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“Augmented and Virtual reality technologies with Adaptive Learning Systems.”

Ms. Juhi Chaudhari

¹MCA, VIVA Institute of Technology, India

Abstract : *Augmented Reality (AR) is a technology that switch the location and timing of learning and training. It also provides admirable possibilities within education and much more excitingly reconceptualise eLearning. It also has an ingenious learning area through blending digital learning products into the structure of media with materials that are primary parts of the real area therefore as a result developing situated education. This paper shows the significance and need of Augmented Reality in education and higher education and in Reality-Virtuality Process in virtual learning abode. The current state and bearing of the use of augmented reality (AR) and virtual reality (VR) technologies as pertinent means of improving the educational process are considered. In particular, recognition is given to the potential of the combined capabilities of AR and VR technologies with adaptive learning systems.*

Keywords - *Augmented Reality, Adaptive learning, Conceptual Model, Computer graphics, Virtual Reality.*

I. INTRODUCTION

The modern world has lead to changes not only in the sector of economics and technology, as well as changes in the degree of subsequent students prior training, their needs and expectations. As a result, the education master plan is commuting too. Virtual and augmented reality (VR and AR) technologies are the means of a radically new magnitude of human interaction with the digital world, which are playing an expanding role in the global economy, politics, social relations etc. The emblematic statistics world offers a wide range of ready-made patterns and styles of behavior that people choose and try to implement in their daily lives. Today, these samples are elected primarily by computer VR, virtual (computer) symbolic world, that provides the thesis of information space different motivational, cognitive, communicative, operational, creative, spiritual instance. VR and AR technologies have got the most consequential development in the entertainment markets. With no limits, the first stage of their implementation. Products based on VR and AR technologies are encouraging in phrase of economic effect in the fields of industry, health care, consumer services, and education. The diversity of companies and institutions of higher education application AR and VR technologies testifies to the prospects of this technology. Culture with AR and VR technologies could be contemplated in a new way of knowledge transfer that be in agreement with a qualitatively new content of learning and personal development of students, stimulates innovative aspects of teachers' activity and creates preconditions for the implementing new approaches to learning and improving education. AR and VR technologies are a new way of bestowing information, making it much more visual and attractive. Their use helps to grow students' motivation in learning process through clarity, information completeness, interactivity and gamification of education.

II Literature Review

This paper covers the review of research on the amalgamate use of AR and VR technologies with adaptive learning systems that lets us to notice some project devoted to the existing state and new scope of adaptive learning in virtual reality, improving massive open online course with augmented reality, adaptive learning and gamification; design implications for adaptive augmented reality based on interactive learning environment for improved concept comprehension in engineering paradigms. However, combined ability of AR and VR technologies with adaptive learning systems has not been considered yet. The focus of the article is to give an overview of design of a learning model based on combination of abilities of adaptive learning systems and AR and VR technologies.

III. Research results

Learning model based on combination of capabilities of adaptive learning systems and virtual/augmented reality technologies

New inclination and merits of modern education entail the perception student as idiosyncratic individual with his/her own individual survey needs. Therefore, educational content introduced to students should be acclimate to their personal expertise and needs, and be associated and zestful. However, Lately, distance e-courses are in focus at the concurrent learning of a large number of students . Therefore, noteworthy heterogeneity of students' educational outcomes is noticed. This fact demand research in the field of personalized learning and improving of distance education. We will have our focus on improving e-learning through the combining abilities of AR and VR technologies and adaptive learning systems. These have recently been embraced in various learning models and have shown a noteworthy impact on students learning experiences. For my study, I have chosen AR and VR technologies because according with up-to-date research they make educational content more interactive, individualized, and motivating. AR and VR technologies provide interaction with real and virtual objects. Such content visualization keeps students active during the learning, as it increases their ability to learn and summon information, as well as adds elements of gamification to learning environment. This is a prerequisite for internal motivation of students to study the elements and do tasks.

Adaptive learning systems supply a wide range of tools for personalized training. However, it calls for development of course to make learning involvement of all students more victorious and to meet the sundry educational needs of students. By using the combined abilities of adaptive learning systems and AR and VR technologies, in my opinion, will come up with the best results, because taking into statement , cognitive characteristics of students upshot on their perception and learning of educational data. pliable settings of testing tools stated in adaptive learning systems make feasible to identify the psychological nature of the cognitive structure of personality for the best selection of learning content at the initial programme.

With reference to Fleming's VARKH model, the educational process is based on student interaction with educational content . It furnishes to classify students by main passage of perception of educational information:

- visual pupils become cognizant of the main part of the academic material by eyes.
- For this psych type, it is preferable to get information by visual images. This will make it easier for the students to analyze and remember
- Auricular pupils become cognizant through sounds preferably, for eg: The audio lectures. Students in this category should listen to educational content for memorization and assimilation.
- write - read pupils prefer information introduced in the form of words, text. Students prefer to read and write educational content by different means;
- kinesthetic Pupils view educational material on a insight basis and tend to make an entreaty.

Tutees have their preferable way of receiving and processing educational content . So, shape of personalized educational content should take into consideration the tender passage of obtaining information and the dominant type of thinking of students. Traditional system of content conveyance (fixed video, audio, scripts) are not customized and collective, so modern teaching ways are to be executed to give an amazing experience for students.

For the students who prefer visual and kinesthetic channel of receiving information will get to have an amazing experience the educational Data organized with the technology of AR and Virtual Reality . Hence, it is pretty advisable to deliver them all the educational content by simulators using AR and VR technologies. The application of combined abilities of adaptive learning systems and AR and Virtual Reality technologies will give the most adapted and personalized educational content to the tutee.

The utilization of amalgamate abilities of adaptive learning systems and AR and VR technologies will issue the adapted and personalized educational content to the tutee.

I here, offer a diagram of the prototype illustrating the amalgamate abilities of these techniques in the learning scenario to create collective, personalized and interesting content (fig. 1).

Learning procedure using AR and VR technologies to furnish educational content has magnificent opportunities to be gamified, with awards and distinctions that will motivate students. The application of game method in learning environment created using augmented or virtual reality technologies, transforms and improves learning experience of students.

The Curricula generated using AR and VR technologies have elevated budding for stimulating influence on the process and operational attribute of students' thinking, creativity, the emergence of specific cognitive motivation and interest in learning, creating positive, harmonious mental states. The enlargement effect of AR and VR technologies is determined by three-dimensional objects, images of recognizable objects, an extensive scope of movements with objects, the effect of habitation, interactivity, visualization of abstract models and more.

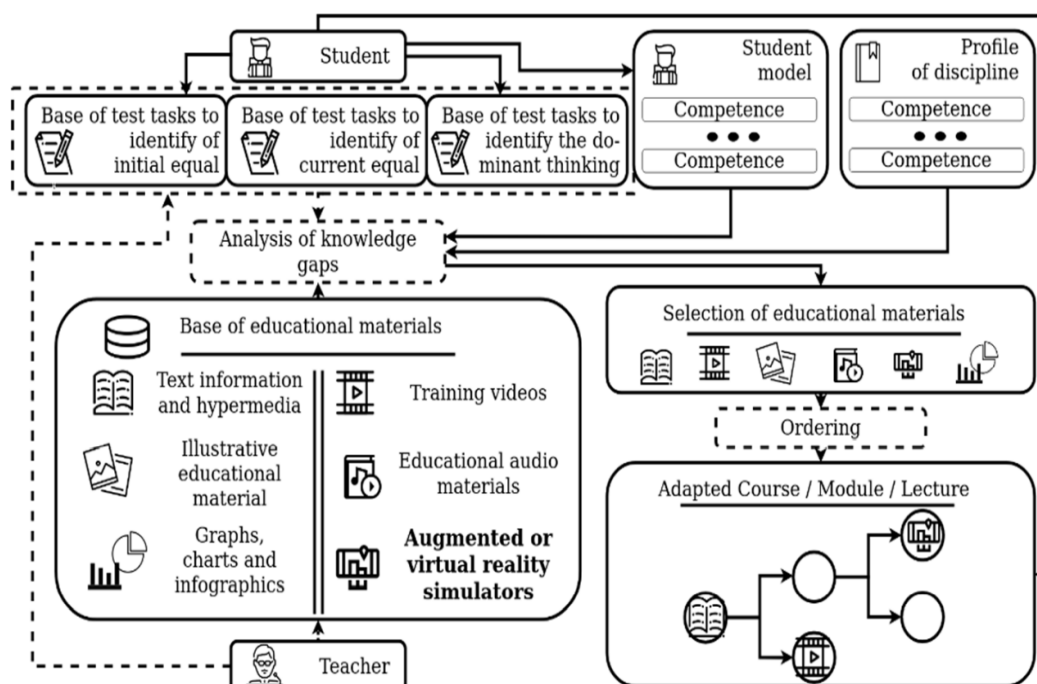


Fig. 1. Conceptual model of learning based on the combined capabilities of augmented and virtual reality technologies with adaptive learning systems.

3.1 Opportunities and perspectives of virtual and augmented reality technologies

Currently, augmented reality technologies influence the organization of learning, augment tools and methods, enlarge didactic opportunities. By fixing virtual objects in a specific environment permits to simulate atypical educational practices, finding new ways to travel over objects and related space, have surety of better interaction. simultaneously, augmented reality technologies are considered as “exotic” tool for educational and methodological support of strictness. This happens due to the constraints and characteristic of human-computer interaction by screen and graphical user interface. Learning it has been more effective when learned with interest in the subject and the flow of cognition. .

The latest survey proves the effectiveness of implementing AR and VR technologies in the educational process. The study was carried out physics lesson in virtual reality. An experiment was conducted to survey the remaining knowledge. Participants were also asked to evaluate the effectiveness of using virtual reality as a learning environment. As per the results of the study, 91.5% of participants passed successfully, and 97.5% of them reacted to using this technology in the educational process positively.

3.2 Combining virtual and augmented reality technologies with adaptive learning systems in Computer Science courses

AR and VR technologies have universal reach in education areas. While, in the procedure of teaching computer science, it is used rarely. Visualization of interactive computer components (chipset, motherboard and other components) is used in “Computer Architecture” course . we can approach it with is use of videos, links, texts tied to labels.

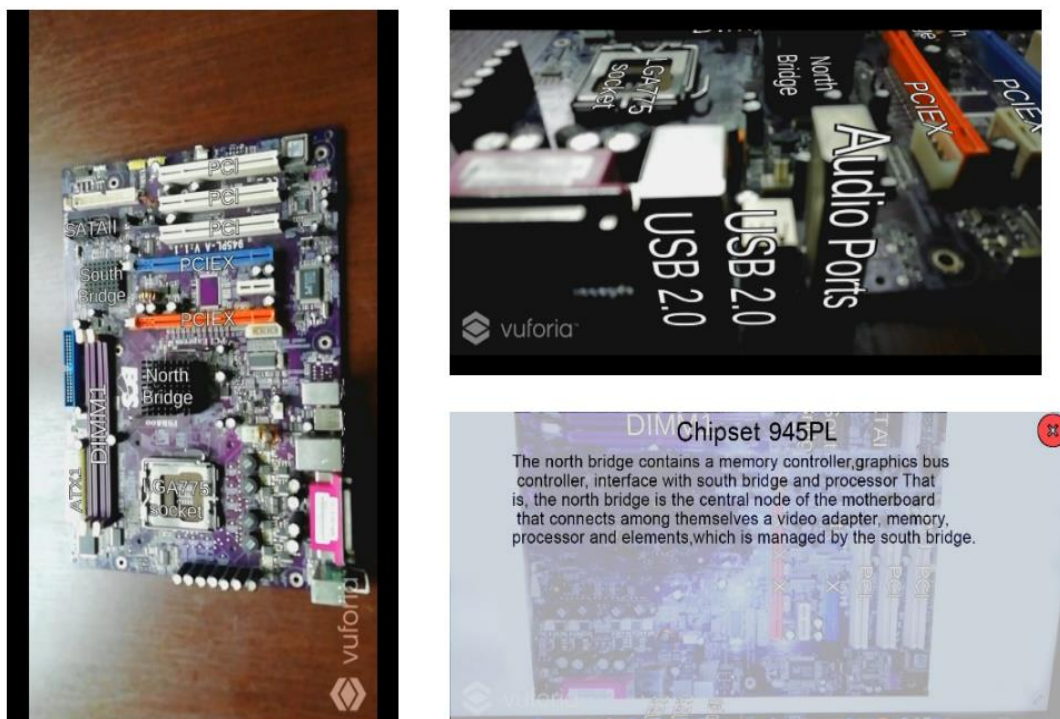


Fig. 2. Interactive manual for studying personal computer architecture.

Let me provide a detailed review of using adaptive learning with AR and VR technologies having the example of learning the topic “Sorting algorithms” in “Algorithms and data structures” course. Its pre-requisite are that students should know the applications of sorting algorithms, such as bubble sorting, permutation sorting, insert sorting, and others, and have a skillset of immersing it in professional activity.

For example, A student knows about bubble sorting algorithm. This information came in from the student model survey resulting in having knowledge. Hence, it won't be thought again. Other section of information obtained from the student model is, the suitable channel of information perception is kinesthetic. Noting this, it is suitable to choose educational content on augmented reality, where student has an opportunity to explore the principles of insert sorting and permutation sorting through simulation.

IV CONCLUSION

In this review paper we described in short the preface, a perception on creating an adaptive learning environment with the context of virtual reality. The use of AR and VR technologies in combination with the abilities of adaptive learning systems gives the better conditions for personalization of learning. As a result, it provides a quality of educational process. Visualization is the key features for the proposed learning model on the conjunction abilities of the adaptive learning system and virtual and augmented reality technologies.

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