The Use of Augmented Reality in Teaching students with Learning Disabilities in Elementary School in Florida

:Prepared by

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Abstract

This study examines the use of augmented reality (AR) technology in teaching individuals with learning disabilities. The research reviews the literature on instructional technologies and their ability to support the learning needs of individuals with learning disabilities. The study focuses on AR technology and its application in education, specifically in classrooms and special education settings.

The study employs an action research approach, including personal interviews with teachers who utilized AR technology to teach students with learning disabilities. The study aims to investigate the effectiveness of AR technology in enhancing the learning experience of students with learning disabilities, its impact on their academic achievement and motivation, as well as the advantages and challenges of using AR technology in teaching students with learning disabilities.

The findings suggest that the use of AR technology can improve the learning outcomes of students with learning disabilities by providing an interactive and engaging learning experience. The technology is particularly effective in facilitating the learning of mathematics and other sciences, and the teachers reported that it improved the motivation and participation of students in the learning process.

The study highlights the importance of using AR technology to support the learning needs of students with learning disabilities. The research suggests that AR technology can be an effective tool for enhancing the quality of education and increasing the academic achievement of students with learning disabilities. The findings also indicate that ongoing updates and modifications to the educational content in AR applications are necessary to ensure the continuity of

the benefit of AR technology. Overall, this study provides evidence that AR technology can be a valuable addition to the instructional toolkit for teaching individuals with learning disabilities.

الملخص

تبحث هذه الدراسة في استخدام تقنية الواقع المعزز (AR) في تعليم الأفراد ذوي صعوبات التعلم، و هذا البحث الأدبيات المتعلقة بتقنيات التعليم وقدرتها على دعم احتياجات التعلم للأفراد ذوي صعوبات التعلم، حيث تركز الدراسة على تكنولوجيا الواقع المعزز وتطبيقاتها في التعليم، وتحديداً في الفصول الدراسية وإعدادات التعليم الخاص.

تستخدم الدراسة منهج البحث النوعي من خلال المقابلات الشخصية مع المعلمين الذين استخدموا تقنية الواقع المعزز لتعليم الطلاب ذوي صعوبات التعلم في المدارس الأمريكية، وتهدف الدراسة إلى التحقق من مدى فاعلية تقنية الواقع المعزز في تعزيز تجربة التعلم للطلاب ذوي صعوبات التعلم، وأثرها على تحصيلهم الأكاديمي ودافعيتهم، بالإضافة إلى مزايا وتحديات استخدام تقنية الواقع المعزز في تعليم الطلاب ذوي صعوبات التعلم.

وتشير النتائج إلى أن استخدام تقنية الواقع المعزز يمكن أن يحسن نتائج التعلم للطلاب ذوي صعوبات التعلم من خلال توفير تجربة تعليمية تفاعلية وجذابة، وأفاد المعلمون أنها حسنت من دافعية الطلاب ومشاركتهم في عملية التعلم.

تسلط الدراسة الضوء على أهمية استخدام تقنية الواقع المعزز لدعم احتياجات التعلم للطلاب ذوي صعوبات التعلم، ويشير البحث إلى أن تقنية الواقع المعزز يمكن أن تكون أداة فعالة لتعزيز جودة التعليم وزيادة التحصيل الأكاديمي للطلاب ذوي صعوبات التعلم. كما تشير النتائج إلى أن التحديثات والتعديلات المستمرة على المحتوى التعليمي في تطبيقات الواقع المعزز ضرورية لضمان استمرارية الاستفادة من تكنولوجيا الواقع المعزز. بشكل عام، تقدم هذه الدراسة دليلاً على أن تقنية الواقع المعزز يمكن أن تكون إضافة قيمة لمجموعة الأدوات التعليمية لتعليم الأفراد ذوي صعوبات التعلم في المملكة العربية السعودية.

الكلمات المفتاحية: صعوبات التعلم، الواقع المعزز، تقنيات التعليم، المرحلة الابتدائية.

Introduction

The importance of the use of instructional technologies has become more important in recent years, as it has become the main role in the teaching process of all students in various stages of education, especially in the early stages of learning. Structured teaching techniques help overcome many obstacles facing teachers and students in teaching and learning processes This is especially evident in teaching students with learning disabilities. Educational techniques for people with learning disabilities, or the specific technological means for people with learning disabilities, are defined as any material, device, product system, or something customized to increase scientific or functional competence in teaching students with learning disabilities. In this respect, this definition, which indicates that the name of specific learning techniques for people with learning disabilities refers to the means used by the teacher to explain and facilitate the learning material for students with learning disabilities, such as personal computers, special programs, enhanced means of communication, and other means assigned to them. Many studies have shown that the use of educational techniques, such as Augmented Reality, has a major role in overcoming students' learning difficulties and thus increasing their educational attainment.

Many teachers use technology in teaching people with learning disabilities, Augmented Reality, also known as AR, will make the experience and success much richer, engaging, and meaningful. First, we must understand what Augmented Reality is to experience it as a Special Education student.

AR is defined in many studies as an "interactive, synchronous, participatory technique that uses devices to add digital data to real

reality in the form of images, media, videos, or links in multidimensional formats".

The Alkalifa (2010) defined the term augmented reality as "referring to the possibility of integrating virtual information with the real world". When someone uses this technique to look at the environment around them, objects in that environment are equipped with information that swims around them and integrates with the image the person looks at. This is in turn a structured and controlled and dynamic approach to keep engagement of the student. Technological development has helped a lot in the emergence of this technology, and we see it in personal computers and mobile phones, after it was limited to research laboratories in large companies.

Larsen, Bogner, Buchholz, Brosda, (2011) states, "Adding, synthesizing, and visualizing digital data and using digital methods for the real reality of the human environment. From a technical perspective, augmented reality is often linked to wearable computers or smart portable devices. "

He defined (Irene Ellis et al., 2015) a new technological system that allows the introduction of virtual contents in the real world to run the same representation and in real time and enhance the perception of the user to reality. From another perspective Augmented Reality: "A set of techniques and tools that add information to a reality.

This technology opens many doors for multiple uses in education, including the following eight uses:

1- Classroom Applications

There are several applications you can employ to bring augmented reality technology to your classroom.

2- Assisted Homework

Augmented Reality can be used to support and accompany learners as they complete homework. When a student stumbles on his homework, he can use his mobile phone camera to aim at a point that is difficult for him to show him a video prepared by his teacher, explaining that point, and provide him with elements to help solve the problem.

3- Live Photo Gallery

Augmented Reality technology can be used to create a photo gallery of faculty near the entrance of the school, where visitors can examine the image of any teacher on their mobile phones, to bring life to this picture and tell the visitor about the owner.

4- Presentation

Students record a summary of the book they have just read. The presentation is converted by an information program designed for this purpose.

5- Parental Encouragement

Brief words are recorded for parents to encourage their children and paste an information card or any expressive picture on each child's seat. For reference and browsing by mobile whenever the learner needs to encourage and motivate his parents.

6- Live Photo Album

You can create a photo album for the activities of the school year, including concerts, outputs, seminars, and the like. Anyone who would like to know more information on a particular activity can slide his mobile phone over the image to show him the activity video and all the information, statistics and reports related to it.

7- Safety Laboratory

Images or labels with safety code are prepared and attached throughout the science lab so that they play multimedia when students scan them with their smart device cameras, informing them of the different safety procedures and protocols for laboratory equipment.

8- Flashcards

Using Augmented Reality technology, you can create flashcards with vocabulary linked to videos that show how to express them in sign language.

The use of this new technology in facilitating the learning of students with learning difficulties is very important, we are in an era where the spread of many difficulties faced pupils in their learning, where their ability to learn and attainment has become limited, which necessitated the use of this technology and tools to help them learn it is able to that.

Literature Review

In the beginnings of the definition of augmented reality, there are many names that refer to it, and by looking at the literature of augmented reality, we notice many terms that have been mentioned in much research.

They knew (Cabero & Barroso, 2016, p.44) as a blending of digital and physical information in real time through various technical devices. In other words, it is the use of a set of technical devices that add virtual information to physical information. That is, to add a virtual part to what is true. In this study, the term augmented reality is used because it is the most Circulate.

Huisinga defined it (Huisinga, 2017, p.27) as, "An intermediary in which digital information is mixed or synthesized with the

physical world, based on the perspective of the individual who interacts and deals with augmented reality.

This section contains an overview of previous studies relevant to the subject of the present study. Here we review the results of some research from two studies on the use of augmented reality in education.

In a study by Chen, C and Huang, Cand Chou, Y, it aimed to recognize the impact of multidimensional concept-based maps through Augmented Reality in the development of academic achievement and motivation for learning and acceptance of students to Augmented Reality. The study used the quasi-experimental method, and the sample consisted of 42 male and female students in a primary school in Taiwan. The study concluded that learning with augmented reality was easier to understand and use, and it simplified content learning. (Chen et. Al., 2017)

Two educational researchers conducted a study aimed to identify the impact of augmented reality on academic achievement and destinations Considering students studying a computer course, the study used a quasi-curriculum The sample consisted of 23 students enrolled in the computer course at Sharq University The lower Turkish is divided into two groups, an experimental group studied using augmented reality, A control group studied in the usual way, the study instrument was an achievement test applied. With students in the pre and post applications, a questionnaire examined students' opinions about Augmented reality. The study found that the level of academic achievement of the experimental group students was higher than their peers in the control group, highlighting a positive effect of teaching using augmented reality in academic achievement,

and students also had positive views towards the course because of the use of augmented reality. (Bal & Bicen, 2016)

Action Research Methodology

The research focused on researching the effectiveness of augmented reality and its applications in education, and through coexistence at Sunrise Elementary School in Orange County, many methods of integrating technology in education in classrooms were seen.

These technologies include the integration of augmented reality technology in the classroom to teach students with learning disabilities, where it was used to collect data, I prepared a set of 5 questions related to the experience of using augmented reality technology in teaching students with different teachers to document the answers to produce the results of the research.

I asked questions regarding the use of augmented reality technology for Teacher Rachel, a teacher of mathematics for the second grade in Sunrise elementary school.

Why did you use augmented reality technology?

With the use of the iPad in recent years, it is necessary to take advantage of the advantages and useful applications in it. In one of the training courses for teachers in the school, we used the HP Raval application, and we did some lessons using the program for use in the classroom.

What is the method and application used for augmented reality?

Some teachers at the school made educational contents for some lessons and materials through the HP Raval program through a unified account that can be used in all classes of the school, we print the cards related to the lesson and distribute them to students, then

each iPad with a group of two students to review the content Then the cards are exchanged with other groups.

What are the advantages of using augmented reality?

Dealing with the iPad became more enjoyable for students, instead of being a display or writing device somewhat like a computer, it became an interactive device, with the use of augmented reality in the iPad increased the desire of students to learn through it.

What are the difficulties of using augmented reality?

Students should be trained to point the camera correctly as some errors occur when directing the iPad on the cards, causing other content not related to the required card to appear, in addition to the frequent updates of the HP Raval application that needs with it to re-explain the application to students.

How do you see the effectiveness of using augmented reality with students with learning difficulties?

Augmented reality is the preferred method for students to learn in mathematics. There has been significant progress in the level of students who have difficulty mathematics in the classroom after using this technique with them.

Then we asked questions about the use of augmented reality technology for Shabata teacher, of the media center at Sunrise School.

Why did you use augmented reality technology?

In the Learning Resources Center, we focus on using the latest educational methods to be a distinct learning experience for students in the resource room, and for this we had to use the latest technology that can be used, which is an augmented reality technology.

What is the method and application used for augmented reality?

The resource room is divided into educational sections for each science, in each section there are a few iPad devices and a set of cards, students direct the iPad to these cards to review a simplified explanation of this science.

What are the advantages of using augmented reality?

Augmented reality facilitates the interpretation of many concepts and facts for students and increases the relevance of information in the minds of students by enjoying the existing augmented reality.

What are the difficulties of using augmented reality?

The difficulty lies in the use of augmented reality in the rapid development of applications and their updates, it is necessary to constantly update the applications and update the content in them in order not to have any problems while using it in the lessons.

How do you see the effectiveness of using augmented reality with students with learning difficulties?

Augmented reality was used to explain some lessons to students with reading difficulties and difficulties in mathematics and it was much easier to understand the lessons for them than other traditional methods.

Teacher Sarah, the science teacher at Sunrise elementary School:

Why did you use augmented reality technology?

Augmented reality technology provides students with an opportunity to explore scientific concepts in an interactive and engaging way. It can be used to illustrate complex scientific phenomena and make them more clear and easily understandable for students.

What is the method and application used for augmented reality?

We applied augmented reality in science classes by using a specific application that can be run on tablets. We designed specific educational content that includes some challenging scientific phenomena, and we distributed certain cards to the students that the tablets are directed towards to display a three-dimensional experience of those phenomena.

What are the advantages of using augmented reality?

Augmented reality technology helps students develop visual thinking, observation, and interaction skills. It also stimulates students' curiosity and love for exploration, making the learning process more enjoyable and exciting.

What are the difficulties of using augmented reality?

Using augmented reality technology requires the availability of suitable devices and appropriate applications. Teachers should also ensure the necessary training for students to use the technology correctly and address any potential technical issues.

How do you see the effectiveness of using augmented reality with students with learning difficulties?

We used augmented reality technology to help students with learning difficulties better understand scientific concepts. We noticed a significant improvement in their level of interaction and engagement. Thank you for providing me with the information.

Then we asked questions about the use of augmented reality technology for teacher Julia, mathematics teacher.

Why did you use augmented reality technology?

I used augmented reality technology because it provides innovative educational opportunities and contributes to making the learning process more exciting and effective. Augmented reality

technology helps motivate students and encourages their active participation in the learning process.

What is the method and application used for augmented reality?

We used a specialized augmented reality application and developed educational content that utilizes this technology. We distributed cards or specific codes to the students, and they used iPads to direct the camera towards those cards. Then, educational content related to those cards appears on the screen.

What are the advantages of using augmented reality?

Augmented reality technology offers an immersive learning experience and makes complex concepts clearer and more understandable. It allows students to interact with educational content in a deeper way and encourages them to explore the material in innovative ways.

What are the difficulties of using augmented reality?

Among the challenges of using augmented reality technology is the need to provide suitable devices and up-to-date applications. It may also require training students on how to use the technology correctly and deal with any technical issues that may arise during its use.

How do you see the effectiveness of using augmented reality with students with learning difficulties?

You see that augmented reality technology greatly contributes to improving the learning experience for students with learning difficulties. This technology helps clarify and enhance their understanding of educational concepts, thus enhancing their interaction and comprehension of the material.

Results

Through a personal interview with the teachers who used augmented reality technology to teach students at Sunrise Primary School, a clear result was drawn from the school's experience in using augmented reality technology. The experience was rich and continuous, as this technology had a great impact on improving the level of students, especially students with learning difficulties, as this technique was useful for the needs of students and their desires, which contributed to improving the level of students. Then objected to the use of the parameters of this technology some minor problems that did not stop in the way of benefiting from its advantages in education, as these problems were related to the continuous technological development, a natural problem that occurs with every modern technology until it is established clearly. Through the result of this research, we conclude that the use of augmented reality technology will be beneficial in the schools of the Kingdom of Saudi Arabia in general and chapters of learning difficulties in particular, where augmented reality technology keeps pace with the rapid technological development that facilitates the teacher and the student learning process and increases its quality. And we can overcome the negatives that teachers have encountered in the Sun Rise Elementary School by creating a team at the school that designs, modifies, and updates the educational content in the HP Raval application on an ongoing basis to ensure the continuity of the benefit of augmented reality technology.

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