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DeafBlind Pocket Communicator: No-Tech Innovation Using 3-D Printing

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DeafBlind Pocket Communicator

Amy Parker & Susan Sullivan
American Printing House for the Blind

April 15, 2018, DeafBlind International Network of the Americas

DeafBlind Pocket Communicator from APH

APH Tactile Graphic Library

Purpose

The DeafBlind Pocket Communicator is a slim, pocket-sized, no-tech device which displays the braille alphabet embossed beneath the corresponding raised print letters, numbers and symbols. Intended to be used as a communication card, the person who is deafblind, can interact by pointing to the letters to ask for assistance; the sighted person "talks" by moving the deafblind person's fingers over the letters.

Human Spirit and Communication

An image of two women communicating sitting at a table- using print-on-palm.

One woman with white hair is smiling as a younger woman uses her index finger to trace a letter on her palm.

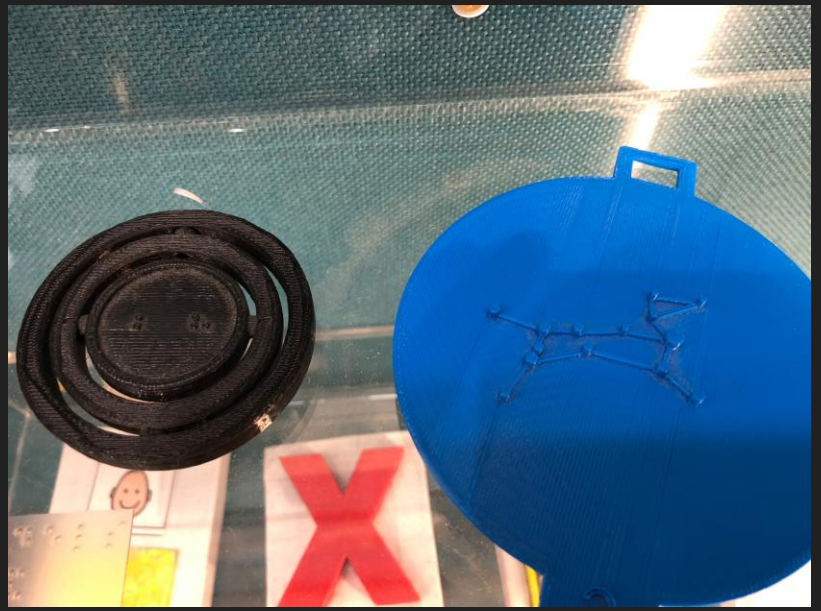
Image credit: Deaf Services Queensland

No-Tech Communication Cards Aren’t New

An image of a communication card with a white background and raised back letters from the English alphabet. Raised numbers.

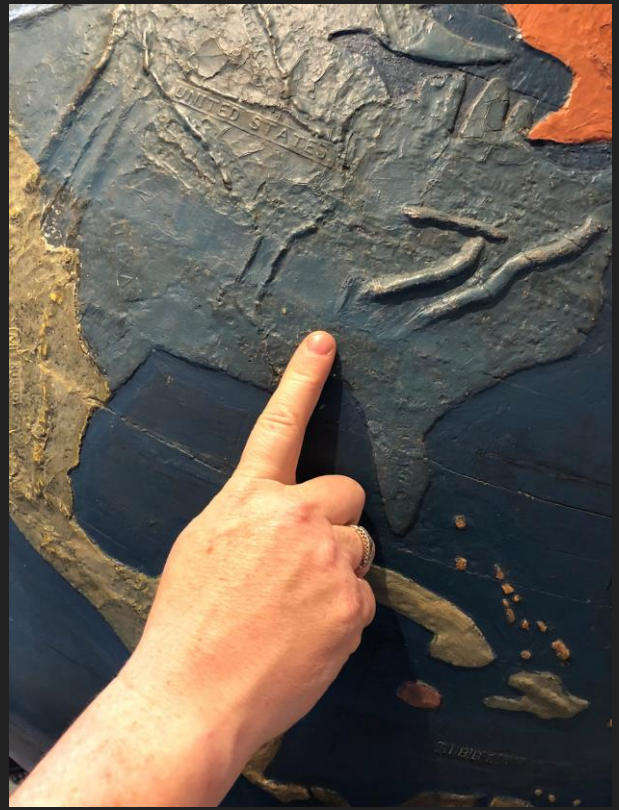
The back of the card has a printed message: This card can be used to communicate with Deaf-Blind Persons. For more information contact Helen Keller National Center

No-Tech Education/Communication Then & Now: Relevant



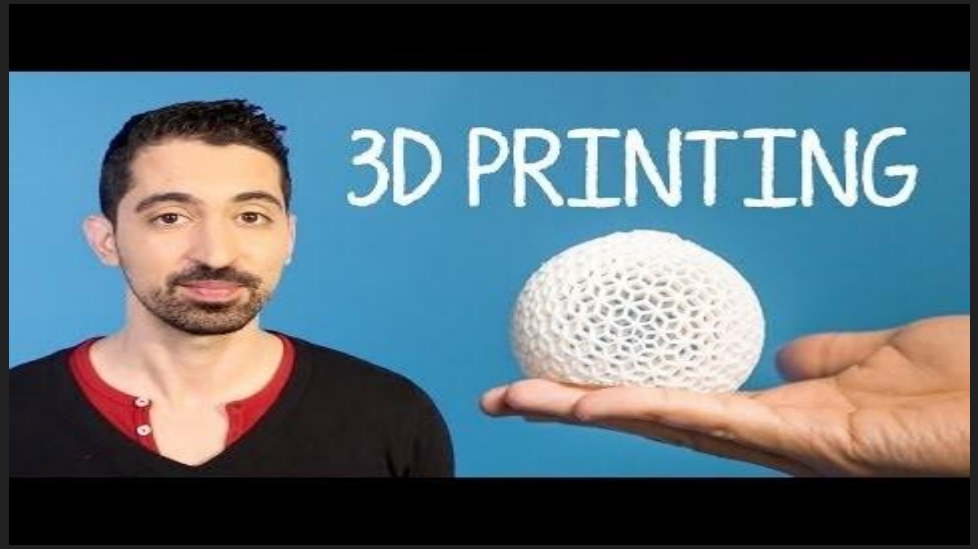
Images from Perkins School for the Blind: photographs of numbers and symbols on a clay tablet. Plastic symbols of canis major consellation; an atom; communication symbols

Importance of touch for learning and communication



Helen Keller's image is shown with her right hand touching her chin and her left hand reading braille. She has a slight smile on her face.

An image of a finger touching the famous globe at Perkins School for the Blind. An index finger points where Alabama would be on the map.



https://youtu.be/Vx0Z6LplaMU

A Summary of 3-D Printing from Mashable

APH Receives Product Ideas from the Community

http://www.aph.org/products/product-ideas/

APH Receives Grants from Foundations

APH has several smaller 3-D printers but received a generous grant from the Hearst Foundation and Morris Family Foundation for a 3-D printer that has a larger build area. It can use multiple materials to print items in more than one color on a single pass.

http://www.aph.org/development/thanks/

Need for Communication

For many Deafblind people, having a simple, no-tech tool is beneficial especially when traveling in the community or interacting with members of the public.

The work of Sauerburger and Bourquin highlights the use of street crossing cards with specific features for travelers who are DB.

Need for Options

Not everyone is comfortable with using high tech devices and many people aren’t fluent in sign language.

Not One Way

For this reason, the DBPC was created to offer this low incidence community options for asking for information, confirming the price of train ticket, or ordering a cup of coffee.

Image of Angela and Sook Hee
Credit: SF Lighthouse for the Blind

Humidity and Electricity

When a person is deafblind, conditions such as bad weather, noisy streets, glare, or poor lighting can make communicating even more challenging.

Trying High Tech and No Tech Solutions Together

Mrs. S is a person who was born Deaf and slowly lost her vision due to retinitis pigmentosa, which produces a type of tunnel vision and eventual blindness. Mrs. S., a wife, mother and grandmother, typically uses tactile sign language and refreshable braille devices to communicate.

Participatory and Iterative Design

She needed a no-tech way to connecting with people in a pinch. As a part of APH's expert review process, we asked her to explore the prototype and used her feedback, along with feedback from small national sample, to make improvements in the design of the device.

For children and for adults

L. became deafblind due to a bacterial infection-meningitis and is fluent in American Sign Language and braille. This is one of many tools that may support L when he communicates with others who are unfamiliar with sign language or who are interested in learning it.

Children with DB Improving Design

- Communication
- Design
- Creation of files
- Involvement in Printing Solutions
- Sharing solutions for others

L on an O&M lesson after using the DBPC. He is working with his COMS on bus travel.

DeafBlind Pocket Communicator from APH

https://youtu.be/Wo1szM41ggs

Discuss

What may the DBPC be used in expected and perhaps unanticipated ways?

What other types of items would be useful?

How may the DB community participate more in design?

References

- Teaching Deaf-Blind People to Communicate and Interact with the Public: Critical Issues for Travelers who are Deaf-Blind by Eugene Bourquin and Dona Sauerburger, www.sauerburger.org/dona/REviewdbcomm.html

- 5 Mistakes People Make in 3-D Printing by Maker's Muse

- Hersh, M. (2016). Improving Deafblind Travelers' Experiences. *Journal of Travel Research, 55*(3), 380-394.

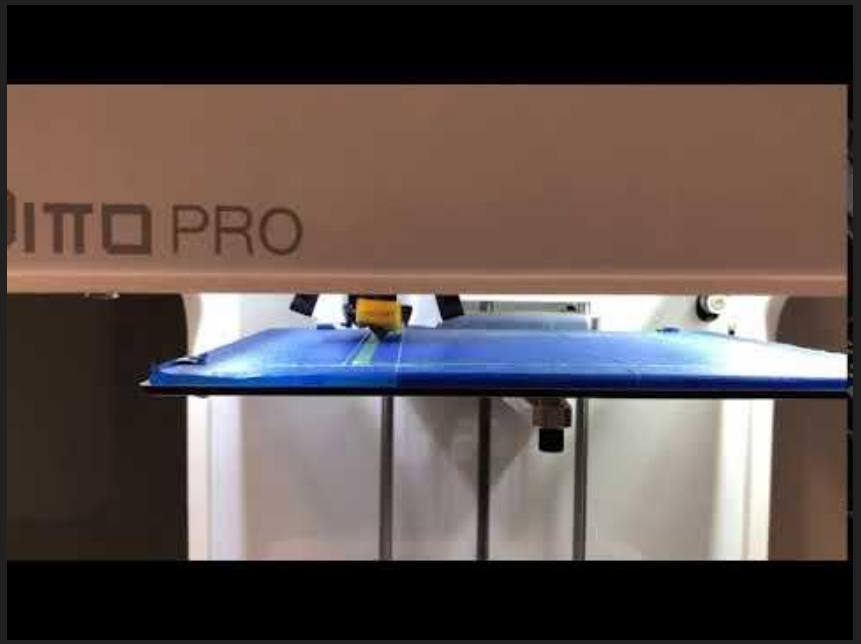
References

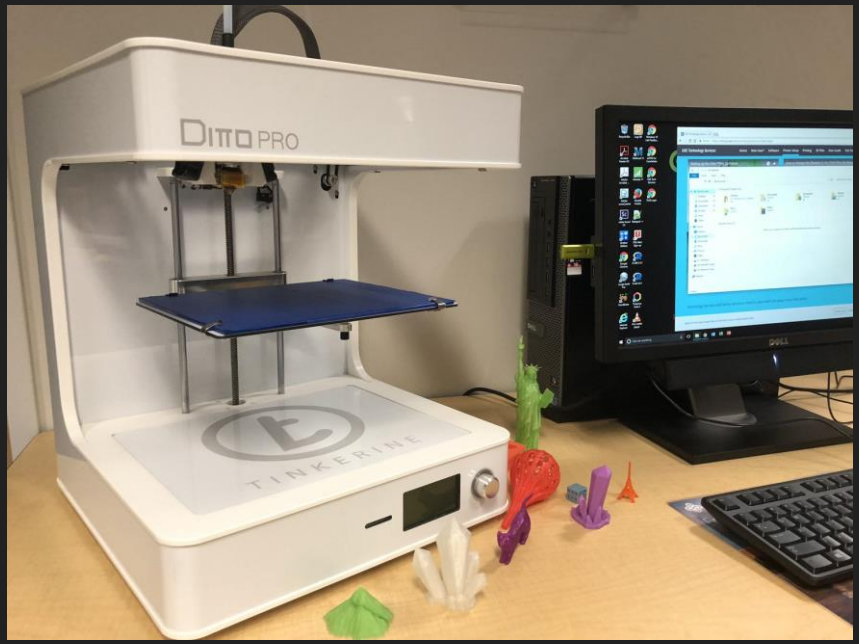
- **Educblogs Software Idiosyncracies**

- **Objet 260 Connex3**

Images from article:

Kim, D. S., Emerson, R. W., & Gaves, E. (2016). Travel in Adverse Winter Weather Conditions by Blind Pedestrians: Effect of Cane Tip Design on Travel on Snow. *Journal of Visual Impairment & Blindness*, *110*(1), 53–58.





https://youtu.be/WPBuPNrxI60

Plethora of 3-D printers for education- Ditto Pro

Exciting work from Cornell Tech- Markit and Talkit

Markit and Talkit: A Low-Barrier Toolkit to Augment 3D Printed Models with Audio Annotations

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ABSTRACT

As three-dimensional printers become more available, 3D printed models can serve as important learning materials, especially for blind people who perceive the models tactilely. Such models can be much more powerful when augmented with *audio annotations* that describe the model and their elements. We present Markit and Talkit, a low-barrier toolkit for creating and interacting with 3D models with audio annotations. Makers (e.g., hobbyists, teachers, and friends of blind people) can use Markit to mark model elements and associate then with text annotations. A blind user can then print the augmented model, launch the Talkit application, and access the annotations by touching the model and following Talkit's verbal cues. Talkit uses an RGB camera and a microphone to sense users' inputs so it can run on a variety of devices. We evaluated Markit with eight sighted "makers" and Talkit with eight blind people. On average, non-experts added two annotations to a model in 275 seconds (SD=70) with Markit. Meanwhile, with

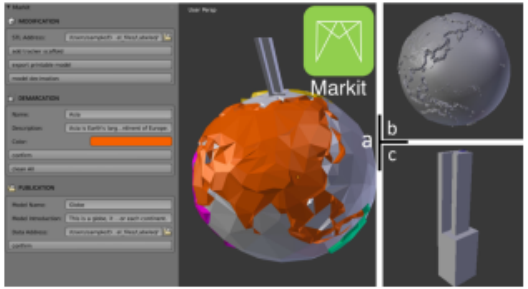
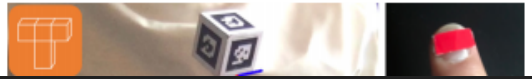


Figure 1. A maker downloads a model of a globe (a), and imports it into Markit. She adds the tracker scaffold (c) and associates text with areas on the model (b).



Innovative work by Lei Shi, Yuhang Zhao, Shiri Azenkot from Cornell Tech.

New collaborations with Holly Lawson from Portland State University

Additional Resources

- 3-D Printed Puzzles with Braille- "Fittle"
- Clara Van Gerven's presentation on 3-D printing from the National Federation of the Blind
- Amy Mason's Deaf-Blind Communication from NFB

Contact Information

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