## Objective

To explore whether the use of the Makaton application on the iPad will enhance learners understanding of Mathematical concepts.

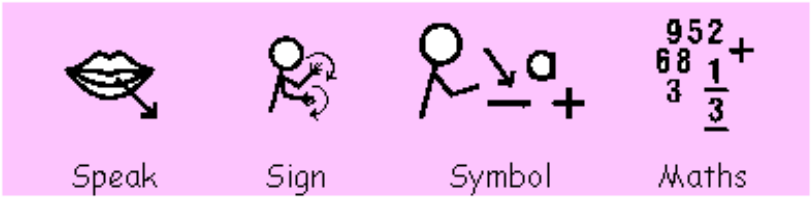
## What is Makaton?

Makaton is a unique language programme, which uses sign, symbols and speech to enable people to communicate. It has been shown to be useful for a range of purposes including understanding concepts. The signs are made for information carrying words. For example when asking 'where is the ball?' you would only sign and symbol 'where' and 'ball'.

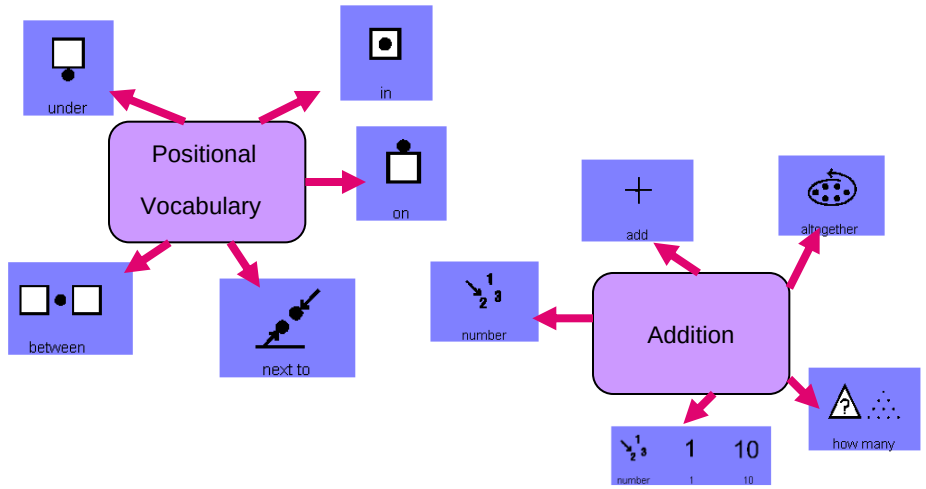
The use of signs and symbols is part of a repertoire of teaching and learning strategies

Using a pictorial symbol and action to represent a mathematical concept supports learners in developing imagery to aid their understanding of abstract ideas.

The symbols offer concrete reference and permanence. Symbols offer tangible representation of language and are often like the concept it refers to.




## Mathematical Concepts Explored




## Data collection and analysis

Three learners were identified through initial functional skills diagnostic and Speech and Language assessments as working at pre-entry with specific maths needs. The learners all have an understanding of receptive language at a 2 to 3 word level and use Makaton to support their communication. Tailored discrete provision was designed to support the embedded maths learning which is integral to the wider vocational and extended curriculum.

The group used a multi modal approach to develop the students' maths learning; this approach included Makaton signs, symbols and iPad applications.

Both the Makaton and maths specialists attended the hourly session each week which was led by a maths specialist teacher, who also had Makaton experience. The sessions were filmed so more detailed analysis could be made after. Findings and recommendations were drawn from this analysis.

**Strengths of the project:** The design of the project ensured that we focused on the teaching and learning and the actual experience of the learners.

**Limitations of the project:** The use of one iPad limited the groups access to the Makaton application, which impacted on the pace of the session.

The specialist theme of the project limited the existing literature that could be utilised to support the research.

## Findings

- The use of signs and symbols has enabled clearer identification of the learners understanding of specific mathematical concepts which may previously have gone undiagnosed
- The signs and symbols help learners to internalise the mathematical concept by giving them a visual and kinaesthetic prompt to reinforce the learning
- The learners were animated as soon as we began to 'speak, sign, symbol, maths' and speak in 'their language' of Makaton
- Using the iPad application has removed communication barriers for learners
- Learners are engaged and enthusiastic to use the iPad and have seen it used in other contexts not specifically educational
- Learners have benefitted from having numbers displayed in patterns which enhances recognition and lessens the reliance of counting in ones
- Learners had difficulty signing 'between' because of manual dexterity
- Learners had difficulty using the iPad application due to the touch sensitivity of the application.
- Having the signs supports their confidence in expressing their mathematical ideas and knowledge
- Maintaining of focus on pictorial symbols and hand signs supports learners attention and listening skills
- Using symbols in a visual sequence serves as a memory tool to help learners understand a sequence – for example 1+2 how many altogether?
- The teaching and learning is more effective when supported by a maths specialist and a teacher with Makaton expertise

## Recommendations

1) Implement the Speak, Sign, Symbol, Maths session as part of the maths curriculum, promoting these sessions as a 'unique model'. Through CPD train teachers to deliver the programme.
2) Use of a multi modal approach signs, symbols , speech, iPad, concrete objects of reference, and interactive whiteboard to enhance the learning and the learners experience.
3) Use of the sign and symbol for 'altogether' to enhance the understanding of the mathematical concept 'equals'. For example 2+3 – how many altogether?
4) The sessions should be delivered by a maths specialist and a teacher with Makaton expertise.
5) Numbers to be displayed in patterns to enhance recognition.

**Project Researchers**
Zoe Barnfield (Maths Co-ordinator ) zoe.barnfield@derwen.ac.uk
Maryanne Hodgkinson (Makaton Regional Tutor)
maryanne.hodgkinson@derwen.ac.uk