Virtual Reality Classroom Innovations With Technology An Institution's Transformation Engine: A Descriptive-Exploratory Study Of Difficulties And Concerns

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ABSTRACT

Studies on the merits and possibilities of using virtual reality (VR) in education has been ongoing for several years. The research has reports of several VR applications, but there isn't a market for a structured examination of them. The market for VR educational apps is analyzed in this study from 2019 to 2021, and recent developments in their services, materials, and features are also tracked. This research seeks to outline the VR resources that instructors might use to incorporate into the teaching and learning process. The other objective was to examine user feedback on VR educational uses and build a summary of them to determine which one's consumers liked best. The findings showed that more than half of the survey programs were free to download, that English was typically used for interaction, and that the programs with the highest user ratings came from the fields of environment, space, medical, art, and literature.

Keywords: VR, Analysis Methods, Learning uses, educational strategies

INTRODUCTION

VR, is a technique that generates a simulated environment through the use of digital platform and a computer-generated experience. With the help of digital technique, a setting that resembles the real world can be created, or it can be a fantastical world that allows for experiences that are not feasible in the realm of traditional physical reality. VR headsets that include reasonably realistic visual and aural opinion replicate a three-dimensional environment.

The idea of VR as we know it today originated in the 1960s (Sun et al., 2019). Four senses—sight, hearing, smell, and touch—were stimulated by the 3D motion picture to create the illusion of reality (Heiling, 1962). Until today, the recreation sector continues to be where VR finds the most profound use. Moreover, since the 1980s, research has been done on the uses and efficacy of VR in training and education (McLellan, 1996).

VR technology and education provide a novel form of learning that typically enhances the conventional approach. This innovative method increases students' interest in learning in novel ways that utilise sensory knowledge (Pan et al., 2006). A more realistic display of functioning or tasks is facilitated by virtual reality. VR materials will help students to realize and study even abstract facts in a risk-free environment, which is a crucial component of VR in education (Morelot et al., 2021).

The establishment of the educational classification, the creation of educational materials for diverse areas, and their influence on academic reasons are just a few of the areas of study objectives that have been defined within the VR research framework (Luo et al., 2021). The contribution of VR to the formation of learning motives, attitudes, and cognitive

burdens is another field of investigation. To lessen motion sickness issues, technical results and their effects on the human body are investigated (Weech et al., 2020). Since the creation of new VR solutions itself affects study findings, the rapid evolution of VR also brings new difficulties. The constant growth of the VR makes it impossible to keep some factors steady for an extended period of time without interfering with instructional goals, even though doing so is crucial for evaluating their effect (Daniela & Lytras, 2019).

If instructors intend to employ VR platform, they should be ready to provide engaging tasks. The participation of students in their learning is positively impacted by well-designed student engagement in the VR environment (Meyer et al., 2019). It may be more successful to use game features to draw students' attention and combine them with video viewing. But according to one study (Makransky et al., 2019), incorporating immersive virtual reality into the classroom may boost student involvement without essentially increasing knowledge levels. The user may be awestruck by the unfamiliar surroundings in the VR experience and become side-tracked from achieving the learning goals.

Although training with VR offers many benefits, it is not used as frequently as it could be because of the high cost of the equipment, the rapid technical progress, and the dearth of applications that can be employed right away. Lack of concentrated study on the creation of educational resources as well as the definition and usage of guidelines in this field are obstacles to a wider adoption of VR technology in education (Qiu et al., 2021)

1.1 RESEARCH AIM

This study's goal is to offer a market analysis of VR as a teaching aid.

1.2 RESEARCH QUESTIONS

The following research inquiries were looked into:

Research Question 1: What language is used, what is the cost of VR applications, and what is the most popular region for VR applications now in existence?

2.   LITERATURE REVIEW

There are numerous VR products on the market. It is vital to take into account a number of factors while picking them, including cost, accessibility of applications, equipment, and functionality. According to the results (Wu et al., 2019), the simplicity of VR (83%), marketing (62%), application content kinds (52%), and VR system level (21%), are the most important considerations for the decision to choose a product. The most preferred application material was the subject of another area of research. The research reveals that adult movies (10.6%), interactive games (32.8%), travel guides (18.6%), and information learning (42.1%) are among the most popular activities.

Despite a number of difficulties and obstacles, research (Papanastasiou et al., 2019) demonstrate that the VR techniques in education has a good effect on education through a variety of sensory aspects. It encourages pupils to experience reality, offers role-playing interactive simulations, deepens teamwork, and improves memory recall lists. All educational levels, from elementary to secondary to university education, have shown efficiency.

In-depth research has been done on immersive VR as a device for enhancing and promoting teaching in education (Johnston et al., 2018). VR-based techniques, in contrast to traditional teaching strategies, have a number of drawbacks. According to a survey of the VR literature, only a small number of research have empirically examined how the technology affects educational objectives, with the bulk concentrating on its usability (Radianti et al., 2020).

Numerous developers' dearth the best practises for creating these particular demands, despite the fact that many VR apps have been built in

latest days. The researchers (Ghrairi et al., 2018) described the present situation of the deployment of VR apps by assessing and rating the excellence of open-source VR projects. The findings reveal that the majority of projects are created by lone developers, JavaScript and C# are desired programming languages.

Instances of VR content in the study of science, technology, engineering, and mathematics are training simulators and virtual vacations. Practicing in a lab is essential to the education of students in technical fields (Lee, 2020). Investigations in the wild are expensive in terms of time, location, and technical infrastructure. The use of VR can help solve these issues (Perez-Ramirez et al., 2021). Robotics is one of the disciplines where learners can make use of virtual surroundings. The suggested trajectories can be better displayed using the industrial robotic arm simulator without endangering students or actual equipment.

3.   METHODOLOGY

The author looked at and contrasted current virtual reality education applications from 2019 to 2021, concentrating on the Oculus platform. Although there is crossover between Vive and Steam and other VR software markets like them, developers provide the app for various VR platforms. Since 2012, Oculus has been making accessible, premium VR headsets available to the general public. There are two types in the product line: the solo headset (Quest) and the headset that is powered by a computer (Rift). The firm has never disclosed the unit sales of any of its VR headsets, even though the predicted market share for this technology is 42.9 %. The estimate is based on a questionnaire that Steam, a digital distribution service, conducts each month.

3.1 Search strategy

The Oculus Store is the primary platform for VR application distribution. Each developer must submit an application for catalogue inclusion and go through the approval process before publishing such an application. Compliance with technical and content criteria is ensured by this inspection. The VR application will show up on the Oculus Store after being approved in one of the 5 groups of Games, Apps, Systems, Entertainment and Early Access. Applications are categorized into 35 genres in addition to divisions, including Art, Educational, Medical, News, Productivity, and Simulation.

4.   RESULTS AND DISCUSSIONS

The authors of the research used quantitative research technique to determine the subject, language, cost, scale, number of reviews, and rating in stars for educational VR applications. Descriptive data on VR applications made available by the Oculus Store were included in the analysis. By Area, each application was categorised. In this categorization, 21 application areas were found in 2019, 24 in 2020, and 23 in 2021. Most applications fell under the categories of space, nature, art, medicine and history (Figure 4.1).
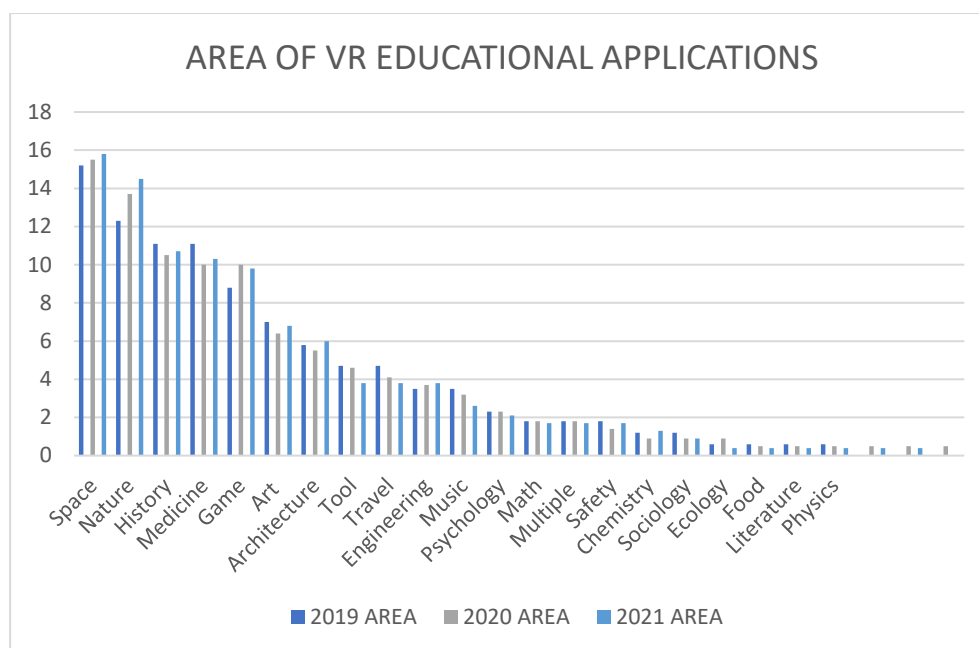
Figure 4.1. Areas of VR educational applications in 2019 - 2021.

Another thing to think about was the language a VR application utilised to communicate with the learner (Table 4.1). The most of the programmes used English as their main language of interaction, but there were also those that used French, Chinese, and Spanish.

Table 4.1 Language of VR applications

2019			2020			2021		
LANGUAGES	**N**	**%**	**LANGUAGES**	**N**	**%**	**LANGUAGES**	**N**	**%**
English	92	99.1	English	181	88.2	English	251	89.5
French	33	7.1	French	17	7.1	French	35	8.7
Chinese	5	3.2	Chinese	18	4.2	Spanish	14	9.4
Japanese	5	4.2	Spanish	18	8.2	Chinese	16	8.5
German	6	3.1	Japanese	4	6.1	German	7	6.1
Italian	8	6.3	German	6	1.3	Italian	17	9.0
Spanish	3	1.8	Korean	2	1.4	Japanese	17	9.0
Korean	2	1.2	Italian	2	1.4	Russian	4	1.1
Russian	3	2.1	Russian	2	1.4	Korean	4	1.1
Portuguese	4	2.1	Portuguese	2	1.4	Portuguese	5	2.1
Arabic	1	0.6	Polish	17	8.6	Swedish	2	0.4
Norwegian	1	0.6	Swedish	12	7.2	Arabic	8	3.1
Swedish	1	0.6	Arabic	4	6.1	Norwegian	1	0.2
Danish	2	1.2	Danish	9	4.2	Polish	1	0.2
Dutch	2	1.2	Dutch	3	3.1	Dutch	1	0.2
Hebrew	2	1.2	Norwegian	1	0.2	Turkish	1	0.2
			Turkish	1	0.2	Danish	1	0.2
			Czech	1	0.2	Czech	6	4.1
			Hebrew	1	0.2	Hebrew	12	5.3
			Finnish	1	0.2	Finnish	4	1.1
			Greek	2	1.4	Greek	2	0.4

			Hindi	1	0.2	Hindi	5	2.1
			Hungarian	5	3.1	Hungarian	8	3.1
			Indonesian	4	6.1	Romanian	1	0.2
			Romanian	2	1.4	Thai	1	0.2
			Thai	2	1.4	Indonesian	1	0.2
			Ukrainian	2	1.4	Ukrainian	1	0.2
			Vietnamese	2	1.4	Vietnamese	2	0.4
			Welsh	2	1.4	Welsh	2	0.4
						Slovak	1	0.2

The bulk of virtual reality (VR) applications are free (2019: N = 89, 75.3%; 2020: N = 213, 44.7%; 2021: N = 245, 65.4%), while the minority of applications costing between $20 and $22.99 (2019: N = 4, 2.9%; 2020: N = 10, 6.4%; 2021: N = 8, 3.8%). (Table 4.2).

Table 4.2 Price of VR applications

2019			2020			2021		
PRICE ($)	**N**	**%**	**PRICE ($)**	**N**	**%**	**PRICE ($)**	**N**	**%**
0	89	75.2	0	211	44.6	0	213	65.3
0.9 - 3.88	18	71	0.9 - 3.99	51	91.1	0.9 - 3.99	64	91.6
4.1 – 7.89	18	71	4.1 – 7.89	61	82.5	4.1 – 7.89	46	41.3
9.0 - 18.89	12	53	9.0 - 18.89	42	74.2	9.0 - 18.89	35	23.1

DISCUSSION

VR offers a number of well-established and anticipated learning and student engagement benefits, but its deployment has some drawbacks. At first appearance, nothing appears to be impeding the full use of VR in education. On the market are ready-to-use commercial gadgets. The first step in implementing VR education, however, entails getting a headgear, investing in computer hardware with enough graphics capabilities, and setting up a suitable lab or physical area. For instance, a library space was converted into a lab to showcase and encourage digital scholarly initiatives. In addition to a substantial investment in VR technology, it was important to offer training and technical assistance to both professors and students.

In order to enhance their syllabus and classes, teachers should think about how they could methodically include VR into their instruction.

After that, they should assess which settings produce the best outcomes for students. Teachers have a variety of options when determining which VR content to use into lessons. With the aid of the resources at their disposal, they can create the VR application directly, entrust the application programming or utilise the already released, for-profit VR applications.

The purpose of the research that was just given was to look into the features and user reviews of the VR apps that are available on the Oculus Store platform. The outcomes show that educators in the fields of history, art, science, medicine, and nature can employ the most VR applications. The number of applications in the fields of psychology, art, and nature that are available on the market has increased between 2019 and 2021. The management of the classroom presents another difficulty in the efficient application of VR technology. The best method for incorporating VR in a

classroom when there are few VR headsets accessible, one of which should be the VR learning station. The benefit of interesting virtual experiences is that learners can develop engagements in just 3-5 minutes.

Teachers are considering alternatives to traditional learning environments in light of the changes in education brought on by the covid 19 pandemic. The advent of remote teaching and school closings seem to make virtual reality the ideal solution. The majority of individuals, though, do not have access to any type of VR setup at home. However, there is a fix thanks to VR cardboards that came after. A low-cost virtual reality headgear called Google Cardboard works with almost any smartphone running Cardboard-friendly apps.

6. CONCLUSION

This study focused on the Oculus Store and looked at the market for current VR educational applications. The study identified the five most popular VR application fields as being nature, space, medical, art, and history. More than half of the sample programmes are free to download, and the majority of them use English as their primary language of communication. The study's author gathered information on the average number of reviews and ratings given by users for each educational programme.

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