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Research and Innovation Division,  
Universiti Teknologi MARA (UiTM) Selangor,  
Puncak Alam Campus

# IMAGE REPRESENTATIVE WITH HOLOGRAPHIC TECHNIQUE AS AN ALTERNATIVE READING METHOD FOR DYSLEXIC

Nik Nor Azidah Nik Aziz<sup>1\*</sup>, Roslaili Anuar<sup>2</sup>, Nurul Asyiqin Mohd Radzuan<sup>3</sup>, Wan Zamani Wan Zakaria<sup>4</sup>, Khairul Zikri Abdullah<sup>5</sup>

<sup>1,3,4</sup>College of Creative Arts, UiTM Puncak Alam, Malaysia

<sup>2</sup>Faculty of Education, UiTM Puncak Alam, Malaysia

<sup>5</sup>College of Creative Arts, UiTM Shah Alam, Malaysia

\*Corresponding author e-mail: nikazidah@uitm.edu.my

## ABSTRACT

This research strives to address the unique obstacles experienced by dyslexic children in their reading process by proposing an alternate teaching method employing image representation with holographic techniques. Dyslexia, a condition marked by neurobiological impairments, frequently impedes an affected individual's ability to analyze the alphabet and efficiently process textual information, particularly in reading. Due to the unique educational requirements of dyslexic children, which diverge from those of typically developing children, there is a clear imperative for developing targeted instructional resources designed to address their specific impairments. Therefore, this study presents an alternate pedagogical methodology to assist children with dyslexia, acknowledging the pressing nature of the issue. The study employs a purposive sampling method to select participants from the Persatuan Dyslexia Malaysia (PDM) in the Klang Valley, Malaysia, focusing on children aged 6 to 9. Utilizing a descriptive research methodology, the study applies qualitative methodology to collect detailed insights. The methodology applied encompasses direct observations of children with dyslexia and interviews with the teachers actively engaged in their educational processes. The research results highlight the efficacy of a reading methodology that integrates image representation with holographic approaches, indicating that dyslexic children readily embrace this unique approach. Moreover, the findings of this study make a substantial contribution to the provision of dyslexic children with an educational experience that is both valuable and engaging while also being in line with current educational practices. Introducing this alternative reading method elicits enthusiasm among dyslexic children, cultivating a favorable disposition towards literacy within the educational setting. The holographic technique effectively attracts the attention of dyslexic children and offers a multisensory approach that caters to their distinct learning preferences. As a result, it is recommended that teachers who are responsible for instructing dyslexic children adapt their instructional approaches in order to address the distinct difficulties associated with dyslexia, hence fostering an inclusive and efficient educational setting. This study supports implementing innovative methods and highlights the significance of teacher training and knowledge in effectively integrating new approaches into conventional education. In summary, the research highlights the significance of considering the distinct requirements of children with dyslexia and adapting instructional approaches to optimize their educational encounters. The suggested alternative reading method, which integrates image representation and holographic approaches, presents itself as a potentially fruitful route for enhancing student involvement and enhancing reading proficiency in children with dyslexia. This study provides valuable contributions to the special education field and promotes a more inclusive and dynamic instructional approach for dyslexic children in the context of Malaysian education. It highlights the importance of ongoing exploration and integration of innovative techniques to enhance the learning experience of dyslexic children.

**Keywords:** Dyslexia, Dyslexic Children, Teaching Aids, Image Representative, Holographic Technique

## INTRODUCTION

Dyslexia, a specific learning disability, presents unique challenges in reading, writing, and language processing. Individuals with dyslexia often experience letter reversals—confusing 'b' with 'd' or 'n' with 'u—as well as difficulties in associating letters with sounds, following directions, and maintaining focus. These challenges significantly impact their ability to process and retain information effectively, often leading to frustration and diminished self-esteem. Studies (Vicari et al., 2005; Shaywitz, 2003; Berninger et al., 2008) highlight that dyslexia are unrelated to visual or auditory impairments but stems from neurological differences that influence cognitive functioning.

In Malaysia, dyslexia are categorized as a Specific Learning Disability (SLD). It is estimated that 5% of Malaysian school children are dyslexic (New Straits Times, 2009), necessitating targeted intervention programs. Despite the provisions of the Compulsory Education Policy (2003) aimed at ensuring equal opportunities for all students, dyslexic children often face unmet educational needs. These gaps in support underline the necessity of developing and implementing specialized teaching methodologies. This research introduces image representation with holographic techniques as a potential solution, aiming to address these gaps by providing an engaging and effective learning tool tailored to the specific challenges faced by dyslexic learners.

### **Objectives**

This research seeks to:

1. Examine the current practices in teaching reading to dyslexic children, with a focus on understanding their limitations and identifying opportunities for improvement. This includes analyzing the methods employed by educators and evaluating their effectiveness in addressing the unique challenges of dyslexia.
2. Develop and assess an innovative image representation technique utilizing holography to create 3D effects. This approach aims to enhance engagement, foster curiosity, and improve reading comprehension among dyslexic children. By leveraging technology, the research seeks to introduce a multisensory experience that aligns with the cognitive preferences of dyslexic learners.

These objectives are designed to align with broader educational goals, ensuring that the proposed intervention not only addresses immediate challenges but also contributes to the long-term inclusion and empowerment of dyslexic students in educational settings.

### **Problem Statement**

From preliminary research conducted, it is identified that dyslexia children are facing difficulties and lack of focus in learning particularly in reading. Learning styles are defined as an individual's preferences for acquiring and using information when learning (Herod, 2002). Subsequently, the definition demonstrates that a distinctive individual has a diverse learning style. There are three basic types of learning styles that are very simple and efficient for children namely visual, auditory, and kinesthetic (Beatrice, 1994). Besides, as dyslexic children are easily losing their focus, therefore attention must be given to identify how well the reading method by using the image representative with holographic technique to enhance the reading style for dyslexic children. Previous research was conducted by Fadilahwati et al., (2009) revealed that dyslexic children needed to be motivated and engaged well in learning by using multimedia components such as animation, audio, graphics, and text. It is believed that one of the recommended interventions should involve strategies, activities, and support from the environment to spark the interest of the dyslexic children in reading (Mohd. Sharani Ahmad, 2004). Such educational intervention proves by Nor Hasbiah (2007) who reported that the implementation of multimedia learning methods can motivate dyslexic children to learn better. In overcoming learning problems in students, an effective learning strategy is much needed. Hence, this research is proposing the image representative with holographic technique to attract the attention of the children and at the same time, able to increase the reading capabilities among them.

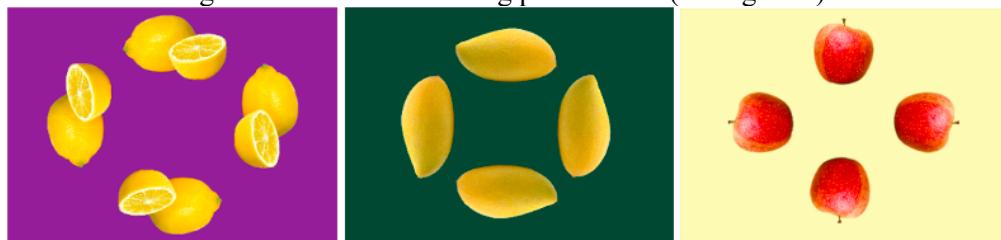
## **MATERIAL AND METHOD**

The Dick & Carey Model (2009) was employed to develop a systematic teaching approach using holographic techniques. This framework integrates cognitive and behavioral elements to create an effective learning system tailored to dyslexic students. Its ten interconnected components provide a structured approach, ensuring the intervention is both systematic and adaptable to the needs of its users. This model is referred to because it includes the cognitive and behaviouristic elements that emphasize the user's response to the stimulus presented. It also represents a thorough and systematic process when creating an ideal learning design system to overcome learning problems. The ten interconnected components contained in this model are the main steps in the development process of the proposed teaching with the holographic technique.

This research is to enhance the reading ability of dyslexic children in a classroom by using image representatives with holographic techniques as visual aids. This study implies qualitative

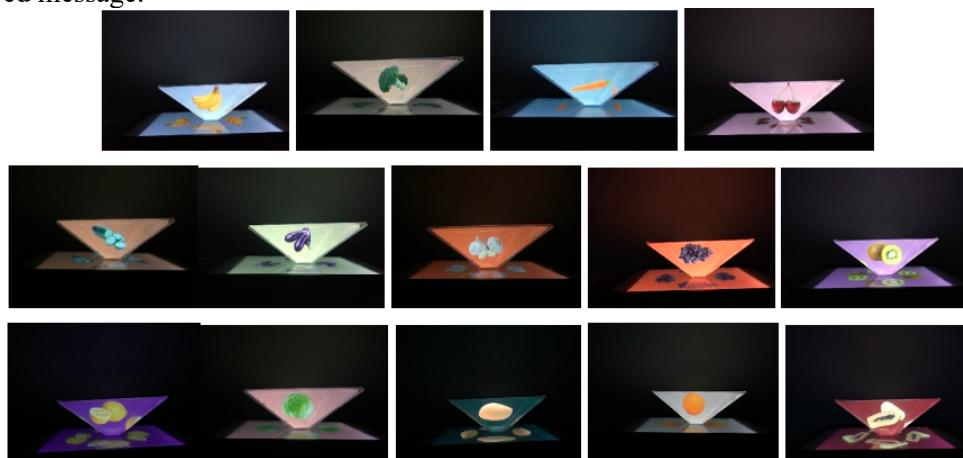
methods, including face-to-face interviews with five (5) PDM teachers and observational studies, were used to gather data. Interviews explored the current teaching practices and the perceived effectiveness of visual aids. According to Oppenheim (2000) and Smith (2015), the basic principle of qualitative interviewing is to formulate a scaffold within respondents that can express their understanding in their way. The interview conducted mainly concentrating on the learning style of the dyslexic children, for example, the significance of visual guides used in the classroom. Meanwhile, the final interview was focused primarily on issues that emerged, what helped or hindered the coordinated effort, and what benefits they can get from the research. The researcher transcribed each interview and added additional notes for interpretation. The findings of the interviews were additionally useful in the planning of the pre and post-test assignments.

Questions were designed to elicit detailed responses about the challenges and opportunities in teaching dyslexic children. Observations were conducted with 75 dyslexic children, later narrowed to 43 participants based on specific inclusion criteria. The selection criteria ensured that the participants represented a diverse range of abilities and learning preferences. (see figure 1).



**Figure 1: Pre-test involving visual about understanding colours on still images.**

Then, a set of tests comprising of visual representative with holographic technique (figure 2) were given afterward. After screening, the observation was conducted four times with the number of children reduced to 43 involving 4 different age groups (6, 7, 8, and 9 years old). During the observation, all activities carried out were recorded. The inclusion criteria for this group sample include; (i) able to see visually and (ii) generate creative imagination about the picture represented and able to maintain the received message.



**Figure from 2: Image representative with holographic technique to create 3D effect for pre and post-test session**

The treatment was implemented by using a set of flashcards displaying the actual image of fruits to assist the children in identifying the object. With a realistic image, the message is clearer and easier for the children to understand, and they could name the fruits without having any troubles. As dyslexic children are more attracted to bright colours or pastel colours, therefore by using the colourful image representative with holographic technique, has supported them to enhance their reading skills. Finally, a post-test with similar images as the pre-test was conducted to test the children's ability in recognizing what has been shown to them during the pre-test session. The children's response was analysed for an amendment to reach the final version of the activities and which took about one month to be completed.

## FINDINGS AND ARGUMENTS

The face-to-face interview that was conducted with 5 teachers at PDM showed that teachers were still using a conventional method of teaching style for the dyslexia children. This is due to limited resources in Malaysia. The teachers used; (i) cycle motor teaching method, (ii) one to one between teacher and dyslexic children, (iii) black and white illustration, and (iv) no graphical nor visual aids. In addition to this, some dyslexic children were easily losing focus, could not stay still for too long and are not attracted to the conventional method of learning styles. The results in table 1 is showing the results of the research conducted.

Table 1: The results of students participated in the research

Age groups (Years old)	Number of dyslexic children	Ability to identify 3D object	
		Able	Not Able
6	20	20	0
7	12	11	1
8	5	5	0
9	6	4	1

Reference: Nik Nor Azidah et al., (2020)

The finding shows that almost all children could identify the 3D objects regardless of age groups. The children who were not able to identify the 3D images were found to have severe dyslexia problem. Based on the data presented, dyslexic children have enjoyed the session conducted. Even though the session took place in a short period, the results are convincing as the image representative with the holographic technique has gained the interest of the dyslexic children in their reading session. Hence, this method is suitable to become an alternative to the reading method and to be used in the future. In terms of learning style, the outcomes from teachers' interviews impressively offered that learning style was affected by teaching materials. At the end of the interview, the teachers informed that there were no interactive visual aids provided for these dyslexic children in their learning method. With the image representative and holographic technique provided, the children were very excited to learn they had enjoyed the lesson conducted as they are able to differentiate the shapes and colours easily.

## CONCLUSIONS

This approach successfully fosters engagement, improves reading skills, and creates an interactive learning environment. By addressing the unique challenges faced by dyslexic learners, the study provides a foundation for developing more inclusive educational practices. The findings emphasize the importance of leveraging technology to create tailored interventions that align with the cognitive preferences of diverse learners.

Future research should explore scalability, long-term impacts, and integration with broader educational frameworks. Additionally, further studies could investigate the applicability of holographic techniques in other areas of learning and among different student demographics. By addressing the specific needs of dyslexic learners, this study contributes to the development of inclusive and innovative educational practices, paving the way for a more equitable and effective education system.

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