

Factors affecting the willingness to use virtual reality technology in education with the role of modulating learners' curiosity

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Abstract:

Purpose: Many countries are leveraging new technologies to enhance the educational experience of the younger generation. The acceptance of these technologies by learners is crucial for the success and advancement of educational institutions. Innovations like virtual reality can enhance the quality of education and facilitate more interactive learning environments. Understanding the factors that influence the acceptance of these technologies and creating conducive conditions for their effective utilization are imperative.

The purpose of this article is to explore the factors that influence the willingness to use virtual reality technology in education and the moderating role of learners' innovativeness in this process.

Method: The current research is of an applied-descriptive type, and an available sampling method was used. The research model was examined through an online questionnaire, and data analysis and hypothesis testing were conducted using structural equation modeling with WarpPLS version 3 software.

Finding: Despite novelty not being included in the integrated theory model of technology acceptance and use, its impact as a vital predictor for new product acceptance was observed on expected performance, expected effort, social influence, facilitating conditions, and attitude towards use.

Conclusion: As a result, the current research indicates that virtual reality technology, as an effective innovation in education, can enhance deeper and more effective learning by fostering interactive and immersive educational environments. Despite certain drawbacks such as high costs and diminishing interpersonal interactions, virtual reality can provide significant value in enhancing the quality of education, fostering collaborative learning, and offering universal access to educational resources. This study proposes that by establishing suitable infrastructure and cultivating positive expectations through training and technical support, the productivity and effectiveness of this technology in the realm of education can be enhanced.

Keywords: Virtual reality, unified theory of acceptance and use of technology (UTAUT), creative technologies, Consumer innovativeness.

Introduction

The speed of technological changes in the world is increasing, and organizations and industries must align themselves with these changes to succeed and survive in today's world. To achieve economic efficiency, profitability, and attract their relevant customers, they need to enter the competitive arena (Leng, 2015). Technological advancements have created new ways to enhance communication and interaction with individuals, which can be crucial for organizations with specific stakeholders, such as higher education institutions, where most members belong to the digital-native generation (Mulvey et al., 2020). Despite the passage of time and the rapid advancement of technology, society's demand for adopting technological methods instead of traditional approaches in education has grown stronger. However, there is still limited research in this area. At first glance, virtual reality may seem primarily designed for entertainment and leisure, but it has now gained more valuable and practical applications, even bringing education to the brink of another transformation. In addition to the impacts and features of modern technologies, examining the factors influencing adoption by learners is

crucial. This analysis can provide precise information to focus on the adoption process, enabling organizations to prioritize and concentrate on these insights for greater success. Given that no specific study has been conducted in this area, the researchers in this study seek to answer the following question: What impact do the variables of the Unified Theory of Acceptance and Use of Technology (UTAUT) model have on the willingness to use innovative virtual reality technology in education, and what is the role of learners' innovativeness as a moderator?

Materials and Methods

The present study aims to examine the willingness to adopt virtual reality technology in education using the Unified Theory of Acceptance and Use of Technology model and the moderating role of learners' innovativeness. Therefore, it is classified as an applied-descriptive research study. The statistical population consists of 240 students from Kashan University who completed the Physical Education course during the 2022-2023 academic year. Using Morgan's table, a sample of 144 participants was selected for the study. The sampling method was convenience sampling, and an online questionnaire was used to examine the research model. The questionnaire items were designed and refined based on a review of previous literature and aligned with the study's context (Roehrich, 2004; Venkatesh et al., 2003). A total of 27 questions were included in the questionnaire, covering demographic information (2 items) and seven variables: facilitating conditions (4 items), social influence (3 items), effort expectancy (4 items), performance expectancy (4 items), attitude (4 items), willingness to use (3 items), and consumer innovativeness (3 items). The questionnaire used a five-point Likert scale. The reliability of the questionnaire was assessed using Cronbach's alpha. To assess face validity, the questionnaire was reviewed by 10 sports management professors. Data analysis and hypothesis testing were conducted using structural equation modeling (SEM) through Warp PLS version 3 and SPSS software.

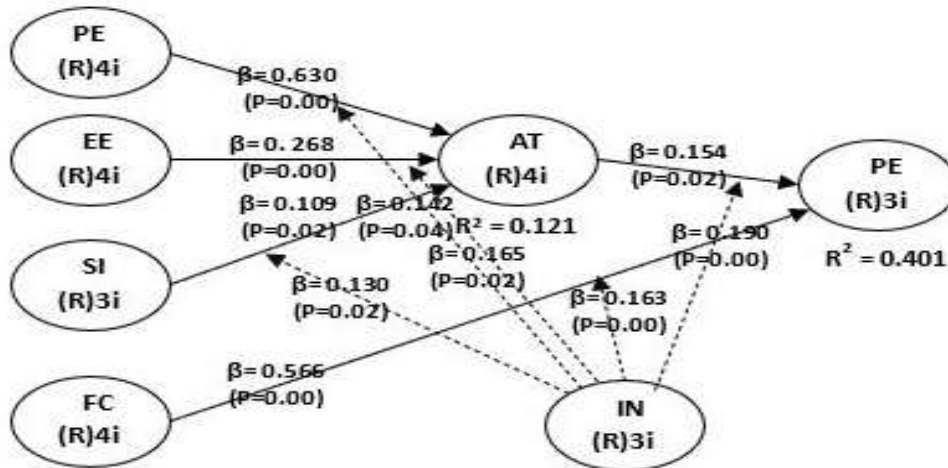
Results and Discussion

The study's demographic data showed that most participants were women (93 individuals) and aged between 20 and 30 years (65 individuals). A measurement model is considered homogeneous if the absolute value of factor loadings is at least 0.7, though some accept a minimum of 0.4. In this study, all factor loadings were above 0.7. The composite reliability index and Cronbach's alpha were above 0.7, and convergent validity exceeded 0.5. Acceptable values for discriminant validity were also found. The path coefficients show that performance expectancy, effort expectancy, and social influence have values of 0.630, 0.269, and 0.109, respectively, which are statistically significant. The coefficients for facilitating conditions and attitude toward use on the willingness to use virtual reality technology are 0.556 and 0.154, respectively, also statistically significant. The path coefficients for the moderating role of innovativeness on various variables are 0.142, 0.165, and 0.130, all statistically significant. The coefficient of determination for innovativeness concerning facilitating conditions and attitude toward use is 0.163 and 0.190, respectively. The results of this study indicate that the research model has a good fit. To assess the goodness of fit and predictive power of the model, the coefficient of determination (R^2) and the f-squared (f^2) coefficient were used. According to the table 1, the coefficient of determination for attitude toward use is 0.121, and for intention to use, it is 0.401, while the f-squared values for these variables are 0.082 and 0.335, respectively.

Table 1. Examination of the Coefficient of Determination and f-Squared in the Study

Variable Name	(R^2)	f-Squared (f^2)
Attitude Toward Use	0.121	0.082
Intention to Use	0.401	0.335

Furthermore, the model fit indices demonstrate that the average path coefficient (APC) is 0.141, and the adjusted R-squared (ARS) is 0.219, both of which are statistically significant at a level of less than 0.05. The Tenenhaus goodness-of-fit (GOF) criterion is 0.424, indicating strong explanatory power for the model. Additionally, the average variance inflation factor (AVIF) is 1.722, which falls within the ideal range (less than 3.3). These findings confirm the appropriate fit of the research model, allowing for the structural results to be used in hypothesis testing and interpretation. Figure 1 below illustrates the structural equation model of this study.



Conclusions

In recent years, the education industry has been transformed by technological advancements. Virtual reality technology, by creating interactive learning environments, has made learning deeper and more effective. Research indicates that the adoption of this technology is influenced by various factors, with 0.401 of the changes in adoption being explained by independent variables. Although innovativeness has not been a part of traditional technology acceptance models, it plays a significant role in adopting new products. This study also confirms that consumer innovativeness in education significantly affects factors such as expected effort, social influence, expected performance, facilitating conditions, and attitude toward use. These results match earlier research (Agarwal et al., 1998; Karjaluoto et al., 2019; Weller et al., 2005). In today's rapidly changing world, organizations must embrace innovation and creativity to survive and develop new solutions by understanding environmental changes. Achieving this requires leaders with innovative mindsets and behaviors who can guide organizations toward progress based on up-to-date knowledge. Additionally, continuous, criteria-based, and scientific performance monitoring, aligned with defined standards, plays a crucial role in technology adoption and its integration into organizational education.

Virtual reality is one of the remarkable advancements in technology that showcases human creativity in its application across various fields. In education, this technology has become an innovative tool for virtual learning, offering safety and high functionality. Virtual reality helps learners learn from their mistakes, practice different skills, make mistakes freely, and try again. Its combination with virtual learning resources, especially in sports, where understanding dangerous and valuable situations is essential, proves to be highly beneficial. The main advantages include enhanced visualization, improved education quality, collaborative learning, global access, better assessment of learners, and the integration of entertainment with learning. However, there are some drawbacks, such as reduced human interaction, lack of flexibility, and high costs. For effective utilization, universities and educational systems must pay special

attention to budgeting and infrastructure needs. Despite the challenges, the future of education will see greater integration of virtual reality, and with appropriate policies, its implementation is feasible.

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