basic Education Conference, 12.7.2011. This paper was published after a lengthy delay in its original form in the conference proceedings in August 2013 by the Papua New Guinea National Research Institute. The second was a peer reviewed revised version of the same paper published in the Journal of the South Pacific Educators in Vision Impairment mid-2013. The Papua New Guinea National Research Institute and the Journal of the South Pacific Educators in Vision Impairment have agreed to share copyright of these two papers.

About SPEVI

The South Pacific Educators in Vision Impairment (SPEVI) Inc. is the major professional association for educators of students with vision impairments in Australia, New Zealand and the South Pacific region. SPEVI acts as the professional body in matters pertaining to the education and support of persons who are blind, have low vision, deaf-blindness, or additional disabilities. SPEVI membership is open to educators, professionals and parent groups who support and promote education for persons with vision impairment.

SPEVI Inc is an Association incorporated under the laws of NSW, Australia –
Registration number INC9889733.

SPEVI Vision

To promote educational systems in Australia, New Zealand and the South Pacific in which diversity is valued and disability is not viewed as a characteristic by which to judge a person's worth.

SPEVI Mission

To stimulate professional and public debate and action on vision impairment issues and change which affect, or have the potential to affect the daily lives of persons who are vision impaired, while emphasising concepts of inclusive, responsive educational communities and interdependence between learners and families within those communities where all people are valued.

SPEVI Aims

- To be recognised as the professional body of educators whose specialty is in matters pertaining to the education of persons with vision impairment in Australia, New Zealand, and Pacific Island Countries.
- To advocate on behalf of members, persons with vision impairment and parents/carers for equitable education access and participation, in accordance with international and national disability anti-discrimination legislation.
- To encourage the highest standards in the educators of persons with vision impairment by promoting research and professional training for general and specialist teachers.
- To promote and facilitate the interchange of information and collaboration among educators, professionals, parent groups and the broader community concerning education and equal opportunity for persons with vision impairment.
- To encourage the use of appropriate mainstream and assistive technologies, resources and optical and non-optical aids, in the education of persons with vision impairment, and to promote teacher education programs in the use and care of existing and new techniques and technology.

SPEVI Structure

SPEVI operates at two levels:

- National level, by means of the Committee of Management;
- Local level (state/territory), by means of a Branch comprising SPEVI Councillors and members who reside in the location.

SPEVI Code of Ethics

All members of SPEVI will:

- Work for the good of SPEVI and actively support and promote its Aims as defined in the SPEVI Constitution;
- Act honestly and with respect and integrity at all times;
- Provide leadership for all members of SPEVI to foster high ethical standards;
- Act to enhance public awareness of SPEVI's objects; and
- Maintain transparency of decision-making within SPEVI.

Committees of Management

SPEVI is managed at the national level in Australia and New Zealand by a Committee of Management. The national Committees, subject to SPEVI's Constitution and to any resolution passed by SPEVI in general meeting, are responsible for the governance and

Addendum

management of the activities of the Association and its members. The Australian Committee manages and supports Australian and the Pacific Island members.

Australia Committee of Management, 2017-19

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For a list of SPEVI Councillors for the 2017-19 Biennium, please visit the SPEVI website, www.spevi.net

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