Closing The Gap 2022

Next-Gen Tactile Symbols – 3D-Printed Blissymbolics

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Anitha Muthukumaran
Andrea Newall

** We have no relevant financial relationships nor relevant non-financial relationships to disclose.*

Good afternoon and thank you for attending our presentation. Anitha, Andrea, and I hope to convince you that there's something very special about our 3D-printed, Bliss Tactile Symbols.

The next three slides go into some depth on our backgrounds. I'm going to skip over them and simply say that I'm an ex-engineer, while Anitha is a teacher of the visually impaired and Andrea is a speech and language pathologist.

We are all volunteers in this effort and have no relevant financial relationships nor relevant non-financial relationships to disclose. We're working with a team of volunteer therapists, and you'll see a few of them further on in the presentation.

Ken Hackbarth

Is the president of Volksswitch.org – an organization devoted to the democratization of assistive technology by leveraging the power and promise of 3D printing. Prior to his current position he worked for almost three decades as a systems architect for AT&T Bell Laboratories and its subsequent divestitures. He has Master of Science degrees in both Evolutionary Biology and Systems Engineering from the University of Arizona and a Master of Education in Special Education, with a concentration in assistive technology, from Bowling Green State University.

Anitha Muthukumaran

-Teacher of students with visual impairments (TVI) working in Douglas County School District in Colorado.

- 11th year teaching and prior to this career, a software engineer working in a large bank in the Midwest.

- 5th year doctoral student at the University of Northern Colorado majoring in special education.

-Main area of research interest is exploring how technology plays a role in implementing an inclusive classroom for children with visual impairments and/or blindness.

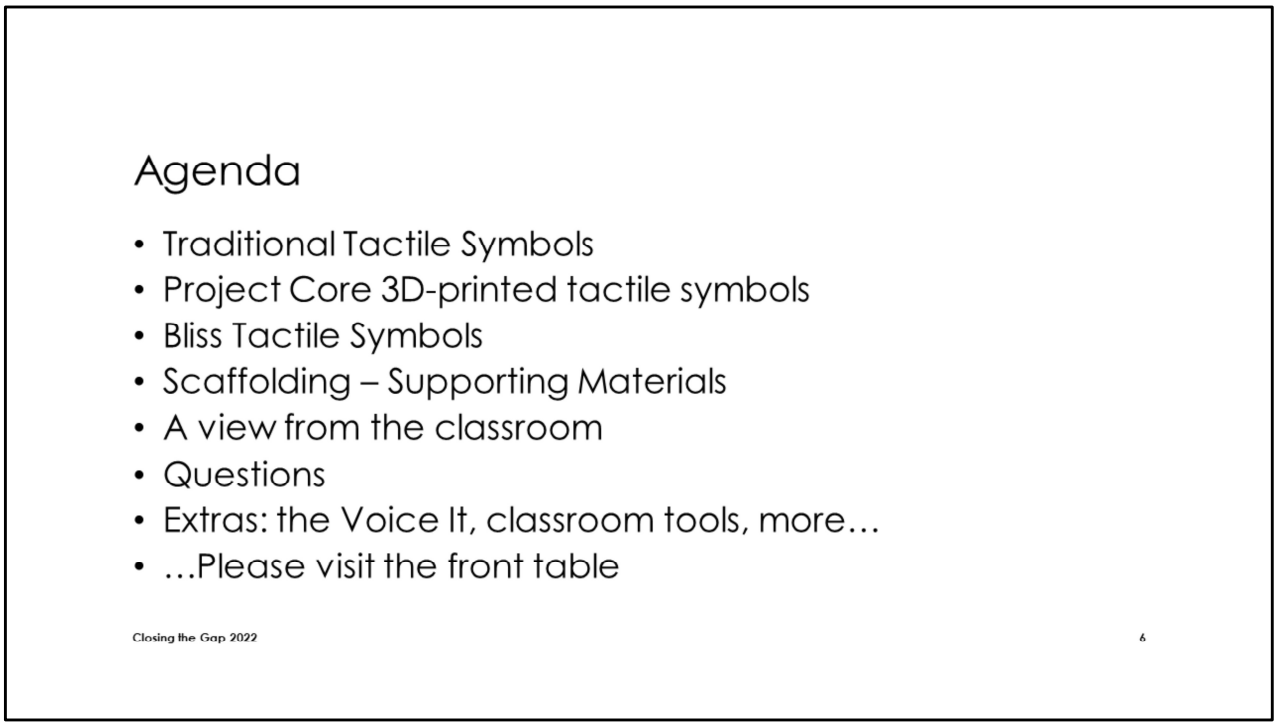
Andrea Newall

Is an Augmentative/Alternative Communication Specialist and Speech Language Pathologist who works in a public school district in California and teaches AAC at a California State University. She has a Master's degree in Communicative Disorders.

Learning Outcomes

- As a result of this session, participants will be able to describe the benefits of using tactile Blissymbols.
- As a result of this session, participants will be able to list/describe the free DIY core and support materials available at Volksswitch.org
- As a result of this session, participants will learn to use 3D-printed Blissymbols in their communication lessons for students with visual impairments and/or blindness including those with cognitive disabilities.

If you walk out of our presentation with a working understanding of these three topics, we believe you'll be positioned to leverage this new technology and these free resources to help your students develop communication skills free of external limitations.



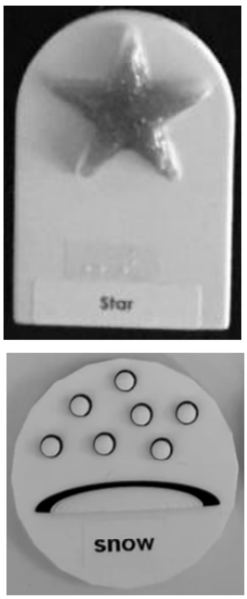
Here's our agenda:

- We'll begin by setting a baseline understanding of traditional tactile or tangible symbols.
- We'll credit the Project Core team from the University of North Carolina for their creative insight, before we talk about how their effort falls short of an optimal tactile symbol system.
- We believe we have created an optimal system based on Blissymbolics, so we'll spend a little time introducing you to the language of Blissymbols and to our Bliss Tactile Symbols.
- We've built an entire ecosystem around our tactile symbols, and we want you to know how you can obtain these free resources.
- We're talking about more than just ideas here. We want to share our own thoughts as well as the voices of people like Anitha and Andrea and their experiences using these tactile symbols in the classroom.

- We'll give you an opportunity to ask any questions you'd like – but it would be great if you could save your questions until the end of the presentation.
- Finally, we hope we'll have the time to show you a special DIY device that gives our tactile symbols a voice - called the Voice It - as well as some 3rd-party tools for managing the symbols in the classroom
- We have all of these items up on the front table so please come up and visit us after the presentation.

Tactile/Tangible Symbols

Tactile symbols help individuals who are blind or visually impaired, and may also have complex communication disabilities, to express themselves.



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You've all seen tactile and tangible symbols before – even if just in pictures. They're used by individuals who are blind or visually impaired and can help them express their needs and desires, as well as gather information about the world around them.

The symbol can incorporate a physical object like a ribbon or simply have a unique tactile profile.

This slide shows two examples of traditional tactile symbols. The first is a plastic starfish glued to a card with the word "star" printed on the front. The second is seven raised dots on a card labeled "snow".

Traditional Tactile Symbols

- Often a physical object glued to a rigid backing.
- There may be a clear tie to the symbol's referent. Plastic Spoon => Eat
- Or it may not be so clear if the referent is less tangible.
- Lots of variation from symbol set to symbol set.
- What to do with physically large concepts?

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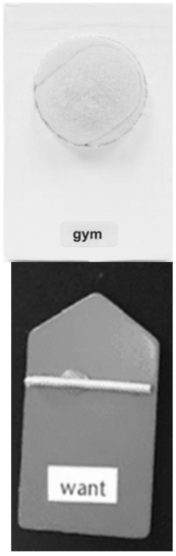
- Traditional tactile symbols are typically constructed by gluing a physical object to a rigid backing.
- The physical object may be closely associated with the symbol's referent
- For example, the slide shows a plastic spoon glued to a piece of cardboard to represent the concept “to eat”.
- It’s much more difficult to create effective symbols for concepts that are less tangible
- The slide shows a tactile symbol with a raised circle as a representation of the concept “yes”.
- Less tangible concepts tend to be modeled very differently by different designers.
- Physically large concepts tend to be modeled by choosing a small component of the larger concept even if that small component is

unrepresentative of the overall concept. For example, how should a tree be represented? By a leaf? By a piece of bark?

Traditional Tactile Symbols - continued

- What to do with complex (multi-component) concepts?
- Symbol sets may contain just a few or more than one hundred concepts.
- Rules are hard to establish and follow.
- Rote learning.
- "Partner Text" is critical for partner understanding (and rationalization).

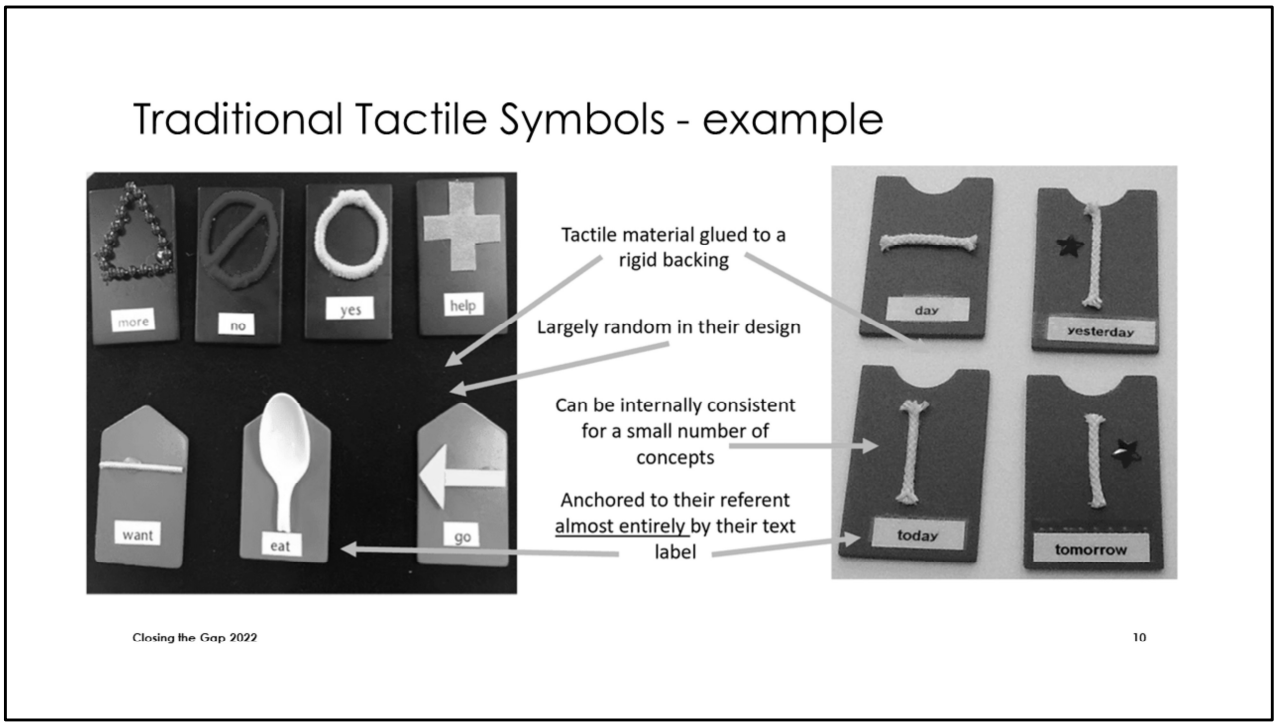


Complex, or multi-component, concepts are often modeled by selecting a single component of the concept

- Is a tennis ball the best representation of gym class?
- Traditional tactile symbol sets rarely represent more than a hundred concepts.
- And anytime a symbol set is constructed for a small number of concepts, there is little or no motivation to base the design choices on a set of rules.
- Without rules, there's little conceptual carryover from one symbol to another. Such symbols must, by definition, be learned through rote memorization.
- Probably the most telling aspect of traditional tactile symbols (just like popular graphic image sets) is the fact that they always include a text label.

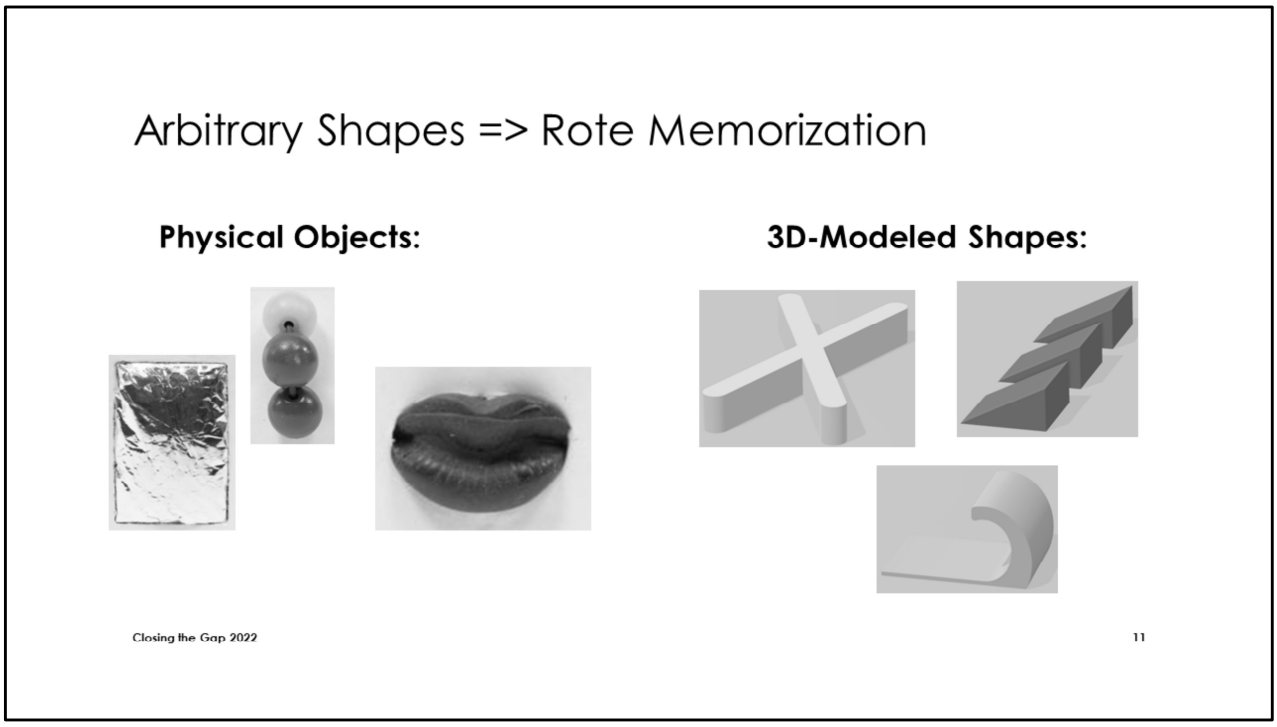
Ostensibly the text is there to help communication partners – because with out the text, it's unlikely that anyone would connect the symbol to the concept. Only by first reading the label can someone "back into" the referent – sometimes not even then.

- The slide shows a card with a piece of string glued horizontally onto it. Why would you intuit that this shape represents the concept "to want"?



Here are examples of two different symbol sets. The slide shows eleven traditional tactile symbols.

- Some symbols are intuitive – an arrow for the concept “to go”.
- But why a bead triangle to represent “more”?
- I’m sure you can rationalize a cross representing “help” – especially a red cross (though this cross appears to be made of brown sandpaper) – How much cultural knowledge do you have to make the connection from a cross to the concept “to help”?
- The symbols on the right are, at least, internally consistent. They appear to use a small piece of rope to represent the concept of “now”. But where do you go next if you want to represent the concept “to want”? The consistent theme is immediately lost.
- Imagine trying to intuit the meanings of these symbols without their text labels.

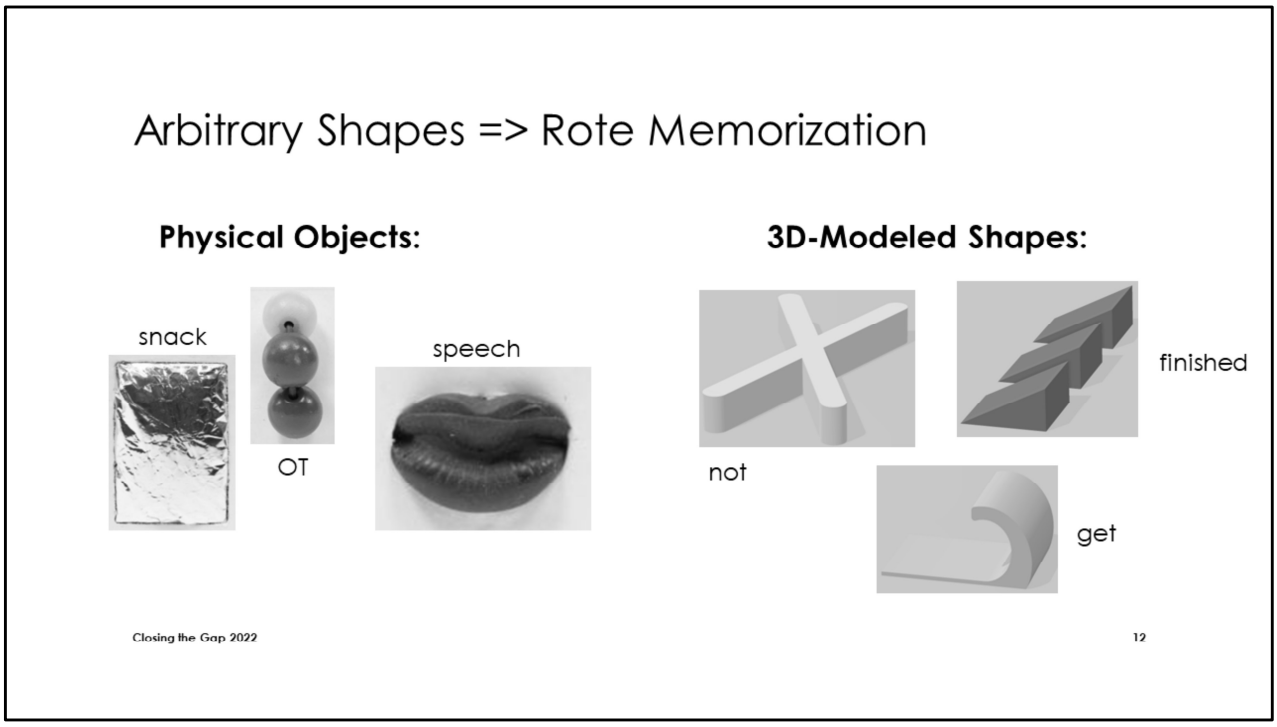


Well, let's try it…

This slide shows six images taken from popular tactile symbol sets. There are three physical objects on the left: a rectangle of tin foil, three beads on a string, and a set of plastic lips. On the right are three virtual objects: an X, three ramps, and a cresting wave (for lack of a better description).

Take a moment and predict what concept each one represents.

Ready?



Here's how these objects and shapes are actually used.

The tin foil represents "snack". The three beads represent "occupational therapy", the lips represent "speech therapy", the X represents "not", the three ramps represent "finished", and the cresting wave represents "to get".

How well did you do? Remember that the individual relying on the tactile shape can't take advantage of the partner text.

Project Core 3D-Printed Tactile Symbols

- Project Core: Center for Literacy and Disability Studies at the University of North Carolina-Chapel Hill.
- Established the set of 36 Universal Core concepts/words.
- Designed 3D-printable models for each one
- **Brilliant!**
- Available for download as STL files.
- 3D-printed repeatability

* Hand out examples

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Let's now look at a breakthrough in the creation of tactile symbols

- Project Core is a program of the Center for Literacy and Disability Studies at the University of North Carolina-Chapel Hill.
- They have established a Universal Core Vocabulary as part of their Universal Core Communication System.
- In support of their Universal Core Vocabulary, Project Core developed a set of thirty-six, 3D-printable, tactile symbols.
- This was a brilliant idea.
- The image on the slide shows an early example of their symbol for the concept "to go". It has a raised arrow from left to right, the word "GO" engraved, and Braille bumps for the letters: "g" and "o". All of these are on the face of the symbol.
- Project Core makes these symbols freely available to the public as STL files.

- Because the symbols are 3D printed it’s easy to produce exact copies of a design.

(https://www.project-core.com/3d-symbols/)

Project Core 3D-Printed Tactile Symbols – cont.

- STL files cannot be modified.
- No way to add new concepts.
- Too much tactile activity on the symbol's face.
- Related concepts are tacitly unrelated.
- Raised shapes are unrelated to their referent.
- Rote Memorization

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So, yes, this is a breakthrough. Unfortunately…

- The STL files cannot, reasonably, be modified if desired.
- There is no support for extending the set if needed. There are 36, and only 36, universal core words and 3D symbols.
- Including Braille and engraved text along with the raised shape unnecessarily complicates tactile processing of the symbol. The Braille, in particular, is very scratchy and off-putting.
- If you look at the complete set of symbols, there are no obvious features that tie together related concepts, other than their word class. Learning one symbol provides no advantage in learning the next or a related symbol.
- Often, there's no obvious relationship between the raised shapes and their referent.
- The slide shows an image of the symbol for the concept "more". What is

the connection between three raised bumps and the concept “more”?

- Without clear tactile relationships and carry-over, these symbols must be learned through rote memorization.

What would an optimal tactile symbol system look like?

1. Immediately Conceptual
2. Simple elements
3. Extensible (generative)
4. Flexible features along with repeatability
5. Managed by an international standards body
    a) Rules-based
    b) Enforced consistency
    c) Independent of culture

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If the previous tactile symbol sets are non-optimal, what would an optimal tactile symbol system look like?

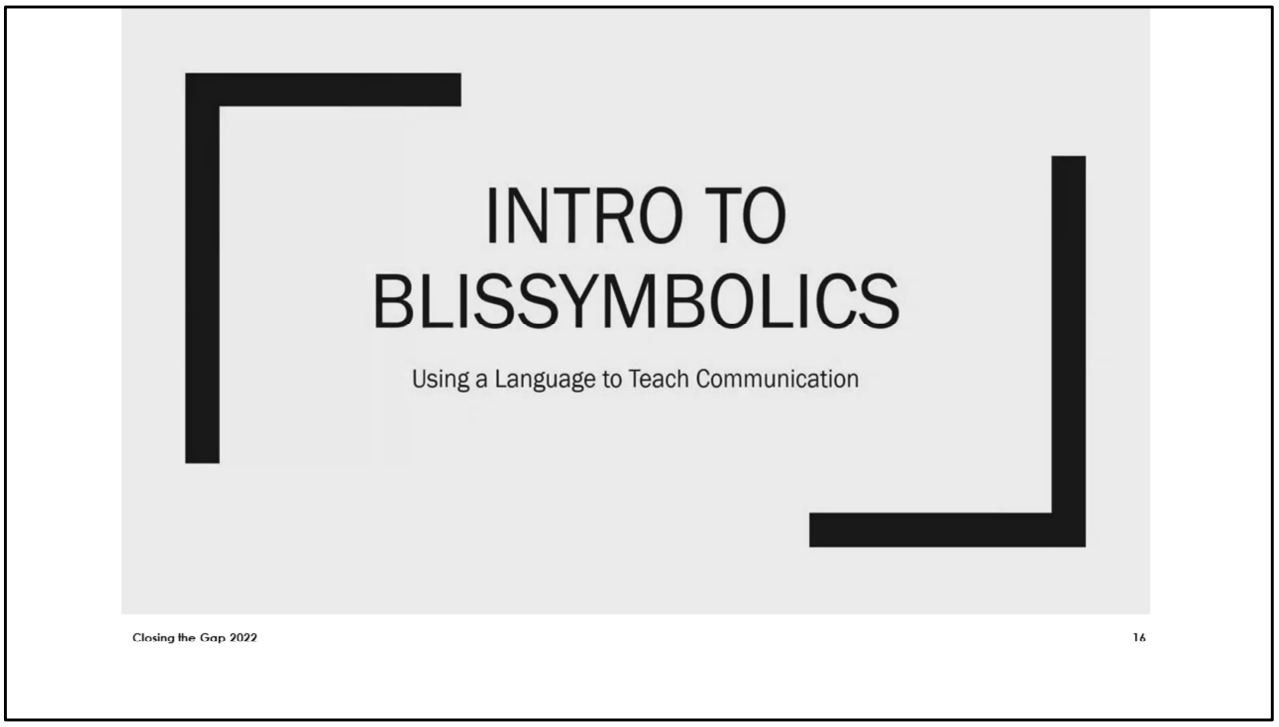
1. First, it would utilize a Conceptual Language – as a result, there would be no intermediate conceptual transformations like: tactile shape => sign language => concept, or tactile shape => Braille letter, => English word => concept.
2. Second, it would be made of simple elements – that would lower the tactile and cognitive load (just a few lines and curves, basically 2-dimensional)
3. Third, it would be extensible – with a generative language, you can easily create new symbols from existing ones
4. Fourth, the tactile symbol design, itself, would be flexible – you and your student should be in control of the amount of complexity – yet creating exact copies of your design would be as simple as printing them.
5. Fifth, there would be a Standards Body to validate and ground

construction of the language and specification of symbols

a. Rules would be established by the standards body to direct the design of new symbols

b. Consistency would be enforced for carry-over of learning from symbol to symbol

c. The symbols would be independent of culture – so cultural knowledge would not be a prerequisite. The standards body would be multicultural and multilingual.



With those characteristics in mind, I'd like to take a few minutes to tell you about the basics of Blissymbolics.

- <play video>

https://youtu.be/hdiO_PYcOI8

I was intrigued with the regularity and predictability of this language 40 years ago when I was in college. I hope you feel some of that yourself. I also hope you see that this is a language that operates completely in the conceptual domain. It's not tied to nor dependent on a spoken language or a particular culture.

Video transcript:

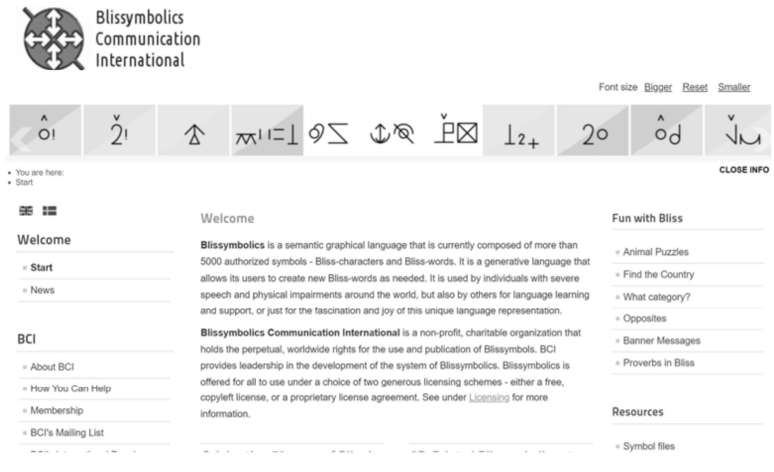
- If you think it's best to teach children to communicate by using a language instead of a collection of arbitrary images or shapes, I'd like to tell you about the language of Blissymbolics.
- Blissymbols were developed by Charles Bliss in the 1940s. He was looking for a language that could be learned and used by anyone on earth. His language is:

constructed – consciously devised instead of naturally evolved, ideographic – graphic symbols that represent an idea or concept, without phonology, generative – able to create an infinite number of concepts from an initial finite set. The language is purely conceptual. The symbols don't have to be translated into a spoken language in order to be understood. This has special implications for cognitively disabled individuals.

- Blissymbols are constructed using a few straight lines and simple curves. As such, they require less cognitive effort to explore and recognize. For tactile learners, this means that the symbols can be processed more quickly and reliably than symbol sets that are more complex in their construction.
- Basic Blissymbols are pictographic in nature. Their associated concepts relate easily to their graphic. For example, the "roof" shaped symbol represents protection. More complex concepts build on these simpler concepts.
- Additional simple shapes for simple concepts.
- More complex concepts can be constructed from the simpler concepts by overlaying one on the other. Here we see the arrow concepts overlayed on the enclosure and container concepts to convey new concepts like into, out of, get, and give.
- A female protector is a "mother". A similar and consistent process is used for "father". A container with water is a bath. A chair over water is a toilet.
- Concepts may also be created by appending one basic symbol to another. For example, all "feeling" words in Blissymbolics have the heart shape at their core. They are then qualified by appending other shapes to represent specific feelings. Feeling "up" means happy, while feeling "down" means sad. Positive feelings mean being good, while negative feelings mean being bad.
- Charles Bliss survived the concentration camps of World War II and was deeply affected by Nazi propaganda. When he created his new language, he wanted the language to clearly indicate when a concept was fundamentally an opinion rather than a fact. An adjective or adverb could lean either way depending on your point of view. He put an "unstable", angled shape over these concepts.
- For Bliss, a volcano epitomized action and power, so he drew his action indicator from the shape of a volcano. He asked, "what does the eye do?" – it sees. "What does the ear do"? – it hears. And so on. This is how verbs are easily built from nouns.
- Our 3D-printed, Bliss Tactile Symbols reflect the two types of indicators in the tope edge of the symbol. Verbs have an "action indicator" like top. Adjectives and adverbs have an evaluation indicator like top edge. Nouns have a rounded top edge, instead. In addition, you can use filament color to distinguish among the parts of speech. In this case, we've used colors from the Fitzgerald Key.
- These symbols can be enhanced by placing engraved text on the back surface, adding Braille to the sides, or including holes at different locations for mounting the symbol on a string.
- You can learn more about the possibilities of representing concepts through Blissymbols by visiting these web sites and pages.

Slides and notes are here: https://volksswitch.org/wp-content/uploads/2021/11/Intro-to-Bliss-Symbols.pptx
Associated web page: https://volksswitch.org/index.php/volks-devices/bliss-tactile-symbols/intro-to-blissymbols/

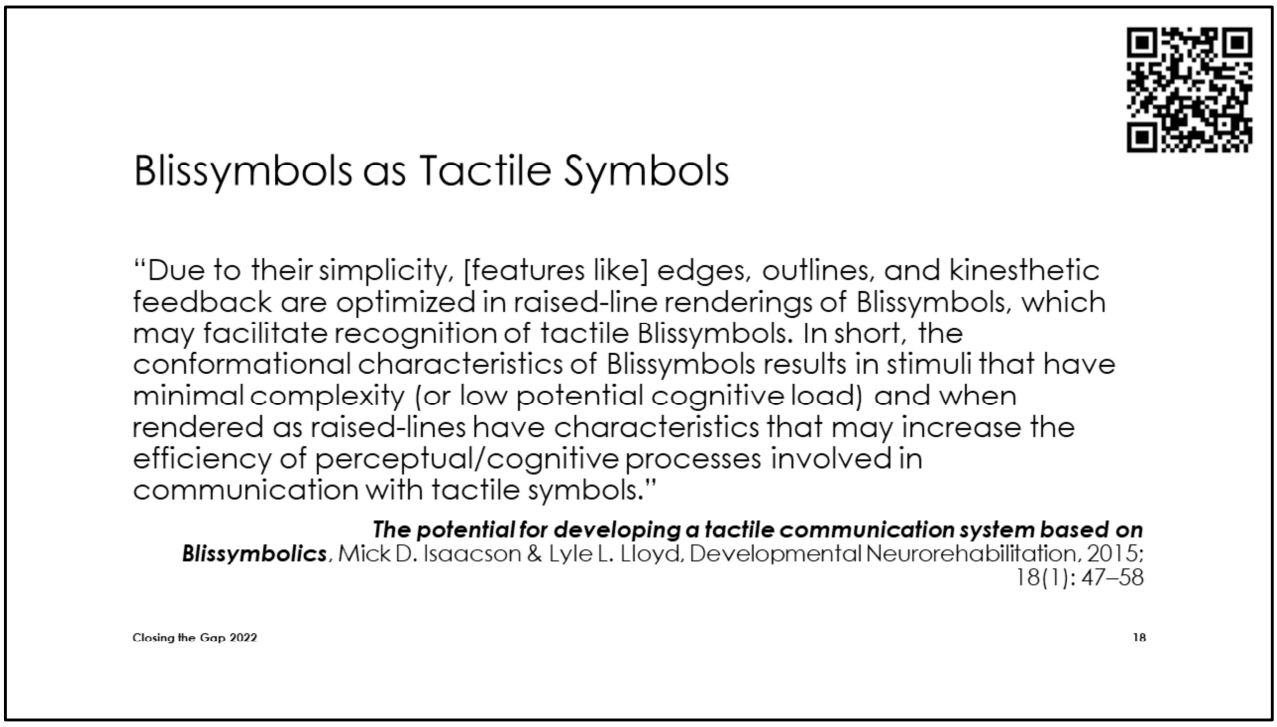
Blissymbolics Standards Body - BCI



Blissymbols are unlike any other graphic symbol set. They are curated by a multicultural, multi-language, non-proprietary standards body. When a new symbol needs to be added to the language, a collection of individuals ensures that the symbol adheres to the rules of symbol design and leverages the rest of the language. What process do you think is followed when they need to add a new symbol to PCS or SymbolStix?

The slide shows a screenshot of the homepage for Blissymbolics Communication International – BCI for short. This is the organization that curates Blissymbols.

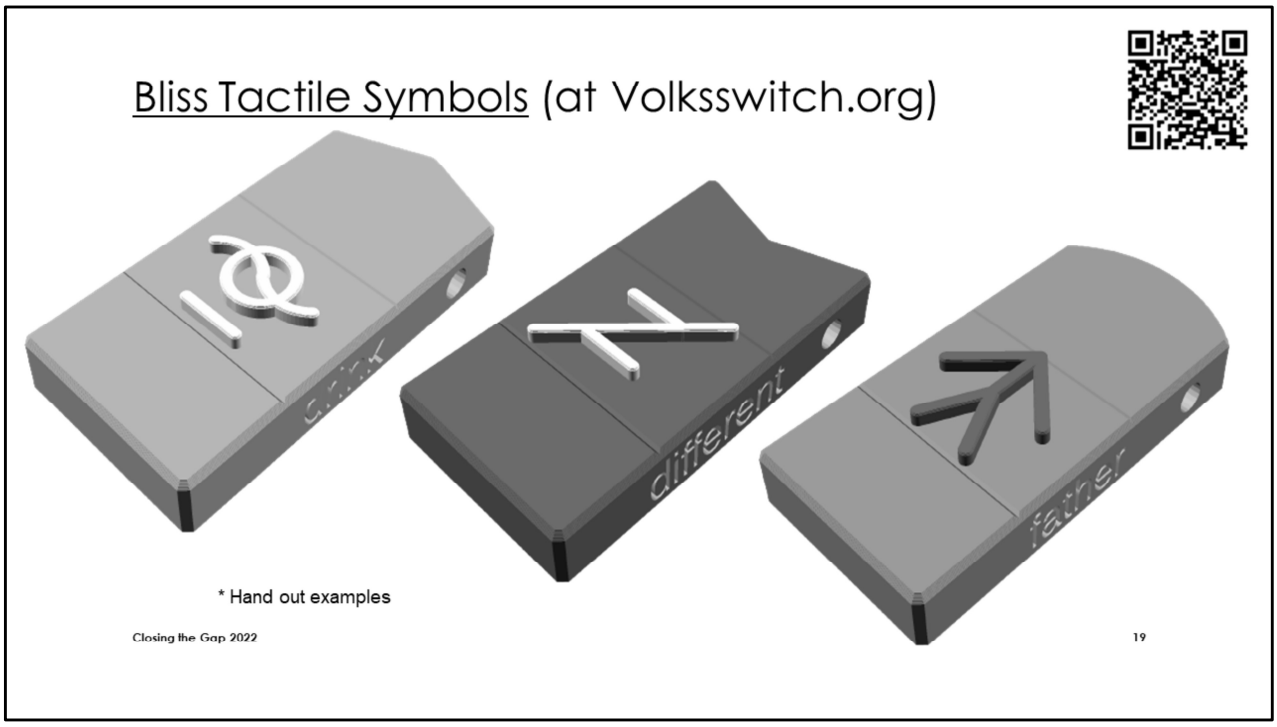
(www.blissymbolics.org)



Isaacson and Lloyd saw something special in Blissymbolics that had them wondering about its applicability to the tactile domain.

In particular, they thought…

(https://pubmed.ncbi.nlm.nih.gov/25325716/)



This slide shows images of three of our Bliss Tactile Symbols. To drink, different, and father.

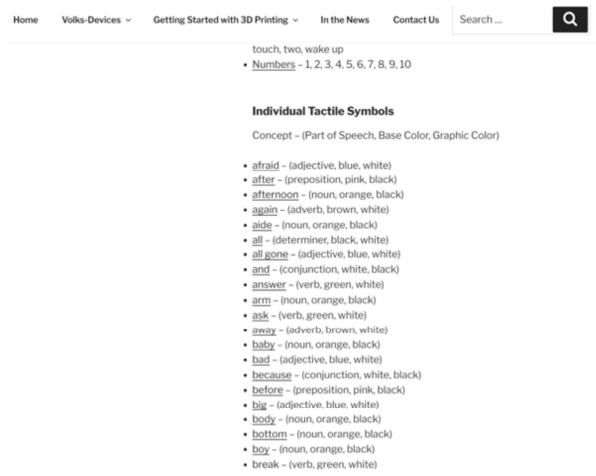
We'd like you to have a "hands-on" experience with our Bliss Tactile Symbols, so we'll pass some out now. They're for you to keep and show to your associates.

(https://volksswitch.org/index.php/volks-devices/bliss-tactile-symbols/)

Available Free Resources: 242 ready-to-print tactile symbols

Including:

- the 36 Universal Core words from Project Core
- Gail Van Tatenhove's 205-word Core Vocabulary List for Students with Intellectual Disabilities



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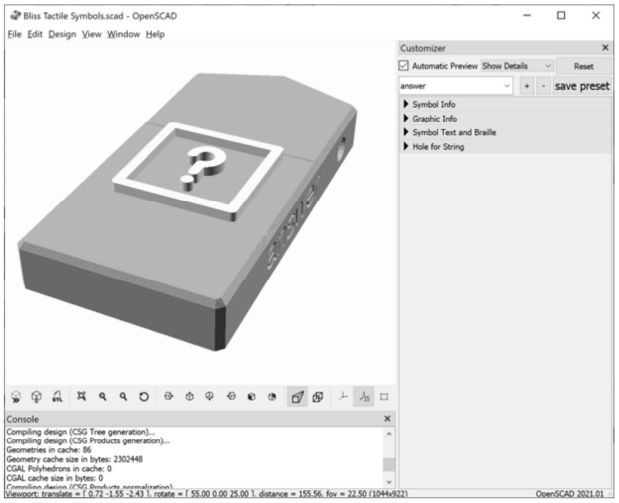
We've made 242 of these symbols free for you to download and 3D-print on the Volksswitch website. They span the 36 Universal Core words from Project Core as well as Gail Van Tatenhove's Core Vocabulary List for Students with Intellectual Disabilities.

The slide shows a screenshot of the Volksswitch webpage where you can download the STLs for individual symbols or as collections of symbols.

(https://volksswitch.org/index.php/volks-devices/bliss-tactile-symbols/bliss-tactile-symbol-stl-files/)

Available Free Resources: tactile symbol designer

A designer for customizing the ready-to-print symbols and extending the set to include any of the over 6500 free-to-use official symbols currently specified by Blissymbolics Communication International



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We also provide a free tactile symbol designer that you can use to modify our initial symbol set, as well as to create new symbols based on the free graphics from BCI.

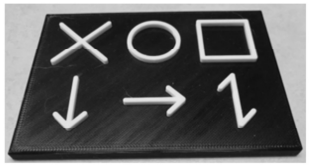
The slide shows an image of the tactile symbol designer's user interface. Modifying an existing design or creating an entirely new one is as simple as choosing options from pulldown lists and typing some text.

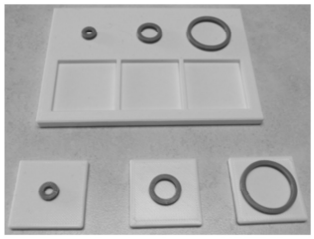
You can take advantage of the pictographic nature of Blissymbols to construct motivational tools like these puzzles – which are also 3D-printable.

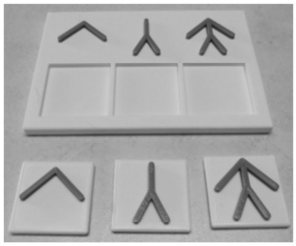
The slide includes five images of four example Bliss puzzles. One picture shows a puzzle that has been disassembled.

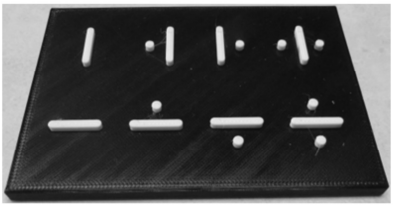
Available Free Resources: Explorers and Challenge Tiles

Challenge tile sets and a tile set designer to build symbol recognition skills









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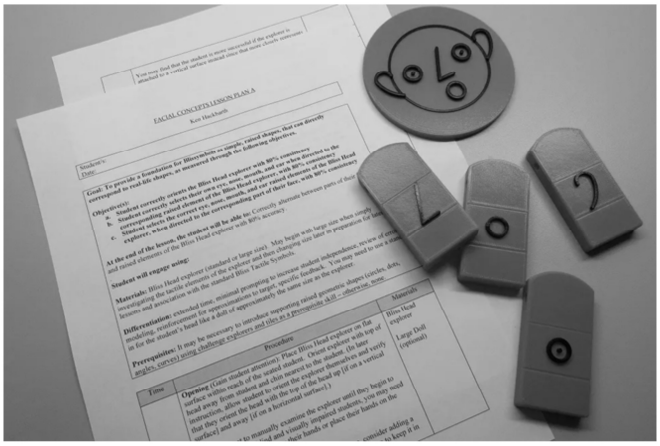
3D-printed Explorers and Challenge Tiles can provide scaffolding for children who need to build their skills from simple tactile shapes to more complex ones.

The slide contains four images. Two example challenge tile sets, in white, and two example explorers, in black.

We provide a free, easy-to-use, designer to create these tools and the Bliss Puzzles, for yourself, based on your student's needs.

Available Free Resources: "Explicit" Lesson Plans

A growing set of ready-to-use lesson plans with remedial and motivational supports



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You can incorporate these tactile symbols into your classrooms in the same way that you've previously used traditional tactile symbols.

But we've taken the extra step of developing a few simple, "explicit" lesson plans to help you get started.

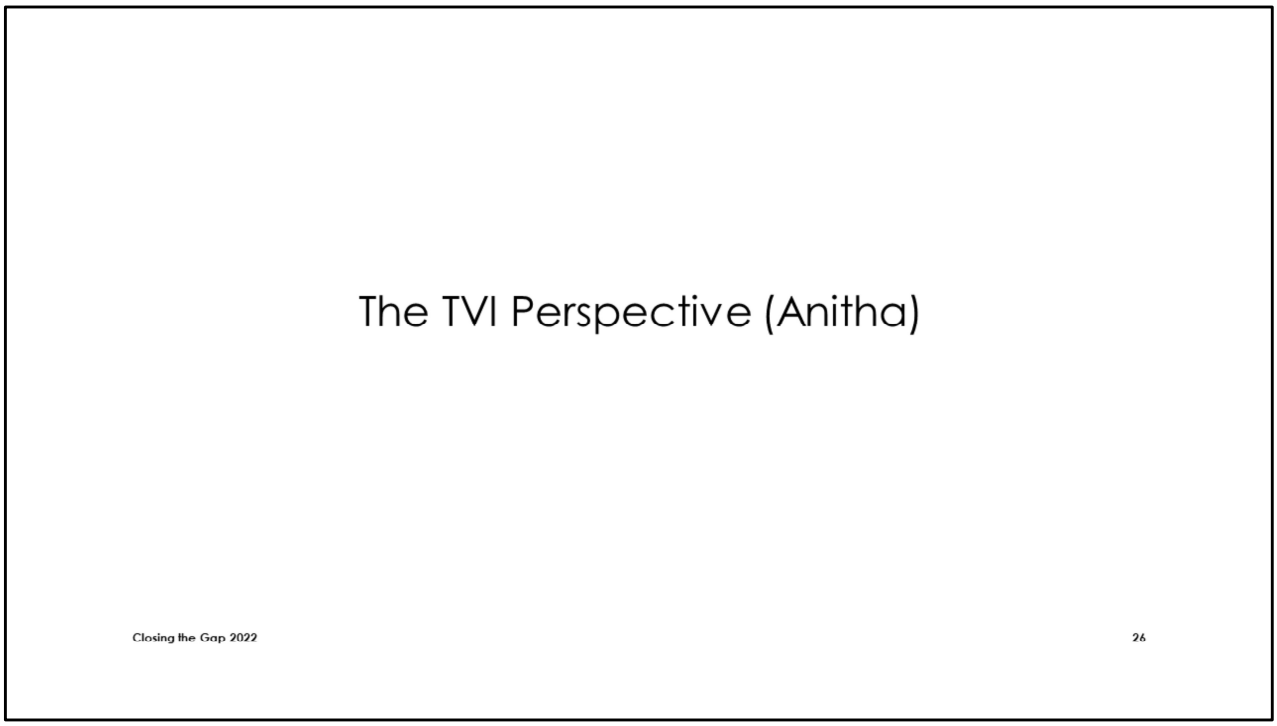
This slide has an image of a documented lesson plan and the Bliss Tactile Symbols and Bliss Head Explorer used to support that lesson.

Our set of lesson plans is small at this point. We'd love your help in extending it based on your own learning and experience.

A View from the Classroom
(Boots on the Ground)

- Anitha Muthukumaran
- Andrea Newall

Speaking of the classroom, I'll now turn the presentation over to Anitha and Andrea to share their knowledge about how these tactile symbols can impact students.



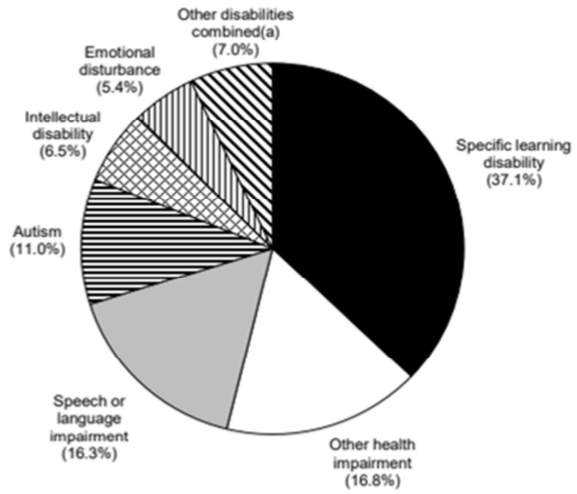
- Children with visual impairments (VI) need access to learning materials presented in more than one sensory modality.
- Although a popular use of 3D printing technology is building tactile models for individuals with VI, teachers of students with visual impairments (TVIs) have not yet fully exploited the benefits of this technology. The meaningful application of 3D printing technology in K-12 schools has been questionable despite the availability of inexpensive 3D printers since 2009.
- Students with VI and additional disabilities need a communication system using concrete or abstract symbols. Tactile symbols of core vocabulary words are often used for students with cognitive, motor, or speech impairments.
- Access to tangible, portable, and meaningful tactile symbols can improve students' access to social interactions in the community.

Reference:

- Horvath, J. C., & Cameron, R. (2018). *Mastering 3D printing in the classroom, library, and lab* [Adobe Digital Editions version]. doi:10.1007/978-1-4842-3501-0

- Siu, T. (2014). *3D Printing for accessible materials in schools.* http://diagramcenter.org

Students with Visual Impairments



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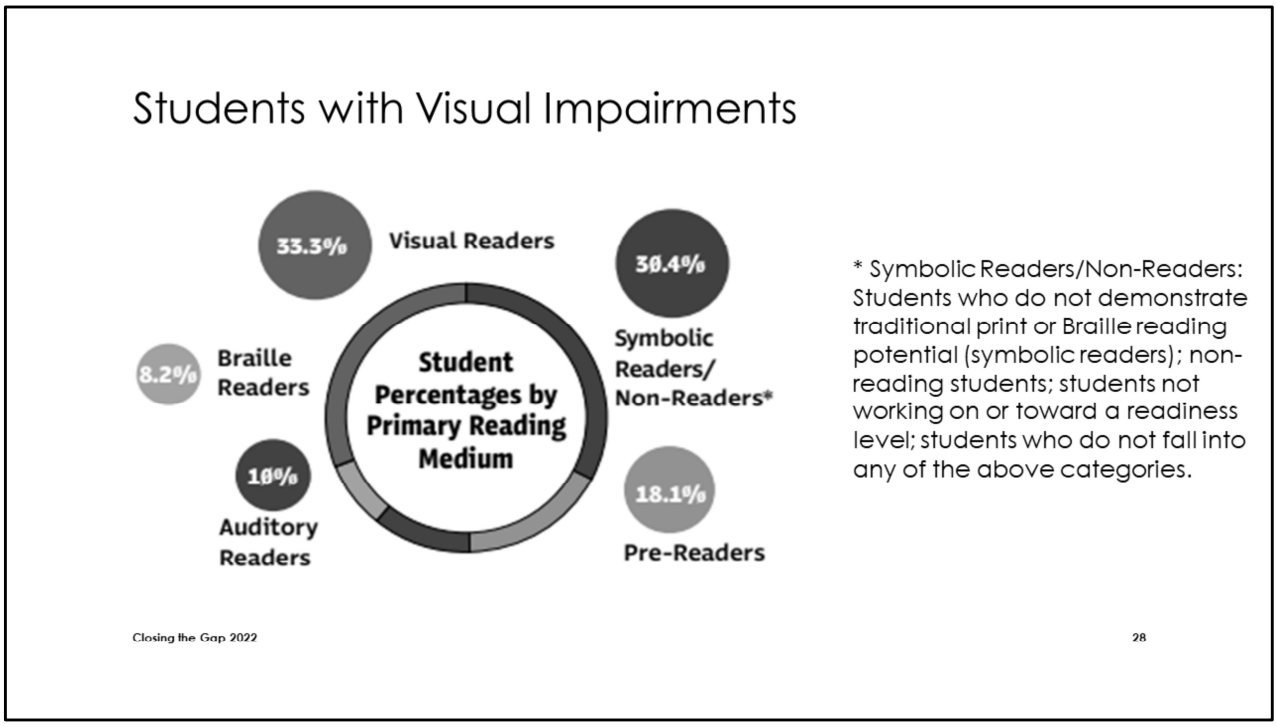
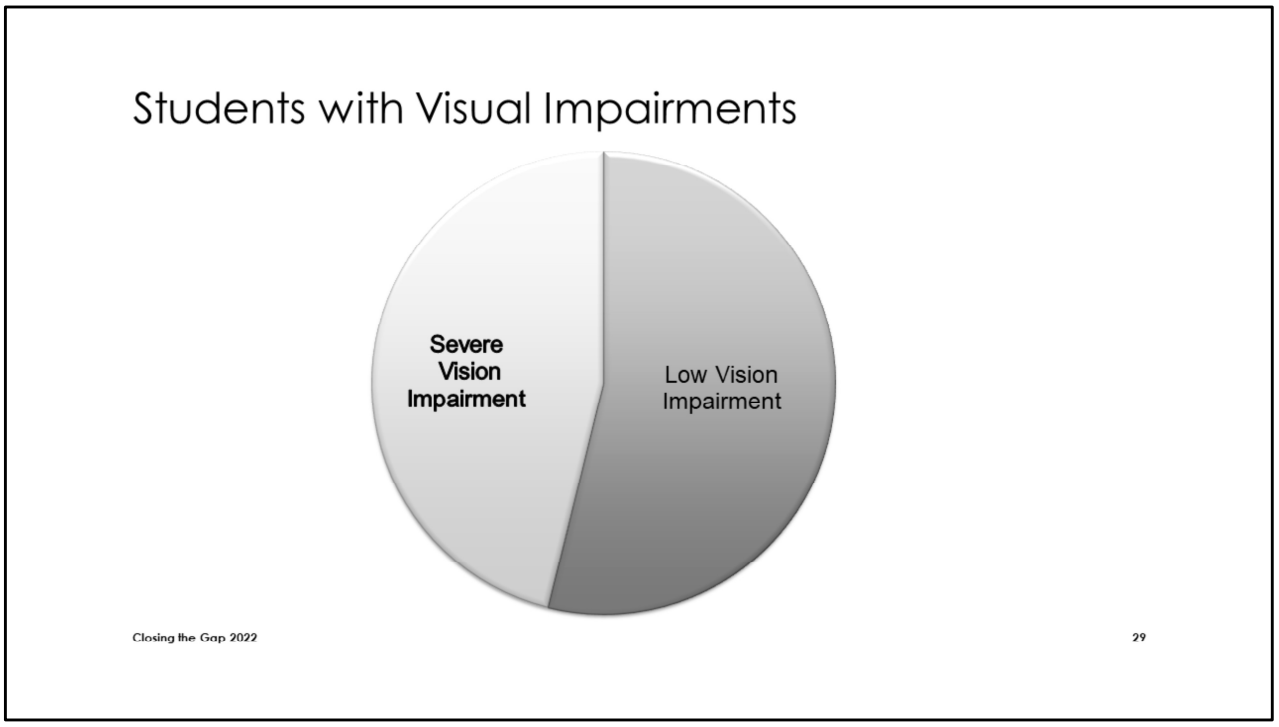
I have a pie chart in this slide showing the percentages of students with VI or blindness compared to all other children receiving special education services. According to the Office of Special Education Program (2022), the percentage of students, ages six through 21, who received services under the category of visual impairments (VI) or blindness was 0.4 percent of all students receiving special education services under IDEA in the school year 2019-2020.

Reference:
Office of Special Education Program. (2022). 43rd Annual report to congress on the implementation of the individuals with disabilities act 2021. https://sites.ed.gov/idea/files/43rd-arc-for-idea.pdf

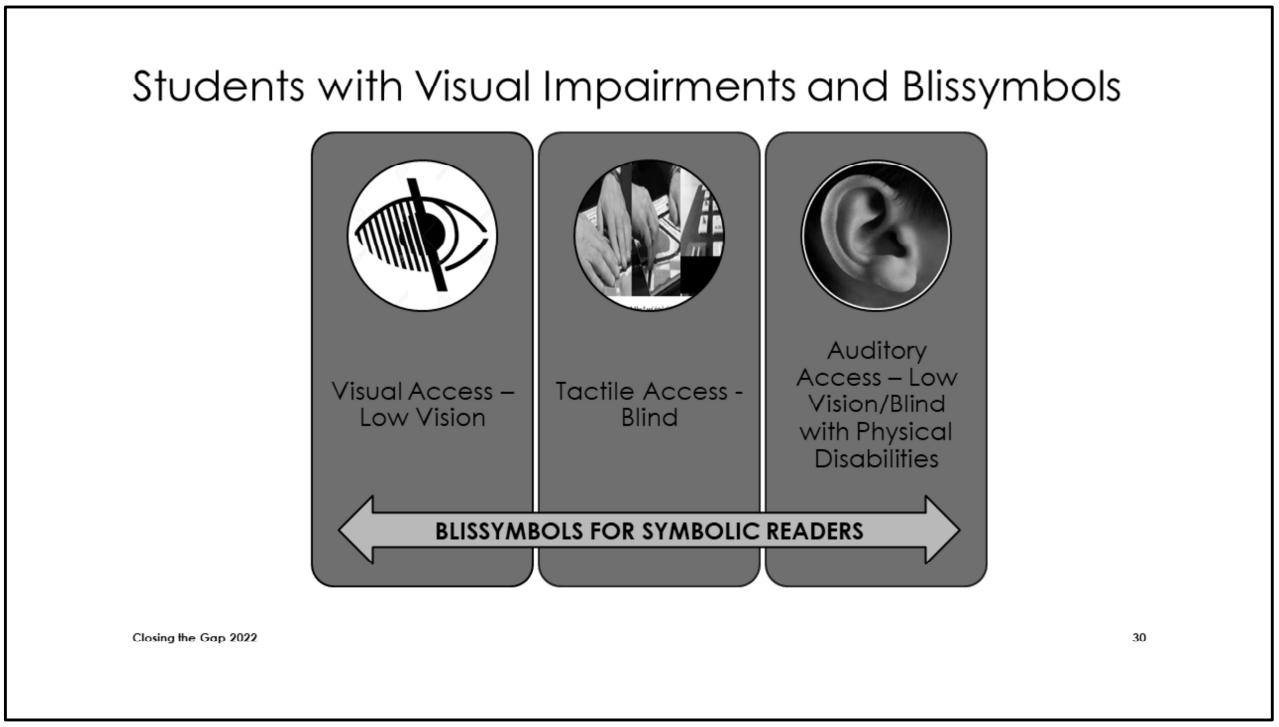


According to the annual quota census by American Printing House (2020), in the year 2019, among students with VI, approximately 8.2% are braille readers, 33.3% are print readers, 10% are auditory readers, 30.4% are non-readers, and 18.1% are pre-readers. As portrayed in the above statistics, even within one disability category of VI or blindness, students differ in how they access their curricula including braille, print, symbolic, or auditory modalities.



Visual Impairment includes both low vision and severe visual impairment that includes partial to total blindness. In this slide, I have a pie chart showing that that there are slightly more students with low vision impairment that severe vision impairments.

In all, 7.24% of school-age children were visually impaired, of whom 3.9% had low vision and 3.34% had severe visual impairment.
Reference:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5685140/#:~:text=In%20all%2C%207.24%25%20of%20school,3.34%25%20had%20severe%20visual%20impairment



In this slide, I have a picture of three rectangles. The first rectangle shows Visual Access - Low vision; The second rectangle shows tactile access for blind learners; and the third is the auditory access for students with low vision/blind and physical disabilities.
The idea of any instructional materials is to present those materials in mutliple formats so that ALL learners can access those materials seamlessly. For example, as we saw even within students with visual impairments, they vary in how they access their instructional materials. So the idea is for Blissymbols to be accessible to all low vision, tactile and auditory learners.
Blissymbols for symbolic readers, students with low vision(visual access), students with significant vision loss (tactile access), students with physical disabilities and cannot access through vision or tactile means, voice it (auditory access).

The SLP Perspective (Andrea)

Perspective-Taking for Educators!

- When we choose symbols (as educators), how much are we tied to our visual perspectives?
- What is it like to learn language via tactile input?

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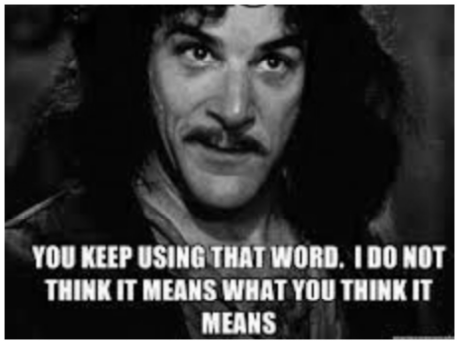
- Conceptually based language system (Bliss) helps us (as educators) spend more time thinking about teaching and less time deciding what to use as symbols; also helps us think less from a purely visual perspective
  - think like the AAC user
  - Try it now: Feel the symbols yourself (close your eyes)
  - try to imagine the user's perspective
- Size, durability and thickness of these symbols makes them useful - less likely to be swallowed, broken, bent, chewed, etc.
- Salient visually, tactually, and (if used with Voice-It) auditorily = multisensory
- Can write text in Sharpie on the front if working with completely blind students; i.e., no interference with visual appearance of symbol

Perspective-Taking for Educators!



- Presenting the symbols
  - Use simple, clear (but correct) language
    - no background chatter
    - reduce/eliminate visual, auditory, and tactile clutter
  - teach flexibility (Blissymbols lend themselves to this); e.g., "animal"/cat
  - Wrist loops and boards used in our class
- How do you know when you (student or educator) are **communicating** vs. "**babbling**"/exploring with the symbol?

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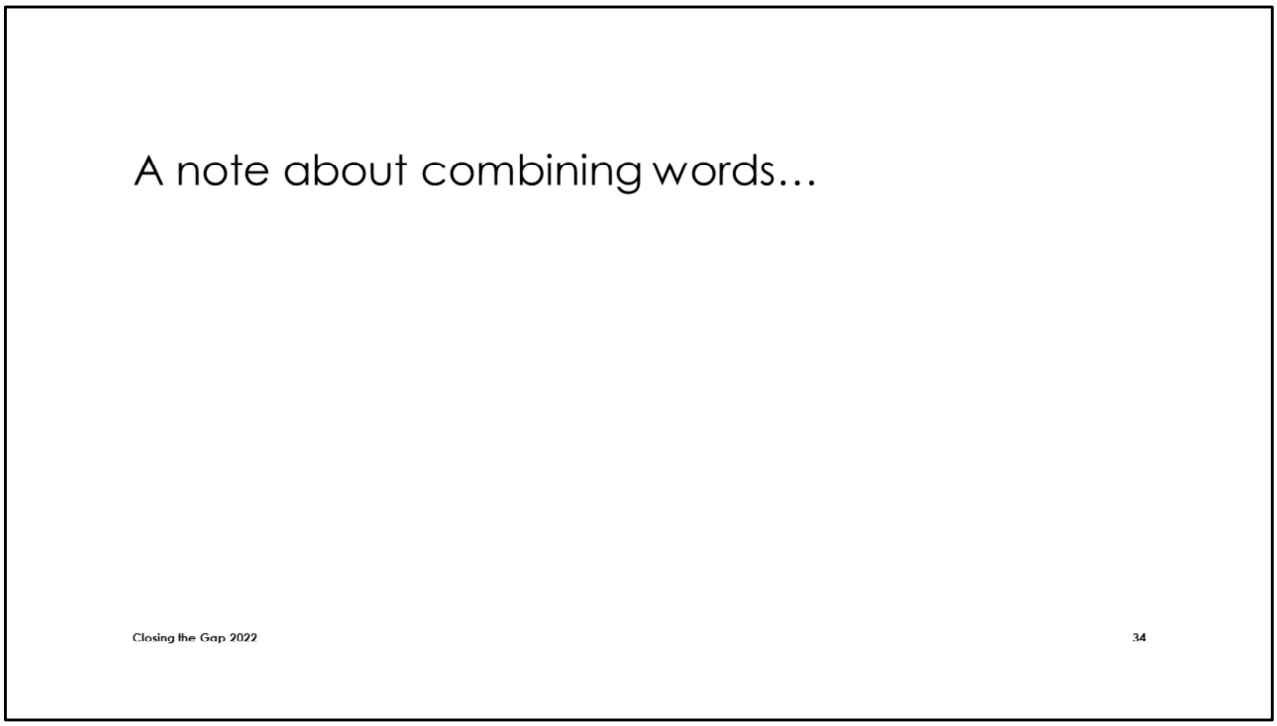
Keep language extremely simple (but not telegraphic - use real phrases or single words)

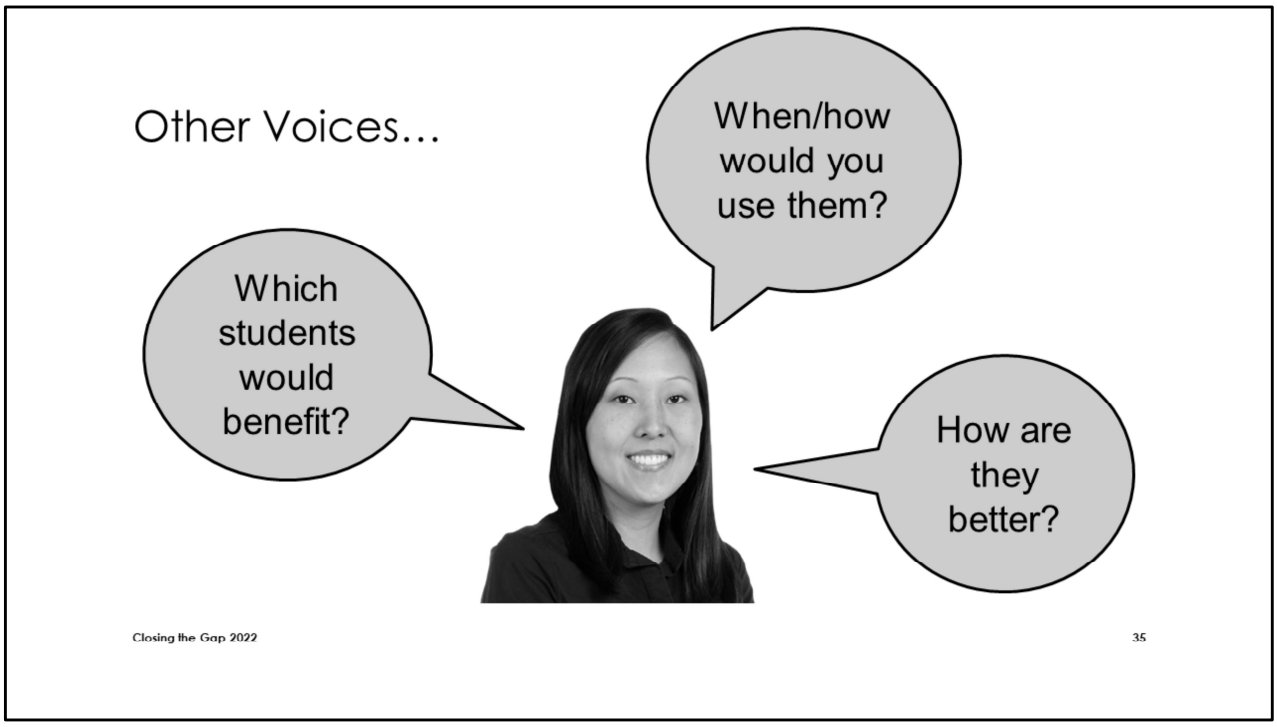
Walk and drink symbols used with "L" - aide with "walk" symbol

I used wrist loops to present symbols (one at a time) dangling from my wrist for students to feel; or for aides to use with students while walking around the classroom when first presenting symbols

Tap to communicate vs hold/feel to explore? Also can be used on a Voice-it or 7-Level Communicator.



If your student is going to be combining words in any novel-utterance generating way… they probably should be doing auditory scanning. But then these would have helped you learn that your student had that potential, or was able to combine words; they might be used to teach phrases…
Blissymbols could have potential for DeafBlind students for whom Protactile signing is not an option…



Let’s hear from other members of the team…

(https://youtu.be/-o24fYl9__I)

Interview Transcripts:

Describe the profile of a student with whom you are using, or anticipate using, the Bliss Tactile Symbols.

- I've been trialing Blissymbols with a 20-year-old in my classroom, who is blind? She has, she has no eyeball in one eye and then she has retinal displacement and the other one. She also was diagnosed with an intellectual disability.

- The student is a primary kindergarten age student who has a variety of needs due to a rare genetic disorder due to her physical and medical needs. She's not able to access other communication. You know, your more typical communication systems.

- I would consider different types of children. Not just a student with a vision impairment. I'd consider those with multiple sensory impairments possibly vision and hearing. I would definitely consider any child – you often hear

teachers say, “well he’s too low”. And so any child that I think maybe they're not ready to attend to some of the visual boards I would definitely introduce these. I know I've had a lot of students even with autism, that really, like to fidget and hold things. So, I think I would use these as a way to almost supplement, the communication with another system. I'm not thinking that I would ever use these by themselves, but more, as really, a complementary tool with other systems. I primarily work with classrooms. So, in a classroom setting to learn language.

- The student that I would use this kind of system with would be a student who [is] visually impaired with limited communication skills, limited verbal speech, who just kind of needs some fundamental beginnings of like beginning to communicate in a way that they understand.

- I think back to one particular student that I had, and she had fetal alcohol syndrome, and, with fetal alcohol syndrome, you've got really some atypical learning patterns but one of the things is that contrast and so for her, she always liked to fidget, and she almost needed something in her hands to hold and I would have definitely used these with that child because they would have been really beneficial. So, for her that's one of the first classrooms we're going to target because she is vision impaired, and she has mild hearing impairment and then she got cognitive impairment and she's also had a very transient lifestyle, so life has been very inconsistent for her, so we want to have a very consistent system and we're starting out with 20 of the symbols.

When would you use the Bliss Tactile Symbols with a visually impaired or non-speaking student?

- So, we wanted something that was easy to make that was long lasting that could be you know carried by the student themselves and also on top of that like something that could help, develop the the students’ language and literacy. So Blissymbols fits all of that. Blissymbols can help like increase languages and to answer like predetermined questions during a lesson. That's like one of the main uses that my student, that my student does also the use Blissymbols as a schedule. So, they can anticipate what's coming next and they can also anticipate what's expected of them.

- So, we wanted something that was easy to make that was long-lasting. That could be carried by the students themselves again, they're very durable, which is another huge advantage because I have a lot of sensory-seeking students and sensory-reliance students in my classroom who enjoy using the tactile symbols for, you know, to help them focus during the day. But if one of those gets lost, I can put it in the software and 24 hours later. I've got it again for her to use.

- I feel it's really important with these students that we use the symbols to communicate with them as well as for them to be able to communicate with us. And, you know, for so many of these kiddos with the reduced Vision, all of a sudden, they're just moved, or they arrived at places, and they don't know. So, we're trying to use the symbols more of like that go and finish to represent things that are kind of more abstract.

- So why would… I would pick it because trying to get kids to kind of just tap on something that does not differentiate in any sort of way such as with any kind of communication device where it's just a flat button. It's not as meaningful, they don't want to explore, it takes so much effort, to try to get them to touch something as opposed to them being having a chance to just feel something and run their fingers over it and explore it independently, try to get them to touch something on their own, rather than me doing having them like, hold their hand, hand over hand. I'd rather them start to develop their independence that way.

- Many of the students that we work with, especially some of the low incidence students, they don't have enough experience, holding a variety of objects, and I think that this might be a more engaging way to start using a language system rather than like a regular typical communication board. You know, my hope is that we're starting with very young children when we're introducing this, although I do have a certain classroom right now that I'm trying to introduce it. Actually, we are introducing it and it's a middle school girl, who has a vision impairment and cognitive disability, and a lot of behaviors right now, and she needs a form of communication. So, I'm working with some teachers there to try to introduce it. I would like to see a set in every, every classroom that is self contained a supplement, and there's a lot of flexibility with them. So I would try to match some of the vocabulary being used in the classroom, so it's an alternative and not necessarily one or the other. I think we often hold our students with disabilities to a higher standard where they only get one means of communication and I would look at this as just a powerful tool as a part of the communication system. Any child, that is not responding to a typical communication system or any child who's slowly progressing on another communication system, I might supplement it with this as a tactial means to support communication with the system, every every classroom that has those students that somebody thinks doesn't have potential, I would definitely want to set of these in there.

What advantages do you see in using the Bliss tactile symbols with students?

- So, she and the past had been using symbols that we created using the Texas School for the Blind and Visually Impaired Dictionary and those were working, okay, but their handmade. And not the same person all the time, can make the symbols. So, there is room for inconsistencies based on how we perceive the

symbols and then also the materials that are available to us at any given time. Everyone else in my class has a diagnosis of intellectual disability or multiple disability and they're interested in the symbols, and that they want to learn with my 20-year-old student, shows me the accessibility that Blissymbols have. They've been through the washing machine and the dryer. They've been ran over. They've been thrown across the room and they're still usable.

- So, the more we looked into this the beauty of the Blissymbols is that it exists. You know, it's an existing system or whatever and it's always easy to create a new one that's already standardized instead of starting over and recreating. The consistency is what's really nice. As they move to programs, that part you know, is going to remain the same. Their size is nice. There are a lot of things that already exist out there that are tactile, if you will, symbols. They can often end up being very big. So, the size of these is perfect. That they can always be with the student is important. I also like that the amount of information on them is just enough. Often there's too much on things. Students can end up being distracted versus getting the needed information.

- They seem more inclined to touch it. I think that has to be the biggest thing. They see more inclined to explore it on their own without me having to constantly grab their hand and be like, “You push this button, you don't know where it is, don't know what it looks like… push this button.” As opposed to, they put their hand over it and they just… Even touching it sometimes - because I have it on top of an AAC device. They put their hand over it, and they explore it, and it triggers the sounds, and now, we’re linking sound to symbol, and I love that!

- You know, one of the benefits to the to the Blissymbols is that it's a generative system. There's so many options, it's a full vocabulary system. There's 3,000 [actually. 6,500] symbols at our fingertips, that we can produce. So, there's nothing that we can't work on to teach that child language. I like these particular tactile symbols. Because, well, they're easy to hold. So, it's engaging. It's something to hold. You know you're always trying to find different manipulatives to get kids interested and our kids often are… they don't have the opportunity to manipulate things. You really do need that more simple shape. And so, one of the advantages of the advantages to the Blissymbols is they're very simple shapes, and when you combine the shapes, then it actually makes more generative language. I just think that's just think it has so much potential. I am really excited about them.

Your Questions?

What questions do you have?

Extras…

In the time that remains, let’s look at some third-party, and DIY, products that you may want to use along with our Bliss Tactile Symbols.

The company, Augmentative Resources, makes several products for the management and display of communication symbols. The two images on the left are of their Bliss Tactile Symbol Carrier that they created specifically for the display, management, and transport of our tactile symbols. The pictures show the carrier in both closed and expanded configurations.

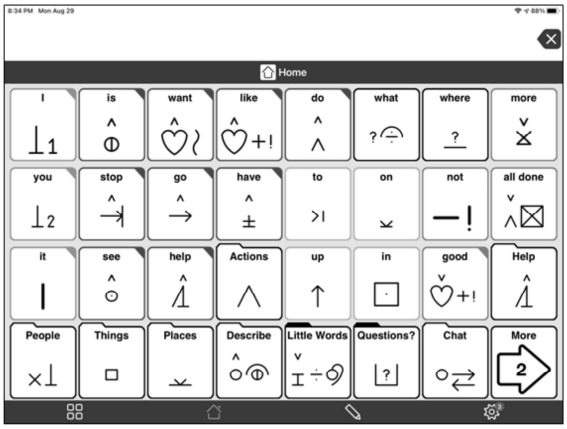
The carrier has a rigid spine and padded separator that keeps the symbols from clacking against each other. In the picture, I've used the space of the rigid spine to attach a 3D-printed "Message Builder". The slide has a picture at the bottom of a Message Builder with the symbols for "go" and "stop" attached. You can download the free 3D-printable Message Builder STL file from the Printables website.

The image on the right is their trifold choice board.

(https://www.augresources.com/Bliss-Tactile-Symbol-Carrier-p/033138.htm)

(https://www.printables.com/model/272827-message-builder)

Blissymbol use on AAC Devices



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If your favorite AAC software will allow you to place your own graphic images on one or more buttons, you can take advantage of Blissymbolics to create a consistent interface for your students. We support that effort by making the symbols for all 242 concepts in our set accessible via a webpage.

This slide includes a picture of TD Snap and a picture of Proloquo2Go. In both pictures the default button images have been replaced with their Blissymbol equivalents.

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(https://volksswitch.org/index.php/volks-devices/bliss-tactile-symbols/adding-blissymbols-to-aac-devices/)

The Voice It

- Can be used with the Bliss Tactile Symbols (pre-recorded voice files)
- Add sound to any object
- Entire books can be "voiced"
- $130 in off-the-shelf parts
- Can be assembled with a screwdriver
- Record your own voice files
- Multi-language support

Closing the Gap 2022

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The Voice It can be used with our tactile symbols to provide a multi-sensory experience.
(https://volksswitch.org/index.php/volks-devices/voice-it/)

The Voice It is a simple, DIY device that reads an RFID tag and then plays a recording associated with the word it finds on the tag.

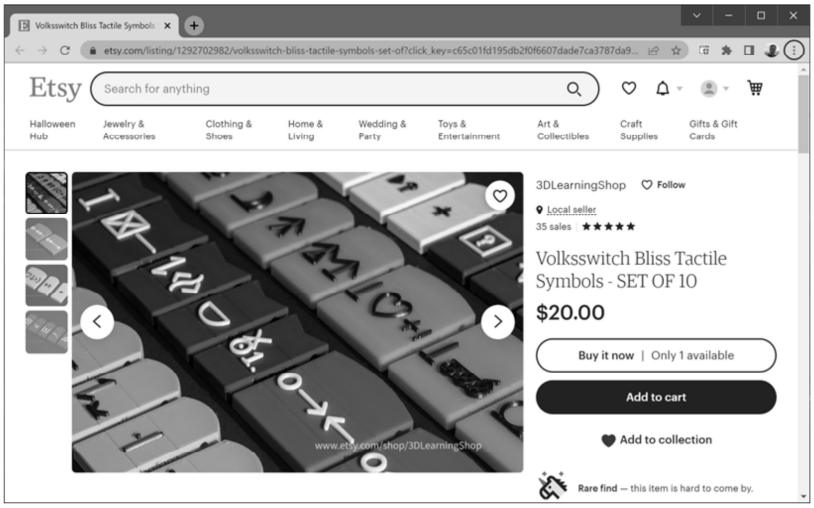
You can build the Voice It in less than 45 minutes using about $130 of off-the-shelf parts and a screwdriver. RFID tags can be purchased online for anywhere from 15 to 30 cents, each.

We provide free voice files for all of our core concepts in both English and Spanish - and adding a new language is a simple matter.

It’s also simple to extend the recordings to add a voice to just about anything from a plush toy to a children’s book

The slide contains a picture of an assembled Voice It box surrounded by Bliss Tactile Symbols.

Etsy Store: 3D Learning Shop



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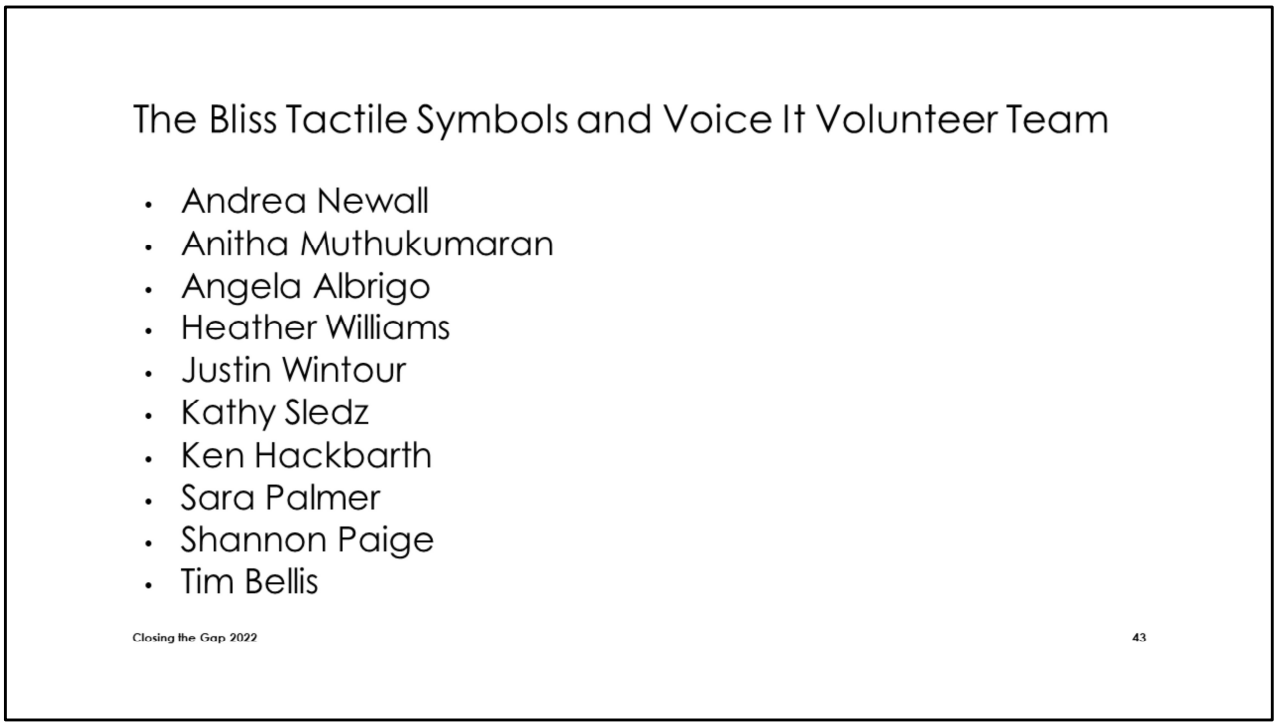
The folks at the 3D Learning Shop on Etsy have already made a business of 3D-printing and selling the Project Core, 3D-printed Universal Core words.

You may be more comfortable purchasing 3D-printed devices and symbols rather than make them yourself. For that reason, I contacted the 3D Learning Shop about printing and selling our Bliss Tactile Symbols as well as Voice It boxes – and they agreed.

This slide contains a screenshot of the Etsy page for the 3D Learning Shop highlighting one of their offers for printed Bliss Tactile Symbols.

Augmentative Resources and this Etsy shop are just there in case you need them. We are not financially connected to either one.

(https://www.etsy.com/listing/1292702982/volksswitch-bliss-tactile-symbols-set-of?click_key=c65c01fd195db2f0f6607dade7ca3787da982c8e%3A1292702982&click_sum=0221ed1c&ref=shop_home_active_1)



This work represents the contributions of a team of volunteers.

Please come to the front and see for yourself…

Ken Hackbarth (ken@volksswitch.org)

That's all we have, so if you can, please come up front and check out all these devices and products. It's also a chance to ask any questions that you still have.

And thanks for joining us today!