# Issue Paper – Symbol users with Speech, Language and Literacy Difficulties.

## Description of the Technologies

The terms non-vocal or non-verbal do not really fit the wide range of individuals who are symbol users. There are those with severe speech and language disabilities who use alternative and augmentative methods of communication that use images or pictographs as symbols and there are individuals who may need reading support or have social behaviour difficulties and find it hard to communicate. This is when pictures or symbol system strategies can be adopted to supplement spoken language and literacy skills. Symbol sets that are used in communication books or on devices and electronic systems are made up of large pictographic dictionaries that have been developed mainly for use with European languages. Some have grammatical structures and allow users to develop basic sentences, others are purely for spoken language and speed the process by offering phrases and word prediction, and others combine the two concepts.

## Issue

There is a need to adapt AAC resources to represent the characteristics of written language systems that will work interactively on the web. The technologies already available need to cope better with different orthographies, grammar and the diglossia issues of some languages, as well as the lack of culturally appropriate symbol representations across all nations. Simple translations tend to lack consistency of symbolic structure and cultural interpretation.

## Challenges for those with speech, language literacy difficulties as symbol users.

Poor interoperability between symbol sets and poor symbol to text or text to symbol conversions.

* In-put –
	+ Users cannot communicate online with those using different symbol sets
	+ Users cannot interact with forms, messaging or social media
	+ Users may use one symbol that represents a phrase not just one word so translation may be difficult
	+ Users may select symbols that contract sentences failing to provide the appropriate grammatical order for easy text translation
	+ Systems are not available for all symbol sets
* Output-
	+ Users cannot easily take text from web pages to convert to symbols that would help understanding
	+ Word for symbol translation fails to support poor readers due to high level of ambiguity.
	+ Systems are not available for all symbol sets

Present situation

* Users are able to read certain websites where word for word translation has been offered but this may not aid reading comprehension of the whole, as symbols offered may have different meanings. (<https://www.widgit.com> )
* Users are able to write sentences using their symbol sets but there is limited language support within a few freely available symbol sets using concept coding. <http://www.conceptcoding.org/AAATE_2013_Inclusive_AAC-MMLS4All.pdf>

### Effect of memory impairments

Symbol users:

* may be unable to cope with large amounts of online material depending on ability and this may limit the degree to which they can cope with content that is text based.

### Effect of impaired executive function

Symbol users:

* may find it hard to plan a route through web pages unless navigation is clear
* may have co-occurring difficulties that impact on successful online interactions
* may be overwhelmed by the amount of interactions required to complete tasks.

### Effect of attention-related limitations

Symbol users:

* may find symbol based content helps draw attention to content.

### Effect of impaired language-related functions

Symbol users:

* may find dense text based content incomprehensible or harder to cope with compared to symbol based content.

### Effect of impaired literacy-related functions

Symbol users:

* may not comprehend the meaning of text based content
* may fail to act correctly when warnings or other interactive items appear on the web.

### Effect of reduced knowledge

Symbol users:

* may fail to recognize images, such as symbols or icons that are not in their known set
* may lack the ability to use the web as it has been intended, fail to find information and fail to interact with operational elements.

## Proposed Solutions

1. The following could enable interoperable symbol mapping for products for Non verbal people.

In the Web Content: Syntax: aria-concept = "uri". Example (Pseudocode):

<img aria-concept="http://wordnet.org/somepage#girlnode" scr="girlwithbow.gif" />

or at a useragent symbol file end:

<mysymbol scr="girlwithskirt.gif" aria-concept="http://wordnet.or

g/somepage#girlnode" lang="en" />

Note this is not about standardizing the symbols but a way of mapping them

1. Using of ontology and Linked Data to enable interoperability of symbols datasets with concept coding framework (CCF). The Concept Encoding Framework Workout Group provides the multilingual and multi-modal lexical ontology resources of the CCF to be made available in a Linked Open Data (LOD) format. There are some existing resources on the LOD already. This approach mainly requires the symbol datasets providers to publish the symbols and their concepts as the Linked Open Data. As one of four principles in Linked Data, the URI naming for the concepts could provide the target concept link described in the first solution. It could also provide the alternative same concept symbols based on preferred properties, such as culture background, language and colour etc.

## References

Lundalv, M. & Derbring. S. (2012). AAC vocabu­lary standardisation and harmonisation. *Lecture Notes in Computer Science. 7383,* 303-310. doi: 10.1007/978-3-642-31534-3\_46.

[http://link.springer.com/chapter/10.1007%2F978-3-642-31534-3\_46](http://link.springer.com/chapter/10.1007/978-3-642-31534-3_46) (Accessed 11June, 2015)

<http://ebooks.iospress.nl/publication/34912> (Accessed 11June, 2015)