

Augmented reality Analysis of factors influencing venue learning

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Abstract: In view of the lack of analysis of the overall structure of the influencing factors in the venue learning, this paper proposes the modeling of the influencing factors of the venue learning based on the augmented reality technology, and clarifies the relationship among various factors. Through the literature and theoretical analysis to determine the dimensions and influencing factors of venue learning under augmented reality technology, the ism method is used to construct the relationship model. According to the relationship model, it analyzes from four aspects, in order to provide a theoretical reference for the learning of the venue under the augmented reality technology.

1. Introduction

Venue learning is mainly carried out in real or virtual venues. It is a learner-centered autonomous learning and an important form of informal learning environment[1].It is centered on exhibits and supported by digital technology to build learning content through observation, experience and interaction. With the establishment of a learning society, it is also important for learners to acquire knowledge not only in the venue environment represented by schools, museums, science museums and libraries[2].Augmented Reality (AR) is a technology developed based on other professional disciplines such as computer vision and computer graphics. It can be used to simulate objects, allowing learners to view virtually generated models[3] in real-world environments. The emergence of AR has realized the interaction between virtual and reality, helping learners to learn and understand abstract concepts.

In 2014, Chen CY et al. studied the design and implementation of augmented reality-based guidance systems for museum guidance, providing intuitive and friendly interaction between people and machines, and providing new museum guidance[4].In 2016, Capuano et al. used augmented reality and semantic techniques to define relevant results for creating digital stories related to museum exhibitions[5].In 2018, Fenu et al. used the design and assessment of augmented reality experiences of storytelling techniques to enhance the experience of visitors to the Museum of Literature[6].It can be seen from the above research that the application of augmented reality technology in museums can bring new learning experiences to users and enhance their interest in learning.

For a long time, the museum mainly realized the information transmission between the audience and the exhibits through two forms of text introduction and explanation. This method is simple in form and boring in content, which is difficult to meet the diverse needs of people. With the application of augmented reality technology in museums, creating an environment where virtual and reality blend, enriching the information content in the real environment, providing people with a more complete information experience, but also complicating the learning environment and factors.Therefore, this paper focuses on augmented reality technology and venue learning. Through theoretical analysis, it tries to establish a systematic relationship model to provide reference and reference for the amphitheater learning mode under the augmented reality technology.

2. Theoretical basis

Activity theory believes that activities are hierarchical, namely the target layer, functional layer and conventional layer[7].The study of science and technology venues also belongs to the scope of activities. The purpose layer refers to the harvest after learning through ar technology experience. The functional layer refers to the various interactions and interactions in the experience learning activities. The conventional layer refers to the application of ar technology in the experience. Various operations performed during the process.

Situational learning theory believes that venue learning is a complex interaction process of individual situation, social situation and physical situation. Under the joint action of multiple influence factors of three major situations, the information of exhibits is transmitted to learners to achieve the purpose of learning[8].Science and technology venue learning is a process in which learners focus on the exchange experience and the learning factors are influenced by the learner dimension, the behavioral interaction dimension and the external environment dimension.

The experiential learning theory believes that in the process of experiential learning, learners can make full use of subjective initiative to achieve better development and learning effects by setting goals, experiencing situations and observing reflections[9].Application of enhanced technology to generate virtual and real-life interactions, by setting certain goals, allowing learners to experience and observe, improve learners' attention, thereby enhancing interest and deepening the mastery of exhibit knowledge.

Through the analysis of activity theory, situational learning theory and experiential learning theory, the research framework is mainly divided into the target layer, the behavior layer, the operation layer and the support layer; the dimensions of the influencing factors are mainly: external environment, experiential learning design, learning Interaction with behavior.The external environment includes augmented reality technology, venue environment and exhibit settings; experience learning design ® includes learning activity design, learning result evaluation design and guidance; learners include learning interests, prior knowledge and experience, visit motivation and expectations, knowledge background and The level of understanding of the exhibit; behavioral interactions include interaction with staff, interaction with members of society, and exhibits.

3. Relationship model construction and analysis

Based on the literature and theoretical analysis, this paper uses the explanatory structure model method (ism method) to construct a mixed relationship model.The ism method is based on discrete mathematical theory and uses a two-dimensional matrix for mathematical operations to calculate the structure and relationship of all elements in the system[10].The result is shown in Figure 1.

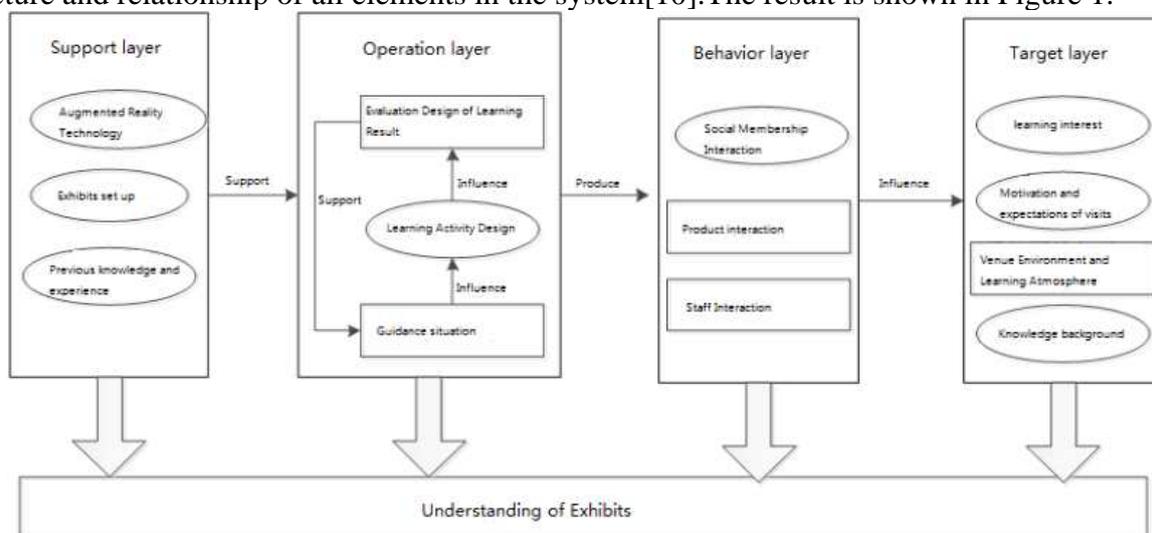


Fig.1 Relational model of the influencing factors of stadium learning under augmented reality technology

It can be seen from the relational model that the application of the ism model to the analysis of the influencing factors is conducive to the complex relationship between the influencing factors of the organization and hierarchy. Through the relationship model, we can get:

(1) The purpose layer is the top level of the venue learning, which is a combination of various factors, which directly determines the learning experience of the learner. The influencing factors mainly include the understanding degree of the exhibits, the interest in learning, the motivation and expectation of the visit, the atmosphere of the venue and the background of knowledge. In this layer, in order to improve the learning experience of the venue, in addition to personal factors such as learning interest, motivation and expectations, the environment of the venue is also crucial.

(2) The behavioral layer is both the result of the operation layer and the reason of the atmosphere of the venue in the target layer, which determines the result of the study. The influencing factors are mainly the interaction with the staff, the interaction with the members of the society and the interaction of the exhibits. They are all the operations carried out in the design of learning activities, resulting in various exchanges and interactions, increasing the learning atmosphere of the venue. The factors in this layer can be quantified, analyzed and processed to draw conclusions in order to obtain better learning results.

(3) The operation layer is in the middle position. It is the operation of the content built by the support layer and the condition generated by the behavior layer. It is the core of the model. The influencing factors mainly include learning activity design, learning result evaluation design and guidance, which determine the quality of learning. Therefore, in the design of learning activities, according to the characteristics of ar technology experience, the experience of learners' interaction, hands-on operation, virtual and real interaction in the activity process is increased, so that learners can get all aspects of the venue learning activities. In the design of learning outcome evaluation, the learner's questions and explanations are added to improve the learners' communication and interaction skills. In the aspect of student assistance, the interaction between the staff and the learner is increased, so that the learner has a relaxed learning environment and can fully participate in the science and technology venue learning activities.

(4) The support layer is at the bottom level, which is the basis for the development of the venue learning model. The main influencing factors are augmented reality technology, exhibit setting and prior experience and knowledge, which determine the content of learning. Previous experience and knowledge have a certain impact on the exhibits that the learner chooses to experience. The exhibits are set up in the physical facilities of the science and technology venues. The exhibits should be simple and practical, so that learners can quickly get started; pay attention to the latest technological developments and maintain and update the exhibits. Augmented reality technology helps learners create a fun and immersive learning environment, guide students' scientific thinking, visualize boring knowledge, make students understand, form a series of effective virtuous cycles, and ultimately enhance students' interest in learning and effectiveness.

4. Conclusion

Augmented reality technology shows its powerful vitality in the teaching process with its unique advantages. It combines virtual teaching with various elements in traditional teaching to achieve the improvement of teaching effect. This paper studies the influencing factors in the venue learning under the augmented reality technology. The relationship model is constructed and analyzed through literature and theoretical analysis and structural model interpretation, in order to provide a theoretical reference for the activity design of venue learning under augmented reality technology. Augmented reality technology has a unique advantage in the field of education and is a supplement to the existing education model in China. In the future research, we can focus on the augmented reality education model, so that the augmented reality can be better and more natural into the teaching.

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