

# USING AUGMENTED REALITY IN TRAINING

Dr. Khaled Kh. Allanqawi

High Institute of Energy  
Public Authority of Applied Education and Training, Kuwait

*kk.allanqawi@paaet.edu.kw*

---

**Abstract:** The aim of this research was to find out the extent of awareness of the importance of augmented reality in training; The researcher used the descriptive survey method, and the study sample consisted of 50 participants in Kuwait, The results showed that the percentage of use of augmented reality in training is weak, however, the results of the study also showed that the trainees support the use of augmented reality in training because of the advantages they expect to receive when using augmented reality, including increasing the quality of training and helping to understand the training materials in ways easier than traditional methods, It also reduces the cost of training for some things that were in fact expensive. The research study recommended raising awareness of the importance of augmented reality characteristics in training.

**Keywords:** Augmented Reality; Training.

---

## 1. INTRODUCTION

The world is now experiencing knowledge, scientific and technological revolution in various fields. It has not been confined to one domain but another, but includes all sectors, especially the education and training sector, which is the main pillar on which the culture and development of peoples are built (Norris & Lefrere, 2011).

The use of technology in training has changed the role of the trainee, it is no longer suitable to be a recipient only as it has become the responsibility of learning and has necessitated being active during the learning situation, and dealing with him with the training materials and interacting with them (Choi et al., 2016).

Due to the successive developments in the methods of designing interactive online training environments, augmented reality is one of the most advanced methods of training (Yuen et al., 2011).

What distinguishes Augmented Reality is that it provides virtual views in the real environment in more than one way to display information and skilled performance to show digital training content in video clips, three-dimensional shapes, animation and static, making the trainee interact with the training content and the possibility to remember the details of the correct performance and stored easily and efficiently in memory (Anderson & Liarokapis, 2014).

Augmented Reality technology can be used in training to assist trainees so that they can deal with information and visual perception easier than using traditional methods, It also improves trainees' perception and deeper understanding of information(wang,2014).

## 2. TRAINING

Training is one of the most important factors that organizations care about before and during service to raise the efficiency of individuals to a level that enables them to accomplish the tasks required by the nature of their work with high quality, as the training is part of the concept of professional development, and professional development is a process of providing important expertise and skills to practice individuals (Anderson & Liarokapis, 2014).

The effectiveness and continuity of training is due to the awareness of the basic principles and principles upon which it is based in all stages of planning, implementation, follow-up, evaluation and development.

#### **Principles of the training process (Ivanova & Ivanov, 2011)**

- Planning
- Integration
- Realistic and graduation
- Renewed
- Continuity
- Comprehensive
- Progression

#### **Training methods**

- Traditional methods
- Sophisticated methods

#### **E-training**

E-training is the process in which to create an interactive environment rich in applications based on computer technology, networks and multimedia, which enables the trainee to achieve the objectives of the training process through interaction with its sources, in the least possible time and with the least effort and the highest quality without restricting the limits of space and time (Shea, 2014).

#### **Advantages of e-training (Baker et al., 2012)**

- Provide training opportunities without adherence to space and time.
- Flexibility in dealing between the parties of the training process.
- Design training programs commensurate with the actual need of trainees.
- The independence of trainees and their freedom to choose training methods.

#### **Cons of e-training**

- Failure to achieve the emotional goal in the training programs offered via the Internet.
- The low level of infrastructure that allows the use of ICT applications in the field of training.

### **3. AUGMENTED REALITY IN TRAINING**

The development of technology has led to the development of many areas, including training; it became necessary to integrate technology with training in order to develop (Lee, 2012).

Augmented Reality is a simultaneous interactive technology that integrates real-world features with the virtual world in two or three-dimensional terms (Dunleavy & Dede, 2006).

There are many characteristics that distinguish augmented reality training, including that it combines reality and imagination in a real environment, and being interactive in real time when used, and is characterized by being three-dimensional, and provide the trainee with clear and concise information, and being available, easy to use, and low-cost and scalability(Koutromanos et al.,2015).

In light of the interest and emphasis on the preparation of trainees in terms of developing their scientific skills so that they can serve the community in which they are located, it was necessary to have appropriate and effective curricula for

training before and during the service, and delivered through an electronic environment (augmented reality), which supports the interaction between the characteristics of real reality and possibilities Virtual Reality (Yuen & others, 2011).

#### **The characteristics of augmented reality technology (Kipper& Rampolla, 2013)**

- Blends truth and virtual in a real environment
- 3D
- Provides clear and accurate information
- The possibility of entering information in an easy and efficient way
- The possibility of interaction between two parties trainee and a trainer
- Cost-effective

#### **Types of Augmented Reality Systems (Johnson, 2010)**

- Projection
- Recognition
- Location
- Outline

#### **The importance of augmented reality in training (Lee, 2012)**

- The success of employing augmented reality technology in training depends on the degree to which the trainer has the knowledge and skills to use and deal with this technique.
- Augmented Reality provides an innovative training space.
- Increases training effectiveness.
- Motivate trainees to participate.
- Increase the efficiency of the trainer.

### **4. RELATED WORK**

Sumadio & Ramble(2010) The study aimed to monitor the compatibility of users with the applications of augmented reality, especially in the learning environment, in order to identify the feasibility of the application of augmented reality in education and the researchers used the descriptive approach, The results showed that most of the participants were the first experience with the application of augmented reality, 27 of 33 respondents reported that they had not seen the application of augmented reality before, while a few of them know augmented reality and the results show that people showed the inability to use the application Augmented reality in education, but through their first experience participants gave very good feedback regarding the use of Augmented Reality in education and it will help well in education.

Barreira et al., (2012) The study aimed to make sure that children who learn language through the experience of games with augmented reality technology more absorbed than children who learn languages by traditional means was used live experiments through the computer on children from Bulgaria for the primary stage and the sample included 37 children and the study used a semi-experimental method The tools were an individual test and a questionnaire. The results of the research revealed that there are positive effects on children, that the audio-visual accessories associated with the technology helped to enhance vocabulary learning, and that the children showed great results after conducting a learning experience based on sensory reality. They are very effective and require only a computer with a web connection, so they are easy to secure in most schools.

Slijepcevic (2013) the study aimed at identifying the impact of the augmented reality presentation on education, cognitive accumulations, and spatial representation capabilities. Where the researcher pointed to the importance of augmented reality technology as a technology that complements reality by adding or synthesizing virtual objects in it, the researcher has used the experimental method to know the effect of displaying augmented reality in astronomy, The number of the sample of 182 students of psychology in American universities, and the results of the study found that there are significant differences in the accumulation of knowledge.

chen(2013) The study sought to reveal the effect of augmented reality technology and its ability to facilitate chemistry learning for students to understand abstract concepts in addition to aiming to test the effect of augmented reality in a collaborative learning environment. The study used a quasi-experimental approach and collected data using questionnaires and self-efficacy scale for subjective chemistry and cognitive testing. The study sample consisted of 96 students of organic chemistry; the results showed that the performance of the group of students who studied using only augmented reality was significantly better than the students who studied themselves without the use of augmented reality.

Jonathan(2014) The aim of this study was to investigate the effect of using augmented reality on the results of Arizona high school students in chemistry based on the pre and post tests of the experimental and control groups of 39 students each. The results showed a significant improvement of 80% in the results of the group that was educated by augmented reality, and attributed the improvement to the following:

- The concept of practical matter has become simpler, easier to trace and understand.
- Concepts of scientific content are linked to virtual reality objects, becoming well-established in the minds of learners and easy to retrieve.
- The great interaction of learners and enthusiasm in addressing and discussing scientific material, which enriched teamwork on the one hand and feedback that supported the consolidation of scientific concepts on the other.

Ekrem(2015) Aiming to determine the motivational level of learners using augmented reality technology, we study the language course for first year students at the University of Turkey The number of 130 divided equally into two control and experimental groups, the importance of using this technology in the education of students, The results of the study showed that the pass rate of the course was 100%. Officers who were educated in the traditional way in class and extra-curricular assignments.

## 5. METHODOLOGY

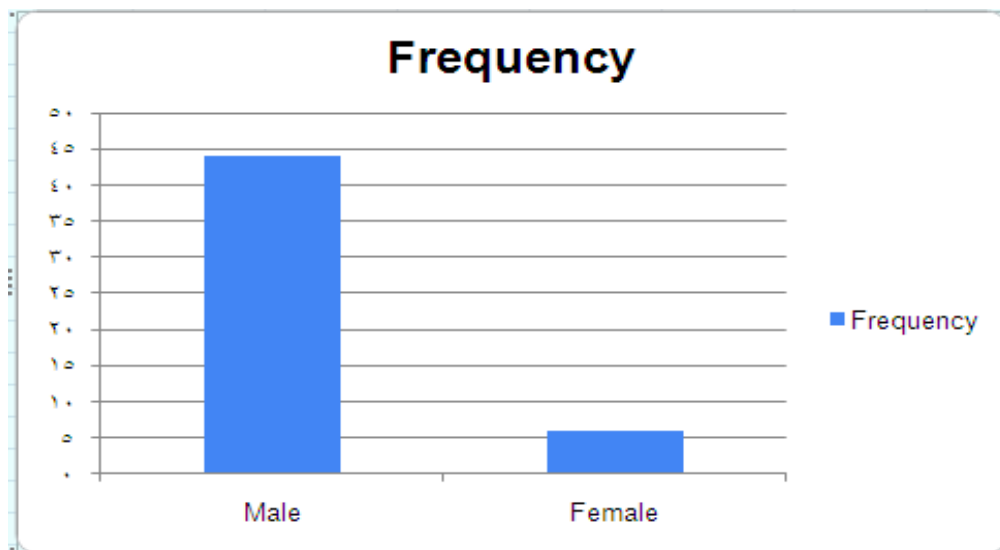
The researcher designed a questionnaire to show the extent of awareness of the importance of using augmented reality technology in training, and the study sample consisted of 50 participants, the questionnaire include demographic and general data and questions related to using Augmented reality in general and using Augmented reality in training, data were analyzed through Excel.

## 6. RESULTS AND DISCUSSION

### Demographic data

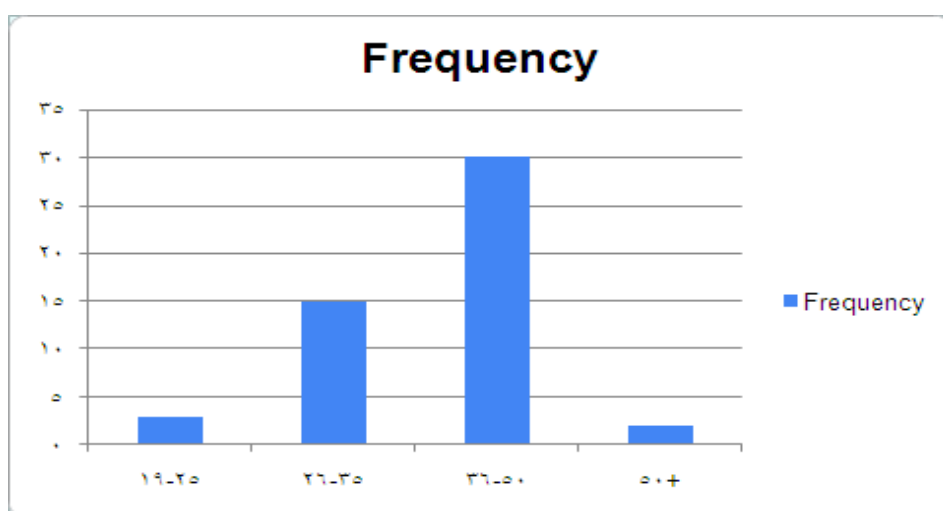
**Table 1: According to Gender**

Gender	Frequency
Male	44
Female	6



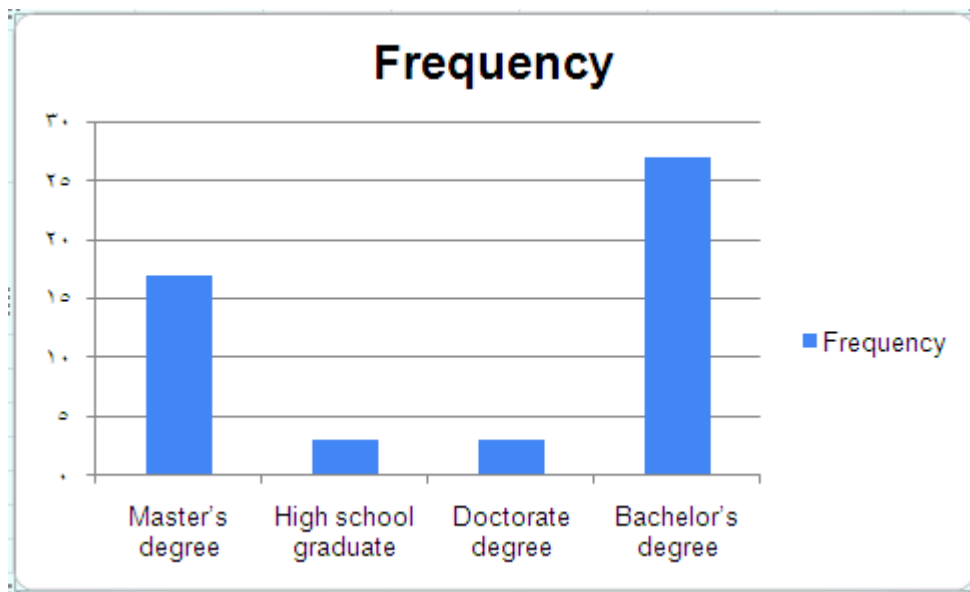
**Table 2: According to Age**

Range of age	Frequency
19-25	3
26-35	15
36-50	30
50+	2



**Table 3: According to Level of Study**

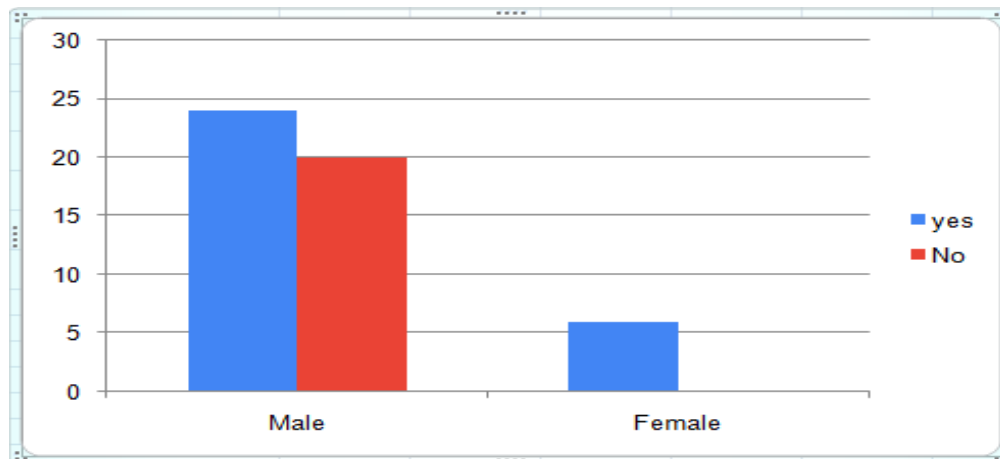
Level of Study	Frequency
Master's degree	17
High school graduate	3
Doctorate degree	3
Bachelor's degree	27



**Augmented Reality**

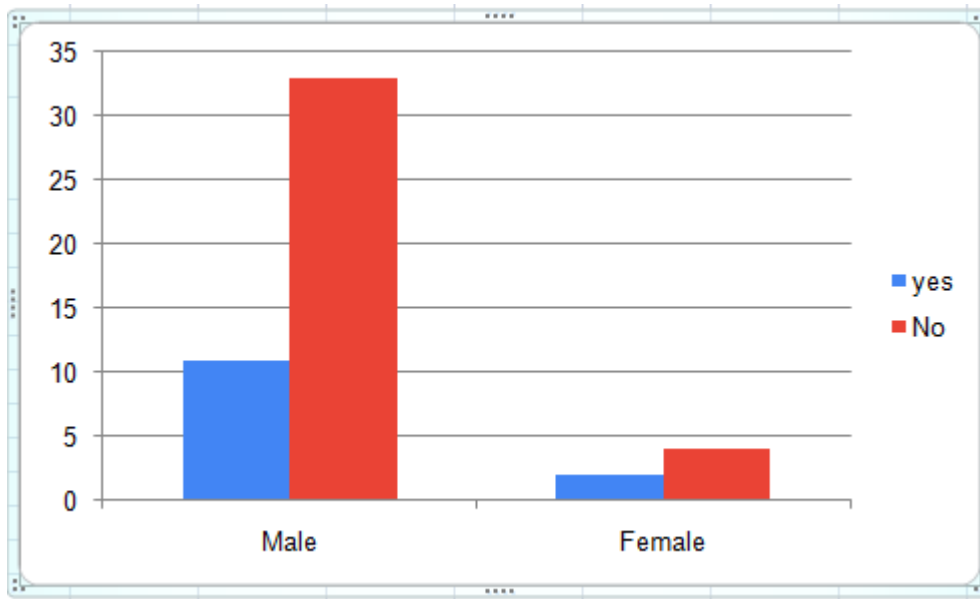
**Table 4: Have you heard about Augmented Reality?**

Gender	Frequency
M	20 No
	24 Yes
F	6 No
	0 Yes



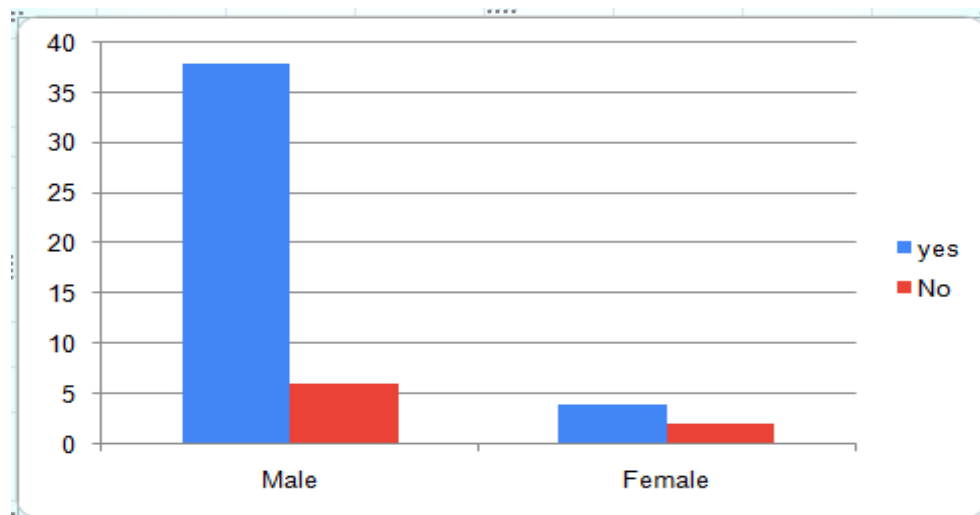
**Table 5: Have you ever attended training and have been using AR in training?**

Gender	Frequency
M	33 No
	11 Yes
F	4 No
	2 Yes



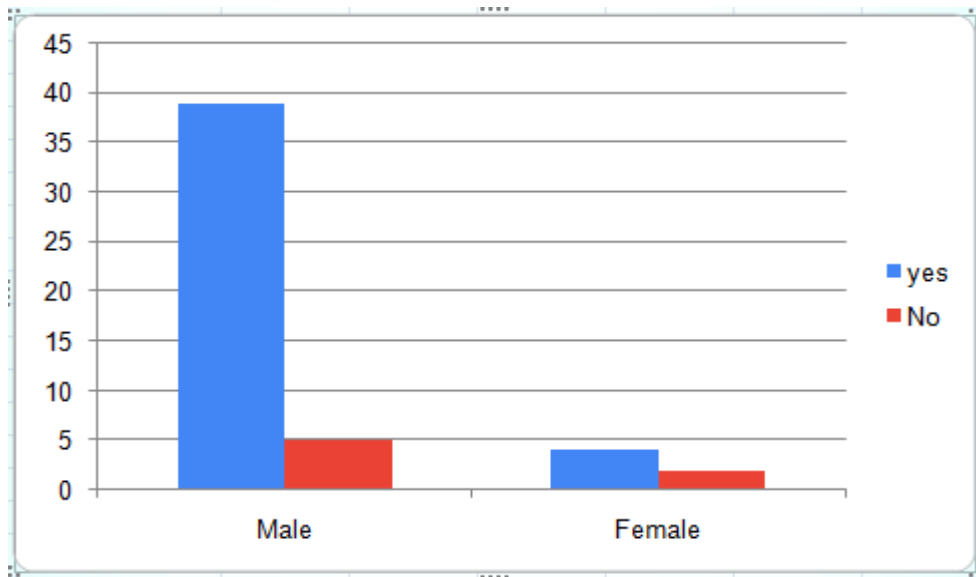
**Table 6: Do you accept the use of augmented reality in training?**

Gender	Frequency
M	6 No
	38 Yes
F	2 No
	4 Yes



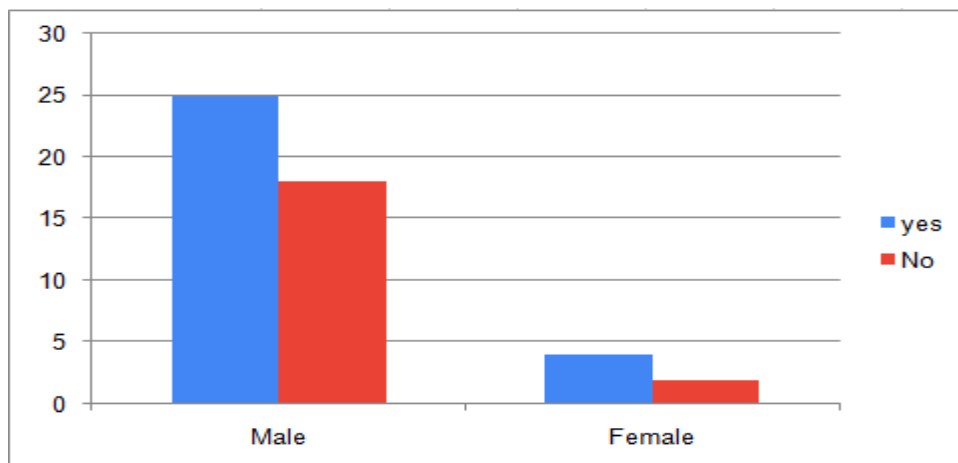
**Table 7: Augmented Reality increase quality in training**

Gender	Frequency
M	5 No
	39 Yes
F	2 No
	4 Yes



**Table 8:** Augmented Reality decrease cost of training

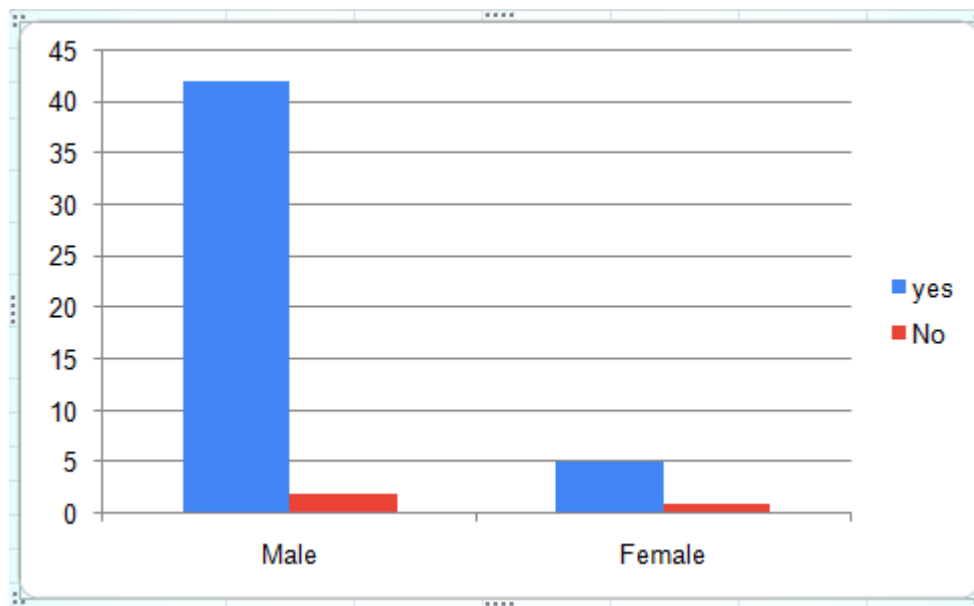
Gender	Frequency
M	18 No
	25 Yes
F	2 No
	4 Yes



**Table 9:** Augmented reality makes it easier for trainees to understand the material

Gender	Frequency
M	2 No
	42 Yes
F	1 No
	5 Yes





### Discussion

Table 1 showed that the proportion of male participants is greater than females.

Table 2 showed that the most age groups that participated were the post-university age.

Table 3 showed that those most educational levels are bachelor and master.

Table 4 showed that the largest numbers of participants, both male and female do not have knowledge of augmented reality.

Table 5 showed that the largest number of male and female respondents did not attend training using AR.

Table 6 showed that the largest number of male and female supported the use of augmented reality in training.

Table 7 showed that greater number of males and females expected that augmented reality would increase the quality of training.

Table 8 showed that greater number of males and females expected that augmented reality would decrease cost of training.

Table 9 showed that greater number of males and females expected that augmented reality would make it easier for trainees to understand the material.

### Results

Consequently, the results of the study showed that the awareness of using AR technique is generally low, The results showed that the percentage of use of augmented reality in training is weak, however, the results of the study also showed that the trainees support the use of augmented reality in training because of the advantages they expect to receive when using augmented reality, including increasing the quality of training and helping to understand the training materials in ways easier than traditional methods, It also reduces the cost of training for some things that were in fact expensive.

## 7. CONCLUSION AND RECOMMENDATIONS

The study aimed to clarify the extent of awareness of the importance of using augmented reality in training, the results of the study showed that the awareness of using AR technique is generally low, The results showed that the percentage of use of augmented reality in training is weak, however, the results of the study also showed that the trainees support the use of augmented reality in training because of the advantages they expect to receive when using augmented reality, including increasing the quality of training and helping to understand the training materials in ways easier than traditional methods, It also reduces the cost of training for some things that were in fact expensive. The research study recommended the need to increase awareness of the importance of using augmented reality technology in training.

## REFERENCES

- [1] Choi,Dong Hwa&Hebert,Amber D ailey.(2016).Emerging Tools and Applications of Virtual Reality in Education.p.168-185.
- [2] Koutromanos, G., Sofos, A., & Avraamidou, L. (2015). The use of augmented reality games in education: A review of the literature. *Educational Media International*,1-19.
- [3] Anderson, E & Liarokapis,F.(2014). Using Augmented Reality as a Medium to Assist Teaching in Higher Education. Coventr University, UK.
- [4] Wang,S.(2014).Making the invisible visible in science Museums through Augmented Reality devices, unpublished thesis, University of Pennsylvania.
- [5] Anderson,E., Liarokapis,F., (2014). Using Augmented Reality as a Medium to Assist Teaching in Higher Education. Coventry University.Uk Retrieved Feb 3, 2015.
- [6] Shea, A. (2014). Student perceptions of a mobile augmented reality game and willingness to communication in Japanese. *Education in learning technologies*, unpublished doctor's thesis, Pepperdine University. California. United States.
- [7] Kipper, G., & Rampolla, J. (2013). *Augmented reality: An emerging technologies guide to AR*. Waltham, MA: Elsevier.
- [8] Baker, W. M., Lusk, E. J., & Neuhauser, K. L. (2012). On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business*, 87, 275–289. doi:10.1080/08832323.2011.622814
- [9] Barreira, J., M., Pereira, L.C., Adao, T., Peres, E., & Magalhas, L. (2012). Augmented reality game to learn words in different languages. Paper presented at the information systems and technologies (CISTI), 7th Iberian conference, Madrid.
- [10] Lee, K. (2012). Augmented Reality in education and training, *Tech Trends: Linking Research & Practice to Improve Learning*, Vol.56,.No.2.
- [11] Norris, D. M., & Lefrere, P. (2011). Transformation through expeditionary change using online learning and competence-building technologies. *Research in Learning Technology*, 19,61–72. doi:10.1080/09687769.2010.549205
- [12] Ivanove, M., & Ivanov, G. (2011). Enhancement of learning and teaching in computer graphics through marker augmented reality technology, *international journal on new computer architectures and their applications*, (IJNCAA), Vol1.1 No. 1, pp. 176-184.
- [13] Ivanova, M, & Ivanov, G. (2011). Enhancement of Learning and Teaching in Computer Graphics Through Marker Augmented Reality Technology, *International Journal on New Computer Architectures and Their Applications*, (IJNCAA) , Vol.1 No. 1.
- [14] Yuen,s & Yaoyuneyong, G& Johnson,E . (2011). Augmented Reality: An overview and five directions for Arin education. *Journal of Educational Technology Development and Exchang*,4(1).
- [15] Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). *Simple Augmented Reality*. The 2010 Horizon Report, Austin, Tx: The New Media Consortium.
- [16] Sumadio, D. & Ramblie, D. (2010). Preliminary evaluation on user acceptance of the augmented reality use for education, *second international conference on computer engineering and applications*, Bali Island.
- [17] Dunleavy, M., & Dede, C.(2006). *Augmented Reality teaching and learning*. Augmented reality, USA: Harvard Education Press.