Symbol users with Speech, Language and Literacy Difficulties Research Tracking

Goals

- Create a research module based on the responses from Literature review
- Propose new patterns and update to existings pattern in Content Usable (W3C Editor's Draft 16 November 2023)

Instructions for literature review process

- Add articles that need to be assessed to the list below.
    - Please avoid duplicates if possible.
    - Categorize topics and research by theme.
    - Under the suitable category/topic standardize the reference
      (e.g: Designing eHealth applications to reduce cognitive effort for persons with severe mental illness: page complexity, navigation simplicity, and comprehensibility. A.J. Rotondi, M.R. Spring, B.H. Hanusa, S.M. Eack, G.L. Haas. JMIR human factors 4:1, 2017. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5247620/. *)*

        - In the citation, use the most official url possible (DOI link, database or journal site). In the Link, put a direct link to the content.
        - Add a link if possible. Try using scholar.google.com to search. On the right of the search results it will often show a link to a full text version or it will say “All X versions” below the entry. Use these to find the full text. If you can’t find a full text version, write Paywall below the article or if it is only available through an academic institution.
        - For the “Other Key Takeaways” field add a few sentences describing the key takeaways.
            - If the findings are more than a few sentences there may be a need for another document or appendix to this document.

Important Links-

Symbol users with Speech, Language and Literacy Difficulties Literature Review

- References - Responses (Google Sheets)

Analysis page

- Proposed pattern and changes for Content-Usable

Issue Paper from rawgit

- Issue Paper: Symbols for Non-Verbal
    - **10.2 Challenges for people with cognitive disabilities using symbols**
        - The users of Alternative and Augmentative Communication (AAC) based on images or pictographs as symbols tend to have no speech or language, very unintelligible speech or difficulties expressing themselves and/or may need reading support. Individuals may also have severe mobility and dexterity disabilities and/or cognitive impairments. Depending on the skills of the user, the environment and task in hand, symbols may be used to represent a phrase or whole sentence of speech or be made up of individual parts of speech to aid sentence making. Where literacy skills are a challenge the use of online communication becomes an issue due to the lack of accurate symbol to text or text to symbol sets that can be used / translated across all symbol systems.

Previous Documents

- Cognitive Accessibility User Research W3C Editor's Draft 21 September 2021 - 3.3 Non-verbal - Severe Speech and Language impairments https://w3c.github.io/coga/user-research/#non-verbal-severe-speech-and-language-impairments

Issue papers suggestions :

- View topics below

Search terms and scope

Note, original search was not documented as terms but was mental health accessibility etc.

Note check for papers that are not in:
https://docs.google.com/spreadsheets/d/1eKNrofGubnpQE6mO-vxmI-1MW5nA2LDj0LxebREPRGA/edit?resourcekey#gid=1686096268

Search terms and the place searched (eg : google scholar):

- Symbols for speech, language and literacy
- Augmentative and Alternative Communication; AAC - research gate
- Literacy skills and use of symbols
- Symbols for comprehension; understanding
- Interoperability and AAC symbol sets.
- Core vocabulary - multilingual

Places to search:

- Check for University library accesses to bypass paywalls (Le)
- Any two of: Google Scholar, pubmed, jmir.org, ncib, ERIC (educational resources information center) , CORE (an academic search engine), Science.gov, ResearchGate‘, CiteseerX

Terms to use (one for each line):

- Blissymbolics
- AAC (Augmentative and Alternative Communication)
- Symbols
- Icons
- Pictographic symbols / pictographs
- Ideographics
- Comprehension
- Understanding
- Receptive Language

Scope

Scope scenarios are discussed in https://www.w3.org/TR/coga-user-research/

Articles that need to be assessed - 70 + research papers…

Topic - Symbols supporting literacy learning

Issue

“A major barrier to literacy learning is the design of current AAC technologies. Individuals with complex communication needs who are nonliterate use **AAC systems with pictures or**

photos; these systems do not support literacy learning." quote from https://rerc-aac.psu.edu/design-of-t2l-decoding-feature/

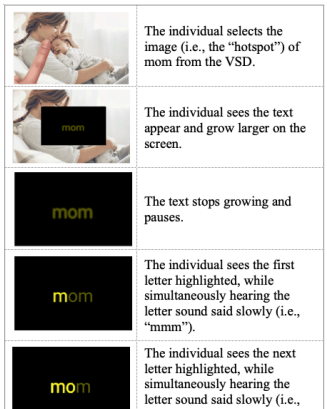
- So "although this practice is intended to provide access to text that a student could not read otherwise, it potentially makes it more difficult for the student to develop reading and writing skills" (Erickson, K.A., Hatch, P. and Clendon, S., 2010. Literacy, assistive technology, and students with significant disabilities. Focus on Exceptional Children, 42(5) citing the following authors in the paper - Pufpaff, Blischak, & Lloyd, 2000; Rose & Furr, 1984; Saunder &

Solman, 1984).
https://literacyforallinstruction.ca/wp-content/uploads/2020/05/Literacy_Assistive_Technology_and_Students_with_Si.pdf

- "Consider the word back, which has a single spelling for its noun, verb, and adjective interpretations. The reader must use the words that surround it to know for certain which form is being used. In contrast, picture symbols might represent just the noun form of this word by illustrating a person's back, the back of a room, book, or building, or the athlete who is in the back position on the field. These are just a few of the options for representing only the noun form of this word, and each choice communicates a clear meaning that may or may not match the intended use in a given context. Although today's software offers the option to select specific symbols for each use, words such as back and play would require students to learn literally dozens of symbolic representations with varying abstractness." (Erickson, K.A., Hatch, P. and Clendon, S., 2010. Literacy, assistive technology, and students with significant disabilities. Focus on Exceptional Children, 42(5). https://literacyforallinstruction.ca/wp-content/uploads/2020/05/Literacy_Assistive_Technology_and_Students_with_Si.pdf)

Learning to decode as a key skill for learning to read is facilitated by the integration of:
• orthographic processing (i.e., knowledge of letters and letter patterns);
• phonological processing (i.e., identification, manipulation, and memory of the sound structure of speech);
• meaning processing (i.e., knowledge of words and their meanings); and
• contextual processing (i.e., use of background knowledge to derive meaning from text) (e.g., Adams, 1994).
Adams, M. J. (1994). *Beginning to read: Thinking and learning about print*. MIT press. Summary available
https://arthurrexradingworkshop.com/wp-content/uploads/2019/11/BriefIntroductionAndSummary.pdf

- Symbol users need all the complex literacy skills including "language skills, background knowledge, phonological awareness skills, letter sound correspondences, decoding, and sight word recognition" in order to gain print knowledge.



Just having labels above symbols does not necessarily help with literacy learning, **but if there is a symbol/image in context shown with text to speech and the word appearing on the screen as it is sounded out with letter sound highlighting, this may better support literacy learning**. (Light, J., McNaughton, D., & Jakobs, E. (2019). Design of transition to literacy (T2L) decoding feature. RERC on AAC: Rehabilitation Engineering Research Center on Augmentative and Alternative Communication. Retrieved from https://rerc-aac.psu.edu/design-of-t2l-decoding-feature/)

- Furthermore, Yorke et al (2020) in a review of 'Foundational Reading Interventions Adapted for Individuals Who Require Augmentative and Alternative Communication (AAC)' found that "despite challenges with verbal speech output (the most common way to participate in foundational reading interventions), **individuals who require AAC can acquire these important early literacy skills when provided with adapted instruction.** Additionally, individuals with disabilities who primarily use speech but are in classroom peers with those who require AAC-based interventions, can also benefit from these same interventions". (Yorke, A.M., Caron, J.G., Pukys, N., Sternad, E., Grecol, C. and Shermak, C., 2021. Foundational reading interventions adapted for individuals who require augmentative and alternative communication (AAC): A systematic review of the research. Journal of Developmental and Physical Disabilities, 33, pp.537-582. https://link.springer.com/article/10.1007/s10882-020-09767-5)

- Based on the Oxford Internet Survey (OxIS) it is clear that **functional literacy is strongly associated with general internet use and seeking out public information via the internet.** (Blank, G., Dutton, W., Lefkowitz, J. (2020). OxIS 2019: Digital Divides in Britain are Narrowing but Deepening. Oxford Internet Institute. University of Oxford. Available at SSRN: https://ssrn.com/abstract=3522083)

- Functional literacy skills allow for independent access and interpretation of real-world information, such as the items on a menu, signage in the community, and job applications (Collins, S.C., Barton-Hulsey, A., Timm-Fulkerson, C. and Therrien, M.C., 2023. AAC & Literacy: A Scoping Review of Print Knowledge Measures for Students who use Aided Augmentative and Alternative Communication. *Journal of Developmental and Physical Disabilities*, pp.1-31.) https://link.springer.com/article/10.1007/s10882-023-09934-4

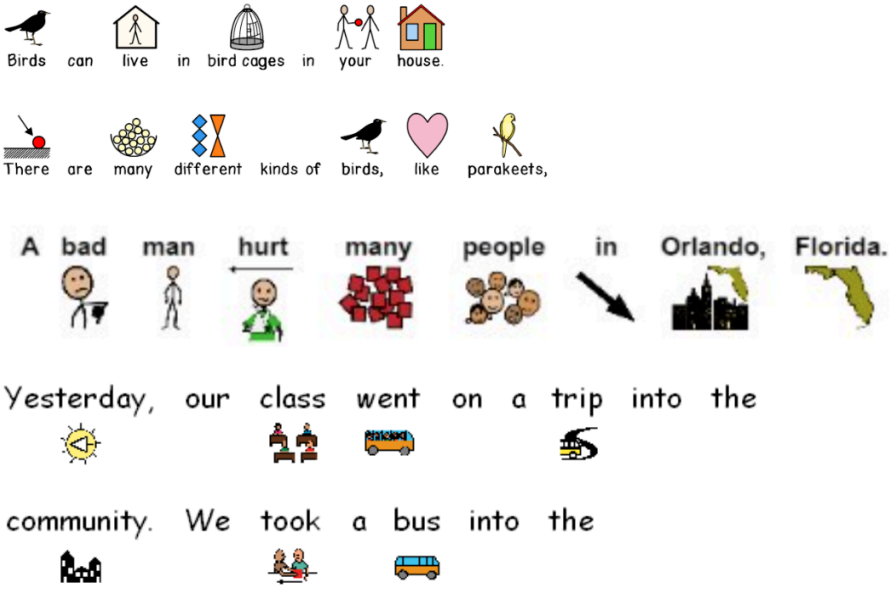
- However, there is an argument that **comprehension of written text in a digital age requires more than a phonics approach and word by word meaning. Digital literacy skills continue to develop throughout our lives and require an understanding of how different types of text content is being consumed**. (Alexander, P.A., 2020. What research has revealed about readers' struggles with comprehension in the digital age: Moving beyond the phonics versus whole language debate. Reading Research Quarterly, 55, pp.S89-S97.https://ila.onlinelibrary.wiley.com/doi/epdf/10.1002/rrq.331)

Topic - Symbols supporting comprehension of text content

Issue

"**90% of individuals with limited speech enter adulthood with minimal functional literacy skills that allow them to independently read and spell.**" (Collins, S.C., Barton-Hulsey, A., Timm-Fulkerson, C. and Therrien, M.C., 2023. AAC & Literacy: A Scoping Review of Print Knowledge Measures for Students who use Aided Augmentative and Alternative Communication. *Journal of Developmental and Physical Disabilities*, pp.1-31.) https://link.springer.com/article/10.1007/s10882-023-09934-4

Can symbols illustrating the meaning of individual words support better understanding of written text in paragraphs or sentences? Examples below taken from an online article by Kate Ahern, M.S.Ed. https://www.aacvoices.org/blog/symbol-supported-text



"Symbol Supported Text, sometimes called Symbolated Text, is the practice of adding picture symbols above or below each word or phrase in text based materials meant to be read."

***Comment**: This is an article based on the research much of which is listed below. Adding symbols above or below keywords does not help - there needs to be simplification and concepts as images that explain the context as well as meaning. A similar article by Jane Farrell Symbol Supported Text: Does it Really Help?https://www.janefarrall.com/symbol-supported-text-does-it-really-help/*

AAC, Literacy, & the SLP Beth Poss, MS, CCC-SLP Apr 1, 2021

“Symbols with text on an AAC device to represent words that an AAC user is using to communicate are not symbolated text. Illustrations and picture books are a critical component of early literacy instruction, and symbols paired with text as a part of a communication system help AAC communicators (both those who are literate and not yet literate) more quickly locate a word on their communication system.”

Comment: *It's crucial to understand that Symbolated Text is not the same as illustrations or pictographic symbols. While illustrations and graphic symbols can enhance reading comprehension, Symbolated Text focuses solely on using symbols alongside text. It is important to provide the use of pictographic symbols to communicate about what you are reading, rather than to read.*

- Example of interactive use of symbols in a primary school where an “initial approach was to use symbols to support storytelling, language development materials, basic learning worksheets and notices. It was found to be very successful, benefiting many more students than anticipated. Not only did symbols help students with identified issues, such as learning difficulties, it also helped reluctant readers and less confident children. **One teacher reported that when using symbol cue cards during storytelling, shy students were more willing to participate** (The role of symbols in the mainstream to access literacy. E.Pampoulou, and C. Detheridge. Journal of Assistive Technologies 1.1: 15-21, DOI 10.1108/17549450200700004 2007. URL: https://www.researchgate.net/profile/Eliada-Pampoulou-2/publication/241675523_The_role_of_symbols_in_the_mainstream_to_access_literacy/links/5551a06d08ae93634eca1283/The-role-of-symbols-in-the-mainstream-to-access-literacy.pdf

Comment*: A small primary school study in English, the authors stated that anecdotally outcomes included improved understanding, motivation to engage with text and better behaviour when Widgit symbols were used to support text content. These children had speech and learning difficulties but did not use AAC for all their conversations.*

- “**If the goal is merely to provide access to content and careful attention is paid to selecting picture symbols that reflect the meaning of the words in the text, it is reasonable to expect that pictures will increase access to content that otherwise would not be accessible.”** (Erickson, K.A., Hatch, P. and Clendon, S., 2010. Literacy, assistive technology, and students with significant disabilities. Focus on Exceptional Children, 42(5). https://literacyforallinstruction.ca/wp-content/uploads/2020/05/Literacy_Assistive_Technology_and_Students_with_Si.pdf)

Comment*: This study is about learning literacy skills in schools where those with severe communication and intellectual disabilities improve their reading and comprehension with intensive support. To improve comprehension they are encouraged to interact with a wide range of teaching methodologies such as shared reading alongside the use of assistive technologies for example text to speech. The use of symbols was only mentioned in the one quote.*

- **"...the addition of symbols to simple texts does not necessarily improve people's understanding of it. It is proposed that a closer examination of people's understanding of symbols should be made and ways of improving this understanding investigated."** Poncelas, A. and Murphy, G., 2007. Accessible information for people with intellectual disabilities: do symbols really help?. Journal of Applied Research in Intellectual Disabilities, 20(5), pp.466-474. https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1468-3148.2006.00334.x

Comment: This study introduced a political manifesto to 34 adults with intellectual disabilities. Half received the easy to read version in text only and the other group had the addition of symbols representing key words in the sentences. Both groups had the text read aloud whilst looking at the content All were able to communicate verbally and participants who said they had seen symbols before had a statistically significantly better understanding. This seemed to illustrate the need to have learnt symbols to make any use of them for comprehension purposes.

- **"The continued use of pictures and text in spite of a growing body of evidence suggesting that this may not always be the most efficient method of presenting information is concerning."** Individuals with intellectual disabilities, who do not learn to use symbols for their communication needs, may find that having leaflets read aloud whilst being shown pictures without text may be better than presenting them with simplified text with a picture. (Hurtado, B., Jones, L. and Burniston, F., 2014. Is easy read information really easier to read?. Journal of Intellectual Disability Research, 58(9), pp.822-829. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jir.12097?saml_referrer)

***Comment**: This study examined whether an EasyRead leaflet improved service users' comprehension and compared the efficacy of two different modalities of presenting information: 'text and pictures' or' pictures only'. Forty-four adults with ID were recruited from consecutive referrals to a community psychology service - none were AAC users so they had not learnt to use symbols but were offered photographic images to the left of a simplified sentence or just the images whilst the text was read aloud.*

- **"It is widely assumed that pairing graphic symbols with text will support text comprehension. This has led to the practice of coupling text with graphic symbols to make it more accessible and understandable. Unfortunately, there is little empirical evidence to support this assumption or practice."** Benson-Goldberg, S. and Erickson, K., 2020. Graphic Symbols: Improving or Impeding Comprehension of Communication Bill of Rights?. Assistive Technology Outcomes & Benefits (ATOB), 14. https://www.researchgate.net/profile/Sofia-Benson-Goldberg/publication/342313872_Graphic_Symbols_Improving_or_Impeding_Comprehension_of_Communication_Bill_of_Rights/links/5eecd4f2299bf1faac630f07/Graphic-Symbols-Improving-or-Impeding-Comprehension-of-Communication-Bill-of-Rights.pdf

***Comment**: 52 speech-language pathology graduate students studying AAC and knowing PCS symbols were asked to say if 15 graphic symbols represented a statement and then to match the symbols to the corresponding statements in a multiple-choice task. Participants had limited success with both tasks regardless of year in school or previous experience with graphic*

symbols. These students did not use AAC symbols on a daily basis and the symbols chosen seemed to have a single referent or concept rather than two or three ideas e.g a symbol for 'want' was used for "The right to request desired objects, actions, events, and people" This might have needed the addition of symbols for objects, events and people.

- Research has shown that to ensure better understanding, **if there are words that are complex the AAC user may have to group a series of pictographic symbols to represent a concept or single word**. This indicates that simplification needs to occur in order for there to be relevant symbols available as part of the AAC user's vocabulary. For example, a seventh grade (12yr old) social studies textbook included the word "escarpment" "When the teacher asked the students to define escarpment, [the AAC user] selected big, hill, safe, close, and fight. His response demonstrated his general understanding of the formal definition of the word (in this case, "steep face near a fortified place, cut away to prevent hostile approach"). Furthermore, he connected the new word with his existing vocabulary, a process that led to an ever-increasing semantic network upon which new vocabulary could be added meaningfully." Erickson, K., 2003. Reading comprehension in AAC. The ASHA Leader, 8(12), pp.6-9. https://leader.pubs.asha.org/doi/10.1044/leader.FTR1.08122003.6

***Comment**: The author was concentrating on the need for good Silent Reading Comprehension (SRC) to occur in order to cope with more complex content with examples of how this was achieved in a classroom where students had to deal with new vocabularies. The paper did not directly provide examples of the use of symbols to explain complex words.*

- This study was about the development of pictographic symbols for personalisation of AAC symbol sets to suit individual needs in multilingual and multicultural situations. Draffan, E.A., Wald, M., Ding, C. and Yin, Y., 2023. AI Supporting AAC Pictographic Symbol Adaptations. Studies in Health Technology and Informatics, 306, pp.215-221.

Summary

- **mixed findings with regard to sight word learning and paired pictures with text,**
- **some findings suggest pictures interfere with acquisition of new words,**
- **adults with moderate-severe intellectual disabilities performed better with traditional orthography alone over words paired with pictures,**
- **there is evidence that students with significant disabilities benefit from the same evidence-based literacy instruction (reading/writing) as that of their peers**.

Taken from Symbol-Supported Text for Students with Complex Communication Needs and/or Intellectual Disability
https://static1.squarespace.com/static/57c86c3cff7c506bc7a8fdbf/t/5ebee7f74adcd72e57891908/1589569527518/EBP_Picture+Supported+Text_PaigeV2.pdf?fbclid=IwAR0o7BU9ccRLlxxw73FVp2M42tK4Jvf0kSehNaa_VWg7Jba_P7Ul6HXsJII

References from the above article

Caron, J., Light, J., Holyfield, C., & McNaughton, D. (2018). Effects of dynamic text in an AAC app on sight word reading for individuals with Autism Spectrum Disorder. Augmentative Alternative Communication, 34(2), 143-154.

Erickson, K. A., Hatch, P., & Clendon, S. (2010). Literacy, Assistive Technology, and Students with Significant Disabilities. Focus on Exceptional Children, 42(5), 1-16.

Fallon, K., Light, J., McNaughton, D., Drager, K., & Hammer, C. (2004). The Effects of Direct Instruction on the Single Word Reading Skills of Children Who Require Augmentative and Alternative Communication. Journal of Speech, Language and Hearing Research, 16.

Fossett, B., & Mirenda, P. (2006). Sight word reading in children with developmental disabilities: A comparison of paired associate and picture-to-text matching instruction. Research in Developmental Disabilities, 27, 411-429.

Hanser, G. A., & Erickson, K. A. (2007). Integrated Word Identification and Communication Instruction for Students With Complex Communication Needs: Preliminary Results. Focus on Autism and Other Developmental Disabilities, 22(4), 268-278.

Meadan, H., Stoner, J. B., & Parette, H. P. (2008). Sight Word Recognition Among Young Children At-Risk: PictureSupported vs. Word-Only. Assistive Technology Outcomes and Benefits, 5(1), 45-58.

Pufpaff, L. A., Blischak, D. M., & Lloyd, L. L. (2000). Effects of Modified Orthography on the Identification of Printed Words. American Journal on Mental Retardation, 105(1), 14-24.

Rose, T. L., & Furr, P. M. (1984). Negative Effects of Illustrations as Word Cues. Journal of Learning Disabilities, 17(6), 334-337.

Sadoski, M. (2005). A Dual Coding View of Vocabulary Learning. Reading & Writing Quarterly, 21(3), 221-238. doi:10.1080/10573560590949359

Soloman, R. T., Singh, N. N., & Kehoe, E. J. (1992). Pictures Block the Learning of Sightwords. Educational Psychology, 12(2), 143-153.

References from Gemma Hoare article in the Bullet Winter 23/24 Pg 20 How children with complex needs can

Erickson, K. A., and Koppenhave, D. A. (2020) Comprehensive literacy for all: Teaching students with significant disabilities to read and write. Baltimore, Maryland, USA: Paul H. Brookes Publishing Co.

Wendon, L., de Rosa, D., and Holt, L. (2007) Letterland ABC. Cambridge, UK: Letterland International Ltd.

Yoder, D.E. (2001) Having my say. Augmentative and Alternative Communication, 17, 2–10. https://doi.org/10.1080/aac.17.1.2.10

Topic - Symbols for most common words

400 words https://fastlanguagemastery.com/400-most-common-words/

Issues to consider regarding the use of Pictographic Symbols to assist comprehension of web-based text content.

Pictographic symbols can potentially enhance the comprehension of web content for individuals with diverse levels of literacy or cognitive abilities in several ways:

1. Universal Understanding:
    - Pictographic symbols for many concepts may convey universal meanings that transcend language barriers. This is particularly helpful for reaching a global audience. **But**…
        - Pictographic symbols may have different meanings or interpretations across cultures, regions, or individual experiences. This ambiguity can lead to confusion rather than clarity.
        - Consider AAC users who need specific symbol sets that are on their devices or paper-based systems.
        - A symbol representing a homonym in one language (spelt and sounds the same) used in one context may have a different meaning in another, leading to further difficulties e.g. the words ‘scale’ or ‘spring’ in English.
2. Enhanced Accessibility:
    - Symbols can improve accessibility for individuals with limited literacy skills, learning disabilities, or cognitive impairments. They provide an alternative means of communication. **But**…
        - abstract concepts may be hard to convey unless context is provided so may require a series of symbols or a visual scene display..
3. Visual Reinforcement:
    - Symbols can reinforce the meaning of textual content, making it easier for readers to grasp concepts. This is particularly effective for conveying key messages or instructions. **But…**
        - most concepts need to be simplified before they can be explained as a symbol or series of symbols. This is because many symbols lack the depth of meaning and context that words can provide. Depending on symbols may result in a loss of nuanced information.
4. Navigational Aid:

- Pictographic symbols can be used for navigation, helping users quickly identify and understand different sections of a website. **But…**
    - they need to be consistent and easy to understand - normally fitting in with standardised symbols used elsewhere on the web or for technology systems. (ISO/IEC 24738:2006 - Information technology)

5. Multimodal Content:
    - Combining symbols with text and other multimedia elements creates a multimodal experience, catering to different learning preferences and cognitive styles. **But…**
        - there would need to be several options available such as symbolic, video, animation or diagram
6. Storytelling and Instruction:
    - Symbols can be employed in storytelling or instructional content, breaking down complex processes into more manageable and visually intuitive steps. **But…**
        - the symbols need to be checked against international standardised (ISO) icons and signs when used for instructions
        - Only Blissymbolics have an ISO ID number - no pictographic AAC symbol set as a similar standardisation.
7. Cultural Inclusivity:
    - Pictograms can be culturally inclusive, as they can convey meanings that transcend language and cultural differences. **But…**
        - this means researching symbol set availability and ISO icons and signs for international, linguistic and cultural sensitivities.
8. Aid for Memory and Recall:
    - Visual symbols can aid in memory retention and recall, especially for users who may struggle with processing and remembering written information. **But…**
        - recall will depend on the type of symbols used and the reader's prior knowledge.
        - For some users, especially those with cognitive disabilities, processing symbols that are not recognised could increase cognitive load, making it more difficult to understand the content.
9. Interactive Learning:
    - Interactive elements incorporating symbols can engage users in a more dynamic learning experience, helping them understand and remember information more effectively. **But…**

        - complexity of content may hinder the degree to which symbols can help so text simplification may be needed.

10. Attention Getting:
    - Symbols can be attention-getting, helping to draw users into the content and guiding them to key points. **But…**
        - the symbols could also be a distraction, so care needs to be taken with choices.
        - Using too many symbols within a small space can overwhelm users and make it difficult to focus on essential information.
11. Customisation Options:
    - Providing users with the option to customise their experience by choosing a symbol set they recognise. **But…**
        - the range of symbols available may not always cover the concepts or language used in the content.
        - Language translations and symbol set interoperability does not always allow for easy matching.

Spreadsheet headings

https://docs.google.com/spreadsheets/d/1Cu_qVP1WBz2TbsrAjLbbeb55RAlJmu9kfHamriL1Ocs/edit#gid=1686096268

Timestamp:

Your Email Address:

What issue paper does this support *(If any)***?:**

User Research: *What sections (if any) does this support (or challenge)**?***:**

Pattern: *What patterns (if any) does this support (or challenge)?***:**

Other (secondary) places:

New ideas?:

Sub topics - themes you are finding in your research (Required!):

Key Takeaways (Required!):

Full citation:
*Title, Author First Initial, Last Name, Journal title and issue, year. URL: url.com. First Author's last name (If organization is the publisher, with no individual authors, list the organization), Year published, Link (If not publicly available, type Paywall)***:**

What speech and language conditions are covered? *(Pick all categories that apply and if you are unsure, check "other" and paste the description directly from the article.)***:**

What type of study? *(numbers are approximate)***:**

Quality of Research *(Initial Impression)***:**

Other Key Takeaways *(If more than a few sentences, add to https://docs.google.com/document/d/1XWmikm5Ein5CQ02knEJ5iGzO1YJMilTMBJ_aLVCTzs0/edit#heading=h.dhrnckcx1v3m" and then past link to that heading below)***:**

Overall Recommendation *(Anything else you want to capture)***:**

New Pattern Suggestions Based on this Research *(Ensure the Following has been Included in Content Usable (ex: Existing Patterns))***:**

Corroborates other patterns: