

Hey Alexa, what can I learn at home? Accessible use of smart speakers for education of children who are blind or have low vision.

#### Authors:

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#### Abstract

Parents of children who are blind or vision impaired are often looking for suitable, fun, early learning resources for numeracy and literacy, without success. At the 2019 VISCON conference in Sydney, a number of presenters and researchers emphasized the benefit for children to develop early literacy and pre-braille skills before they enter school.

Smart speakers present with a voice activated assistant, a feature that can be engaged to make educational games that are easy to use for young children. Children's TV programs and channels, such as Sesame Street and Nickelodeon, have created so-called children 'skills' to engage children with smart speakers. Smart speakers are widely used inside the home. A 2019 survey of 1127 families in the US with children aged 2 – 8, showed that more than 40% use a smart speaker like Amazon Echo or Google Home. And that number is likely to increase rapidly.

In the presentation together with the audience we explored the potential of mainstream smart speakers to support young children who are blind or vision impaired in the development of essential early learning skills in a home setting, together with parents, siblings and friends. We presented the current state of this innovative application of smart speakers and discussed the potential value of developing a series of educational games supporting early (braille) literacy skills by young children who are blind or vision impaired – for use at home, and potentially in the classroom.

#### Background

Jarek and Phia, experienced audio game and accessible educational app developers, were both presenters at the 2019 Vision Conference VISCON at RIDBC (Sydney). There, a number of delegates and presenters shared their concern that children who will be taught braille in school may not have developed important 'emergent braille' or early literacy skills yet. Ideally, children should develop these skills before coming to school,

in the home environment, with their family, or in preschool.

As a result, the idea arose to use smart speakers with voice control technology and collaborate to create a learning tool that can address this need.

### Alexa smart speakers technology – voice control

#### Amazon Alexa

The Amazon Alexa is a hands-free, virtual personal assistant that responds to voice commands and questions. Alexa devices need to be connected to Internet and use a cloud-based Artificial Intelligence (AI) engine that processes and learns user's speech and language patterns.

#### Alexa Skills

Just as mobile devices have downloadable applications (apps), Alexa provides access to content through enabling "skills". Amazon provides a range of their own skills that users can enable as well as hosting numerous third-party skills numbering over 100,000 as of October 2019 ([Amazon, 2019](#)). There are over 160 Alexa Skills "designed for kids" ([Amazon, 2020](#)), ranging from storytelling, trivia, maths, language learning and science facts.

The user can command Alexa to perform a wide range of tasks including accessing information: playing news, checking time and weather, listening to music, playing games, performing simple tasks such as creating shopping lists or setting up timers and reminders.

The Amazon Alexa can also integrate with a growing variety of "smart home" products such as lights, thermometers and any appliance that can connect to a smart outlet plug.

There is no subscription cost to use Amazon Echo. All Alexa Kids Skills are free.

### Potential of Alexa in Education

Sonnar did a trial at the Blind Foundation in New Zealand on how smart speakers can help with reading books.

Some of the general skills that are available on Alexa can be used by teachers in the classroom practice. Such as setting a timer for a test, asking Alexa to state facts or provide definitions, asking for the weather or time in a particular country (geography), and telling stories.

But the hypothesis was developed that the Alexa could also have potential to enhance very specific learning outcomes for children.

[New technology for educational applications.](#)

Alexa skills and apps for iPad use different technologies and devices. Each of these have their advantages in specific learning situations and for specific learning goals.

As our aim was to develop a skill that parents can use inside the family home for shared learning activities, it is an advantage that an Alexa smart speaker can offer a more 'social' learning experience: Parents can look at their child(ren) while talking to Alexa, instead of having to focus on the device itself. Also, the Alexa is in the living room, constantly available, it is always present, and a skill can therefore become a daily routine. This is relevant, because for early literacy skills to develop, repetition and practice is essential.

An Alexa smart speaker can also be programmed to be a guide for parents. Parents can ask Alexa for help. Alexa can explain why they use this skill, how to use it and, potentially, suggest what props to use with activities. Instructions are built into what Alexa says. You can start whenever you want, in your own living room.

Importantly, we believe that our educational kids' skills for Alexa will also have a place inside the classroom. The device is less distracting for students to use than a laptop for instance, as it doesn't take a student's attention away from the teacher or other students. Only a voice command is required to control it.

[We presented a number of educational Alexa kids skills.](#)

[Stolen Stars of Matariki](#)

Stolen Stars of Matariki is an Alexa skill developed by SONNAR for BLENNZ in New Zealand. This is the first in the world bilingual story for kids on Amazon Alexa and Google Home.

[Ballyland Flight Special Education Kids Skill](#)

Sonnar and Sonokids collaborated on the development of Ballyland™ Flight, an educational kids skill for Alexa with a particular focus on support for young children who

are blind or vision impaired, but including all children. The story is based on Ballyland Rotor, an educational game app for iPad by Sonokids Ballyland.

Ballyland Flight is a fun skill for young children. Ballicopter, the little red helicopter, flies high through the skies of Ballyland, on his way to visit one of his friends. What will happen and how his adventure will go, will be decided by the child using their voice, or expressing their intention and the adult giving the voice command. Every selection will change the course of the story. This game is particularly rich in audio and includes two original songs to move or dance along with. Young children who are blind or visually impaired will be able to enjoy and engage with this story, building self confidence in the use of voice control technology.

Learning outcomes Ballyland Flight:

- Become familiar with the Alexa voice and adults' response
- Develop simple voice commands to use smart speaker technology with voice control
- Choice Making skills
- Concept of Cause & Effect
- Language skills
- Concept of sequencing
- Singing and moving along to songs
- Recognize sounds of musical instruments (banjo, xylophone, harmonica, bongo drums)
- Enjoy and recognize musical styles (the final song is played in jazz, reggae, pop and rock version).
- Conceptual understanding of selecting options, through Ballicopter's story.
- Concepts such as weather, animals, slow, fast, grumpy, happy, friendship.

[Concept 'Ballyland Band', Special Education Kids Skill to support Emergent braille literacy skills](#)

Following the 2019 Vision Conference VISCON, at RIDBC, SONNAR and Sonokids wanted to explore the opportunity for an Alexa kids' skill that would help children develop important emergent braille literacy skills. Ideally, children should develop these skills before coming to school, in the home environment, with their family.

As explained before, the Echo Dot and other smart speakers are currently mainly used in the house, in a family situation. This makes them an ideal device to apply for this purpose.

Phia demonstrated a demo version of “Ballyland Band” (work title), a skill for Alexa that is currently under development. It is a fun, nice family activity, without the feeling that this is a ‘lesson’ or ‘training’ for the child. Participation by siblings and friends is encouraged as well.

The audience at the SPEVI 2020 Conference presentation was invited to provide input into the development of this new, unique, important skill. We discussed the potential of Alexa for teaching early literacy and emergent braille skills, such as hand and finger dexterity and strength, spatial relationships, listening and memory skills. The response was very positive, and encouraged us to continue this work.

### Contact information

If you and your student or child would like to be involved with this project (the development of an educational skill for smart speaker technology that will support emergent braille and early literacy skills) for instance with expert advice, testing and providing feedback, then please contact Phia by email: [phia@sonokids.com](mailto:phia@sonokids.com)

To learn more about the Sonokids Ballyland suite of gamified, accessible educational software and apps for iOS touch devices and Alexa, visit <http://www.sonokids.org>.

To learn more about Sonnar Interactive visit [www.sonnar.nz](http://www.sonnar.nz).