

# Accessible Teaching of Digital skills, for Today and the Future - Tips, tools and resources for young students who are blind or vision impaired

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## Introduction

Early access to technology, computational thinking and coding is important for those students who aim for a future career as computer programmer or app developer. But effective digital skills, the skills to use an iPad, an understanding of how computer technology works, are important for all students in today's 'connected' and 'smart' world, regardless of whether you will at some point in time actively apply them in the IT field. For many students who are blind or vision impaired, mainstream mobile touch devices will have replaced "blindness specific" equipment. iPads can greatly assist with access to classroom assignments and activities, as well as in a broader sense enabling communication and social interaction with friends, as well as independence through a variety of available apps. But first a student needs to learn how to use this technology, such as with VoiceOver, the built-in screen reader.

Mainstream Learn-to-Code programs generally have very limited levels of accessibility and/or usability for young students who are blind or vision impaired. This can result in students not being able to actively participate in classroom Coding activities with their sighted peers and missing out on opportunities to develop computational thinking and coding skills. These skills ensure students' equity of access to The Australian National School Curriculum's 'Learning in Digital Technologies'. Learning Coding logic also positively impacts on a range of other skills, such as general problem solving, independence, mathematics and Orientation & Mobility.

Sonokids Ballyland is an accessible technology learning pathway, with a suite of educational game apps for iPad. These apps support building of essential digital skills, including coding, benefitting students' current education, as well as their future. Sonokids Ballyland has been announced as winner of the prestigious award for innovation in education from the global 2020 Zero Project.

## Workshop setup

In this one-hour workshop, Phia will address a number of relevant topics around teaching digital skills to students who are blind or visually impaired.

- Digital skills to use an iPad.
- Required conceptual and physical skills and how to develop these
- VoiceOver touch concepts and touch gestures
- Introducing and navigating a physical, tactile and digital grid (O&M, Maths)
- Computational thinking and Coding

Real case examples and videos will illustrate potential challenges students may encounter in this process, and together we will discuss possible solutions.

The Sonokids Ballyland suite of accessible, gamified educational apps now consists of 11 apps. A number of important aspects and features of these apps will be discussed in more detail, to illustrate learning objectives and outcomes.

Participants will have the opportunity to discuss learning opportunities, share ideas, try out some of the Ballyland apps, and work hands-on with the 3D printed Ballyland tactile learning tools. If you have an iPad please bring it to the workshop, and if possible, download Ballyland Code apps.



Image: Overview of Sonokids Ballyland accessible gamified eLearning pathway with 11 apps. These apps are available from the AppStore (with Ballyland CosmoBally in Space on offer for free).

## Learning outcomes Sonokids Ballyland Apps

- Touchscreen interaction (AT, iOS touch device)
- Orientation & Spatial Awareness on touchscreen
- O&M
- Tactual exploration
- Directionality
- Finger dexterity
- VO gestures
- Finger drag to explore screen
- Rotor concept and gestures
- Listening skills
- Digital grid, rows and columns
- Mental mapping
- Computational Thinking
- Coding
- Sequencing
- Algorithms
- Matching
- Timing
- Social skills
- Literacy
- Numeracy
- Self determination

## Learning outcomes Ballyland Early Keyboarding software:

- Inclusion
- Active and experiential play
- Cause & Effect concept
- Foundation keyboarding skills
- Early literacy and numeracy skills
- Listening skills
- Speech development
- Fine motor skills
- Sorting and Matching
- Concentration
- Memory
- Creativity
- Understanding the world

- Orientation & Spatial Awareness on keyboard

Where to find more information:

Resources and tools

- [Ballyland apps in the AppStore](#)
- Ballyland suite of software and apps on Sonokids website:  
<https://www.sonokids.org/ballyland-early-learning/ballyland-game-apps/>
- Ballyland 3D printable tactile models and learning resources:  
<https://www.sonokids.org/ballyland-early-learning/ballyland-3d-print-learning-tools/>
- Swift Playgrounds, including Dash  
<https://www.apple.com/au/swift/playgrounds/>
- Information about, download and print Swift Playgrounds Tactile Puzzle Worlds: <https://www.apple.com/au/education/teaching-code/>
- Tactile booklet 'Flick and Drag with Ballylanders 2 – Ballyland Memory Grids' by Hungry Fingers and Sonokids. Request for purchase from [www.hungryfingers.com](http://www.hungryfingers.com). The booklet gives tactile representations of a grid, the active part of the screen, and the finger gestures movements.

Background information

- Brauner, D. 2019. Overview of accessible coding programs (including Sonokids Ballyland Code 1 – 3), based on posts on the Paths to Technology website. Yes, students who are blind or have low vision can now absolutely be included in the Hour of Code (Annual week in December).  
<https://www.perkinselearning.org/technology/blog/coding-posts-summary>
- Damsma, P., *Touch, Flick, Learn: A hands-on approach to technology education for young students with vision impairment*. Paper presented at the 2017 SPEVI

Conference in Brisbane, Qld. Download from

<https://www.spevi.net/conference/papers-2017-conference/>

- Damsma, P. *Audio Based Coding: An Innovative Approach to Accessible Coding for Children who are Blind* JSPEVI Journal, 2018. Download from <https://www.spevi.net/jspevi/#2018>
- Damsma, P. 2019. *How Access to an iPad Can Change a Blind Child's Life*. Article for the Wonderbaby dot org website, which is dedicated to helping parents of young children with visual impairments as well as children with multiple disabilities: <http://www.wonderbaby.org/articles/ipad-access>
- Knight, M. (2015). Early Learning Access Technology Framework -working document developed to introduce technology to children (early learners) who are blind or have significant vision impairment. For download from <https://www.spevi.net/wp-content/uploads/2015/07/Early-Learning-Access-Technology-Framework.docx>
- McPherson, S., 2017. *Digital literacy: what is it and how important is it in the future of work?* Online article on general importance of digital literacy for young people: <https://www.fya.org.au/2017/06/29/digital-literacy-important-future-work/>
- Perkins introduction to VoiceOver gestures, Pdf: <https://www.perkinselearning.org/sites/elearning.perkinsdev1.org/files/03%20VoiceOver%209.3.pdf>
- White, E. H., Woods, K., & Poed, S. (2017). *The assessment and development of digital literacy in students with vision impairment and additional learning needs: Preliminary findings from a current PhD study*. Proceedings from the 9th International Council on the Education of People with Vision Impairment European Conference, Bruges, Belgium. Retrieved from <http://www.icevi-europe.org/files/2017/empowered-by-dialogue/icevi-europe-2017-proceedings.pdf>
- Withagen, A, et al. In Touch, Helping your blind child discover the world. 2010 Royal Dutchy Visio, Centre of Expertise for Blind and partially sighted people, Huizen. Order form to purchase from <https://www.visio.org/en-gb/home/webshop>