



Mavrou, K., Charalambous, E. and Michaelides, M. (2013). 'Graphic Symbols for All: Using symbols in developing the ability of questioning in young children'. *Journal of Assistive Technologies*, 7(1), 22-34.

Abstract

This study investigated the effects of symbol use in developing young learners' questioning skills in mainstream early childhood education. The research adopted an experimental design, with 40 children randomly assigned to an experimental group (EG) or a control group (CG). Both groups attended the same core instructional programme, which employed symbols in the EG and conventional instructional materials in the CG. Data collection involved pre- and post- oral assessment tests. Both groups underwent the same tests, which measured the number of questions and the mean length of utterance (MLU). Symbols positively affected children's ability to formulate questions. The EG scored significantly higher than the CG on the number of questions formulated in the post-test. The EG's within-group improvement (pre- to post-test) was also higher. The paper discusses some possibilities of a lengthier implementation of symbol use and its effect on language acquisition. The study raises some considerations about the development of new teaching methodologies with the use of symbols and ICT to enhance language development and maximise learning for all learners. The study shows some of the ways symbols can effectively be used for enhancing learning for all children, particularly for developing specific language skills, such as question formulation.

Main findings

The results show that symbols positively affect children's ability to formulate questions. The EG scored higher than the CG on all variables examined. Within-group improvement (pre- to post-test) was also higher for the EG. The group of children that used symbols in learning question formulation formulated significantly more questions in the post-test and also presented a significantly higher difference between pre- and post-test than children following an alternative method of instruction.

These results validate this study's first hypothesis, i.e. symbol use was expected to help students formulate more questions. It is worth highlighting the significantly higher score in questions where the interrogative word was not given. Questions recorded in this case were independent and spontaneous and this is the key research finding. The increase in the children's number of spontaneous questions demonstrates improved expression, which seems to have been positively affected by symbol use. These results are consistent with other research, which showed that symbol-supported writing software can help to increase the amount of writing. The results also show differences regarding the number of questions when the interrogative word was given, although these are not statistically significant. Providing the interrogative word was a guided activity that may have restricted children's freedom and creativity.

The study's second hypothesis anticipated that symbol use would help children increase the length of their interrogative utterances (number of words per sentence). The group of children that used symbols had a greater MLU than the CG in the post-test activities. They also had a greater difference of MLU between pre-and post-test than children using traditional learning methods, although the differences were not statistically significant. Notwithstanding the results of the statistical analysis, it is worth noting that symbol use, as well as the intervention in the CG, may have affected both groups' MLU. Differences in utterance length are more about vocabulary development, since MLU is one of the methods used in assessing children's vocabulary. Findings show that there is potential for



symbols to help children increase their MLU, and thus their vocabulary, although the time of intervention was not sufficient to provide statistically significant results; however, it would be worth pursuing this hypothesis after a lengthier implementation of symbol use.

The intervention in the present study was a school-based practice, aiming to enhance children's ability to formulate questions during their learning processes. Based on the findings, we can assume that the EG's progress may be as a result of the use of symbols, which are considered a dynamic method of enhancing understanding of abstract concepts, such as questions/interrogative words. The children in the group that used symbols during intervention were able to spontaneously formulate more questions than their peers, when interacting with their teacher in school activities. Symbols alone cannot teach a concept and change learning, but they can enhance comprehension and help make understanding and the use of concepts more permanent.

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