Educating Children, the Preventive Measures of COVID-19 Transmission by Using Augmented Reality

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Summary
This study investigated the effectiveness of applying augmented reality in enhancing children's awareness of the preventive measures of COVID-19 pandemic. To this end, (30) male and female children at Al-Hussein school in Ma'an city in Jordan participated in this study. Augmented reality application so-called protect children that employs sound, video, and photos to educate children was designed. The study raised two research questions; the first one examined the shortcomings of using traditional teaching methods at Al-Hussein school in Ma'an city in Jordan in raising the children's awareness of the preventive measures during COVID-19 pandemic. On the other hand, the second research question addressed the effectiveness of using Protect Children AR Application in educating children about the preventive measures during COVID-19 pandemic. The study used observation in a form of a note taking. The assessment criteria for analyzing data is classified into three parts, namely, memorization, performance, and effectiveness. The findings indicated that protect children AR application is more effective than traditional teaching methods. The students were able to memorize and perform the preventive measures of COVID-19 in terms of wearing masks, washing hand, and social distancing after the use of AR application. Moreover, the students were more motivated towards imitating the video in AR application more than imitating their teachers in the school. Prospects for future studies we see in designing another AR application that aim at raising the awareness of secondary school students regarding the riskiness of not being vaccinated in order to reliably generate robust conclusions about the findings.

Keywords:
preventive measures, COVID-19, traditional teaching method, protect children AR app.

1. Introduction

It is commonly known that COVID-19 is "an infectious disease caused by the novel coronavirus that was first reported in Wuhan, China, in December 2019". Saji et al. (2021, p.137) The World Health Organization depicted Covid-19 as an alarming level of inaction, spread, and severity [1].

COVID-19 started in China in December 2019 when citizens were sharing curfew videos in Wuhan. Sometimes they describe it as "Ghost City" or "blighted city" at the beginning of 2020." The majority of Jordanian people have never thought about the rapid spread of the virus in Jordan. The mass media has published from January until February 2020 the spread of the pandemic to Europe and the occurrence of the near collapse in the health system in Italy. The Jordanian government started by warning people in the beginning of February to pay attention if they have symptoms of COVID-19 that should not be ignored.

It is widely acknowledged that social distance, wearing masks, hand washing, and hygiene are considered as preventive measures against COVID-19 pandemic. The majority of group of people are aware of them, whereas children should be educated constantly of such measures. Educating children falls upon the school. According to The Centers for Disease Control and Prevention (2021), there are some preventive measures that should be complied with for children safeguarding against COVID-19 pandemic that are summarized into wearing masks, keeping social distance, avoiding crowded places, washing hands frequently, cleaning high-touch surfaces regularly, excluding employees or students with COVID-19 from asymptomatic people.

According to the World Health Organization, the method to reduce the spread of the virus, decrease and control the number of COVID-19 cases and fatalities might only be achieved with mass adoption of key measures; including, cough etiquette, alcohol gel use, hand hygiene, avoiding agglomerations and social distancing, and cleaning surfaces. Such preventive measures are adopted and employed by adults because they are completely aware of the risks that are associated with COVID-19 pandemic. However, children need to be constantly reminded of the preventive measures of the pandemic because they are the most vulnerable group of people. To prevent the spread of COVID-19, a variety of countries all over the world require their people to apply physical distance and social distance [2].

It is worth mentioning that the major spreaders of severe acute respiratory syndrome coronavirus 2 are children and that by maintaining them at home, a considerable number of new COVID-19 cases could have been reduced [3]. Therefore, teaching children the preventive measures of COVID-19 is highly important.

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However, traditional teaching methods that aim at increasing students' awareness on COVID-19 pandemic rely on giving students information in which the students are required to memorize and to apply such content. However, raising students' awareness on COVID-19 pandemic would be more effective if it is integrated with augmented reality. In this respect, In [4] suggest that conventional teaching-learning is considered ineffective after the emergence of COVID-19 pandemic, they claim augmented reality is regarded as one of the technologies that has received great interest and attention. Teachers play a pivotal role in the teaching process. According to [5] teachers should support and assist their students in the learning process, therefore, teachers should implement novel methods to improve students' achievement by using a variety of teaching techniques that achieve the desired learning objectives.

Turning on into defining augmented reality (AR),in [6] maintain that augmented reality is a technology that combines three-dimensional virtual items (3D) into a three-dimensional real-world environment that are used as a teaching material assistance to help learners absorb the information. AR has unfailingly garnered attention a variety of researchers because it presents unique learning experiences that cannot be obtained by employing other approaches [7].

In respect of the importance of AR in educational context, Saadon et al. [8] claim that augmented reality increases students' confidence and motivation. It is in keeping with [9] study of teachers' perspectives concerning the impact of AR on education, the study found that teachers opine that AR is an effective technology that will change students' learning path by making them more experiential and autonomous. AR applications are considered as an innovative technology in electronic learning that improves students' learning faster in virtual classrooms [10].

This study aims at articulating the effectiveness of using AR on raising children's awareness of the preventive measures during COVD-19 that are completely different from traditional teaching methods that are employed in schools and educational settings.

1.1 Statement of the Problem

COVID-19 needs special care because is transmitted rapidly among people. As indicated above, wearing masks, social distancing, washing hands, and cleaning surfaces are highly important. In [11] puts it forward, wearing masks should not be neglected by both teachers and students. Children are oblivious about the preventive measures against COVID-19. According to Wei et al. children are unable to wear masks and do not comply with the preventive measures against COVID-19; thus, the number of child infection cases registered a significant increase, particularly in younger age groups, which should not be neglected. Therefore, children need to be educated and reminded constantly about the preventive measures to maintain their health. In the pandemic period, schools educate the students in general and children in particular about the preventive measures against COVID-19. However, schools do not establish procedures for students or employees regarding hand hygiene and respiratory hygiene. In [12] given the enormous scope of the problem, scant attention has been paid to the consequences of educating children regarding the importance of wearing masks, cleaning hands, and leaving social distance by using (AR) that differs from traditional teaching method. To support this claim, in [13] conclude that telehealth technologies enable the students with autism to wear a mask for a period of ten minutes without reporting any challenging behavior. Thus, it can be deduced that technological means are beneficial for educating children about the preventive measures against COVID-19 pandemic. To reliably generate robust conclusions about the findings, this study seeks to investigate the importance of AR application in educating and raising children's awareness about the importance of wearing masks, washing hands, and leaving social distance.

1.2 Significance of the Study

The significance of this study stems from the fact that it is one of the few studies that addresses the importance of augmented reality (AR) in educating the children about the preventive measures against COVID-19 in terms of wearing masks, cleaning hands, and keeping social distance. The lack of the studies that have been conducted in this field in [13] has prompted the researcher to bridge this gap in literature. This study is different from the previously mentioned studies. It addresses the importance of AR in educating children about the preventive measures during the pandemic. By doing so, the study seeks to bridge this gap in literature.

1.3 Objectives of the Study

This study seeks to achieve the following objectives:

-To articulate the shortcomings of using traditional teaching methods at Al-Hussein school in Ma'an city in Jordan in raising the children's awareness of the preventive measures during COVID-19 pandemic.

-To manifest the effectiveness of using protect children AR Application in educating children about the preventive measures during COVID-19 pandemic.

1.4 Questions of the Study

This research raises the following research questions:

1-What are the shortcomings of the traditional teaching methods used at Al-Hussein school in Ma'an city in Jordan in raising the children's awareness of the preventive measures during COVID-19 pandemic?

2- What are the advantages of using Protect Children AR Application designed by the researcher in raising the children's awareness of the preventive measures during COVID-19 pandemic?

By addressing these questions in this study, we hope to contribute to a fuller understanding of the use of AR in educating children about the preventive measures against COVID-19 pandemic?

2. Literature review

2.1 The Preventive Measures against COVID-19

Fiorino et al. [14] investigated the challenges faced by General Practitioners in Lombardy, Italy concerning the management and prevention of COVID-19. The study underscored the need of educating general practitioners regarding the preventive measures of COVOD-19.

[15] explored the response of Kurds towards the prevention principle against COVID-19 infection. To this end, the investigators from various geographic areas of Duhok Governorate of Iraqi Kurdistan were invited to examine their compliance with the preventive measures of COVID-19. The study concluded that the majority of the participants take into account public health measures to control and prevent the spread of the pandemic. On the other hand, the study concluded that there are a group of Kurds who do not comply with the preventive measures of COVID-19. For instance, they do not use tissues or face masks when they sneeze or cough. Besides, they do not visit medical centers when they experience COVID-19 symptoms.

In their analysis of the preventive measures of COVID-19 in school, in [16], conclude that schools face challenges in terms of distancing younger children and they need financial and policy support for effective execution of preventive measures.

2.2 Augmented Reality in COVID-19

Saleem et al. [10] used a conceptual model that relies on planned behavior theory in order to investigate the attitudes of students as well as their intention to use AR apps in Pakistan during COVID-19 pandemic. An online survey was used to elicit the findings from the participants. The study found that students have positive attitudes towards using AR applications. Perhaps this study relies too heavily on quantitative analysis; thus, the use of mixed methods such as conducting interviews with the participants might achieve the desired objectives of this study.

Similarly, [17] used a quasi-experimental study to examine the impact of AR based multimedia on improving students' scientific literacy during COVID-19 pandemic. To achieve the objective of the study, an online test was distributed to 111 students. The findings of the descriptive quantitative study indicated that AR improved students' scientific literacy. However, the only limitation of this study is manifested in using one method. To the best of my knowledge, using mixed methods such as test, questionnaire, and observation as Sywaludin et al. (2019) [18] indicate in their useful study that was conducted on the development of AR interactive based multimedia to enhance critical thinking skills in science learning. In [19] investigated the effectiveness of augmented reality in distance learning during COVID-19 pandemic and concluded that AR enhances the quality if learning, particularly when AR contains vision-based.

After reviewing the findings of the previous studies, it is clear that none of the previous studies investigated the implementation of augmented reality in education for teaching children the preventive measures of COVID-19. Given the enormous scope of the problem, scant research has been paid to the consequences of children's non-compliance with the preventive measures. Therefore, this study endeavors to fill this gap in literature.

3. Methodology

3.1 Research Method

The experimental research is considered the most valid and reliable scientific research due to the fact that it is done by a thorough controlling of the confounding variables outside the experiment [20]. It is a study that strictly comply with a scientific research design in which the researcher collects the data and the findings to either support or reject the findings [21]. The experimental method is a research employed to determine the impact of particular treatments on their impacts under controlled conditions [22]. In the present study, the researcher developed an augmented reality app so-called 'Protect Children' that aims at raising children awareness of the preventive measures of COVID-19 pandemic; it differs from traditional teaching methods.

3.2 Protect Children AR Application

It is an AR application that is designed to educate children concerning the preventive measures of COVID-19. After the children press the START button, the screen consists of 5 parts will appear. Each of which gives the children an in-depth information regarding the topic under discussion. The application contains videos, images, and sounds to guarantee that the children are able to absorb and elicit the information. Moreover, there is a camera in the screen to give each the children the room to imitate the videos and/or photos that are presented. If the students are able to imitate the photo successfully, a correct sign will appear. On the other hand, if the students are unable to imitate the photo successfully, an incorrect sign will appear.

The first part is so-called 'How to wear a mask?' which summarizes the essential information for the children in terms of cleaning their hands before putting their masks on, before and after taking it off, and after touching it at any time. The first part consists of the following steps. First, put your mask on after washing your hand. Second, make sure that your mask covers your chin, nose, and mouth (World Health Organization, 2021).

The second part is called 'How to wash your hand?', which boils down the steps of handwashing for children into the following steps. First, wash your hands with a soap and a running water. Second, make lather soap by rubbing your hand together and make sure that the water comes into the back of your hands, under your nails and between your fingers. Third, scrub your hands for twenty seconds as a minimum. Fourth, rinse your hand properly under clean and running water. Fifth, use an air dry or clean towel to dry your hands. (Centers of Disease Control and Prevention).

The third part is called 'How to keep social distancing?', which summarizes the steps of social distancing for children into the following points. First, keep social distance at least one meter from others. Second, avoid overcrowded places and close contact with others. Third, wear a fitted mask in poorly ventilated settings or when physical distancing is not possible (World Health Organization, 2021).

3.3 Data Collection

It is a technique to gather data from the participants. Generally speaking, the data are collected by using different methods, namely, observations, interviews, documentation, tests, and so forth [22]. In this paper, an observation method is used. It is a type of qualitative approach in which the researcher observes the participants' behavior in terms of memorization, performance, and motivation.

3.4 Research Design

Research design is considered as a plan for a study that presents the overall framework for collecting data Leedy [23]. In the present study the data will be analyzed qualitatively by using direct observation method and notes taking.

3.5 Participants of the Study

The sample consisted of (30) male and female children aged between 8 to 13 years, after taking approval from their parents. The children were chosen from Al-Hussein school in Ma'an city in Jordan. The participants were recruited by employing purposive sampling and divided into two groups (the experimental group consisted of 15 participants, while the control group consisted of 15 participants). The control group was taught the preventive measures of COVID-19 by using traditional teaching method that are used in school. On the other hand, the experimental group children were invited to watch augmented reality video about the preventive measures of COVID-19, including washing hands, wearing masks, and keeping social distance.

3.6 Data Analysis

To analyze the findings of this qualitative study, the researcher used a direct observation method. The researcher used notes taking to jot down notes about the students' performance of preventive measures of COVID-19 according to assessment criteria, namely, memorization, performance, and motivation categories. Such categories were presented in a data sheet in order to interpret the findings. The same procedure was applied to the experimental group. After that, the researcher compared the elicited findings of the control group with those in the experimental group in order to examine the effectiveness of augmented reality in educating children of the preventive measures of COVID-19.

3.7 Variables of the Study

-Independent variable: the performance and knowledge of the children regarding the preventive measures of COVID-19 by using traditional teaching method.
-Dependent variable: the performance and knowledge of the children regarding the preventive measures of COVID-19 by using augmented reality.

3.8 Limitation and Implication of the Study

This study is limited to children in Ma'an city in Al-Hussein school in Jordan. It is further confined to the methods of educating the children the preventive measures of COVID-19 pandemic, such as wearing masks, cleaning

hands, and keeping a social distance. Therefore, prospects for future studies we see in designing another AR application that aim at raising the awareness of secondary school students regarding the riskiness of not being vaccinated in order to reliably generate robust conclusions about the findings.

3.9 Findings

The findings of the research are presented in the form of tables. In the discussion section, there is an explanation and clarification of the findings of the data.

This section provides the data that has been obtained by the researcher to answer the questions of the research.

RQ1: What are the shortcoming of applying the traditional teaching methods in raising the children's awareness of the preventive measures during COVID-19 pandemic?

To answer this question, the observational method was used in a form of note taking. To clarify, the researcher writes notes on the assessment criteria, namely, students' memorization, performance, and motivation towards using the adopted preventive measures of COVID-19 in school. The findings of the control group students exposed to traditional teaching method are illustrated in Table 1 below.

Table 1 Educating the children of the preventive measures of COVID-19 at Al-Hussein School in Ma'an city in jordan according to the Ordinal scale of measurement

Assessment Criteria	***Ordinal Scale of measurement***				
	Poor	***Bad***	***Good***	***Very Good***	***Excellent***
Memorization	40%	45%	10%	5%	0%
Performance	50%	20%	20%	10%	0%
Motivation	70%	20%	10%	0%	0%

A closer inspection of Table 1 above shows that (45%) of the children in school are unable to memorize the preventive measures of COVID-19. Only (5%) of them have a very good ability to memorize such preventive measures in school in which the traditional teaching method is adopted. As for the students' performance and their ability to stimulate the preventive measures of COVID-19 in terms of wearing masks, washing hands, and leaving social distance (50%) exhibit poor performance. On the other hand, only (10%) of them report very good performance. In respect of the students' motivation towards learning the preventive measures of COVID-19, (70%) of them present poor motivation. However, only (10%) of the participants manifest their motivation towards the use of traditional teaching methods in school for learning the preventive measures of COVID-19. Surprisingly, none of the participants demonstrate an excellent memorization, performance, or motivation.

RQ2: What are the effectiveness of applying Protect Children AR Application in raising the children's awareness of the preventive measures during COVID-19 pandemic?

The findings of the experimental group students exposed to augmented reality method are illustrated in Table 2 below.

Table 2 Educating the children of the preventive measures of COVID-19 by using protect children AR application according to the ordinal scale of measurement

Assessment Criteria	***Ordinal Scale of measurement***				
	Poor	***Bad***	***Good***	***Very Good***	***Excellent***
Memorization	0%	0%	5%	10%	85%
Performance	0%	0%	15%	5%	80%
Motivation	0%	0%	5%	0%	95%

As shown in Table 2 above, the rate of children's memorization of the preventive measures of COVID-19 is excellent with a percentage of (85%). Only (5%) of them have a good rate regarding their ability to memorize such preventive measures by using augmented reality application. As for the rate of the children's performance of the preventive measures of COVID-19 in terms of wearing masks, washing hands, and leaving social distance after their exposure to augmented reality (80%) exhibit an excellent performance. However, only (5%) of them report very good performance. With regard to the children's motivation towards learning the preventive measures of COVID-19 by using augmented reality application, (95%) of them present an excellent motivation. On the other hand, only (5%) of the informants demonstrate their motivation towards the use of augmented reality application for learning the preventive measures of COVID-19. Surprisingly, none of them manifests either poor or bad memorization, performance, or motivation.

4. Discussion and Conclusion

This study is set out to investigate the effectiveness of using augmented reality Protect Children application in educating children about the preventive measures of COVID-19 in terms of wearing masks, washing hands, and social distancing. The reason behind using AR in education is reinforced by Marín-Díaz et al. (2022) [9] that AR is an effective technology that will change students' learning path by making them more experiential and autonomous. Moreover, the study compared the traditional teaching method that is applied in Al-Hussein school in Ma'an city

in Jordan. The assessment criteria that was used in this study was classified into three aspects, namely, memorization, performance, and motivation.

The first question in this study sought to determine the traditional teaching method that is applied in Al-Hussein school in Ma'an city in Jordan, the findings of this question indicated that the memorization, performance, and engagement of the students ranged between poor and bad, which indicates that traditional teaching methods are ineffective in educating children of the preventive measures of COVID-19 pandemic. A possible explanation of this finding might be attributed to the fact that the traditional teaching methods that are applied at Al-Hussein school lacks students' interactivity due to the lack of students' engagement in the classroom. According to [5] teachers should support and assist their students in the learning process, therefore, teachers should implement novel methods to improve students' achievement by using a variety of teaching techniques that achieve the desired learning objectives. The findings of the present study are in line with [4] that conventional teaching-learning is considered ineffective after the emergence of COVID-19 pandemic, they claim augmented reality is regarded as one of the technologies that has received great interest and attention.

The second question in the study was the effectiveness of augmented reality in educating children of the preventive measures of COVID-19. The findings of the current study revealed that the memorization, performance, and engagement of the students ranged between, which underscore the importance of AR in education. A possible explanation of this finding could be due to the fact that augmented reality increases students' motivation and enable them to memorize information. As stated in [8], that augmented reality increases students' confidence and motivation. Moreover, AR enhances the quality of learning. As a result of the huge benefits of augmented reality in increasing students' motivation, memorization, and performance, the current study recommends using it in education, particularly for educating children the preventive measures of COVID-19 pandemic.

References

[1] S. Boseley, "WHO warns of global shortage of face masks and protective suits," The Guardian, vol. 7, 2020.

[2] A. Pragholapati, "COVID-19 impact on students," 2020.

[3] S. Esposito, N. Cotugno, and N. Principi, "Comprehensive and safe school strategy during COVID-19 pandemic," Italian journal of pediatrics, vol. 47, no. 1, pp. 1-4, 2021.

[4] R. Tolba, T. Elarif, and Z. Taha, "AUGMENTED REALITY IN TECHNOLOGY-ENHANCED LEARNING: SYSTEMATIC REVIEW 2011-2021," International Journal of Intelligent Computing and Information Sciences, pp. 1-16, 2022.

[5] Y. A. A. S. Al-Wreikat, B. Abdullah, and M. K. Kabilan, "Effectiveness of Teaching Approaches of In-Service Training Courses for EFL Teachers in Jordanian Schools," English Language Teaching, vol. 4, no. 1, pp. 190-196, 2011.

[6] M. I. S. Guntur, W. Setyaningrum, H. Retnawati, and M. Marsigit, "Assessing the potential of augmented reality in education," in Proceedings of the 2020 11th International Conference on E-Education, E-Business, E-Management, and E-Learning, 2020, pp. 93-97.

[7] C. Avila-Garzon and J. Bacca-Acosta, "Augmented Reality in Education: An Overview of Twenty-Five Years of Research," Contemporary Educational Technology, vol. 13, no. 3, 2021.

[8] N. F. S. M. Saadon, I. Ahmad, A. N. C. Pee, and C. Hanapi, "The implementation of augmented reality in increasing student motivation: systematic literature review," in IOP Conference Series: Materials Science and Engineering, 2020, vol. 854, no. 1: IOP Publishing, p. 012043.

[9] V. Marín-Díaz, B. Sampedro, and J. Figueroa, "Augmented Reality in the Secondary Education classroom: Teachers' Visions," Contemporary Educational Technology, vol. 14, no. 2, p. ep348, 2022.

[10] M. Saleem, S. Kamarudin, H. M. Shoaib, and A. Nasar, "Influence of augmented reality app on intention towards e-learning amidst COVID-19 pandemic," Interactive Learning Environments, pp. 1-15, 2021.

[11] M. Spitzer, "Masked education? The benefits and burdens of wearing face masks in schools during the current Corona pandemic," Trends in neuroscience and education, vol. 20, p. 100138, 2020.

[12] T. B. Johansen et al., "Infection prevention guidelines and considerations for paediatric risk groups when reopening primary schools during COVID-19 pandemic, Norway, April 2020," Eurosurveillance, vol. 25, no. 22, p. 2000921, 2020.

[13] M. Sivaraman, J. Virues-Ortega, and H. Roeyers, "Telehealth mask wearing training for children with autism during the COVID-19 pandemic," Journal of Applied Behavior Analysis, vol. 54, no. 1, pp. 70-86, 2021.

[14] G. Fiorino, M. Colombo, C. Natale, E. Azzolini, M. Lagioia, and S. Danese, "Clinician education and adoption of preventive measures for COVID-19: a survey of a convenience sample of general practitioners in Lombardy, Italy," Annals of internal medicine, vol. 173, no. 5, pp. 405-407, 2020.

[15] D. M. Abdulah, S. S. A. Qazli, and S. K. Suleman, "Response of the public to preventive measures of COVID-19 in Iraqi Kurdistan," Disaster medicine and public health preparedness, vol. 15, no. 5, pp. e17-e25, 2021.

[16] N. Sundaram et al., "Implementation of preventive measures to prevent COVID-19: a national study of English primary schools in summer 2020," Health Education Research, vol. 36, no. 3, pp. 272-285, 2021.

[17] M. Ahied, L. Muharrami, A. Fikriyah, and I. Rosidi, "Improving Studentsâ€™ Scientific Literacy through Distance Learning with Augmented Reality-Based Multimedia Amid the Covid-19 Pandemic," Jurnal Pendidikan IPA Indonesia, vol. 9, no. 4, pp. 499-511, 2020.

[18] A. Syawaludin, "Development of Augmented Reality-Based Interactive Multimedia to Improve Critical Thinking Skills in Science Learning," International Journal of Instruction, vol. 12, no. 4, pp. 331-344, 2019.

[19] A. A. Eldokhny and A. M. Drwish, "Effectiveness of Augmented Reality in Online Distance Learning at the Time of the COVID-19 Pandemic," International Journal of Emerging Technologies in Learning, vol. 16, no. 9, 2021.
[20] W. R. Borg and M. D. Gall, "Educational research: An introduction," British Journal of Educational Studies, vol. 32, no. 3, 1984.
[21] E. Babbie, "The practice of social research (ed.)," Belmont, CA: Wadsworth, 1998.
[22] R. Ardhani, S. Setiyanto, and I. Permatahati, "Augmented Reality 3D Heart as Learning Media at Midwifery Lab University of Aisyiyah Surakarta," International Journal of Computer and Information System (IJCIS), vol. 3, no. 1, pp. 1-5, 2022.
[23] F. Leedy, "Advanced Research Methodology," ed: London: Routledge & Kegan Paul, 1997.

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