第 48 卷 第 10 期
2021 年 10 月

湖南大学学报（自然科学版）
Journal of Hunan University (Natural Sciences)

Vol. 48 No. 10
October 2021

Open Access Article

Opportunities and Challenges of Using Augmented Reality in Iraqi Schools

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Abstract: This paper aims to investigate the opportunity of implementing Augmented Reality (AR) in Iraqi schools by answering the following questions: Are teachers familiar with such technology? What perceptions do teachers and students hold toward using AR in education? Do schools have the proper infrastructure to adapt AR? What are the barriers preventing implementation of this technology? An online survey was designed and distributed to a random sample, including teachers and students at international, private, and public schools in Iraq. The results show that even though the teachers had a basic understanding of the technology, they did not employ it in their classes. Teachers have a slightly good attitude toward the usage of AR. However, they do not believe in its ability to enhance the learning environment. On the contrary, from students' perspective, they show a great attitude in using AR; however, they face a lack of training and cannot self-learn. These findings are linked to the challenges that affect the use of AR in education, including the difficulties teachers face in learning and using AR in classes.

Keywords: augmented reality, e-learning, active learning, teachers' attitude, students' attitude.

在伊拉克学校使用增强现实的机遇和挑战

摘要：本文旨在通过回答以下问题来调查在伊拉克学校实施增强现实（增强现实）的机会：教师是否熟悉此类技术？教师和学生对在教育中使用增强现实有何看法？学校是否有适当的基础设施来适应增强现实？阻碍实施这项技术的障碍是什么？设计了一项在线调查并将其分发给随机样本，包括伊拉克国际、私立和公立学校的教师和学生.结果表明，即使教师对技术有基本的了解，他们也没有在课堂上使用它.教师对增强现实的使用态度稍好.然而，他们不相信它能够改善学习环境.相反，从学生的角度来看，他们在使用增强现实方面表现出极大的态度；然而，他们缺乏培训，无法自学.这些发现与影响增强现实在教育中使用的挑战有关，包括教师在学习和在课堂上使用增强现实时面临的困难.

关键词：增强现实，电子学习，主动学习，老师的态度，学生的态度。

1. Introduction

Early 2019, the world faced an outbreak that had a massive impact on all aspects of life, including healthcare, social life, and education. According to the World Health Organization [1], coronavirus (COVID-19) is caused by a newly discovered coronavirus. According to the WHO, people infected with the COVID-19 virus develop mild to severe respiratory disease and recover without special treatment. Despite widespread public education about deterring and delaying disease transmission, COVID-19 has spread with 203,461,989 confirmed cases in 220 countries and territories worldwide, including Iraq, with a total of 4,307,546 confirmed death cases as of August 2021 [2]. COVID-19 created the largest disruption of education systems around the globe, affecting nearly 1.6 billion learners in more than 190 countries and all continents [3].

Received: June 14, 2021 / Revised: August 12, 2021 / Accepted: September 11, 2021 / Published: October 30, 2021

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Many countries took extreme measures, including lockdowns of schools and universities to prevent the spread of the virus. According to [4], the closure of universities and schools has severe negative consequences on students and, most importantly, interrupted learning, depriving young learners of opportunities for growth and development. Therefore, educators, schools, and universities faced a challenging year by switching to full e-learning [5]. E-learning was growing by approximately 15.4% yearly with no pressure on teachers or students before COVID19; during the pandemic educational institutions began providing most of their services online, including assessment and lectures to over 60% of students around the world, and this drove the big companies to compete offering new facilities and services to learners and educators [6].

However, online learning is challenging, especially in areas where practical training is required, making the online platforms not sufficient for acquiring the desired knowledge. Several researchers have looked at the difficulties that come with implementing e-learning. There is evidence that the implementation of electronic learning programs has failed when agencies and their constituents remain unprepared [7], [8]. Based on [9], E-learning challenges can be classified into four categories, technological, individual, cultural, and course challenges. Moreover, E-learning lacks presenting teacher-student interaction, which is crucial to improving students' motivation. This relationship develops from the daily classroom activities conducted between teachers and students [10].

One promising opportunity to overcome this shortage is computing technologies, such as augmented reality (AR) [11]. AR can be defined as "a system or visualization technique that fulfills three main features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects" [12]. AR provides the addition of virtual objects into real environments to enable real-time interaction between the teacher and the students [10]. Furthermore, AR can be considered one of the formats within the Reality–Virtuality (RV) continuum, which ranges from a fully real to a completely virtual world. AR can be thought of as a mixed reality environment with more real-world artifacts than virtual components due to the possibility of mixing real and virtual worlds within a single show [12].

It also provides an architecture where the virtual world mixes things from the physical world. It acts as a connection between the real world and the virtual environment by providing synchronous interaction, making it ideal for one-to-one teaching when it is impossible to communicate. AR works by pre-determining target points in the real world, connecting to virtual objects, and interpreting the results through certain programs. The pedagogical approach followed in AR applications is Active Learning, a student-centric approach that involves students and encourages them to take ownership of their own learning experience. It motivates them to use active inquiry, critical thinking, and problem-solving [6], [13].

Authors in [14] argued that AR has a great potential to make learning more apprehendable, interesting, and engaging for students. Moreover, [15] stated that the learning process in education should focus on enhancing the level of interaction and creativity to a new level, and it is not limited to sharing knowledge and experience. AR uses creative and innovative teaching methods, and it can transform classrooms as [16] suggested.

In this paper, the concept of augmented reality in education is introduced, the method that can be used to determine the appropriateness of using augmented reality for education in schools is proposed, the results of applying this method are illustrated, and finally the most important conclusion and recommendation is discussed.

2. AR in Education

The way AR is designed, implemented, and integrated into formal and informal learning environments directly impacts its educational value. How AR technologies support and enable, meaningful learning is an important consideration. Educators will benefit from seeing AR as a term rather than a specific form of technology [17]. Educator participation is critical for the creation of beneficial AR technologies for teaching, which increases the likelihood of AR being used in education [18]. AR applications have been created for a variety of educational purposes [19]. This form of learning will improve cognitive skills and increase intellectual awareness of phenomena that are either invisible or difficult to observe and correct any misconceptions [17]. Learning difficulties are often encountered when visualizing unobservable phenomena, and AR discusses these difficulties [17], [20].

In [21], the authors investigated the effect of AR-enhanced science textbooks on Malaysian students in lower secondary school. In [22], the authors used fourth-grade students in Taiwan to assess the use of an AR-based mobile learning framework for natural science inquiry activities. Also, in [23], the authors used first-year students in Turkey to assess the use of an AR improved laboratory manual in science labs. The impact of the Anatomy 4D mobile application on the learning motivation of undergraduate health science students at UCT was investigated in this study.

AR technologies may help students improve the skills and information gained from technology-enhanced learning environments [17]. Integrating various sources of information can reduce cognitive workload [18], [21]. AR immersion and interaction

features can motivate students to participate in learning activities and improve learning motivation [20]. Moreover, the skills and knowledge that students develop through technology-enhanced learning environments may be developed more effectively through AR technology [23].

However, some challenges with the use of AR in education concerning AR technology, users may experience usability issues and technical problems, and some students may find this technology complicated [23]. There is no evidence to suggest that usability issues are directly related to AR technology and may instead stem from inadequate technology experience, interface design errors, technical problems, or negative attitudes [24]. Combining real and virtual objects may cause confusion, as students may face difficulty navigating between fantasy and reality [17]. AR technology within a learning environment requires multitasking, as students need to engage with large amounts of information and multiple technological devices to accomplish complex tasks [17]. This may result in a cognitive overload and a feeling of being overwhelmed or confused.

Moreover, when using AR technology in the classroom, students need to use multitasking because they must interact with vast volumes of data and various technical devices to complete complex tasks. This can lead to cognitive overload and feelings of overwhelm or confusion [17], [24]. Another issue is that the stability of mobile AR technology cannot be assured, and problems can arise if the technology lacks well-designed interfaces and instructions, as this may make the technology too complex. Users can need additional time to become acquainted with and relaxed with AR technology [17], [21], [24].

3. Research Methodology

When recognizing the benefits and challenges of using AR in education, it is important to research the possibility of implementation in Iraqi schools. This research aims to identify the application of AR in education and the obstacles regarding the adoption of AR in Iraqi schools; this paper focuses on the teacher's and the student's viewpoint about AR technology. Thus, it can answer the following questions:

1. Are teachers at Iraqi schools familiar with AR?
2. What perceptions do teachers hold toward using AR in education?
3. What are the challenges that face teachers?
4. What perceptions do students hold toward using AR in education?
5. Is there a difference in readiness among private, public, and international schools?

This paper aims at examining the level of acceptance of using augmented reality technology in the educational context, discovering the willingness of Iraqi school students and teachers to use augmented reality technology in their classrooms. A methodology based on a questionnaire will be designed, data will be collected and analyzed to reach these aims.

3.1. The Survey Design

An electronic survey consisting of a list of questionnaires as multiple-choice questions was designed and developed. The questionnaire consists of three sections. The first section contains an explanatory video on how to use augmented reality technology in education and a questionnaire for the participants' basic data such as the possibility of using this technology, the type of school, the geographical area, and the e-mail. The second section of the questionnaire contained a set of questions about students' familiarity with AR technology and the possibility of using it in their education. Finally, the third section contains questions directed to teachers about their position towards it and the advantages and obstacles of using augmented reality in education.

The questionnaire was written in the English and Arabic languages as neutral as possible. The survey questions focused on basic and important matters, including understanding AR technology and the possibility of using it, availability of its requirements, enjoyment of learning, education, and creativity, the possibility of communication, difficulties, problems, safety and health, and other psychological issues. Survey questions were rated from 1-5 which means (1 = Strongly Agree (SA); 2 = Agree (A); 3 = Neutral (N); 4 = Disagree (D); 5 = Strongly Disagree (SD), respectively.

3.2. Data Collection

The link to the questionnaire was sent directly to schools to ensure the reliability of the data collected. The reasons beyond using google forms were, it can reach a large number of participants at different locations, save cost, and due to the schools' lockdown at the time of collecting the data. The participants were selected randomly and asked to participate in the study voluntarily. Over one month, 145 responses were collected; 95 (65%) participants were teachers, and 50 (34%) were students. After carefully looking through the responses, one teacher was excluded as they did not declare their gender. No duplication in answers and no indication of lack of attention while filling the form. Table 1 and Table 2 illustrate the demographic data of the teachers and the students, respectively.

Table 1 The demographic data of the teachers' participants

Variable	Value	Frequency	Percentage*
Occupation	Teacher	94	65%
Gender	Male	48	51%
	Female	46	48%

Continuation of Table 1

School Type	Public	83	88%
	Private	8	8%
	International	3	3%
Qualification	Bachelor	56	60%
	Master	22	24%
	High Diploma	7	7%
	Doctoral	7	7%
Region	Northern Iraq	28	30%
	Mid Iraq	14	14%
	Southern Iraq	51	53%

* Rounded to the nearest one

Table 2 The demographic data of the teachers' participants

Variable	Value	Frequency	Percentage*
Occupation	Student	50	34%
Gender	Male	35	70%
	Female	15	30%
School Type	Public	43	86%
	Private	2	4%
	International	5	10%
Year Stage	Primary	24	48%
	Secondary	14	24%
	Highschool	12	28%
Region	Northern Iraq	43	86%
	Mid Iraq	1	2%
	Southern Iraq	11	22%

* Rounded to the nearest one

3.3. Data Analysis

The Statistical Package for the Social Sciences (SPSS) version (26) was used to analyze data collected from the survey. Descriptive statistical analysis such as frequencies, percentages, mean, standard deviation, and reliability was carried out to identify the satisfaction level of using AR technology in teaching and learning. The dependability was assessed using Cronbach's Alpha Coefficient for internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The basic analysis process is to bring the data together and to edit and interpret them. Therefore, validity and reliability are necessary to make detailed descriptions.

4. Results Analysis

The details of the results can be categorized into two sections: first, the analysis of the results from the teachers' point of view, and second the results from the students' point of view.

4.1. Analyzing Teachers Questionnaire

Two constructs were covered in this survey: attitudes and barriers. Table 2 and Table 3 show teachers' familiarity and use of AR. Table 4 shows five questions that look at the challenges, and Table 5 shows 12 questions that look at teachers' attitudes. The Cronbach's Alpha Coefficient for the 17 items was 0.84, which means a very good level of reliability such that the items have relatively high internal consistency.

Of the 94 participants who completed the survey, 48 (51%) were males, and 46 (48%) were females, as shown in Table 1. The majority of participants (58, 62%) have a Bachelor's degree, 48 male and 10 female. However, (22, 23%) have a Master's degree, (7, 7%) have a high Diploma, and (7, 7%) hold a Doctoral degree are all females. (83, 88%) of the participants are teaching in public schools.

To address the first research question – *Are teachers at Iraqi schools familiar with AR?* – teachers were asked to rate their knowledge with Augmented Reality as shown in Table 2. From this table, it can be seen that 52% of male participants with a Bachelor's degree agreed with being familiar with AR, and 31% of them strongly agree with the statement. Only 5% of females agree with the statement, and 12% disagree or are neutral. This item had a mean of 1.46 and a standard deviation of 0.85. However, 55% of Master holder female and 57% of Doctoral holder female participants agree to the statement, while 43% strongly agree, this item had a mean of 1.57 and a standard deviation of 0.53. From these results, it can be indicated that teachers at Iraqi schools are familiar with AR. Also, gender and qualification had no bearing on teachers' familiarity with AR.

Table 3 Teachers use of AR

m: male f: female	Yes		No		Maybe		Total	Mean	SD
	m	f	m	f	m	f			
Bachelor Degree							58	1.46	0.85
Frequency	37	6	0	3	11	1			
Percentage	64%	10%		5%	19%	2%			
Master Degree							22	1.45	0.8
Frequency	0	16	0	2	0	4			
Percentage		73%		9%		18%			
High Diploma Degree							7	1.43	0.79
Frequency	0	5	0	1	0	1			
Percentage		71%		14%		14%			
Doctoral Degree							7	1	0
Frequency	0	7	0	0	0	0			
Percentage		100%							

The second issue concerned teachers' use and perception towards augmented reality programs: What perceptions do teachers hold toward using AR in education? According to the statistics, the majority of the teachers show a willingness to use AR in teaching despite their gender and their qualification. Tables 3

and 4 show the statistics for teachers' attitudes toward AR. Table 4 features 12 questions aimed at gathering data on teachers' attitudes. The frequencies, percentages, means, and standard deviation (SdD) are shown in Table 4.

Table 4 Teachers' attitude toward using AR in education

#	Question	SA	A	N	D	SD	Mean	SdD
1	AR helps you explain lectures more efficiently	42	43	6	2	1	1.68	0.78
		45%	46%	6%	2%	1%		
2	AR improves the quality of education and performance	40	45	6	2	1	1.71	0.77
		43%	48%	6%	2%	1%		
3	You can communicate with students easily using AR	28	44	15	6	1	2.02	0.9
		30%	47%	16%	6%	1%		
4	You can improve the curriculum using AR	38	38	13	5	0	1.84	0.85
		40%	40%	14%	5%			
5	Class activities are more interactive using AR	36	41	11	6	0	1.87	0.87
		38%	44%	12%	6%			
6	Using AR make the students more creative	40	39	10	5	0	1.79	0.84
		43%	41%	11%	5%			
7	AR increase student attention	48	37	6	3	0	1.62	0.75
		51%	39%	6%	3%			
8	Using AR is more fun with the students	51	36	3	3	1	1.59	0.79
		54%	38%	3%	3%	1%		
9	You can use AR in the subjects you teach	36	46	8	4	0	1.8	0.78
		38%	49%	9%	4%			
10	AR makes it easier to teach certain subjects that cannot be taught in normal classes	37	46	7	4	0	1.77	0.76
		39%	49%	7%	4%			
11	AR decreases the teaching/learning efforts	33	42	11	8	0	1.94	0.9
		35%	45%	12%	9%			
12	AR is a safer and healthier learning environment	42	43	8	1	1	1.69	0.76
		45%	46%	9%	1%	1%		

The mean values, which varied from 1.59 to 2.02, and standard deviations, ranged from 0.75 to.9, demonstrated a high positive response to the items. "*You can communicate with students easily using AR*" had the highest mean (mean = 2.02), followed by "*AR decreases the teaching/learning efforts*" with (mean = 1.94). However, all items had a mean of less than 2, indicating that the teachers did not believe AR could improve the learning environment.

To answer the third research question – *What are the challenges that teachers face?* – Table 5 shows the collection of questions meant to gather information about the barriers that can obstruct the usage of AR in education from the teacher's perspective. The teachers agreed that various impediments could stymie the use of AR in education. Some points of agreement were stronger than others related to learning and using AR. "*You have difficulties learning and teaching using AR*" with mean = 3.02 and "*There are difficulties using AR applications*" with mean = 2.38. Teachers also pay importance to the cost of using AR devices and applications. On the other hand, some challenges had less agreement from teachers, such as the availability of the internet connection.

Table 5 Challenges for using AR in education

#	Question	SA	A	N	D	SD	Mean	SdD
1	I have an Internet connection	41	44	7	1	2	1.73	0.82
		44%	47%	7%	1%	2%		
2	You have difficulties learning and teaching using AR	2	28	35	23	6	3.02	0.95
		2%	30%	37%	24%	6%		
3	There are difficulties using AR applications	3	38	29	21	3	2.81	0.93
		3%	40%	31%	22%	3%		
4	I have a smart device (Mobile, Tablet, iPad, etc.)	55	35	4	1	3	1.84	0.63
		59%	37%	4%	1%	3%		
5	AR is expensive for you	17	39	29	6	4	2.38	0.99
		18%	41%	31%	6%	4%		

4.2. Analyzing Students' Questionnaire

The Cronbach's Alpha Coefficient for internal consistency is 0.74, which is an acceptable reliability level. 70% (35) of the participants are male students, and 30% (15) are female. The majority of students are from public schools (43, 86%). Therefore, the school type had no impact on the students' attitude towards AR. Moreover, (24, 48%) of them study at primary school (ages 6-11 years) in northern Iraq. Please refer to Table 2 in Section 2.2 for the demographic data of the student participants.

Table 6 Students readiness of using AR

Item	Level	Gender	Frequency	Total	Percentage	Mean	SD
Do you want to use this teaching method?	Yes	Male	22	30	61%	1.61	0.84
		Female	8				
	No	Male	6	8	16%		
		Female	2				
	Maybe	Male	6	12	24%		
		Female	6				

The fourth research question – *What perceptions do students hold toward using AR in education?* – deals with the students. This question is answered in the second part of the survey. Twelve questions are included to find the students' attitudes and six questions for the challenges towards AR. Another question is designed to find the readiness of the students to use AR; Table 6 illustrates the students' readiness, and Table 7 presents the students' attitudes.

Table 7 Students attitude of using AR

#	Question	SA	A	N	D	SD	Mean	SdD
1	Understanding the lecture is easier with AR.	16	20	10	2	2	2.1	1.03
		17%	21%	11%	2%	2%		
2	AR provides better ways to perform duties	20	18	5	5	2	2.04	1.14
		21%	19%	5%	5%	2%		
3	You can communicate with your friends at school using AR	19	17	9	4	1	2.04	1.04
		20%	18%	10%	4%	1%		
4	AR is more fun and flexible	24	16	7	2	1	1.82	0.97
		26%	17%	7%	2%	1%		
5	You can learn by yourself using AR applications	9	12	15	13	1	2.73	1.09
		10%	13%	16%	14%	1%		
6	You will be more creative if you are using AR applications	16	21	8	3	2	2.1	1.05
		17%	22%	9%	3%	2%		
7	You are more interested in studying with AR	15	18	9	6	2	2.27	1.13
		16%	19%	10%	6%	2%		
8	You enjoy studying with AR	13	23	9	4	1	2.16	0.96
		14%	24%	10%	4%	1%		
9	AR is better than the traditional class	5	11	17	9	8	3.12	1.18
		5%	12%	18%	10%	9%		
10	AR is a safer and healthier learning environment	16	22	9	2	1	2.02	0.92
		17%	23%	10%	2%	1%		
11	Remembering is easier with AR	12	23	11	3	1	2.18	0.93
		13%	24%	12%	3%	1%		
12	AR is boring	4	4	11	21	10	3.55	1.14
		4%	4%	12%	22%	11%		

Table 6 shows that only (16%) of the students said they did not want to use AR, while the majority (61%) said they wanted to use AR, and (24%) were not sure. The data did not show any difference between the readiness of male students and female students concerning their readiness to use AR. Students show great interest in using AR in the classroom (see Table 7); almost all the items measured scored with mean > 2, they agree that *"AR is better than the traditional class"* and that it is not boring.

Table 8 Students challenges of using AR

#	Question	SA	A	N	D	SD	Mean	SdD
1	I have an Internet connection	21	22	2	5	0	1.84	0.92
		22%	23%	2%	5%			
2	I have problems using smart devices and the Internet	7	2	14	15	12	3.43	1.29
		7%	2%	15%	16%	13%		
3	I need the training to use AR in education	14	15	11	9	1	2.39	1.13
		15%	16%	12%	10%	1%		
4	AR is expensive for you	6	10	21	11	2	2.9	1.01
		6%	11%	22%	12%	2%		
5	I have a smart device (Mobile, Tablet, iPad, etc.)	29	15	4	2	0	1.63	0.95
		31%	16%	4%	2%			
6	There are difficulties using AR applications	4	9	25	7	5	2.96	1
		4%	10%	27%	7%	5%		

However, their main challenge is using smart devices; the question *I have problems using smart devices and the Internet* has the highest mean of 3.43. This result is understandable due to the young age of the participants, as the majority are from primary school (aged 6-11 years). Moreover, data collected and presented in Table 8 show that students highlighted the need for training as they find using AR difficult and cannot learn it by themselves.

Table 9 Students acceptance level for using AR

#	Question	Level	Acceptance %
1	Understanding the lecture is easier with AR.	Primary Secondary High school	42% 25% 67%
2	AR provides better ways to perform duties	Primary Secondary High school	40% 32% 63%
3	You can communicate with your friends at school using AR	Primary Secondary High school	31% 36% 46%

4	AR is more fun and flexible	Primary Secondary High school	40% 39% 40%

Continuation of Table 9

5	You can learn by yourself using AR applications	Primary Secondary High school	13% 29% 29%
6	You will be more creative if you are using AR applications	Primary Secondary High school	35% 32% 44%
7	You are more interested in studying with AR	Primary Secondary High school	31% 32% 36%
8	You enjoy studying with AR	Primary Secondary High school	33% 36% 42%
9	AR is better than the traditional class	Primary Secondary High school	17% 7% 24%
10	AR is a safer and healthier learning environment	Primary Secondary High school	42% 25% 46%
11	Remembering is easier with AR	Primary Secondary High school	38% 25% 42%
12	AR is boring	Primary Secondary High school	4% 14% 9%

Concerning the fifth research question – *Is there a difference in readiness among private, public and international schools?* – there is no clear picture from the obtained results to answer this question; this is due to the lack of international and private schools in the country, in addition to the fact that most of the respondents to this questionnaire are from public schools.

However, students' responses at different types of schools can be examined using the acceptance level (the average of agreement), as shown in Table 10. From this table, it can be seen that the students at Primary and High Schools are more responsive, especially from the side of understanding the AR; the provision of AR is a better way to perform duties; AR is boring because High School students are more exposed to technology through game videoing and social media use. Primary school students were forced to use technology due to the COVID pandemic and the time spent studying online. The other factors are normal and low because of the novelty of using AR. Also, it can be seen from Table 10 that the low acceptance responses of the secondary school due to struggling of the secondary students in adopting and embracing the use of technology due to lack of online resources dedicated to them, less understanding the AR technology, less familiarity with AR, they thought that AR technology is not better than traditional ways, and it is boring.

5. Conclusion and Recommendation

This research aimed to investigate teachers' and students' familiarity with AR, their attitude toward its use in education, and the challenges faced in Iraqi schools. Surprisingly, despite the fact that the instructors were familiar with AR, they did not employ it in the classroom. They do not believe AR can change the outcome of teaching, this is due to the challenges they have in using AR and the lack of proper training. Moreover, AR is expensive even though their schools do not have sufficient funds to provide the equipment. The teachers' attitude was not affected by gender, background, and qualification.

From a student perspective, despite the young age of the participants, they showed great readiness in using AR, and they have good attitudes towards learning using AR. They realize its importance, and they prefer it over traditional classroom learning. However, primary school students lack training and have difficulties using AR applications; another issue is having smart devices and using these devices.

At all, the students' response to the use of augmented reality technology in different levels did not reach a high level due to the absence of the official use of augmented reality technology in schools and the lack of training for teachers on its use, as well as low awareness of the importance of using this technology. However, it can be seen that the responses for primary and High schools are better than secondary schools due to many reasons; some of them are psychological, environmental, technical, educational, and economical.

Finally, there is a need to provide awareness about AR and improve the software to make it easier for teachers and students; pay attention to teachers' training to employ different educational techniques to enhance their knowledge and skills; educate teachers and students about the usage of augmented reality technology and how to apply it in the classroom through training courses and workshops. There is also a need for better infrastructure and improved technologies to make AR more impactful and widely acceptable in education in Iraq.

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