

Intervention strategies for maths learning



**ASSIGN
BUSTER**

I am teaching Functional Maths in social purpose setting (a charity organisation) where learners are usually the ones who have immigrated to UK from under developed or developing nations mostly as Refugees. The learners have very limited English vocabulary and communication skills. They are also learning English simultaneously and hence have not yet developed the full English language skills. Learners from Refugee background have little educational experience and sometimes had significant interruptions in their prior learnings in their home countries. Due to this, they usually do not have positive or fruitful experiences. Sometimes this leads to their disinterest and unwillingness to get involved in learning process with best of their capabilities. Coming from a different culture and language difficulties make them bit reluctant and unable to participate fully in the lessons. Some of the learners although may have had consistent education in their home country and may have studied in their native language to a higher standard, however when it comes to translating their education and skills in English, they find it difficult as EAL learners. It is challenging for learners to develop further Maths Skills in English or enhance knowledge, while simultaneously learning English.

Maths concepts and problems are already difficult even for the people who have mastery of English language, but it becomes particularly challenging for learners who find themselves incapacitated due to inadequate English language command of reading, writing and speaking. English Vocabulary and communication skills are very important in learning Maths. Maths concepts in Wordy maths problems and Technical terms in solving maths problems, all requires mixture of reasonable command over language for understanding

the requirements and logical thinking for resolving the problems. Learners can face a range of challenges in terms of the language requirements of maths lessons; they may have difficulties at word, sentence and instructions in the class room. They may also feel too embarrassed to admit or ask that they are struggling due to poor English language skills in understanding the instructions and acting upon them. English provides means for learners to understand the instructions and also to express themselves in terms of their questions, queries, doubts or any further help needed. If learners are not supported to develop their English language skills, they are less likely to take full advantage of lesson and participate fully in Mathematics lessons.

During my initial sessions in the setting, I found it particularly challenging to address this issue as I was not sure what can I do to eradicate these challenges encountered by my learners in the classroom. Although, it was clear to me on reflection that many learners were struggling to understand some core concepts of functional Mathematics due to inadequate language capabilities and some of the instructions were getting lost in the process of showing the methods/formulae to my students. I wanted my learners to not only learn maths as a subject but also as way to understand how these Mathematical concepts play role in our Daily life. I not only wanted them to take maximum possible advantage of sessions in understanding Mathematical concepts (for example Multiplication, Division, Probability, Ratios and Proportions etc.), but also to develop confidence to enhance their Language and communication skills. I wanted them to stretch out of their comfort zone and take part in rounded learning and also increasing English vocabulary at the same time during the lesson.

To support my Learners, I worked on many strategies and came up with few as below which I use in my class now to improve educational experience and outcomes for all learners in my classroom whether the learners are from non-native English backgrounds or those who need additional support.

-The most important and constructive strategy which I felt needed in my class was to make learners comfortable, so they leave their shyness. Fear of Embarrassment is real in EAL students as they take on the challenge of new language and new environment and hence it becomes even more important that classroom is very welcoming. I always greet my students and start the informal conversation before starting with any formal learning process.

Some of the students come from cultural background where learners are meant to be seen but not heard so it was very important for me to constantly encourage them to interact with their peers. I always start my lesson with an ice breaker so that learners are encouraged to communicate and feel part of learning journey.

“ Many of the skills taught in classrooms can be conveyed by providing prompts, modelling use of the prompt, and then guiding students as they gain independence.” Barak Rosenshine

- To support reading word problems in Maths, I read aloud the question and stress on the important bits in the question and at the same time tell them which information is irrelevant. I also model and show them how to break down information into parts so that it doesn't become too much to handle. Also, learners need encouragement that even if they are not confident about

certain words in the problem, they can still attempt the question and succeed.

- I Encourage my EAL learners to make their own list of words list encouraging them to write words and meanings in both English and their native language. These are useful words and mathematical terms which commonly appear in Maths problems for example- altogether, each, as many as possible etc. This helps them not only to refer when they encounter it in Maths questions but also to relate the word and its meaning with their native language to reinforce understanding.

-I ask my learners to work in pairs to solve each other's problems. This collaborative learning helps their interaction skills and also helps them to learn from each other and enhance their language and communication skills. This also motivates them as Learners think (formulate and test possible solutions) when they encounter challenge and learn from each other. This also helps in fostering Integration and tackling hesitation due to fear of embarrassment. For example, while learning about various averages like mean, median and mode, I ask my learners to not only work out the problems but also discuss in their respective group which average is best in the given scenario. This encourages them to engage with each other and start a conversation and led to a conclusion with the help of each other.

Collaborative Learning Activities can be used as a tool for improving the access of bilingual learners to mathematical language through the medium of English. If this is achieved, it is likely that their attainment in mathematics will increase.' (Symonds, 2010).

I have started to allow my learners to use computer or their own 'smart phone' to translate instructions as scaffolds and gradually as they are becoming more and more confident about their English Language skills, they are less likely to be dependent on it. This helps them to bridge a gap between Maths terminology described in English and their native language. Incorporating use of EAL students' first language makes the lesson more accessible and that way learners are able to relate this to their prior learning in their native language too. Involving learners by asking them what the term or word in their own language is also helps them to get interested. Grouping students with other speakers from their native language also support learning as together they can help each other in translation to some extent. All this is proving very worthwhile in my lessons.

During my attempt to devise strategies to support my Learners, I also studied Cognitive Load Theory (John Sweller). It is built on a theory that treats schemas, or combinations of elements, as the cognitive structures that make up an individual's knowledge base.

I, therefore, in my practice has started to provide my learners with Worked Examples for Schema development. In these worked examples I provide step by step demonstration of how to solve a given problem. This helps learners to build their foundation on concepts and procedures by understanding the stages in worked out solution and modelling the steps in other similar problems. Once learners develop a degree of expertise than they attempt the questions without looking at examples. This technique is also very helpful while differentiation is used to provide appropriate level of support and challenge.

I have also experienced that playing games like Maths Bingo has helped maintain interest in the topic. The group games activities in the class room helps engage all learners to communicate with each other in their teams and thereby come out of their anxiety and participate. I also use a lot of props which are mostly universal like Dice, playing cards etc to reinforce concepts like Probability, ratios etc

To conclude, the long-term goal of my above listed strategies is for learners to take responsibility for their own learning. Learners in my classroom have different strengths, interests and knowledge from their previous educational, cultural and social background that I am attempting to harness to help further learning. Supporting the student's development of mathematical English is assisting them to participate more fully in maths lessons and is building their confidence. This way they are integrating in their new life in UK and becoming active resident in UK society.

References:

1. Monaghan, F., 2016, The Language of Mathematics, EAL Journal, Autumn 2016.
2. Symonds, A., 2010, Mathematical collaborative learning activities: the linguistic benefits for bilingual learners, NALDIC Practice Papers PP5
3. Sweller, J., Cognitive load during problem solving: Effects on learning, Cognitive Science, 12, 257-285 (1988).
4. <https://theliteracyblog.com/2013/09/05/barak-rosenshines-principles-of-direct-instruction/>
5. Issues for EAL students learning maths, suggested strategies.
<http://www.acara.edu>.

au/verve/_resources/EALD_Learning_Area_Annotations_Maths_Revised_February_2014. pdf