

Developing a vocabulary app for maths problem-solving for Y5 pupils (EAL and non-EAL)

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Introduction

This research aimed to create an "interactive" android application for year-five monolingual and multilingual students (9-10 years old). The objective of the application was to explore its use as a learning tool for maths-specific vocabulary. The students have been taught how to use the app independently. The research team measured their math vocabulary learning and progress over a month.

Teaching Methodology

The problem with the current teaching methodology is that the mathematical terminology definitions are heavily worded. Therefore, students must have good English knowledge to understand mathematical terminology. Furthermore, creating a learning barrier for multilingual pupils that do not have a vast understanding of English. Finally, having a lot of text makes it harder to retain active participation from the students, making learning passive.

Word	Common use in literacy	Common use in mathematics
Odd	Something strange or abnormal	Any integer that cannot be divided exactly by 2
Volume	Loudness of a sound	Measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid.

Table 1 - The different meanings of the same word in a different context in English literacy [1].

We adopted a different approach to teaching by incorporating the aims and findings of Transferable Vocabulary Research by Anna Tsakalaki [1].

Transferable Vocabulary Aims:

To promote inclusion & creativity by:

- Teaching maths-specific vocabulary to all to boost performance in word-based problems.
- Using home languages to acknowledge linguistic diversity.
- Using cross-curricular activities for more fun and accessible learning.

Application Design Approach

We developed the application in Java for android devices because predominately schools use android tables. Moreover, the user interface is kept simple, so the students can easily navigate the application. The application has twelve levels to teach twelve different mathematical terms. The levels are composed of two different sub-levels. Sublevel one displays the dictionary definition of the word and includes the text's voiceover.



Sublevel two displays the storyline that explains the mathematical definition and gives a set of instructions to complete the task. Once the text disappears, the student can play the interactive level by following the instructions in the storyline.

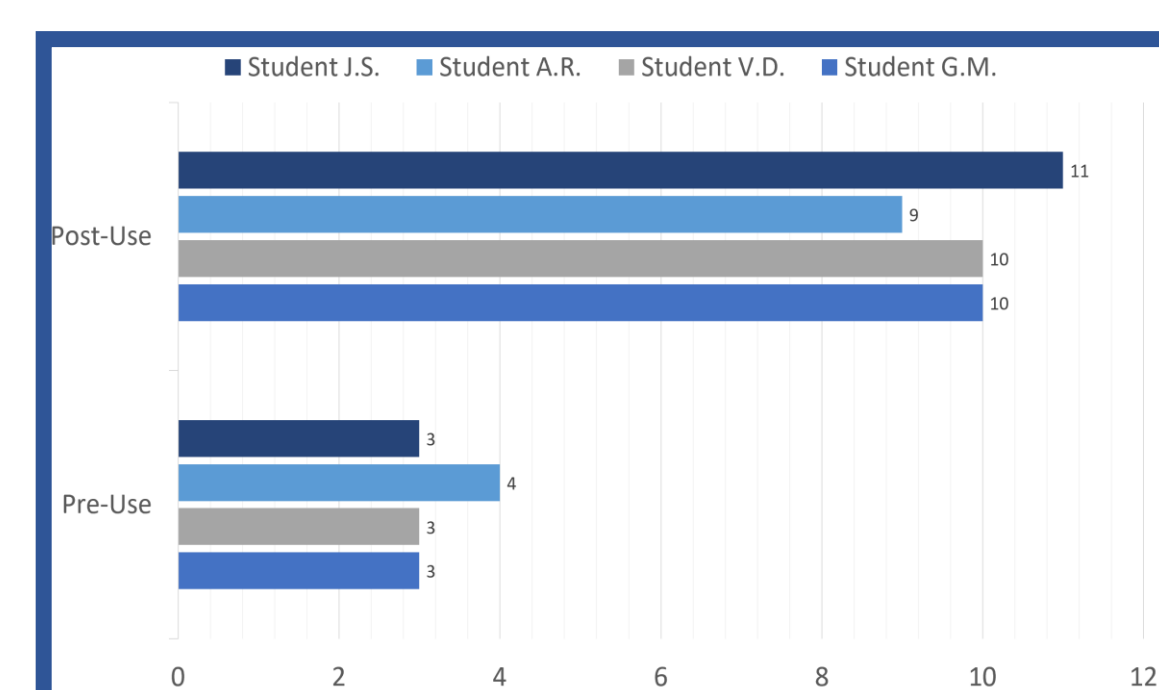
Data Collection

We created a questionnaire with twelve multiple-choice questions to collect students' data on their understanding of mathematical terminology. We selected the terminology according to the year five syllabus, and the questions were on their definition. The sample of collected data consisted of five students from one school.

We also conducted a focus group with the students participating in the program. We asked twelve questions about their background and experience with the app.

Research Findings

The multiple-choice questionnaires were given to the students Pre and Post application used. The collected data shows that, on average, a student, before using the application, could only define 3.25 words out of 12. However, after learning by using the application, a student could define, on average 10 words out of 12. The results show an incredible increase of 67.5%.



For the focus group, we got such incredible feedback. The students enjoyed playing games while learning, and we got asked by the students to increase the app's vocabulary. However, we can improve by creating a video tutorial to educate students on how to use the app.

Overall the project was a success. The students enjoyed learning and retained so much information using the application only a few times.

References

1. A Transferable Vocabulary. (n.d.). *Transferable Vocabulary*. [online] Available at: <https://research.reading.ac.uk/transferable-vocabulary/> [Accessed 21 Oct. 2022].

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