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Measuring the Intention of Using Augmented Reality Technology in the Health Domain

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Abstract

Augmented Reality technology can provide useful tools and devices to support healthcare services. The aim of this study is to investigate the intention of IT and health care scientists' to use Augmented Reality technology in Healthcare. A survey was conducted using a questionnaire based on a theoretical research model. According to the results, the participants seem to have positive perception about using the Augmented Reality technology in health domain, and they intend to use it.

Keywords:
Technology Assessment, Delivery of Health Care, Augmented Reality

Introduction

Augmented reality (AR) can be defined as an interactive visualization system (e.g. a head-mounted display, a computer, a game console, a smartphone, a tablet) allowing the merging of digital content with the real environment sourrounding the user, and blending both "real-world" elements with "virtual" ones [1]. The evolution in the area of mobile and wearable devices, has led to a rapid growth of AR technologies. AR can provide useful tools combining innovative devices and software, which can contribute positively to the domain of healthcare [1-3].

In this context, much scientific work is taking place on the assessment of the AR technology [4,5]. The acceptance of this technology is crucial and promising [6-8], especially in the health domain [9].

The aim of this ongoing study is to investigate the intention of information technology (IT) and healthcare scientists' to use AR technology in healthcare.

Methods

For the aim of our study, a questionnaire was developed based on a theoretical research model. The proposed model was a combination of Davis' Technology Acceptance Model (TAM) [10] and other related research work [11,12]. Our model included six dimensions with at least two questions (items) per dimension. All items used a 7-item Likert scale from "strongly disagree" to "strongly agree". The questionnaire was anonymous and distributed through Google forms to Greek IT and healthcare scientists during 2018. Specific relationships between the dimensions were tested, based on the following hypotheses (Figure 1):

- H1: Does "Perceived Usefulness" positively affect "Attitude Toward Use".
- H2: Does "Perceived Ease of Use" positively affect "Attitude Toward Use".
- H3: Does "Attitude Toward Use" positively affect "Behavioral Intention to Use".
- H4: Does "Compatibility" positively affect "Behavioral Intention to Use".
- H5: Does "Relative Advantage" positively affect "Behavioral Intention to Use".

The sample consisted of 81 IT and healthcare professionals. Descriptive statistics and structural equation modeling data analysis was performed using SmartPLS 2.0 M3 to conduct partial least squares path modeling [13].

Results

The participants of this study were 34.2% males and 65.8% females. The average age of the participants was 27.6 years old. According to the descriptive statistics, the mean and median value for all items values were above 4, which reveals the positive attitude of the participants (Table 1).

Table 1– Survey Results

Items	Mean	St. Dev	Median	Individual Item Loadings
ATT1	6.07	1.00	6	0.88
ATT2	5.68	1.20	6	0.82
BI1	5.95	0.93	6	0.76
BI2	5.67	1.10	6	0.86
BI3	5.40	1.29	6	0.75
COMP1	5.98	0.98	6	0.84
COMP2	5.79	0.98	6	0.70
PEU1	5.53	1.24	6	0.93
PEU2	4.48	1.53	4	0.70
PU1	6.06	1.00	6	0.86
PU2	5.85	1.07	6	0.89
RA1	5.57	1.09	6	0.73
RA2	5.94	1.03	6	0.79
RA3	5.83	1.01	6	0.81

Based on the partial least squares analysis, the measurement and the structural models were examined. To test the validity and the reliability of the models, individual item loadings (for indicator reliability), internal consistency, convergent and discriminant validity, were tested and produced reliable results [14].

The coefficient of determination (R2) was 0.612 for the "Behavioral Intention to Use" and 0.456 for "Attitude toward Using". All relationships between the dimensions (as described

in the hypotheses, Figure 1) were found to be statistically significant. The structural model was validated by applying a bootstrapping technique (with 5000 resamples) based on a two-tailed t-test (with α=0.05 or 0.01). All the hypotheses were confirmed (Figure 1), with at least 95% significance (p-values<α).

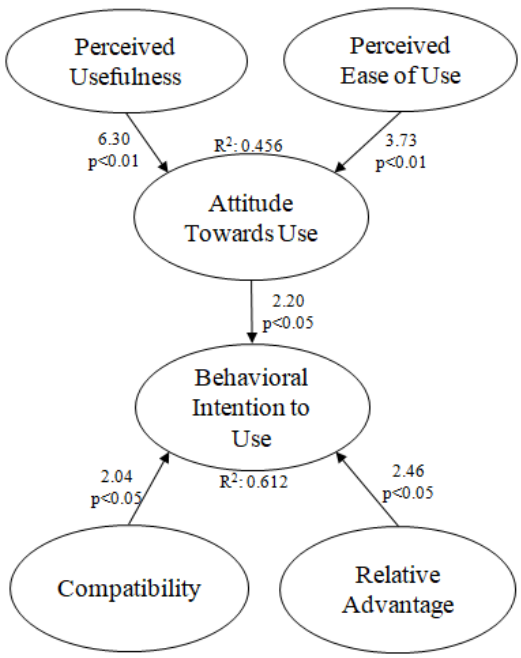

Figure 1– Theoretical research model

Discussion

According to the study results, the participants seem to have positive perception about the implementation of the AR Technology in health domain, and they intend to use it. Perceived Usefulness and Perceived Ease of Use positively affect the participants' Attitude towards Using AR technology in Healthcare. Additionally, Relative Advantage and Compatibility, as well as Attitude towards Using positively affect the Behavioral Intention to Use AR technology. These findings present the positive attitude of the paerticipants towards AR technology, their positive view as they consider it as useful and usable technology, and their intention to use it in their professional healthcare enviroment.

Conclusions

The survey results indicate that the participants have a positive attitude towards the Augmented Reality Technology in health domain and they express their intention to use it. Limitations of this survey may be the young age of the participants, as younger professionals might be more familiar with new technologies compared with older professionals. Future work may include further investigation of behaviors and attitudes of IT and health care professionals towards virtual and augmented reality technologies being used in healthcare.

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