Learning Material by Augmented Reality Technology About Korfball for Health

Suppawan Vongsrangsap, Kasetsart University, Thailand

The Asian Conference on Education & International Development 2023
Official Conference Proceedings

Abstract
This research aimed to 1) develop the learning material by augmented reality technology about korfball for health according to the performance criteria of 80/80 and 2) study the students' satisfaction after learning with the developed learning material. The samples in this research were the 50-1st year student in Physical Education and Health Education Faculty of Education and Development Sciences Kasetsart University Kamphaeng Saen Campus, by voluntarily. The research instruments included the learning material by augmented reality technology about korfball, the performance evaluation of electronic media by using augmented reality and a questionnaire on student's satisfaction. The statistics used in this research was the E1/E2, mean and standard deviation. The result of this research found that the efficiency of the developed instruction media was at 80.52/84.06, which was higher than the specified criteria of 80/80 and the students' satisfaction was at a highest level ($\overline{x}$ = 4.87, S.D. = 0.34).

Keywords: Learning Material, Augmented Reality Technology, Korfball, Health

Introduction

AR technology is an extension of Virtual Reality (VR) technology, which allows users to see the virtual generated model objects in the background of the real environment. It has been applied to military, medical, education, entertainment and other aspects. This interaction technology is based on the real world and is enhanced by virtual data which provides people a better way to display the learning content, and also builds a space for learners to explore independently with a more appropriate way. AR technology is very instructive for the presentation of abstract content. Because of its characteristics, AR technology has great potential and opportunity for development in education field. The characteristics of AR technical simulation and interaction can display the abstract and obscure knowledge in a more vivid, intuitive and comprehensive way, and can enhance students' sense of immersion.

Augmented reality (AR) has been slowly but surely following its predecessor virtual reality in changing the education sector digitizing classroom learning, and making training more diverse and interactive. In this section, current studies in the literature in recent years on the integration of augmented reality applications into education are given. When these studies are examined;

Çetin (2022) investigated the effect of augmented reality-based stories on reading skills in his research. In the research, augmented reality-based story text samples were presented to primary school 3rd grade students (Figure 1).

Figure 1. Augmented reality-based story text samples.

A scoring key was developed for the answers given to the questions prepared by the researcher to measure the skills of expressing what they read in writing. As a result of the research, it was observed that the augmented reality-based stories did not have a significant effect on the reading motivation and reading comprehension skill levels of the students, but they created a positive significant difference on their ability to tell what they read in written and verbal form. In addition, as a result of the research, it was observed that the reactions of the students towards the texts increased.

As a similar study Baysan and Uluyol (2016) the effect of the use of augmented reality books (AR-books) on the academic success of the students and the students'opinions about the environment were investigated in his study. The AR-based teaching material developed by the HITLibHZ-BuildAR program was used in the laboratory environment for the experimental group of 22 people and the course was taught by the researcher. As a result; according to the qualitative data obtained from the students, AR is a promising technology. Educational AR applications should be used in areas that require 3D spatial visualization such as Geometry and Geography rather than technology education. Participants support the

use of AR in Computer Hardware training, with better developed platforms and more professional designs (Figure 2).

Figure 2. Augmented reality application book sample.

Almusawi et al. (2021) in their study, they discussed innovation in physical education: teacher's perspectives on readiness for wearable technology integration. The study is a case study and includes semi-structured interviews with 38 public school physical education teachers. The following scheme was used in the study (Figure 3).

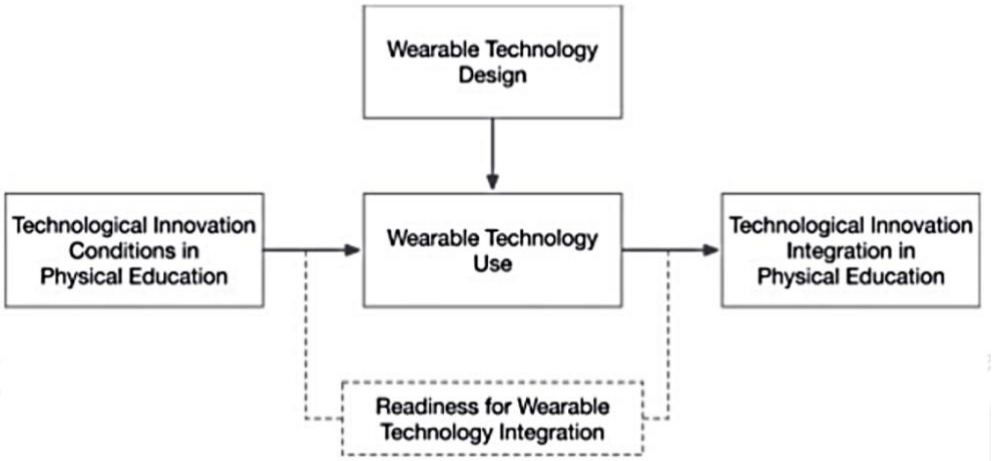

Figure 3. Augmented reality application book sample.

The findings show that physical education teachers have concerns about the design aspects of wearable technologies in terms of material design and device suitability for physical education. To eliminate these concerns, it is proposed to provide innovative learning environments that impact technology through collaborative, competitive, engaging and evidence-based learning experiences through wearable technologies that provide comfort, enhanced wear ability and injury prevention in physical education.

It is understood from the existence of studies in the literature that augmented reality technologies have been used frequently in medical education recently. When the relevant studies in the literature are examined (Figure 4).

Kucuk et al. (2015) a new perspective in medical education multimedia applications: augmented reality has been studied in their research. As a result, it is difficult to understand the subjects including the structure of the brain and vessels such as neuroanatomy in medical courses, in this direction, it was emphasized that AR applications could be developed to

facilitate the learning processes of students in such subjects. Considering the characteristics of today's students in the digital citizen group, it has been suggested in the study that students should be supported with various technological solutions in this process, at this point, the dissemination of medical augmented reality applications that are based on the learning approach anytime and anywhere and support individual learning.

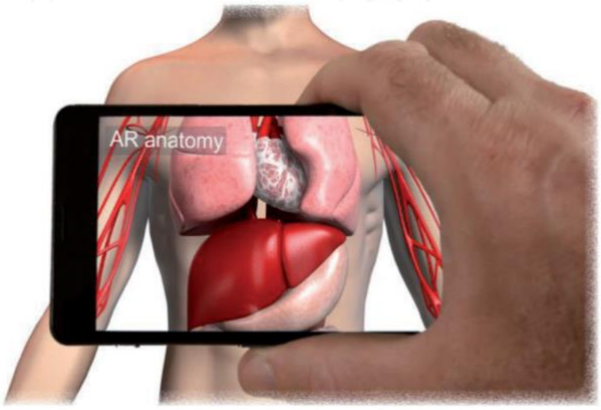

Figure 4. Use of augmented reality technologies in medical education.

The mobile AR system can strengthen the ubiquitous cooperative and scene learning with the help of virtual objects in the real environment. Everything in real life can become a prop for AR learning, achieving convenience, interactivity, situation, connectivity and personalization. With the coming of the shallow reading age, more and more learners become less dependent on books and more inclined to the shallow reading of electronics. AR technology can take content out of the screen and books with more entertainment and interactivity. AR digital publishing will become an explosive opportunity for the culture education industry.

Korfball is a new sport that has arrived in Thailand for less than 5 years. It is regarded as an equal sport that can be played by both males and females. and modern, interesting in students to learn and apply the skills of Korfball to play for fun, field and good health. Due to the COVID-19 epidemic situation, the application of media and technology to use in learning is therefore very important and necessary. In addition, augmented reality technology (AR) can be counted as creating a virtual learning experience. And it is interesting to access learning. Researcher as a Korfball academic and coach Therefore, he was interested in developing learning materials with augmented reality technology about healthy Korfball for the benefit of education and health development for students and other interested parties.

Methods

1. Study and collect information; from the study and analysis the information has been designed as a Augmented Reality aid. (AR) defines the format Lessons to be a role model.
2. Construction of research tools; by ADDIE MODEL. (Analysis Design Development Implementation Evaluation)

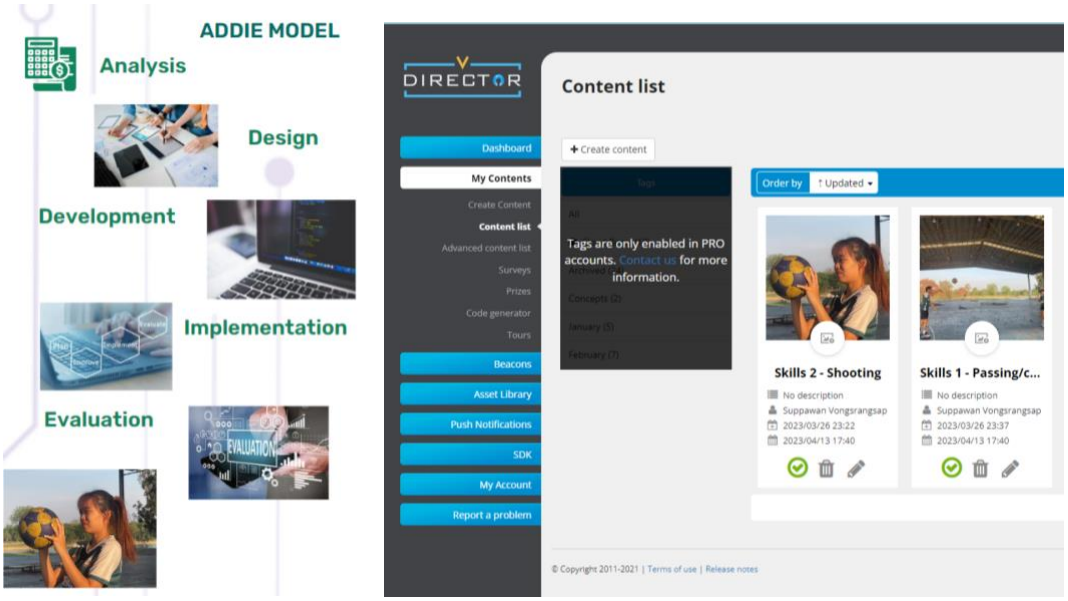

Figure 5: Research Process.

Conclusions

1) Quality augmented reality technology media in terms of content and production techniques, the overall media production was at a very good level (Mean=4.65, S.D.=0.29) by content quality in a very good level (Mean=4.85, S.D.=0.17)and the quality of media production techniques is at a good level (Mean=4.94, S.D.=0.29). The efficiency of the developed instruction media was at 80.52/84.06, which was higher than the specified criteria of 80/80.

One of the most important sectors in which augmented reality technologies are used is the education area. Augmented reality applications help students understand abstract concepts in the learning and teaching process; it provides environments where students can share information within the group. In addition, it has been supported by studies in the literature that these environments significantly increase students' learning. In addition, it was emphasized that augmented reality increases the interests, motivations and experiences of students in the field of education and plays a role in transferring the knowledge and skills gained in the virtual environment to real environments. In all this context; increasing the use of learning environments of augmented reality environments and applications, where the effectiveness of its use in education has been determined to this degree, in different levels and course contents is the most important suggestions of this research **(**Ezgi Pelin Yildiz, 2021**)**.

2) The students' satisfaction was at a highest level. ($\bar{x}$ = 4.87, S.D. = 0.34) In this research, a detailed analysis of the augmented reality environments and applications that are frequently used in the design of learning and teaching environments in the education sector with the digitalization process is included. As the general results of the research; today, with the introduction of technologies into educational environments, different tools and materials have begun to be used in teaching methods. In this context, it is seen that the inclusion of mobile tools and mobile applications in learning environments has become widespread recently. With this rapid development in mobile technologies, new media environments, in which interactivity increases, offer an increasing number of services to the user. One of the environments where this interaction is provided and which can integrate objects in virtual environments with real objects is technologies that offer "Augmented Reality (AR)". These

technologies allow virtual objects to be superimposed on real images. AR tools consist of camera, computer infrastructure, a marker and tangible objects.

AR applications play a crucial role in gaining desired behaviors in learning and teaching processsince students are in an interactive and collaborative environment, they learn through doing andexperiencing, it helps students to develop positive attitudes towards lectures and it enables studentsto reveal different perspectives about topics. When the future of augmented reality is considered, itwas predicted that AG technology will be one of the technologies which affect education in the nearfuture and it was also expected that AR technology will play an important role in education conductedwith wearable technology since 2013 and mobile devices since 2010 in the Horizon report.

The use of AR in sports initially focused on bringing, it applies to athletes and training. Especially with professional athletes and excelling by creating realistic images in training. Athletes will be able to train in simulated environments that are suitable and controlled. This is because the actual physical environment can be complex and difficult to control. And may have to travel long distances. It also reduces the risk of injury. and helps reduce damage or deterioration of sports equipment.

Expensive in training as well, for example, in motor sports, AR technology is used in training using a virtual simulator that provides an experience close to the real track environment, coupled with equipment that can accelerate and set the car on the track. Yes (Noury, Polman, Maloney, & Gorman, 2022).

Although AR technology is currently not a mainstream technology and is widely used, it tends to be applied to work in each industry more and more. play a greater role Although at present it is still a new alternative technology in the sports industry. But in the future, this technology will be important. It is important and plays an important role in helping to drive the sports industry in terms of sports science and sports business industry. The application of this technology to athletes, clubs and various sports organizations will have the opportunity to occur directly or indirectly (Sawan et al., 2020).

Acknowledgements

I would like to thank the experts for considering this research tool. For assistance and guidance in developing valuable research tools throughout this research. I am most grateful for her teaching and advice. not only research methodology but also many other methodologies, and this research would not have been complete without your constant support.

In addition, we would like to thank teachers, administrators, personnel and research assistant students from the Department of Physical Education and Sports Faculty of Education and Development Sciences Kasetsart University, Kamphaeng Saen Campus Nakhon Pathom, Thailand and others who provide all advice and assistance. Including all students who registered for physical education activities. for cooperating in being a sample group in this research until it was accomplished.

Finally, I would like to express my deepest gratitude to my parents and friends for their support throughout the course of this research.

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