Augmented reality with spatial contiguity principle in learning sight words

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Researchers from the faculty of Computer Science & Mathematics, Universiti Teknologi MARA, have proposed prototype takes advantage of the principle on how the human mind works to innovate learning strategies for those with Learning Disabilities (LDs).

Down syndrome (DS) children are individuals with learning disabilities (LD), they differ from normal children their age, for instance in terms of cognitive, language usage, physical abilities and motor, as well as social and individual characteristics. Their strength is they are visual learners. Nevertheless, they face difficulty to memorize and recall information that they read. At the same time, Mayer's cognitive theory of multimedia learning (CTML) has proposed that a set of instructional design principles grounded in human information processing research provide best practices in designing efficient multimedia learning.

Many researches have been conducted involving normal students; however, there is a lack of study in helping students with disabilities particularly the DS children. There is much to be gained from applying these principles to children with learning disabilities. DS students are learners with learning disabilities.

The question remains whether these CTML principles are applicable to those children, such as DS with a variety of challenges. One of the Mayer's CTML principles that can guide the design of multimedia material such as computer assisted instruction (CAI) and promote retention and understanding are called spatial contiguity principle. This

principle states that people learn better when words and corresponding pictures are presented close to each other rather than far away. Unfortunately, research specifically on creating technology for learning with an understanding of spatial contiguity design principle for those learning disabilities such as DS is fairly limited.

Hence, the proposed prototype takes advantage of the principle on how the human mind works to innovate learning strategies for those with LDs. Sight word reinforcement is a crucial step involved in the early learning stage of DS children. It will provide visual graphics in their memory in representing the words that they have learned. This step can assist them to understand the connection between the alphabet sound, word structure and its pronunciation.

Struggling students such as those with DS usually present difficulties in some areas of reading skills. Sight words as words whose pronunciation and meaning students can automatically recognize. Reading words by sight means accessing the words stored in the memory. It requires the ability to read the word as a whole, without sounding them out. The learning of sight words is important because research has shown that most of the words in children's texts are sight words. When children have better recognition of sight words, their reading comprehension improves because they spend less time trying to decode. This situation provides advantages to DS children as they are weak in the tasks that involve memory.

Augmented reality (AR) is one of the technologies that can be added in learning sight words. AR shows both real and virtual environments simultaneously. Besides, AR environment supports, motivates, engages and excites students with reading disabilities. Furthermore, AR can be used with 2D and 3D animations, visualization and simulation, text, audio and video integration. With such features, AR provides a rich environment to the users to experience and feel it.

The research methodology used is teaching and learning using AR flash cards for DS students. The outcome of the study is a module for sight words learning designed for DS students.

The findings will provide input for teachers as well as courseware designers to develop programs for early reading in a fun and enjoyable way using available technology.

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