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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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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 of charge and is available on the SPEVI website: https://www.spevi.net/jspevi/

Membership information and forms are available on the SPEVI website: https://www.spevi.net/join/

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

Authors must submit a separate file containing (a) the manuscript title, (b) author or authors' name, professional title/status and organisational affiliation of authors, and (c), preferred contact details (address, email, fax, telephone) for the principle author (or co-author) who will be handling correspondence.

File 2 Manuscript

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).

Size limit: The preferred size limit for scholarly manuscripts is 5000 words or less. The preferred size of agency reports is one A4 page of single line text.

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.

Referencing guidelines: Citations and references included in manuscripts should conform in style to the American Psychological Association (APA). APA guidelines are available on the Griffith University website: https://www.griffith.edu.au/library/study/referencing/apa-7

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Compliance with ethics requirements: For manuscripts reporting original research studies, authors are responsible for ensuring that the reported research has been conducted in an ethical and responsible manner, with full compliance with all ethical requirements and legislation. This includes adherence to privacy and confidentiality guidelines regarding publication of participant information, including de-identification of participants' information and data. Authors must confirm in the manuscript that written consent has been obtained prior to publication if participant information is included. Where such a person is deceased, authors are responsible for securing written consent of the deceased person's family or estate. Authors are encouraged to consult the Australian Government National Health and Medical Research Council's **National Statement on Ethical Conduct in Human Research (2007) – Updated 2018**, see https://www.nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018

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.

Manuscript submission: Please forward your contributions to the Convening Editor, Dr Bronwen Scott, Email: bronscott@iinet.net.au

Editorial

Dr Bronwen Scott

Welcome to JSPEVI's fifteenth volume. The journal aims to provide a forum for scholarly exchange among organisations and individuals who support and promote education for learners with vision impairment. The journal will be available in an open-access digital format only, in order to allow the widespread sharing of information, so please feel free to share via the SPEVI website. Previous editions of the journal are also available here: https://www.spevi.net/jspevi/.

This volume includes three interesting papers, as well as news and reports from around the region. Our first report comes from the Netherlands and evaluates a programming education tool as a teaching material for children with blindness and low vision. The authors explore the usability and accessibility of the "Sandwich Robot" lesson, in which children learn about programming and computers by working together in an assignment where they program each other as a robot. Their data shows that the Sandwich Robot is promising as an inclusive teaching tool since it is flexible in its usage, children are able to either work through vision or tactile means, and the tool appears highly engaging and motivating.

Our second paper also concerns technology, with an exploration of how advisory teachers can make decisions around braille technology, including when and how braille technologies can be introduced. Jackie Kirkman, an Advisory Visiting Teacher in Queensland explores the research that exists in this area along with some of the associated issues. She provides some useful ideas that can be used in your practice if you are working with students utilising braille and braille technology.

Our third paper in this volume is a more personal reflection on the challenges of gathering information from parents about the needs of their family, particularly if they are dealing with issues of grief following a diagnosis. Bill Sakoulas reviews a range of current practices and explores his personal insights and when considering how to structure an interview with parents of one of his students. His paper provides an example of a family interview which may assist other families dealing with the varied facets of coping with a child with a sensory disability.

This edition also includes a report from Phia Damsma on a 2022 project undertaken by Sonokids and supported through funding from SPEVI. Please do read about the latest Sonokids app, 'CosmoBally on Sonoplanet'. It introduces students to Sonification, which is the use of non-speech audio to represent information or data.

There is also an update on what is happening in the wider Pacific region through the International Council for Education of People with Visual Impairment (ICEVI). It is always heartening to hear about the many successful projects happening throughout our region.

Many of you would have been participating in the 2023 SPEVI Conference that took place in January. The conference was very successful and included participation from a number of conference hubs in Kiribati, Vanuatu and the Solomon Islands. Many thanks to our conference organisers in New Zealand, and to Trudy Smith from NextSense Institute for her expertise in facilitating the online component.

Finally, I would like to thank our contributors, as well as the JSPEVI Editorial Committee and Advisory Panel for their assistance in putting together this edition.

Dr Bronwen Scott
Editor
bronscott@iinet.net.au

SPEVI Presidents Message
Sharon Duncan (New Zealand), Phia Damsma (Australia) and Frances Gentle (Australia)

Dear Readers,

Welcome to the 15th volume of the SPEVI journal. SPEVI is a professional membership association which was established in 1955. For the past 67 years, SPEVI has promoted the right to quality education for children and young people with blindness, low vision, deafblindness, and multiple disability. The priorities, activities and membership base of the association have changed over the years in response to the changing education and social landscape for persons with disabilities. In recent years, positive changes in education for children with vision impairment (VI) have resulted from growth in accessible ICT and social media, and national adoption of United Nations human rights instruments and the WIPO Marrakesh Treaty. Challenges have been associated with school closures and the rapid shift to online learning due to the COVID-19 pandemic. In response to these changes and disruptions, specialist VI professionals have found new and innovative ways of supporting children and families and facilitating quality learning outcomes.

On behalf of the Committees of Management of SPEVI Inc and SPEVI NZ, we are pleased to present this snapshot of activities during 2022.

SPEVI 2023 Conference - Cultivating New Futures Together: Growth for Life

As we write, planning and preparation for the SPEVI 2023 conference is almost complete. This is an online conference, to be held via Zoom from 18th - 20th January 2023. A high number of abstracts were submitted and the programme is available on the SPEVI Conference website. The conference has attracted three highly esteemed Keynote Speakers: Professor Cay Holbrook, Professor John Ravenscroft and Dr Lisa Hamm (see bios and outline of presentations on the conference website.

A new initiative for this conference is the creation of three Pacific Conference Hubs to support attendance, presenter opportunities and engagement with SPEVI from across the Pacific. These hubs have been sponsored by ICEVI and SPEVI, and participants from Solomon Islands, Kiribati and Vanuatu will each book a venue with a quality internet connection and relevant IT equipment and support. Catering, travel costs and transport support for outer island participants will also be supported. Evaluation of the Hubs will inform possibilities for utilising Pacific Hubs for future SPEVI conferences.

The Conference host, SPEVI NZ, sincerely thanks the SPEVI Conference Committee, which is made up of members from Fiji, Australia and New Zealand. The Committee has worked tirelessly to ensure the success of this conference. We also thank our sponsors and exhibitors: Sonokids, Blind Sports Australia, Braille Designs NZ, NextSense and Macquarie University.

SPEVI Conference Archives

SPEVI offers an open access repository on the SPEVI website of past conference presentations and papers. This repository is a valuable contribution to researchers and VI professionals in Australia, New Zealand and internationally. At the conclusion of the 2023 SPEVI conference, we will endeavour to upload all conference materials to the repository, including recorded keynote presentations, paper and poster presentations and handout materials.

Progressing the SPEVI Inc Strategic Plan

Members of the SPEVI Inc Committee of Management (COM) include Australian practitioners and researchers in the field of vision impairment, together with representatives of ICEVI global and ICEVI Pacific. The COM developed a Strategic Plan for 2020-2024 which addresses the mission and aims of the association and includes supporting SPEVI office bearers, parents, and professionals. Annual progress is monitored by the COM and updates are provided via the SPEVI journal, conferences and the SPEVI website.

Membership

SPEVI Inc. transitioned to an online membership system during 2020. At the present time, the system accepts memberships from Australia and Pacific Island Countries, with New Zealand applications directed to the SPEVI NZ Secretary. In October 2022, SPEVI Inc introduced an online credit card payment system. We extend our thanks to Craig Cashmore of PeppaCode for his assistance with the required coding and technical support.

Community of Practice

With the shift to online communication during COVID, professionals and parents have become skilful in connecting with online meetings and events. SPEVI currently offers an early intervention (VI) community of practice (EIVI CoP) for members and non-members who support young children with vision impairment. The CoP was established by convenors Lara Anderson and Sharon Duncan, in collaboration with Bronwen Scott, and five meetings took place during 2022. For information about the

EIVI CoP and the planned 2023 meetings, please visit the EIVI CoP webpage on the SPEVI website or email spevi.eivicommunity@gmail.com.

SPEVI is planning to establish a parents' community of practice in 2023, which will be convened by Dr Melissa Fanshawe. For more information, please email Melissa.Fanshawe@usq.edu.au.

SPEVI Website, News List and Facebook Pages

One of SPEVI's key aims is to promote and facilitate the interchange of information and collaboration among professionals, researchers, parent groups and other stakeholders, who are concerned about the rights of children and young people with vision impairment. The SPEVI website, news list and Facebook pages are essential in achieving this aim.

The SPEVI website is a valuable source of information about SPEVI and VI education. The website serves as a repository for SPEVI publications, links to useful resources, and announcements of upcoming events. We aim to ensure the website is current and accurate and welcome your input into any additions or changes to content. For more information, please email the webmaster, webmaster@spevi.net.

The **SPEVI News List** is open to members and non-members of SPEVI. There are currently around 520 subscribers who share information from the field of VI education, including current research, technology advances, and educational practices. You can read here how to subscribe to the SPEVI News List. Please note that receiving emails from the SPEVI News Lists does not imply that your SPEVI membership is up to date.

SPEVI has two **Facebook pages** and new subscribers are always welcome. The first Facebook page is for general information sharing and the second is focussed on mathematics. For information and to join, visit the SPEVI Facebook page and/or the Educators supporting students with V.I. in Maths' Facebook page.

Member Projects

In recent years, SPEVI Inc has been supporting member projects that are aligned with the mission and aims of SPEVI and which address the professional and research priorities of members. The following member projects have been supported during 2021-2022.

- Monash University "Accessible 3D Printed Graphics" project, an Australian Research Council (ARC) Linkage research project. SPEVI's financial contribution has been as a member of the Round Table on Information Access for People with Print Disabilities. We congratulate Leona Holloway and the Monash research team for the substantive project outcomes. Guidelines resulting from the project can be found at https://printdisability.org/about-us/accessible-graphics/3d-printing/.

- Dr Melissa Cain of the Australian Catholic University undertook a research project entitled “Learning to access – Lessons for learning in COVID-19 times”. The research team included Melissa Fanshawe and Polly Goodwin, and details of the project and its results can be found in JSPEVI Volume 14 (2021).
- Phia Damsma of Sonokids Australia undertook a project entitled “Sonokids Ballyland app for Emergent Sonification Literacy”. The 2022 project included development of an educational app, ‘CosmoBally on Sonoplanet’, for early learning of sonification concepts and skills. The app is designed for all children and is fully accessible for children with vision impairment. The app is available for free download from the Apple AppStore and Google Play and a report on the project is included in this volume of JSPEVI.
- Dr Joanne Mosen, President of ICEVI Pacific, undertook a study entitled “Educational access for children who are blind in Vanuatu”. The project received human ethics approval from the University of Newcastle and commenced once the COVID restrictions had eased in Vanuatu. The study team plan to share the outcomes with the Vanuatu Ministry of Education and Training and other stakeholders, with the aim of promoting increased opportunities for inclusion of learners with vision impairment.
- SPEVI, in collaboration with ICEVI, is funding in-person Pacific “hubs” for the SPEVI 2023 conference in Kiribati, Vanuatu and the Solomon Islands. Evaluation of the hubs is expected to determine their effectiveness, uptake, strengths, opportunities for improvement, outcomes, and possibilities for conference hubs in the future.

The SPEVI Inc. Committee of Management invites members to consider submitting proposals for projects, activities and events. General information and the application form are available on the SPEVI website: https://www.spevi.net/spevi-members-projects/.The webpage also includes the SPEVI Inc policy regarding project grant applications.

Supporting Professionalism of Members

In September 2022, SPEVI, in partnership with the NextSense Institute, hosted a webinar on the UK Curriculum Framework for Children and Young People with Vision Impairment (CFVI). Professors Mike McLinden and Graeme Douglas of the University of Birmingham presented an overview of the CFVI, including how the framework came to be developed, its content/specialist areas, and what’s next for the project. The CFVI is underpinned by the “access to learning – learning to access” framework and involved 10 months of consultation and substantive support from the UK VI education sector. For detailed information about the Framework, please visit the RNIB website, https://www.rnib.org.uk/sites/default/files/CFVI-Framework.pdf.

Member discounts for professional learning

During 2022, SPEVI Inc partnered with the NextSense Institute and Statewide Vision Resource Centre (Victoria) to offer SPEVI member discounts for professional learning. This initiative directly addresses SPEVI's aim of "encouraging the highest standards in the educators of persons with vision impairment by promoting research and professional training for general and specialist teachers". The discount offer has been well received by members and will be continued in 2023.

In closing this message, we extend our sincere thanks to all SPEVI members and office bearers. As Co-Presidents, it is our great privilege to contribute to SPEVI'S direction and member priorities.

Sharon Duncan, Phia Damsma and Frances Gentle
Co-Presidents, SPEVI

The Frances Gentle Award

Dr Frances Gentle requires no introduction. Since she became involved with SPEVI in the mid 1990's, she has worked tirelessly for the organisation and for people with vision impairment in general, earning so much respect along the way. She has held the position of SPEVI President twice, the second time successfully partnering with Phia Damsma to steer SPEVI in all sorts of exciting directions. At the forefront of Frances's enormous contribution is her dedication to ensuring children with vision impairment and additional disability, along with support teachers, families and other stakeholders, regardless of where they are in the world have access to quality education. It's the relentless pursuit of this goal, along with Frances's kind and empathetic nature that has helped SPEVI become a source of learning for all involved in the education sector.

As Dr Frances steps down from her role as SPEVI Australia Co-President, the SPEVI organisation is so proud to honour Frances's immeasurable contribution to the vision education sector through the creation of the Dr Frances Gentle Award. This recognition will be bestowed on a SPEVI member from Australia, New Zealand or the Pacific who best represents Dr Frances's ongoing contribution to the SPEVI organisation and to the education of children who are blind, have low vision and additional disability.

Announcement of this award was made during the 2023 SPEVI online conference with the inaugural award given at the next conference in 2025.

Congratulations Frances!

An Exploration of Unplugged Programming Education for Elementary School Children Who Have Low Vision or are Blind

Anna van der Meule, Mijke Hartendorpb, Wendy Voornc and Felienne Hermansad

Abstract

Although programming education provides a valuable introduction to computers, accessible materials for young learners with vision impairments are lacking. This study focused on unplugged programming, using the sandwich robot lesson, for young learners who have low vision or are blind. 17 children with vision impairments participated in pairs in a programming assignment where one child instructed (‘’programmed’’) the other child to prepare a sandwich. The findings, based on thematic coding of children’s behaviors, show the children could access the artifacts visually or tactile, worked with enthusiasm and relatively independent, and could complete the assignment. The children who are blind did require additional assistance, and finding correct instructions was challenging. Our insights suggest the promise of the unplugged sandwich robot lesson as an inclusive programming tool.

Introduction

Familiarity with digital and computational thinking skills, part of the “21st century skills”, is vital to navigate the current world, both in order to understand daily life and to apply digital skills in professional lives. Consequently, it is essential to ensure that all young learners, including individuals with impairments, are being introduced to these skills (Prado, Jacob, & Warschauer, 2021). Specifically in the context of early programming education, one fundamental element of an inclusive approach concerns usable and suited materials. A wide range of programming materials for young learners exists and continues to be developed, yet adequate insights in usable materials for especially younger learners with vision impairments have until recently remained lacking (Morrison et al., 2018). Challenges are known concerning the often-visual nature of programming materials for children (Milne & Ladner, 2018; Morrison et al., 2018), including the widely used block-based programming languages and tangible floor robots or robotic sets (Hadwen-Bennett, Sentance, & Morrison, 2018; Jašková, & Kaliaková, 2014, Kabátová et al., 2012). These materials are consequently less or not accessible for children who are blind or have low vision, which contributes to lack of full participation in programming lessons. One option to improve this lies in adapted or newly constructed versions of these materials (Milne & Ladner, 2018; Morrison et al., 2018).

Another valuable but less explored option could be found in the form of unplugged programming tools. These tools are characterized by the absence of the use of computer or electronics, instead they rely upon usually few, easily adaptable daily artifacts (Cortina, 2015), for example beads, cups or cards (Bell, Alexander, Freeman, & Grimley, 2009; Faber, Wierdsma, Doornbos, van der Ven, & de Vette, 2017; Hermans & Aivaloglou, 2017). Unplugged lessons using these tools can be highly engaging (Wohl, Porter, & Clinch, 2015), and have been shown to contribute to the understanding of computer science concepts (Hermans & Aivaloglou, 2017). Moreover, teachers of learners with vision impairments recently expressed their enthusiasm about unplugged programming as the most inclusive tool currently available for their learners (van der Meulen et al., 2022).

Unplugged materials have the potential for children who are blind or have low vision to equally participate with their peers in programming lessons. This study consists of a qualitative exploration into unplugged programming for elementary school learners with vision impairments. The specific unplugged activity of the sandwich robot is used, where children program each other to prepare a sandwich. The rationale behind this selection is that this is a typical unplugged tool (using daily artifacts that are actively engaged with) that is currently popular in the Dutch school context. In our exploration of this tool, our objectives, based on usability and accessibility criteria (Queirós et al., 2015), are to gain insight in: 1) through which sense modalities (vision, touch, auditory) access to the material is obtained, and whether this can be done independently, 2) how learning and working on the assignment takes place, 3) the occurrence of collaboration, creativity, and positive and negative experience. Our aim is to assess how learners with vision impairments approach and experience an unplugged programming activity.

Unplugged programming tools

Unplugged or offline programming, as compared to plugged, refers to learning how to program without a computer or any types of electronics (Bell et al., 2009; Faber et al., 2017). Unplugged materials form one type of materials currently available to teach children programming, examples of other types include floor robots or mini-computers, child-level programming languages, or games (Yu & Roque, 2018).

Unplugged lessons use artifacts such as beads or cups, or have the participants themselves act out an activity (Bell et al., 2009; Faber et al., 2017; Hermans & Aivaloglou, 2017). A design principle is that the activities are easy to implement, fun and engaging, and invite active, collaborative behaviour (Bell et al., 2009; Cortina, 2015). Children for instance learn about binary counting by deciphering and creating binary code using paper cut outs that represent binary numbers, or learn about algorithms by taking on the role of programmer to write an algorithm to complete a specific action (Faber et al., 2017). Research on unplugged programming, though not that extensive yet, highlights the enthusiasm of teachers and students (Brackmann et al., 2017; Faber et al., 2017), and indicates its effectiveness in getting children engaged in (Wohl et al., 2015) and mastering (Hermans & Aivaloglou, 2017) computer science concepts.

An additional essential feature of unplugged programming tools is its potential to reach a broad population (Cortina, 2015). This includes learners with limited access to computers or internet, but also learners with impairments (Cortina, 2015; Faber et al., 2017). The activities generally require few artifacts, easily adapted for groups with different possibilities and needs (Cortina, 2015). This can be especially relevant for learners with vision impairments, since this group is diverse and challenging in their use of and preferences in technology. The often very visual nature of plugged programming materials for children can result in issues for children who are blind or have low vision (Hadwen-Bennett et al., 2018; Jašková, & Kaliaková, 2014; Kabátová et al., 2012; Morrison et al., 2018). Depending on the specific material, difficulties have been identified in incompatibility with assistive technologies such as screenreader technology, output in the form of animations (Hadwen-Bennett et al., 2018, Morrison et al., 2018, and in the case of tangible tools in the form of visual properties or small pieces (Kabátová et al., 2012; Morrison et al., 2018).

Some potential drawbacks can also be mentioned to this overall promising picture of unplugged programming. Compared to working with computers or robots, unplugged programming can appear less exciting and be less inviting (Faber et al., 2017; Wohl et al., 2015). Furthermore, when the connection between unplugged activities and plugged activities or computer science is not adequately understood, exposure to unplugged programming can lessen the enthusiasm for computer science careers (Taub, Armoni, & Ben-Ari, 2012).

Unplugged programming for children with vision impairments

Interestingly, there seems to be very little exploration so far in the potential of unplugged tools for learners with vision impairments. A recent literature review on accessibility of programming tools for learners with vision impairments does not mention unplugged tools (Hadwen-Bennett et al., 2018). Further, several studies look into new or adapted tangible electronic tools or alternative programming environments (Jašková, & Kaliaková, 2014; Kabátová et al., 2012; Koushik, Guinness, & Kane, 2019; Milne & Ladner, 2018; Morrison et al., 2018). Reasons for the lack of attention for unplugged might include that most research into programming for this group has focused on older learners, for whom unplugged can seem (though not necessarily is) less suited, that the focus often lies in the identification of electronic issues, and that certain plugged tools are currently very popular. In a recent focus group study however, teachers of learners with vision impairments at the elementary school level were within their comparison of different programming materials especially enthusiastic about unplugged tools (van der Meulen et al., 2022). They experienced unplugged lessons as the only approach that can engage low vision and blind learners equally. Another exploration of unplugged tools for high school learners with vision impairments highlights its value but indicates potential issues with visual artifacts and metaphors (Stefik et al., 2019).

Our structured exploration of unplugged programming for learners with vision impairments is grounded in the concepts of usability (referring to effectiveness, efficiency and experience in the use of a product) and accessibility (the extent to which everyone can use the product) (Queirós et al., 2015). An essential concept in the user experience of children is “fun”, which captures the adult equivalence of user satisfaction (Read, MacFarlane, & Casey, 2002). Previous usability research on programming materials, for sighted children and children with vision impairments, has focused on whether and how a material could be accessed, level of support and instruction that was needed, possibility for children to collaborate and be inventive, and the valence of the overall experience (Donker & Reitsma, 2004; Milne & Ladner, 2018; Morrison et al., 2018; Read et al., 2002; Van Kesteren et al., 2003). Accessibility should in this context include the diversity within vision impairments (with most having a diverse range of low vision, and a smaller group being blind).

We have selected the sandwich robot lesson as an unplugged tool to explore in learners with vision impairments. In this lesson, children are required to program the teacher or each other as a robot to prepare a sandwich (Bagge). By composing a set of specific step by step instructions for “the robot”, students learn about the basic working of a robot and the instruction of an algorithm (Faber et al., 2017). The sandwich robot is a typical example of an activating, engaging unplugged lesson, that moreover uses familiar daily artifacts. In our inquiry of this tool, we distinguish three main objectives, building upon previous insights into usability and accessibility in the context of programming materials for learners with vision impairments. We aim to observe 1) through which sense modalities (vision, touch, auditory) access to the material is obtained, and to what extent can this be done independently, 2) how learning and working on the assignment takes place, 3) the occurrence of collaboration, creativity, and positive and negative experience. We expect to provide insights into how learners who are blind or have low vision approach and experience unplugged programming, which will give an indication of the potential of such tools for this group of learners.

Method

Participants

Seventeen children (11 boys and 6 girls) participated, divided over eight pairs (one of which contained three children). The children came from three classes from different special education schools, which are part of the two Dutch expertise centres for individuals with vision impairments and are located in different parts of the Netherlands. Two classes were what is indicated as the “upper level” of elementary school (10-12 years old) and one the “lower level” (6-8 years old). One of the upper level as well as the lower level class had some previous experience with programming. Twelve of the 17 children had low vision, the five other children were indicated as “braille students”, three of them had very limited residual sight and two were completely blind. Because in the Netherlands children with vision impairments are enrolled in special education only if they cannot partake in regular education, the children had additional special learning needs.

Procedure

Schools and classes were recruited through the two expertise centres for individuals with vision impairments. In the context of a larger project on programming materials for children with vision impairments, all participating classes received three programming lessons in which a different material was introduced. The unplugged lesson was used as the first lessons in the three classes included in this study. The project was approved by the ethical committee of the faculty of Science at the University of Leiden. Parents were informed through the teachers with informed consent letters, in which it was explained that three programming lessons would be given in the class of the children, during which all children would be present. Parents were asked to give permission for the children to participate in the research and for video recording during this lesson. If parents did not give permission, children would still be able to take part in the lesson but no video recording would be made and no data would be collected. In the three groups participating in the unplugged lesson, half to all of the parents gave consent. Children who did not have consent worked in a separate classroom in order to ensure they would not appear in the recordings. During the assignment each pair of children was guided and supported by either the main researcher or a research-assistant (both indicated below as the tester). The research-assistants were students in social sciences or computer science bachelor tracks. They received training beforehand on working with children with vision impairments (including how to provide instructions and support) as well as on facilitating and monitoring the set-up of the assignment and the constructive interaction (explained below).

The sandwich robot assignment and test setup

The unplugged lesson and assignment of the sandwich robot was based on the Dutch teaching material describing the “chocolate sprinkles robot”, known also as “jam sandwich algorithm” (Bagge). The lesson started with a brief plenary introduction in which the topic of writing an algorithm in the form of a step-by- step instruction and taking into account a robot’s inability to think for himself, was explained. The children were divided up into pairs and matched to a tester. After the instruction on the protocol (explained below), the tester started the camera, and explained that the children would program each other to prepare a sandwich with chocolate sprinkles. After the roles of robot and programmer were divided (following the preference of the children), specific instructions for both roles were provided, indicating to the programmer that they had to come up with and give specific instructions to the robot, and to the robot that they had to follow the instruction by the programmer and not think themselves. The tester placed the materials in front of the children (plate, knife, butter, chocolate sprinkles, bag with two sandwiches) and the children could get started.

Table 1 summarizes the eight pairs of children. The children within a pair are referred to by their roles in the assignment: “robot-child” and “programmer-child”. The protocol of constructive interaction method was followed during the assignment (Als et al., 2005). Within a collaborative setting between children, they are stimulated to verbalize their thoughts in order to optimize insight in their experiences. An elaborate instruction on thinking aloud was provided by the tester at the start of the session, including an example and practice (Als et al., 2005; Donker & Reitsma, 2004; Van Kesteren et al., 2003). During the session itself the children the tester used neutral prompts to remind the children to verbalize and to work together. Further, recommendations for usability testing with learners with impairments were followed by working in individually guided pairs, and using tailored support (Foss et al., 2013; Guha, Druin, & Fails, 2008). The teachers helped form pairs of children who worked well together and if needed advised on individual children.

Table 1: Characteristics of child pairs

Pair	**Robot-child**	**Programmer-child(ren)**	**School level**
1	Braille (f)	Braille (m)	Lower
2	Braille (m)	Low vision (m)	Lower
3	Braille (m)	Braille (m)	Higher
4	Low vision (m)	Braille (m)	Higher
5	Low vision (f)	Low vision (f)	Higher
6	Low vision (m)	Low vision (m)	Higher
7	Low vision (f)	Low vision (m)	Higher
8	Low vision (m)	Low vision (f) (both)	Higher

Data processing

All sessions were individually recorded on video. A combination of coding and transcribing was used to process non-verbal and verbal data, using a detailed pre-defined coding scheme. This approach fits a thematic analysis of qualitative data (Braun & Clarke, 2006). The scheme included 17 categories of behaviour, 9 of which were used for the current research and are described in Table 2. Other categories referred for instance to behaviour relevant only for materials with electronics. Each category contained several pre-specified, directly observable behaviours (Donker & Reitsma, 2004) and the option to indicate a non-pre-specified behaviour fitting the category. The categories and pre-specified behaviors were derived from usability and accessibility concepts and previous observational research on programming tools by sighted children and children with vision impairments (Donker & Reitsma, 2004; Faber et al., 2019; Milne & Ladner, 2018; Morrison et al., 2018; Read et al., 2002; Van Kesteren et al., 2003) and if necessary adapted or complemented to fit the current purpose. As indicated in Table 2, the categories “independent access” (referring to whether and through which sense modalities the material could be independently used) and “access through other” provide insight into the first objective of the study; the categories “learning material” and “working on assignment” connect to the second objective, and the remaining five categories on collaboration, creativity and overall experience connect to the third. Further, verbal behaviours were transcribed verbatim for four pairs (pairs 1, 2, 3 and 6), after which saturation was reached. Consequently, for the remaining four pairs behaviours were coded but not transcribed. The eight completed coding schemes (one for each pair) were further processed for each category by collecting information per category across the pairs. The information from the transcriptions was used to clarify and deepen understanding of the children’s behaviour (for instance, assessing the content of positive verbalisation’s). Finally, the categories were gathered per study objective, and summarized.

Table 2: Study objectives, behavioural categories and sample behaviours of coding scheme

Study objective	**Behavioral category**	**Sample behaviors**
Independent access, sense modality, access through other	Independent access	Follow visually, follow tactile, follow auditory, material to child, child to material
Independent access, sense modality, access through other	Access through other	Ask explanation child, ask explanation tester, receive explanation child, receive explanation tester, tactile guidance other child, tactile guidance tester
Learning material, working on assignment	Learning Material	Explore visually, explore tactile, explore auditory, explore by actions, explore by reasoning, listening to instruction, experience material as logical, experience material as not logical, ask questions during instruction, ask questions during assignment, struggling to learn, learning easily

Study objective	Behavioral category	Sample behaviors
Learning material, working on assignment	Working on Assignment	Starting, finishing, working on assignment, playing or joking with material, trying material, working outside of material, not doing anything
Collaboration, creativity	Presence collaboration	Non-verbal contact, taking in roles, explaining to include, explaining to discuss
Collaboration, creativity and exploration, experience	Absence Collaboration	Work opposite goals, competing, work different outputs, one child doing something else
Collaboration, creativity and exploration, experience	Creativity & exploration	New step with used element, new step with new element, initiate new assignment, conduct new idea assignment
Collaboration, creativity and exploration, experience	Positive experience	Laughing, smiling, moving excitedly, positive verbalisation, sitting/lying comfortably
Collaboration, creativity and exploration, experience	Negative experience	Frowning, showing boredom, negative verbalisation, shrugging, showing distraction, showing confusion or difficulty

Results

Independent access, sense modality, and access through other senses

In five of the eight pairs both children accessed the material entirely visually. Further, in Pair 3 both children accessed the material tactile, in Pair 2 one child had visual access while the other had tactile access, and in Pair 1 one child accessed the material entirely visual whereas the other child combined visual and tactile access. When accessing visually, incidentally the child brought the material closer to their face, and more often the child brought their face closer to the material. Two children who had tactile access also brought themselves or the material closer a few times. Finally, not all children were clear about their possibilities. The children of Pair 1 (both braille students with residual vision) used a not transparent combination of a visual and tactile approach. Other children however were very outspoken about their needs and preferences in order to follow the scene. In Pair 3 for instance, the child who was blind and who played the programmer immediately took initiative to stand behind and put his hands on the shoulders of the robot-child to follow his movement: Tester: “Where would you start?” Programmer-child: “Can I just stand behind him...if he has to make a movement he should.”(Programmer-child stands behind the robot-child). Getting access to the material through the other child or tester was only observed for the children who are blind (occasionally in Pair 1, and frequently in Pair 2 and 3). Most frequent was the child who was blind receiving an explanation from the tester, which often involved the tester directly describing the visual scene. As Pair 2 showed:

> Tester: “Maybe then the robot gets confused, since there are two sandwiches in the bag.” Programmer- child: “Take one sandwich out of the bag”. Robot-child: “This is one sandwich.” Tester: “Go ahead and feel, there are two”.

Other behaviours in Pair 3 included the programmer-child asking and receiving an explanation from the tester, and (once) the programmer-child receiving an explanation from the other child. In Pair 2, the robot-child received explanations from the other child a few times, as well as tactile guidance by the tester or the programmer-child. Quite often this involved combinations of behaviours, for instance receiving an explanation from both the tester and the other child as well as tactile guidance by the other child: Programmer-child (takes the hand of the robot-child with the knife and adjusts the position):

> “This is how you do that, robot”. Tester: “No it is actually a little stuck in the butter. Help a bit, programmer.” Programmer-child (takes the hand of the robot-child and pulls the knife out of the butter). Tester: “The knife got a little stuck”. Programmer-child: “Yes”. Robot-child: “Is it done?” Programmer- child: “Yes.”

Finally, in this pair it was also observed once that the programmer-child handed the robot-child material, and occasionally the low vision programmer-child received explanations from the tester.

Learning the material and working on the assignment

Learning how to work with the material most often, frequently in all pairs, involved listening to instructions by the tester. After the initial instruction, the tester intervened by asking for clarification, indicating an incorrect instruction, or providing suggestions. Pair 6 for example showed:

> Tester: “But ’take’ is actually a pretty vague instruction. What exactly should the robot do to take the butter?”

Most pairs (except Pair 8) occasionally also showed other learning behaviours, primarily asking questions and struggling to learn to work with the material. Struggling could be seen for both the robot-child and programmer-child, for example in Pair 2:

> Tester: “A lot but not too much, would he understand that?” Robot-child: “Yes.” Programmer-child: “He understands that.”

Other behaviours were seen incidentally: exploring by reasoning, easily learning the material and experiencing material as logical as well as experiencing material as not logical. Some “other” coded behaviours were the tester instructing the children who don’t respond, or the child giving an explanation to the tester.

All pairs started the assignment after receiving instruction, and managed to finish the assignment, spending between 9 (Pairs 1 and 8) and 25 minutes (Pair 4). Different types of instructions could be seen. First of all, instructions in the form of specific small and distinguishable actions were seen in all four pairs who’s verbal behaviour was transcribed (most often in Pair 2 and 3, occasionally in Pair 1 and 6). Examples of such instructions are: “Right hand out”; “Turn the knife a little more”; “Let go of the knife”; “Walk forward”. Pair 3 almost exclusively showed these types of instructions, within a long sequence of steps. Second, very short instructions following or complementing a previous instruction occurred occasionally in Pairs 6 and 2, and often in Pair 3: “Stop”; “Enough”. Third, a more broad type of instruction was most often seen in Pairs 1 and 6. The programmer-children of these pairs continued with these instructions even after multiple attempts of the tester to break this up into smaller actions: “Put the sandwich on the place”; “Get the chocolate sprinkles”. Finally, specifically in Pair 2 the low vision programmer-child was searching for clear instructions for the blind robot-child:

> Programmer-child: “Feel where the sandwich is and then you know where the sandwich is and then there you can put on chocolate sprinkles”.

All pairs also joked and played with the materials. For some pairs this occurred occasionally at the beginning or end. Pair 2 and 6 continued joking through the assignment, disrupting the assignment for example by throwing the sandwich on the floor. Other behaviours outside the assignment yet with the material involved reflecting on or discussing the material (often but not always at the end) or comments on or playing with the food. A few times children displayed unrelated behaviour, for instance distraction by other children.

Collaboration, creativity and exploration, experience

Collaborative behaviours were seen in each pair, yet with the exception of Pair 2 only occasionally. Often the programmer-child and the robot-child corrected each other. For instance, the robot commented on incorrect instructions.

> Pair 1: Programmer-child: “Put a lot of chocolate sprinkles on the sandwich but not too much.” Robot-child: “Can’t.” Tester: “What is it that can’t?” Robot-child: “I don’t understand.”

Further, role shifting occurred relatively often, most often by the robot- child coming out of the robot role:

> Pair 2:) Tester: “Maybe you should tell what is happening. Do we have enough butter?” Programmer-child: “No.” Robot-child (with robot voice): “I’ll get some more.”

Other incidental behaviours were asking for advice and explaining in order to include (both only in Pair 2), taking in roles and several “other” behaviours including giving advice or help or discussing the situation.

Correcting, advising, and shifting in roles all occasionally occurred together.

Creative or exploring behaviours were seen incidentally (in Pair 6 and 7) or often (in Pairs 2 and 3). Generally, this was initiated by the robot-child, who spontaneously gave shape to this role by using a robot voice or sounds (both coded as “other” behaviour). All four pairs displayed this, the robot in Pair 2 even consistently through the entire assignment:

> Robot-child (with robot voice): “Can I start?” Tester: “The robot is completely in his robot mode.” Robot-child: “Bzzzt”.

In Pair 3, several times the robot-child added an unexpected issue that the programmer had to deal with, such as being low on battery or initiating an automatic cleaning process:

> Robot-child (with robot voice): “Battery 5 percent” (tester and programmer-child laugh). Programmer-child (goes to the robot and puts his hands on his shoulders). Tester: “Well we have to...” Robot-child: “Powering down in 5-4-...”.

Twice a pre-defined behaviour occurred: once in the form of a new step with a used element and once a new step with a new element (eating the sandwich or bringing the knife to the kitchen).

Finally, all pairs showed positive behaviours, including all pre-defined behaviours. By far the most common behaviour was laughter, which was seen in all pairs. This occurred a few times (Pair 1) to very often (Pair 6 and 8). Positive verbalisations also occurred often (in six pairs), primarily by expressing enthusiasm at the end of the assignment or while evaluating the material. In Pair 2 the robot-child expressed positive comments through the assignment: Robot-child: “I like it, nicely playing robot”. Further, smiling was seen in four pairs and sitting/lying comfortably as well as moving excitedly was only seen (multiple times) in pair 2 (where the robot was often humming contently). “Other” behaviours included being enthusiastic to start or disappointed to stop or showing surprise. Negative experiences were also shown in all pairs, with confusion or experience of difficulty occurring most often (except in Pair 3). Mostly this behaviour occurred a couple times, in Pairs 2 and 5 quite frequently. Almost always it was the robot-child who experienced difficulty, related to them noticing an incorrect instruction and being uncertain how to proceed since the robot was not allowed to think.

Pair 5: Robot-child (stops putting on butter by himself): “Hmmm so difficult.” Tester: “Hmmm:”. Robot-child: “...can’t think”.

Occasionally the children showed distraction, frowned, expressed themselves negatively or got upset. “Other” negative experiences included showing frustration, looking questioningly at the tester, or showing doubt about the other child. The robot-child of pair 5 was very critical overall, and the programmer-child of Pair 7 was struggling a lot.

Discussion

This study consisted of a structured qualitative exploration into unplugged programming, using the sandwich robot tool, for young learners with vision impairments. Seventeen children who are blind or have low vision were observed while they worked in pairs on the assignment. Below, the insights are discussed for the three objectives of this study.

Sense modalities, independent access and assistance while learning and working

All children were able to complete the assignment. Importantly, the children appeared to be able to follow their preferred sense modality to gain access, which was primarily visually and tactile. The same activity, for instance keeping track of the robot-child carrying out an instruction, was followed visually by the children who have low vision and tactile by the children who are blind. The possibility for this “hybrid approach” (Morrison et al., 2018) is a very valuable feature for children with vision impairments, fitting the diversity of their possibilities and preferences (Bocconi, Dini, Ferlino, Martinoli, & Ott, 2007; Milne & Ladner, 2018; Morrison et al., 2018). Although all children could consequently fully participate, it was apparent that the children who are blind did require additional support either by the tester or the other child. This type of verbal or tactile assistance was, to different extents, needed by all children who are blind, and not by the children who have low vision. The required guidance to capture the visual scene is similar to the previously found issues in unplugged programming with visual artifacts (Stefik et al., 2019).

Children who are blind appear not able to participate completely equally in the sandwich robot lesson. However, the extent and form of the required support (a brief verbal hint or manual readjusting of a hand) seems relatively minor, compared to adaptations necessary for children who are blind to work with plugged tools (Hadwen-Bennett et al., 2018). This confirms the adaptive and flexible nature of unplugged programming (Cortina, 2015) and its especially high suitedness for learners with vision impairments (van der Meulen et al., 2022). However, it also stresses the need to provide formal guidelines for required additional support when children who are blind work with unplugged tools (Van Mieghem, Verschueren, Petry, & Struyf, 2020).

Collaboration, creativity, and positive and negative experience

The children displayed a positive experience of the tool and assignment, enjoying themselves and working concentrated and at ease. Negative experiences such as frustration or distraction occurred only incidentally. From the perspective of usability assessments, this confirms a high user satisfaction (Read et al., 2002), in line with unplugged tools being conceived of as fun and engaging (Cortina, 2015, van der Meulen et al., 2022). Further, unplugged programming has elsewhere been indicated as less exciting and novel compared to computers or robots, which can however be seen both as a disadvantage (Faber et al., 2017; Wohl et al., 2015) or as adding to its suitedness as a calm and natural start of programming education, without the distraction and added cognitive load of the novelty of computers (Hermans & Aivaloglou, 2017). The latter interpretation might apply especially to groups of learners with impairments, as can be seen in the enthusiastic but also concentrated overall attitude of our group.

Further, although creativity is limited in the defined assignment of the sandwich robot, the children displayed surprising spontaneous actions where they played the robot and added their own ideas. In addition to being inventive and fun, such additions (such as the robot being low in battery) also display an accurate expression of unpredictable, interfering aspects of robots or computers that have to be dealt with instantly.

Most children also experienced some difficulty or confusion, especially when incorrect instructions were given. Most relevant for the usability of the tool for the target group was the example where a child with low vision struggled specifically to form understandable instructions for a child who was blind. It should be further explored how children with different visions, including sighted children, collaborate with this tool. The majority of children with vision impairments take place in mainstream education, which stressed the need to assess how collaborations between differently sighted children are experienced on both sides. A related potential issue with the instructions in the sandwich robot tool is that the child playing the robot can him or herself determine whether an instruction is correct. Consequently, it needs to be assessed how instruction from the teacher can be optimized here, as well as the effectiveness of teaching programming through the sandwich robot (as has been explored for other unplugged approaches (Hermans & Aivaloglou, 2017 and Wohl et al., 2015)).

Limitations, future directions, and conclusion

A first limitation of this study concerns the focus on materials, and not other aspects, of programming education. To provide sound and inclusive programming education it is also necessary to formally determine teaching instructions and additional teacher or peer support for specific groups (Van Mieghem et al., 2020). Second, it is important to further consider the potential of unplugged programming for older learners with vision impairments. The current focus was on young learners also because programming materials for children are often especially visual (Morrison et al., 2018), yet difficulties persist for older learners as well. A recent workshop with young adults with vision impairments points towards the value for them as well to first explore algorithmic thinking and problem solving before getting started with the plugged programming environments (Alotaibi, S Al-Khalifa, & AlSaeed, 2020). Third, the approach in the data collection of balancing between a fixed protocol and providing flexibility to facilitate individual needs in the target group can be considered the valid approach in usability research with children with impairments (Foss et al., 2013; Guha et al., 2008). However, the resulting differences between the sessions in terms of length and support by the tester could have impacted for instance the impression of children's independence and collaboration. In addition, thinking aloud was actively stimulated but, similar to previous studies (Als et al., 2005; Donker & Reitsma, 2004), some children appeared notably more verbal than others which possibly conceals experiences which are difficult or negative. Finally, concerning the data processing, an approach was chosen to optimize extensive and detailed depictions of the children's sessions fitting the purpose of this qualitative study (Tracy, 2010). A limitation can be seen in the reliance upon one coder, however, accuracy was strived for by using a fixed and precise coding scheme.

Overall, the sandwich robot appears an engaging and activating activity which learners who are blind or have low vision can participate in through their preferred sense modality, requiring for the learners who are blind some additional support. As a typical unplugged tool, it is flexible to use and suited for a group with different, and divers, possibilities and needs. The sandwich robot, as well as potentially other unplugged tools, can be a valuable inclusive programming education tool, providing children who are blind or have low vision the possibility to be introduced to digital and computational thinking skills, together with their peers.

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Author details:

Anna van der Meulen, University of Leiden, The Netherlands.
Mijke Hartendorp, Saxion University of Applied Science, The Netherlands.
Wendy Voorn, Royal Dutch Visio, The Netherlands.
Felienne Hermans, University of Leiden, The Netherlands; Vrije Universiteit Amsterdam, The Netherlands.

Corresponding author: a.n.van.der.meulen@liacs.leidenuniv.nl

Making decisions about braille technology

Jacqui Kirkman

Abstract

Teachers working in the field of vision impairment are often called upon to assist with decisions about braille technology. Little research exists to support decisions around types of braille technology or when technologies should be introduced, and practices vary between education authorities. This paper explores some of the associated issues and looks at the research that does exist. The advantages and disadvantages of various types of braille technology are considered and some conclusions presented to assist in decision-making.

Introduction

The value of braille as a literacy method for people who are blind or have very low vision is well documented (Fanshawe, 2021; Hoskin, et al., 2022) and despite reports of declining use (National Federation of the Blind, 2009), it remains the primary literacy medium for many people across the world (Swenson, 2016). The Expanded Core curriculum, a set of skills specific to students with a vision impairment, enshrines braille as a communication method in the area of Compensatory Access. The purpose of Compensatory Access is ultimately to allow students to access curriculum (Guerette, 2014).

A component of the Expanded Core Curriculum related to braille is that of Assistive Technology. McNear and Farrenkopf describe its place within the Expanded Core Curriculum as "learning how to use technology to access all aspects of daily living, whether at school, at work, at play, or at rest" (2014, p.187). All methods of producing braille fit into the definition of assistive technology as "items designed to improve the functional capabilities of individuals with a vision impairment or other disabilities" (Siu & Presley, 2020, p.19). On one end of the continuum is a low-tech item such as a slate and stylus, low-tech assistive technology being defined as equipment that doesn't require much training in order to be able to use it, doesn't have "complex or mechanical features" and is often inexpensive (Georgia Tech, n.d.). Electronic braille devices would be categorised as high-tech assistive technology which is a category of equipment which is usually electronic or digital, often requires significant training to use and is often expensive (Georgia Tech, n.d.). Numerous studies support the positive impact of assistive technology for people living with a vision impairment (Kelly & Smith, 2011).

The braille technology a student will be exposed to and instructed in appears to vary depending on their school and teachers. This paper explores some of the issues around the choices that teachers make with regards to braille technology, and how students' learning trajectories are impacted by these choices. Recent research findings around braille technology are reviewed.

Dearth of research

Writers in the field of vision impairment education have identified the lack and quality of research into vision impairment education generally and braille technology specifically (D'Andrea, 2012; Ferrell, 2007; Holbrook, 2015; Hoskin, et al., 2022; Kelly & Smith, 2011; Opie, 2018). As long ago as 2007, Ferrell lamented that practices in the field were often "more philosophical than proven, more descriptive than empirical, and more antiquated than modern" (p.2). The low incidence nature of blindness and low vision means that studies often have very small sample groups, are not replicated, and the body of research does not constitute a foundation for rigorous evidence-based decision-making. Kelly and Smith (2011) explain that while practical use of devices may prove that they are effective (e.g., having a positive impact by allowing a student to write), there is little research available to measure the effectiveness of one device compared to another. Holbrook (2015) considers this lack of recent research as a risk to teachers and students, and like Kelly and Smith, alludes to the era of accountability in which education operates today. Certain aspects of braille instruction can be mapped against Hattie's (2018) USA research into effect sizes. For example, "interventions for students with learning needs" (Hattie, 2018, no. 20) has a positive effect of 0.77, “phonics instruction” (no. 31) an effect size of 0.7, and “technology for students with learning needs” an effect size of 0.57 (no. 59); however, there is little research available which is this specific in the area of vision impairment education, often leaving teachers in the position of decision-making which is supported by philosophy rather than evidence.

Types of devices

In the contemporary Australian context, the types of mid- to high-tech assistive technology available for students with vision impairment include manual and electric braille devices; refreshable displays and notetakers; embossers and translation software; and screen reading software on mainstream computer and tablet devices that interacts with refreshable braille (Gentle, 2021).

In many education jurisdictions, there seems to be a practice and philosophy of using a Perkins manual braille machine for students who are starting to learn braille and indeed some education authorities mandate this. Since the Perkins Brailler was invented in 1951 (Perkins School for the Blind, 2022), it has a long history of application in the literacy development of children who are braille learners; however, a limited research base exists as to its efficacy (Gentle, 2017). History aside, the factors that appear to make it the most common choice as a beginning instructional device are: the simplicity of use for learners and their support staff who know braille; the ability to produce tactile graphics; and the fact that braille produced on the Perkins can display a whole page of braille at a time. This encourages the development of fluency and also allows teachers to teach concepts such as formatting and spatial arrangement of the page (Bickford & Falco, 2012). The disadvantages are the finger strength and dexterity required and the difficulty in correcting errors and editing text (Bickford & Falco, 2012; Brauner, 2018; Siu & Presley, 2020). It could also be argued that the Perkins manual brailler does not offer the opportunities for engagement that some more modern technologies offer.

More recent innovations on the Perkins Brailler have included the Mountbatten series of devices (made initially by Quantum Technology and later by Harpo), the Perkins SMART Brailler and devices such as BrailleBuzz (American Printing House) and Annie (Thinkerbell Labs). The common features of these devices are audio feedback, a mechanism which requires less strength and dexterity, and inbuilt instructional tools, which some argue leads to less fatigue, higher productivity and increased independence (Cooper & Nichols, 2007). The BrailleBuzz and Annie don't produce embossed braille and are promoted as learning tools rather than reading and writing devices (American Printing House, 2022; Thinkerbell Labs, 2022). The Mountbatten devices and Perkins SMART Brailler also have a visual display and the ability to connect with mainstream devices which allows feedback and support from peers, teachers and parents who do not know braille (Cooper & Nichols, 2007; Gentle, 2017; Michaelson, Matz, & Morgan, 2015) and were perceived to be less disruptive in a classroom (Martiniello, Wittich, & Jarry, 2018). In the absence of an embosser, these devices can also produce hard copy braille (D'Andrea, 2005; Perkins Products, n.d.).

Despite what Bickford and Falco (2012) identify as scant supporting data for the use of refreshable displays as literacy instruction tools, they are being used for beginning braille learners in some cases. Perceived advantages include a light mechanism, ease of editing (Bickford & Falco, 2012; Brauner, 2018; Siu & Presley, 2020), dot consistency over time (Bickford & Falco, 2012), and the motivation associated with using a high-tech device (Brauner, 2018; Kamei-Hannan & Lawson, 2012). Perceived disadvantages of refreshable displays are the technology skills required to operate them on the part of teachers (Bickford & Falco, 2012) and students, and the single-line braille display (Siu & Presley, 2020).

There are three main categories of refreshable braille devices – displays which require a host device, displays which require a host device for most functions but have some independent functionality, and notetakers which have their own operating system (Siu & Presley, 2020). Devices in the first category are not common in Australia, being offered by only one Australian retailer. Those in the second category are more common, possessing the advantage of a lower price point than notetakers. Since they are usually paired with a mainstream device such as a computer, tablet or phone (and a screen reading program), they also allow a workflow which can be shared with others (Brauner, 2018; Siu & Presley, 2020) and approximate more closely a universal or mainstream set up which is more acceptable to many young people (Fanshawe, 2021; Hong, 2012; Opie, 2018; Rudinger, 2021). Notetakers offer a more portable alternative, a purpose-built suite of apps and most have a visual display. The disadvantages are the cost and the fact that as devices with a niche market, their operating systems can be quite old compared to those in mainstream devices (Hong, 2012; Siu & Presley, 2020). In 2015, Russomanno et al. expressed surprise that there had not been significant change in the technology of braille displays. In the intervening years, projects have been started that explore new technologies such as a mainstream tablet which displays graphical information (Braille House, 2020) and a single braille cell display (Bettelani et al., 2020). A multi-line display, the Canute 360, entered the market in 2020 (Bristol Braille Technology, n.d.).

Issues

Teacher confidence has been identified as a major factor influencing a student's experience and success with braille devices (Opie, 2018). The lack of confidence has been attributed partly to the rate of technological change (Opie, 2018), lack of training (Fanshawe, 2021; Opie, 2018), and time pressures and challenging caseloads (Fanshawe, 2021). Hollier et al. (2013) note that IT departments in Australian schools are often unable to support assistive technology and Fanshawe (2021) found that Queensland school leaders did not always understand or prioritise the necessary infrastructure. In Fanshawe's 2021 study, parents and teachers reported frustrations with technology implementation in schools due to infrastructure and device issues and incompatibilities. As an example, while a BrailleNote Touch Plus is a popular device for student use, an Android operating system is not compatible with some education department networks and some schools have purchased these devices not understanding that the student would not benefit from the full suite of features while at school. Lack of opportunity to network with other specialists (Fanshawe, 2021) means that Australian teachers often feel isolated and miss out on opportunities to develop the collective teacher efficacy, which is the factor with the highest effect on student achievement according to the 2018 version of Hattie's Visible Learning synthesis (2018).

Another barrier to effective recommendation is the absence of an evaluation framework specific enough for recommendation of braille devices. Frameworks exist for decision making around assistive technology, for example Elsaesser and Bauer's assistive technology services method (2011) and Steel et al.'s tool incorporating the International Classification of Functioning, Disability and Health (ICF) model (2011). These tend to have a health industry focus and rely on the existence of evidence as to the effectiveness of possible devices. Siu and Presley (2020) describe the TPACK model for integration of general technology in the classroom and list a number of frameworks for selection of classroom assistive technology tools. They propose a process for evaluation and implementation which incorporates vision-specific assessment tools and considerations, the tasks which need to be performed, available tools and infrastructure. Aspects of the process are culturally-specific to the United States and it is a lengthy and detailed process which could be daunting to the aforementioned teachers with little available time. However, when it comes to making a recommendation as the culmination of this process, the authors acknowledge that "the ultimate decision of what tools to include in one's toolkit is based on personal practice and experience" (p. 19).

In the United States, the Individuals with Disabilities Education Act (Individuals with Disabilities Education Act 2004 (USC)) is quite specific in its mandates for education authorities regarding assessment and provision of assistive technology. The Australian Disability Standards for Education 2005 (Cth) are much less specific in defining specific reasonable adjustments, although Standard 3.4 does note that a detailed assessment may be necessary in order to provide the right adjustments. There is variance across Australian states in processes for recommendation and provision of braille devices. In New South Wales, an Assistant Principal-Vision must approve a decision to progress a student to a refreshable display; however, Victoria, Western Australia and Queensland do not appear to have a formal process. In Queensland at least, purchases of braille technology for use at school have been made by schools or families on the recommendation of vision support agencies.

While there is little research on effectiveness of refreshable displays, neither is there significant research on when to introduce them. Brauner (2018), writing about introducing a braille display paired with an iPad, suggests that students should have basic knowledge of braille and exposure to some braille technology (low or high tech), ability to perform some VoiceOver gestures and good spatial concepts. Others consider the ability to use more than one sense for accessing information (presumably touch and sound) as the most important criteria for using a refreshable display (Siu & Presley, 2020). Siu and Presley (2020) advocate introducing technology early and following a 3-year learning curve which progresses "from learning technology to using technology for learning" (p.312) and making technology learning fun.

Conclusion

Based on the information outlined above, the following synthesis may assist in informing recommendations:

- A manual (or electric) brailler is useful for beginning students to learn concepts such as page formatting and orientation. The Perkins in particular is a preferred tool for many teachers who feel comfortable supporting its use.
- Embossed, multi-line braille is important for developing fluency and tactile skills.
- Some students do not have the finger strength and dexterity for a Perkins manual brailler so may benefit from a device which requires a lighter touch.

Use of this lighter touch device may be an interim step or an additional tool or may be the only manual brailler the student uses.

- Student voice should be considered in choice of devices. Many students will prefer a technology solution that includes mainstream technology.
- High-tech technology can be introduced early. High-tech assistive technology devices are motivating and engaging for many students, which may improve learning outcomes.
- Real time audio (as well as tactile) feedback increases opportunities for learning and support from non-braille users.
- Many students will benefit from a toolkit, rather than a single device. This also acts as a safeguard when one piece of technology fails.
- A framework for evaluating the effectiveness of braille technology is needed.
- Teachers require significant support to understand and teach refreshable braille devices to students.

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Author Details:

Jacqui Kirkman, Advisory Visiting Teacher – Assistive Technology, Statewide Vision Impairment Services, Department of Education, Queensland.
25 Salisbury St, Woolloongabba Qld 4102
jkirk4@eq.edu.au
07 3823 0754

Reflections on an interview with a parent of a child with a sensory disability

Bill Sakoulas

Introduction

Gathering information from the parents of a child with a sensory disability is an important tool when seeking to comprehend the needs of the family and child. The insights gleaned provide perceptions into the journey of all family members, as well as understandings of helpful practices that could be imitated by future families. After the prognosis of a disability, parents often struggle to find some form of reference guide to study and analyse the experiences of those who have travelled on a path similar to theirs. This paper provides an example of a family interview which may assist other families dealing with the varied facets of coping with a child with a sensory disability.

Detailing the experiences of a family of a child with a sensory disability has potential to contribute to knowledge in the field as well as to support new parents to consider previous practices which allow them to make informed decisions about their child's educational and recreational lifestyle. It is hoped that by providing this information, a new frame of reference outlining factors contributing to a better quality of life for those living with a child with a disability is possible. Having heard the accounts of parents and their reminisces and wishes, had they known what they do now, they may have done things differently. This was the stimulus which instigated the following discussion. My aim was to assist others who find themselves in a similar situation.

Josh[1] became blind during primary school following a car accident. At the time of the interview, Josh was in his mid-twenties having managed to find part time employment through a family friend. To instigate an interview with his parents was initially an intimidating experience. A series of thoughts resonated through my mind. What do I do if the parents start crying? What happens if the mood changes and the parents get resentful at my seemingly intrusive questions? What do I say if the interview digs up buried traumas? My thoughts aligned with De Jonckheere and Vaughn (2019), who identified possible pitfalls of interviews such as inadvertently leading the interviewee towards a particular response that may cause distress. These concerns made me determined to set a relaxed and positive atmosphere for the interview.

When interviewing individuals going through grief, Blackburn and Bulsara (2019) affirm that a successful interview is dependent on the empathetic characteristics of the interviewer and the atmosphere created. Ghellai et al., (2021) indicated parental

[1] A pseudonym

satisfaction when an interviewer shows genuine interest, care, warmth and responsiveness during the discussion. Furthermore, Lancaster (2017) found that initial clarification of anonymity helps resolve some uneasiness in the interviewees.

To be empathetic, a person needs to put themselves in the position of the individual, which I attempted to do. Therefore, the interview was designed to be a combination of an informal and formal style, based upon techniques discussed by De Jonckheere and Vaughn (2019) and Barth (2021). These authors propose a personal and sensitive approach based on developing rapport and the establishment of trust through a respectful and calm procedure with helpful hints of posture, stance, listening and asking open-ended questions.

Rationale for Interview Questions

Before beginning the interview, the questions needed to be formulated to ensure the atmosphere was positive for the family. Some form of context needs to be given for the interviewee to comprehend the direction of the question (Brubacher et al., 2021). An initial problem which arose when reviewing the literature to develop interview questions was that most did not lend themselves to building up a good introduction to the interview process.

The following section outlines the questions chosen. Questions were specifically developed from the relevant literature cited and arranged in an order that would be deemed least threatening, allowing the interviewees to feel relaxed and comfortable. The writings of authors reveal a range of circumstances that influence the family life of a child with a disability. In summary, the literature displays a paradox between parents' wishes and hopes and the reality of factors outside familial control. This is demonstrated, for example, in a parent's desire to raise a child as similar as possible to a child without disabilities, only to be thwarted by the unique characteristics of the child and their disability as well as the challenges of parental background and behaviour. Overarching is Austvoll-Dahlgren et al.'s (2016) proposal to all stakeholders working with families with a child with a disability to maintain transparency and not promise false hopes and unrealistic expectations. However, the consensus of literature (Billen et al., 2022; Austvoll-Dahlgren et al., 2016; Fernandez-Avalos et al., 2021; Cain & Fanshawe, 2021; McCarthy & Guerin, 2022; Dale et al., 2019; Davis et al., 2019 and Hanson et al., 2019) is that all individuals desire a high quality of life for their child with a disability and the family members. These findings were taken into consideration when creating the questions utilised below.

1. **What kind of things did you do to develop the confident qualities in your child**[2]?

The first challenge of conducting an interview based on set questions was beginning with a positive ice breaker. As the interviewer, I was aware of Josh's progress since losing his vision and the role of his parents in building confident qualities. The first question was chosen to establish that the interviewer had a positive view of the parenting and Josh, and is based on Billen et al.'s (2022) article which describes the affirmative influence which a loving relationship between caregiver and child establishes, and the importance of warm, parental nurturing in facilitating healthy developmental outcomes despite a child's disability.

2. **What kind of assessment was offered to identify the child's abilities, interests and needs?**

With an opening question established, the next issue was to seek an arrangement of questions which flowed. Still attempting to keep the discussion focused positively and giving time for relaxed rapport to occur, the next question concentrated on Josh's abilities, interests and the assessment undertaken after he lost his vision. This question was open-ended to allow the parents freedom to discuss the topic broadly and express personally what they believed would have worked, rather than specifically guiding them in the direction of home-based assessments (Austvoll-Dahlgren et al., 2016). Surprisingly, the area of assessment of Josh's needs was not addressed as adequately as the parents had wished and was formally completed in vision support and rehabilitation centres, rather than balanced to include in-home assessment.

3. **How did you cope with the grief of the diagnosis?**

Most people who suffer loss and pain undergo grief and Fernandez-Avalos et al.'s (2021) article gave a lead question in this direction, through their findings that parents of children with disability are often left without adequate support. Additionally, though there are common features of grief, they are not necessarily sequential and each family develops their own coping style (Cain & Fanshawe, 2021). This question, therefore, sought to explore the potentially more personal area of grief and the development of coping mechanisms, once a positive rapport had been established.

4. **What support and health services would you have liked to receive?**

I was interested in learning about whether early home visits and family-centred services were offered to the family. I began by reading Dale et al.'s article (2019) which gave a variety of activities an allied health professional could implement in the household to support the family. In collaboration with an assigned practitioner, parents were upskilled and guided in teaching daily living skills, daily tasks,

[2] This question was meant to elucidate a reflection across the child's lifespan.

developing the parent-child interactions and continuing with a visual needs-based curriculum at home. McCarthy and Guerin (2022) emphasise that family-centred services are an important part of early intervention. The involvement of families in setting goals and activities helps support each family member holistically.

5. **How would it have helped if you only had to deal with one representative from a health team?**

The rationale for question five stems from Davis et al., (2019) who identified the importance of using a transdisciplinary model for services. The transdisciplinary model involves a group of professionals who work collaboratively in the provision of various services to the families of children with disabilities (State of Queensland Department of Education and Training, 2017). The key to its efficiency is that one member of the team is nominated to act as a conduit so the family only has to deal with one professional rather than an array of representatives of service providers. Davis et al., (2019) believe that this model is the most effective system of service provision as it saves the family emotional heartache and distress from having to continually relive and recount the painful details associated with their child's disability. Moreover, Altman et al., (2018) indicate the complexities and fragmentation of care when there is a lack of coordination in health service providers. Additionally, Davis et al., (2019), outline the benefits and expediency of the family dealing with a single representative. The combination of these factors promotes mental well-being.

6. **How did home visits from agencies help your family? (In what ways were the services you received family centred?)**

The logic behind question six arises from Hanson et al.'s (2019) research into what aspects of service delivery are most valued by families. They discuss how families may receive a range of care services but are rarely consulted as to the strengths and weaknesses of a program; there is no model which fits all and some services may not be what a family desire. The perspectives of parents need to be considered when delivering a service.

7. **(To the father) How did the service agencies involve you?**

An interesting article by Uribe-Morales et al. (2022) on recognising the important role of fathers with children with disabilities is behind question seven. The authors indicate how the involvement of fathers in family life is vital and ways of promoting their participation need to be enhanced. The father's role is even more crucial when the child has a vision impairment. Since the child cannot see cues or read emotions, thus receiving no visual feedback from their environment, they require more hands-on expressions of love and affection from both parents, especially the father, with whom expressing such body language may go against the grain of their manhood.

8. **How did you balance your acceptance of the child's limitations and simultaneously have hopes and dreams?**

The rationale for the final question came from wanting to end the interview with hope and optimism. Gupta and Kumar's (2020) forthright report was insightful, with the authors arguing for a balance of acknowledgement of a child's condition with a sense of optimism. Practitioners may limit a child's potential and categorize them by labelling them with their disability. Parents who have dreams for their child with a disability are not in denial, claim Gupta and Kumar (2020). Parents' goals and dreams may be adjusted over time (Cain & Fanshawe, 2021), however, professionals need to rethink denial, avert judgment and maintain parents' hopes.

Conducting the interview

After establishing the interview questions, gaining ethical approval and permission from the parents, the next step was to conduct the interview. Although I faced incredible anxiety myself with the responsibility of the interview, I focused on considering how I would create a sensitive relaxed atmosphere in which the interviewees would feel at ease.

Food is cherished by most people thus I brought a cake and this set a positive tone to the afternoon. As tea was made, time was taken to establish rapport and catch up on personal lives. Before commencing the interview, an explanation was given concerning the format of the interview, specifically that the questions would be based on certain research articles. However, to ensure parental empowerment and ownership of the interview process it was clearly stated that they could direct the discussion as deemed necessary. Rocque et al. (2020) strongly affirm that a family's preferences ought to direct the information gathering process and this was embraced from the start, giving me room to modify the interview as necessary.

A goal of the interview was to relax the parents and not dwell on painful experiences. Jakobsen et al. (2017) illustrated that family members who have experienced past grief and loss will undergo emotional pain during the interview. In order to alleviate this, Leahy (2022) recommends a sensitive approach whereby parents' reactions enable the interview to be redirected away from painful memories. These findings made me alert to any signs of discomfort and uneasiness in the parents and to move on to the next question to relieve the situation.

Findings from the interview

During the conversation, Josh's parents were as comfortable as possible but it was apparent that they were experiencing a degree of pain. The questions involving assistance of the family from various health or educational services proved to be a tense area and was dealt with quicker than the other questions. Being aware of the possible pitfalls in raising up painful memories made me determined to emphasise the success of the parents in handling the situation of their child and I sought to focus on their achievements. This confirmed the expectation that although time permits some healing, it does not take much to trigger traumatic memories. The parents' statements concerning grief affirmed the findings of research (Clarke, 2020) about not standardising a particular model. Studies (Holm et al., 2020; Bonnano & Malgaroli, 2020) have revealed the inadequacy of grief models based on the encounter of death; additionally, their responses do not necessarily follow an invariable pattern as revealed by my interviewees.

A discovery from the interview was that the rehabilitation of a child with a sensory disability never ceases. After the accident, Josh had to be re-educated and retrained to walk and talk. Currently, his parents are very concerned about the child's lack of social skills and are involving family members to rectify the situation. For example, whereas family members overlooked Josh's interruptions in conversations, they now inform him when this is inappropriate whilst simultaneously teaching him more suitable social responses. The latter strategy affirms the findings of research (Asa et al., 2021; Collings, et. al., 2020) in that family support assists in the adaptation and coping process of a child with a disability.

The parental interview confirmed the benefit of a positive outlook. The parents sought to give Josh as normal a life as possible, one most similar to his peers. As Jigyel et al. (2021) affirm, having high expectations for a child with a disability is not equivalent to denial of the child's limitations. In fact, it was because Josh's parents dreamed big and refused to be sidelined by the challenges of his disabilities that Josh now leads an active life, swimming, playing a trumpet with one hand and riding a tandem. Mulyatno and Costa (2022) highlight the potential accomplishments and exciting futures, inspired by loving relationships, open to children with disabilities, citing Helen Keller as an example. This is supported by several authors (McKenzie, et. al., 2020; Wickman, et. al., 2018; Akoto et al., 2022) who indicate the importance of self-belief and of instigating a desire to achieve in a child with a disability. Josh's parents acknowledged their child's diagnosis but would constantly think of ways around obstacles which sought to restrict his lifestyle. The determination of the parents was a great inspiration.

The advantages resulting from the development of resilience was highlighted in this interview. Unfortunately, the family did not have much emotional support in the early years. Eventually, the mother found some other mothers and a phone network was set up between them. Focusing on people who had achieved in life despite disabilities was and still is a coping mechanism for the family in grief. The African-American singer Stevie Wonder was a model of hope for the mother. The father stated that being left to themselves they would look to a series of programs and cling on to whatever offered hope for their child and themselves. Affirming the finding of the parents, several scholars (Lyons & Roulstone, 2018; Martin et. al., 2019; George-Levi & Laslo-Roth, 2021) illustrate how hope assists a family and develops an attitude of resilience.

A revelation regarding the community surrounding the child was the lack of family-centeredness, coordination and communication between service agencies. Interestingly, the parents' statements confirmed the findings of some of the research articles (Provenzi et. al., 2021; Shevell et. al., 2019). For example, both parents lamented that most of their services were not family centred neither were they invited to participate in the services or designated outcomes for their child. They recall a lot of family disruption from running to and fro to different services. Additionally, the mother vividly remembers having to repeat the same traumatic story and information over and over to various agencies. These experiences support the findings of Rausch et. al. (2021) who illustrate the ease and efficiency of dealing with a collaborative transdisciplinary team for intervention services. Such a method would have been very beneficial for the family who were exposed to repeated painful administrative procedures.

Of interest was the parental insight regarding the high turnover of workers in the health services. Personnel were replaced with younger staff who were often inexperienced and full of impractical ideals. Each time there was a new worker, the parents had to elucidate again issues which had already been addressed. This led to frustration and despair, again emphasising the need for parental involvement in determining the suitable support of families of a child with disabilities. Upon reflection, it was demonstrated that the need of these services to comprehend service delivery from the family's point of view was paramount.

Occasionally, there were awkward moments of difference of opinions between the parents. The father was critical of the incompetence of service agencies in offering inadequate assistance while the mother attempted to qualify with a moderate response. Moreover, both parents were exasperated that they had to go to different organisations to have another aspect of the child's disability dealt with. I attempted to ease tension by either repeating the question from an alternate angle or by modifying an extreme statement and acknowledging the difficulty under consideration. Bakken (2022) reports the need to be thoroughly prepared for surprises in an interview, and Jones and Abdelfattah (2020) suggest the wisdom of having pre-scripted techniques to escape embarrassing situations. Admittedly, this was an area to which I had not given appropriate forethought.

In conclusion, the interview process of Josh's parents was a most enriching experience. Most interesting was their agreement with several of the articles which prompted the questions. The only thing I would do differently would be to be pre-prepared for an awkward scenario and think of how to diffuse uncomfortable situations. It was tense having to revisit traumatic times, however, the meeting ended by reflecting how the family has progressed a long way and triumphed over many adversities.

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Author details:

Bill Sakoulas, Assistant Principal Vision

Macquarie Park, Nirimba Network
NSW Department of Education
Blacktown Vision Team
Base: Crawford Public School
email: bill.sakoulas@det.nsw.edu.au

Sonokids 'Sonoplanet' Project Report
Phia Damsma

With funding from South Pacific Educators in Vision Impairment (SPEVI Inc) Sonokids was able to develop a new app as its latest addition to the 'Ballyland' suite of educational game apps. This app for Emergent Sonification Literacy is called CosmoBally on Sonoplanet. It introduces students to Sonification, which is the use of non-speech audio to represent information or data. The project was successfully completed in 2022.

Project outline

Build an accessible and inclusive-design app for mobile touch devices that offers four educational games supporting the early learning of sonification and developing other essential skills for young students who are blind or vision impaired, such as attentive listening, pattern recognition, mental mapping, analytical thinking, memory, and spatial orientation skills.

Project purpose and aims:

- Build capacity in young students to develop an understanding of 'sonification', an important new technology which has huge potential for accessibility and is more and more widely used in mainstream STEM fields
- Enable young students to explore sonification and use sonification to identify shapes, trace shapes, make drawings, and build spatial awareness on a touch screen
- Provide a proof of concept for accessible, innovative, gamified applications of sonification for young students who are blind or vision impaired

Project report

Throughout the development process consultation took place with stakeholders and expert consultants in assistive technology, early childhood education, and specialist teachers (Vision Impairment). The prototype games were tested by students and adults who are blind or have low vision. Special thanks go to Morgan Tyrrell and Oliver Fanshawe for their valuable help in testing the app.

The sonification algorithm used by Sonokids to map information in sound was tested by way of an online quiz with the participation of a total of 29 delegates, including those who are blind or vision impaired, attending the 2021 SPEVI Conference and the 2021 Round Table Conference. The wide majority (96%) of them proved to be able to comprehend and correctly identify the sonification of shapes after only a very short introduction (2:30 min.). This confirmed the effectiveness of the algorithm, and resulted in the decision to implement the same algorithm in the new app.

Sonokids decided to make CosmoBally, the astronaut from Ballyland, the main character in this app. As the story goes, CosmoBally discovered a planet, which she called Sonoplanet, where everything and everybody is sonified.

The app was consequently called ‘CosmoBally on Sonoplanet’.

It was released on the Apple iOS platform on 24 March 2022, and on 31 March 2022 for Google Play (Android platform). As per mid October 2022 CosmoBally on Sonoplanet has been downloaded 14.000 times.

Wide-spread publicity about the app included acknowledgements of the support from SPEVI Inc.

You can download the FREE CosmoBally on Sonoplanet app in the AppStore or on Google Play.

Research survey

Outside the scope of SPEVI funding for this project, Sonokids has developed a support website, at https://www.sonoplanet.com. This website offers background information about sonification in general and the CosmoBally on Sonoplanet app in particular. You can find tips and tutorials for how to use the app, and links to accessible educational sonification and multi-sensory projects.

No user analytics are embedded in the app, to ensure privacy of the user data. Instead, the site links to a very short, online research survey. Through this survey Sonokids aims to gain as much information as possible about how the app is being used by educators and parents and how young students experience, explore and benefit from the different sonification concepts. Sonokids intends to report on this aspect of the project in the future.

Results from this survey can provide an insight into capabilities of young students in using this technology and skills they can develop through sonification. The findings may also inform future development of new educational sonification applications, tools and resources.

Have you tried the app? Please participate in this important user survey and let us know what you think about sonification and the CosmoBally app. It only takes about 3 minutes of your time, and you can opt to go into the draw to win a free 3D printed tactile learning tool of CosmoBally for your student to use with the app – while stocks last (thanks to Mable Community Grants).

Report: International Council for Education of People with Visual Impairment (ICEVI)
Frances Gentle, President (global) and Joanne Mosen, Pacific President

The International Council for Education of People with Visual Impairment (ICEVI) is a global membership-based organisation which shares with SPEVI the goal of promoting equitable access to quality education for children and young people with blindness, low vision, deafblindness, and multiple disability.

ICEVI and the global education community are participating in a transformative period of collaboration, networking and partnerships with UN agencies, organisations of persons with disabilities, and other international organisations supporting the rights of persons with disabilities. One recent example of collaboration is the United Nations (UN)Transforming Education Summit which took place during the 77th Session of the UN General Assembly in New York in September 2022. As noted by the UN Secretary General, "the Summit was convened in response to a global crisis in education – one of equity and inclusion, quality and relevance. The Summit provided a unique opportunity to elevate education to the top of the global political agenda and to mobilize action, ambition, solidarity, and solutions to recover pandemic-related learning losses and sow the seeds to transform education in a rapidly changing world."

This report presents an overview of ICEVI's global and Pacific activities during 2022.

Global plan of activities, 2022-2024

The ICEVI Executive Board has developed a global plan of activities for 2022-2024 which progress the ICEVI mission of promoting access to inclusive, equitable and quality education for all people with vision impairment, in accordance with the UN Convention on the Rights of Persons with Disabilities and the Sustainable Development Goals and targets for education by 2030. The ICEVI plan of activities addresses the following strategic goals and cross-cutting priorities:

Strategic goals:

- Promote access to quality education for people with visual impairment (VI);
- Influence governments and relevant stakeholders to implement the Sustainable Development Goals and the UN Convention on the Rights of Persons with Disabilities; and

- Facilitate networking, information sharing and collaboration at national, regional, and global levels.

Cross-cutting priorities:

- Support the UN agencies and global education community in “building back better” in education, post-COVID, for children and young people with blindness, low vision, deafblindness and multiple disability;
- Emphasise the right to education for all children and young people, recognising the multiple discrimination experienced by those with deafblindness and/or multiple disability;
- Address gender-based discrimination by empowering children and young people with visual impairment and their parents/carers through leadership opportunities, participation in decision making, and knowledge and skill development;
- Advocate for protection against school-based violence, abuse and exploitation of teachers and students with disability, including those with blindness, low vision, deafblindness and multiple disability; and
- Magnify the influence and “voice” of members and partners of ICEVI.

The 2022-24 global plan of activities includes establishment of thematic task groups. The following five task groups commenced their work during 2022:

- Advocacy/influencing task group, facilitated by Andrew Griffiths of Sightsavers;
- Technology in education task group, facilitated by David Clarke of RNIB;
- Gender equality and women’s rights task group, facilitated by Ana Peláez of ONCE;
- Task group on children participation, with the goal of creating a Children’s Council in each ICEVI region, facilitated by Ana Peláez of ONCE; and
- Deafblindness and multiple disability task group, facilitated by Mirko Baur of DeafBlind International. This group will provide input into a larger group under the auspices of DeafBlind International.

Higher education and employment project

The Higher Education project of ICEVI, supported by The Nippon Foundation, commenced in Indonesia in 2007. The project was extended to the Philippines and Vietnam in 2008, Cambodia in 2010, Myanmar in 2013, Laos in 2014, and Mongolia in 2017. The broad objective of the project is to promote inclusive higher education institutions and support the academic performance of students with vision impairment by training them adequately in the use of accessible technology.

The higher education project has been extended to include preparation for employment. In August 2022, ICEVI released its open access publication, Transition To Employment: Experiences of Philippines, Indonesia and Vietnam, which may be downloaded from the ICEVI website.

Instructional mathematics videos

ICEVI has established a Maths made easy YouTube channel with more than 400 instructional videos on teaching concepts in mathematics to children with vision impairment. The instructional videos include creating resources using low cost materials and are proving to be a valuable resource for mainstream and specialist teachers of mathematics.

Inclusion of children with deafblindness and multiple disability

ICEVI has developed the two open access publications, entitled Include Me, which promote the rights of children with deafblindness or multiple disability to inclusion in family, community, and education. Creation of the publications is in response to a 2018 World Braille Council resolution, in which the Council undertook to collaborate with ICEVI and World Blind Union to provide educational support, including braille access, for children with multiple disability and deafblindness in developing countries.

A second initiative promoting the right to education for children with deafblindness and multiple disability is the establishment of a global education campaign by Deafblind International (DbI), in partnership with the World Federation of the Deafblind (WFDB), UNICEF and ICEVI. The priority targets for the campaign are quality early childhood development and care, and increased participation in pre-primary education and free, equitable, quality primary and secondary education leading to relevant and effective learning outcomes.

ICEVI regions

The Presidents and Boards of the seven regions of ICEVI, together with ICEVI members and partners, drive progress towards achieving the mission and strategic goals of ICEVI. Summarised below are the priority activities of the seven regions for 2022-2024.

The **Africa region** is prioritising the Visionary Learning through Technology project, in partnership with the DAISY Consortium. The project was first launched in Kenya and the Africa Board plans to extend the project to other countries in the region. The Africa Board also plans to work with African governments in influencing legislation, particularly with regards to implementation of the WIPO Marrakesh Treaty, and to organise several capacity building programmes.

The **East Asia region** is prioritising youth development programs in member countries, soft skills development for higher education graduates with visual impairment, networking with parent organisations, influencing legislation, and promoting higher education and employment opportunities. With regards to influencing policy, the region will continue to work with the Special Education Centre of the Southeast Asia Ministers of Education Organisation, SEAMEO-SEN, and the regional bodies of the United Nations. The ICEVI East Asia Board will also work closely with the WBU Project ASPIRO.

The **Europe region** is continuing to prioritise regional development and its focus group meetings during 2022-2024. A regional conference and country level thematic workshops and conferences are planned, together with regional research activities, in collaboration with funding organisations and professional bodies. For more information, visit the ICEVI Europe website.

The priorities of the **Latin America region** include teacher training and development of instructional and multimedia materials by professionals with expertise in such areas as inclusive education, braille literacy, teaching of mathematics, Universal design for learning, adjustments to curriculum and pedagogy, low vision and school settings, rehabilitation strategies, and training in deafblindness and multiple disabilities. The ICEVI Latin America Board will also prioritise training for parents, families and VI education stakeholders.

The focus of the **North America and Caribbean region** continues to be advocacy/ influencing and capacity building at the regional level and in Saint Vincent and the Grenadines. The capacity building areas include pedagogy, orientation and mobility, and working with parents. The Regional Board is also proposing to organise a regional conference in conjunction with the conference of the Association for Education and Rehabilitation of the Blind and Visually Impaired (AERBVI).

ICEVI Pacific

Joanne Mosen (ICEVI Pacific President) served as Returning Officer for the Pacific Disability Forum 2022 elections and Robyn McKenzie (ICEVI Pacific Secretary) gained a position on the World Blind Union Asia Pacific Committee, representing ICEVI Pacific.

Joanne Mosen and Robyn McKenzie are representing ICEVI Pacific on the SPEVI NZ Conference Committee including promoting greater Pacific representation at the conference. There are two Pacific Island presentations accepted for the SPEVI NZ conference with a team from Kiribati and a research project in Vanuatu.

ICEVI Pacific is sponsoring the Kiribati and Solomon Islands remote hubs for the SPEVI NZ conference. SPEVI Inc will sponsor one hub in Vanuatu along with an evaluation of the hubs including future recommendations.

In addition, an advocacy brochure has been developed promoting access to education for people who are blind or vision impaired in the Pacific. The brochure will be translated into at least two Pacific languages and printed ready for distribution in early 2023.

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 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, 2020-22

Co-Presidents: Phia Damsma: phia@sonokids.com;
Dr Frances Gentle: frances.gentle@nextsense.org.au

Vice-President: Melissa Fanshawe: spevisecretary@gmail.com

JSPEVI Editor: Dr Bronwen Scott: bronscott@iinet.net.au

Secretary: Melissa Fanshawe: spevisecretary@gmail.com

Treasurer: David Rice: spevi.treasurer@gmail.com

Membership Secretary: Ben Clare: membershipspevi@gmail.com

Public Officer: Dr Sue Silveira: sue.silveira@nextsense.org.au

Directors: Pranitha Moodley: Pranitha.Moodley@nextsense.org.au;
Emily White: emily.white@unimelb.edu.au

Access Coordinator, Web and List administrator: Phia Damsma: phia@sonokids.com

SPEVI Representative, International Council for Education of People with Visual Impairment: Joanne Mosen

SPEVI Facebook Editors: Ben Clare: bwclare@gmail.com; and
Yin Yin Htay: yinyin.htay@blennz.school.nz

SPEVI Representative, Round Table on Information Access for People with Print Disabilities: Phia Damsma: phia@sonokids.com

New Zealand Committee of Management, 2019 - 2020

President: Sharon Duncan: sharon.duncan@blennz.school.nz

Treasurer: Yin Yin Htay: yinyin.htay@blennz.school.nz

Secretary: Jude Shelley: judeashelley@gmail.com

Communications: Yin Yin Htay: yinyin.htay@blennz.school.nz

Counsellors: Dr Sue Spooner: suespooner.nz@gmail.com and
Kay Hood: kay.hood@blennz.school.nz

For a full list of Australian SPEVI Councillors, please visit the SPEVI website: www.spevi.net

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