

Virtual Reality in Higher Education

Anamika, Kamal Nain Sharma

LKCTC, Jalandhar

Corresponding author: Kamal Nain Sharma, Email: kamalnain3@gmail.com

This paper is a survey and talks about the well-being of using the VR era inside the higher excessive schooling gadget. The summary element explores the better schooling gadget and its capabilities which will examine the blessings of the use of VR era structures in high education. VR technology and its cutting-edge nation in education had been explored and which branches of better education use those era structures. Nowadays virtual fact is an early diploma in schooling systems in higher education with inside The entire global This generation offers the capacity to envelop the environment of advantage knowledge. Which isn't always typically inside the 3-D models and the interactive 360 motion pictures are bodily available to college students. VR performs a giant function in better schooling and numerous cutting-edge education use this era to decorate the scholar intelligence and gain knowledge of revel in.

Keywords: higher education System, Learning Environment, immersion, Modern generation, Virtual Reality Introduction for gaining.

1. Introduction

For gaining knowledge of and schooling functions the usage of digital gadgets is increasing worldwide. This is considerable in 1997 to 2006 while community computer systems had been relatively used for sharing data gaining knowledge of and inside the duration 2007 to 2016 while on-line digital gaining knowledge of have become spreading inside the international. In those periods, humans had been interrogating the dormant to comprehend new technology inclusive of digital gaining knowledge of and cellular gadgets. Recently, virtual reality (VR) technology has been widely employed in teaching, training, and education in a variety of settings. [1].

VR has gained extra attention from scientists over the past ten years in terms of interaction and visualization. Virtual screens of the moment, inclusive of Oculus Rift or HTC Vive permit customers to revel in a depth of immersion. The period immersion describes a consumer's involvement in digital fact surroundings whereby their perception of the present becomes incoherent. By the year 2022, the HMD (Head-mounted display) market is expected to reach 25 billion, increasing at a CAGR of 39.51% from 2019 to 2025. The current time is a perfect one to study immersive VR because digital reality has advanced, plus its costs have steadily decreased, and therefore it's a good time to research this. [1]. In the European Union, there are three, three hundred better schooling institutions, and compared to the United States gadget, Unlike North America, Europe is far more complicated since it is divided into both regional and national areas, with each having different prison rules, cultural norms, and language restrictions. [2].

To allow for a uniform address, three key proportions from the literature may additionally be singled out stratification, orientation, and standardization. [3].

Virtual fact and Virtual surroundings are used in the computing community, there are numerous phrases used to explain digital fact: Virtual Worlds, Synthetic Experience, Arterial Worlds, or Artificial Reality [4]. These three phrases represent a similar era: real-time interactive graphics in conjunction with 3-D fashions and stereoscopic shows. which lets customers immerse themselves inside the digital international and without delay control it [5].

It is set a phantasm of taking part in artificial surroundings, now no longer approximately an outside remark of such surroundings. VR is predicated on a 3-dimensional stereoscopic display that video displays units' head, arm, and frame movements, and binaural audio. VR is an immersive, multi-sensory revel in [6]. Virtual reality refers to an immersive, interactive, multi-sensory, third-dimensional environment generated on a laptop and blended with the generation needed to assemble such environments [7]. The first concept of digital fact become conceptualized in 1935, while Stanley G. Weinbaum defined glasses that permit the consumer to observe a movie from a first-individual angle wherein the structure viewer is the precept protagonist and interacts surely with the film via image, sound, smell, taste, and tactile perception. When we examine cutting-edge VR structures and Weinbaum's concept, it's miles not possible to disregard putting sameness between his coinage concept and the cutting-edge nation of the era [8].

The biggest issue with incorporating new technologies into the classroom is instructors' limited ability to conceive how to successfully integrate different periods into the curricula. The idea of lively VR is orient to design pedagogical systems that concentrate on networked and genuine interactive memories with the pupil in their center period of acquired knowledge. Gaining knowledge of locations through networking brilliantly stresses collaboration, determination, trust, and enterprise in the way knowledge is gained. Examples of networked scholar-focused pedagogies consist of social constructivism branched gaining knowledge, and pedagogy [10].

Even eleven though the improvement of Virtual Reality for academic functions is considerable, maximum humans nevertheless use the era to advance and improve conventional coaching techniques the use of the brand new console without affecting the learning and teaching methods. Modern technology, which includes VR, must be implemented in STEM schooling which will grow performance and hobby in gaining knowledge and studies [11]. In all the protection departments (navy, air force, and army) flight simulators are the most famous use of VR. [12]. The findings of a survey of 25 college students performed in 2018 on the topic of Analysis and Use of Virtual Reality for Educational Purposes in the Field of History, was that the to be had content material improved long-term knowledge when accompanied by VR, Through the usage of VR, individuals said that they might be tons extra immersed inside the content material which becomes plenty extra interesting and exciting than conventional academic approaches, which then improved motivation and hobby for the content material, contributed, and consequently to higher and enduring proficiency of coaching satisfied material [13].

Essentially, the risks of using digital facts in schooling come from the fact that this is a relatively new era, and its implications haven't been sufficiently analyzed. Typical disadvantages are the fee associated with using technology, the time required to discover how to use hardware and software, health and safety implications for consumers and slow integration into classrooms. Using extra studies to solve these issues will help grade by grade with new technology, in addition to the aid of using the trendy attractiveness of era outdoor coaching procedure [14]. There is compelling proof that scholars can enhance their gaining knowledge of manners thru VR structures. However, there are nevertheless some unsettled problems worrying about the efficiency of such frameworks. (HMD) Immersive rather than non-immersive (standard computer system displays) VR frameworks, partnership in scholastic VR frameworks, several issues arise in discussion when discussing the application of VR frameworks in educational settings, including the level of realism within the frameworks [15].

2. Applications of virtual reality

Virtual reality has been shown to increase learning. The immersive classroom is equipped with a variety of ways to make learning more attractive and communicative. It is more interactive and provides advanced knowledge to students.

There are many different types of virtual reality classrooms, including those that provide 3D videos and images through IoT (Internet of Things). These devices allow students to learn at their own pace.

Virtual reality provides a simulated environment in which students feel that they are part of the setup they are looking for.

Virtual reality also allows users to travel to faraway places without leaving home. In a time-saving and cost-friendly manner, users can see realistic graphics images and view the view of the place.

Virtual reality provides professional and high-tech training in higher education. It creates a realistic environment for students to practice real-life situations at a lower cost than with traditional training methods. They use virtual reality scenes combined with real-world devices connected to wireless systems that appear to move within the training environment as they would in real life. VR is also used in military combat situations and medical training. With the help of VR, we can see a three-dimensional view of something. Virtual reality is also used in disaster management.

3. Defining Research

Defining the problem "Although it's miles apparent that digital fact can substantially contribute to the academic manner, it is still rarely applied in most regions of the academic system, and in instances where

it is, it is still regarded as a novelty instead of a device for improving education. The query is whether or not a hobby in this form of the era is sizeable sufficient to justify fees of the nation price range and modifications inside the schooling gadget so as for the VR era to be utilized efficiently in schooling. Purpose too intention as for studies "until now the use of latest technology is recognized as a step closer to development in all components of a person life, education technique is requesting advance approaches to enhance the application of modern technologies moreover. Virtual Reality has skilled fast improvement inside the closing decade too has grown to be an increasing number of found in regular life. All preceding studies factor in a big quantity of blessings that Virtual Reality can produce in schooling, and a totally small quantity of risks. formed on preceding studies, the aim of this is to observe the trendy and acceptability perspective of humans closer to the advent of Virtual Reality structures in the education establishment.

4. Hypotheses

- ✓ H1: Over a 2D show, respondents prefer to utilize an HMD VR.
- ✓ H2: People are convinced that using virtual reality
- ✓ H3: The majority of respondents to a survey on the use of VR systems in education believe that the systems would improve learning outcomes.

5. Methodology

Responses The poll was carried out on people who willingly provided details. Fifty-5 responders, of whose 30 had been 25 women, and men, finished the personality inventory. responders have extraordinary stages of schooling; a huge percentage of individuals (38.2%) have a few shapes of better schooling, university, etc. The bulk of responders (52.7%) said that they'd attempted to apply a Virtual Reality gadget extra than once. Attitudes and the acceptability of VR structures in schooling were assessed utilizing the Likert scale as one of the measuring instruments. The statements used inside the scale had been decided on primarily based totally on an examination of literature associated with the effectiveness of VR structures in schooling and the immersive effect of VR structures on the consumer. The questionnaire becomes performed in English which will have the ability to consist of as big of a pattern of humans with extraordinary demographic backgrounds as feasible. An occasion of the way the questionnaire emerges as made to be had to the respondents can also be found interior the Attachments of this paper. The technique "The survey emerge as carried out inner the period from August twenty-third to August 29th, 2020. The survey grows to be created with the help of the Google Forms utility, and grow to be dispensed on numerous internet forums. Participants volunteered to fill out a questionnaire, which turn out to be anonymous. The questionnaire turns into specially primarily based definitely on the reviews of the individuals. At the begin of the questionnaire, its context and motive had been temporarily defined. In the main section of the questionnaire, the respondents had been requested state-of-the-art demographic questions. In its longer element, the questionnaire will become particularly based totally absolutely on the Likert scale. The statements had been related with the assumed hypotheses, and administration questions had been included. The frequent time required to fill out the questionnaire end up six minutes.

6. Results

Upon a final touch of the evaluation of personal items, taking into consideration manage and inverse questions, which have to be converted inside the equal way, the calculation becomes made as to signify a superb mindset closer to a statement/speculation. Hypotheses had been evaluated in line with the common percent of respondents who expressed superb attitudes on the subject of the statements associated with specific speculation and primarily based totally on median & mode. On a scale of one to

five, solutions four and five are taken into consideration as superb, solutions three are taken into consideration as neutral, even as solutions 1, and a couple of are taken into consideration as negative. For a speculation to be shown with certainty, the share of superb solutions might exceed 51%, even as mode and median must exceed the restriction of 3.75. Fifty-5 respondents, of whom 30 had been men, and 25 were women, participated in the studies. Most of the individuals (30 of them) are a part of the schooling gadget, even as 21 respondents have finished better schooling, and four respondents have now no longer finished any shape of better schooling. Forty-six respondents could check a VR system, and nine respondents in no way had reveled in a VR gadget. Of the fifty-five responders, 25 of them have a Virtual Reality gadget at place of residence.

6.1 Hypothesis 1

Examines whether or not customers favor using an HMD Virtual Reality machine over a 2D visual. Content material can be interactive, such as video games, or passive, like videos on demand and so on. Respondents had been supplied with a chain of statements that wondered about respondents' hobbies in positive factors of the VR machine along with the feel of the paragraph of time. VR technology, the feeling of being in the virtual world (immersion), and opinions about VR. The question will also be manipulated. 60 % of respondents reacted honestly when it involved the second declaration, whereas 52% responded honestly to the manipulated query. According to data analysis, respondents didn't understand the manipulated query, or they didn't pay attention to hobbies. While analyzing the speculation, statements, and declaration 3 will not be ignored due to the inconsistency of the data. As a result, it is critical to inversely recalculate the mode and median in response to the statement "Complete immersion in the virtual international frightens me". at the same time as the proportion of respondents who do now no longer accept as true this assertion becomes taken under consideration as a percent. The evaluation becomes invalid when the above statements are excluded, the commonplace region percent of respondents who take shipping of as authentic statements associated with Hypothesis 1 is 68.25%, The not unusual place mode value is 4.5, and the not unusual place median value is 4.00. All indicators suggest that the hypothesis "Respondents prefer using an HMD over a 2D screen" can be proven, however, the inconsistency of answers to outstanding statements should be taken into consideration, and after the inconsistent statements are removed, this hypothesis appears to be proven on a small scale.

Table 1. Questionnaire Result of Hypothesis 1.

Participants favor utilizing HMD VR over a 2D present								
Statements	Positive		Neutral		Negative		Mode	Median
	N	%	N	%	N	%		
I feel that time passes faster when I watch videos via VR system than when I watch videos via continually 2D displays.	22	40	21	38	12	22	3	3.00
It gives me the feeling that I am present in a virtual world when I use Virtual Reality.	33	60	16	29	6	11	4	4.00
The VR system that I use, while it is immersive, keeps me aware that I am in a virtual world.	29	52	18	33	8	15	3	2.00
Virtual reality allows me to interact with information and images in a more active	42	77	8	14	5	9	5	4.00

way than I would normally.								
A virtual world that is entirely absorbed in me makes me nervous.	9	16	31	24	33	60	5	4.00
Virtual reality provides users with a fascinating experience through visual stimuli.	53	96	1	2	1	2	5	5.00

6.2 Hypothesis 2

Examines whether or not respondents agree that using VR structures might boom hobby in sure coaching content material. The members expressed their personal opinion on the hobby in the use of VR in lecture rooms and out of doors of lecture rooms for academic purposes, the significance of the social element inside the academic process, and the development and higher expertise of coaching content. From the to be had data, it's far feasible to finish that there may be a great hobby on the subject of the use of modern technologies – in this intense, VR for coaching objective if you want to boom hobby. still, social interplay supplied with the aid of using academic establishments remains extraordinarily critical for the responders, and the "getting to know by home" version via VOD content material isn't desirable, whilst social interplay in digital surroundings is acceptable. Respondents additionally agree that using VR in schooling might not distract a pupil from their teacher's content material. The manipulated question is consistent whilst in comparison to the opposite answers. It has been confirmed that VR platforms will increase interest in certain coaching content material, as the average percent of high-quality assessments is 66.1.

Table 2. Questionnaire Result of Hypothesis 2.

Using virtual reality systems for teaching has the potential to increase students' interest.								
Statements	Positive		Neutral		Negative		Mode	Median
	N	%	N	%	N	%		
Abstract concepts and contents are difficult for me to comprehend without visual representations of the same (e.g. energy transfer).	34	62	11	20	10	28	5	4.00
The use of interactive content and VR systems would greatly enhance my interest in learning and educational content.	38	69	9	17	8	14	5	4.00
In a shared environment, the group's shared experiences are crucial.	41	74	10	18	6	8	4	4.00
It is easier for children to grasp educational content when they are stimulated with multiple senses.	46	83	6	11	26	6	5	4.00
Whether lecturers or students, it is essential to interact with the real world.	37	67	4	7	13	26	2	2.00
The use of VR systems can allow students to actively participate and learn rather than simply viewing 2D displays passively.	41	74	7	13	7	13	5	4.00
It is inspiring and fascinating for students to be able to see and experience locations around the world using virtual reality in	51	93	4	7	0	0	5	5.00

the classroom.								
Learning can now become entertaining by incorporating virtual reality into the classroom	39	71	9	16	2	4	4	4.00
Students would be distracted from learning if they were immersed in virtual reality.	16	29	11	20	28	51	4	4.00
Students will continue to investigate and examine instructional topics as a result of the simulation and experience given by VR.	32	58	15	27	8	25	4	4.00

6.3 Hypothesis 3

Examines how respondents feel about the idea that incorporating virtual reality (VR) into classrooms and curricula might improve learning outcomes. Many research thus far factor capability advances in mastering consequences while the usage of Virtual Reality systems. Through declarations associated with this hypothesis, the responder's opinions on this subject matter changed during the examination. Respondents had been presented with statements expressing the performance of the mastering procedure statements associated with the training system, the manner statistics are transmitted, the manner college students are evaluated, and statements associated with the mixing of VR into training. The control question, which changed primarily based totally on the announcement, shows that the responders carefully examine and recognize the declarations. From the offered data, it's miles feasible to wind up that maximum human beings consider the announcement that the modern-day assessment system (e.g. exams) does now no longer mirror actual knowledge, however, it'd as a substitute be essential to discover an opportunity tailor-made to every individual. When it involves the announcement that a professor needs to be the primary supply of statistics and interplay inside the schoolroom rather than the announcement that almost all interplay needs to take region amongst college students, wherein a professor might best function as a The reviews of the respondents had been divided into "guides". Once it came to the first declaration, 56 % gave it a positive review, even as 44 % gave it a positive review. The common percentage of folks that reacted definitely to the statements associated Hypothesis three has a success rate of 63.27 percent, a common mean of 3.9, and a median of 4.00. The hypothesis "Respondents feel that the introduction of interactive media would improve people's lives" is based on the evidence supplied (in this case, virtual reality systems) inside the curriculum may boost mastery outcomes "may be con 225 firmid.

Table 3. Questionnaire Result of the Hypothesis 3.

The majority of respondents to a survey on the use of VR systems in education believe that the systems would improve learning outcomes.								
Statements	Positive		Neutral		Negative		Mode	Median
	N	%	N	%	N	%		
Interaction helps people learn more effectively.	50	91	4	7	1	2	5	5.00
To grasp a new skill, it is vital to apply theoretical information to practical instances during the learning process.	49	89	5	9	1	2	5	5.00
In the classroom, students should engage mostly with one another (the professor should simply function as a "guide" to the dialogue).	31	56	13	24	11	20	4	4.00
The professor should be the major source								

of knowledge and engagement in the classroom.	24	44	12	22	19	34	2	3.00
A classical evaluation system (e.g. grading exams) cannot determine whether or not the respondents possess real knowledge.	38	69	11	6	11	20	4	4.00
An assessment system that relies on written tests produces results that reflect the respondent's superficial knowledge.	9	16	9	16	37	68	4	4.00
A better evaluation system would be one in which the parameters of individual respondents are observed by means of a virtual reality system.	33	60	15	27	7	13	4	4.00
Virtual reality simulations can be a useful method for training and instruction.	16	29	19	35	20	36	3	3.00
Virtual reality (VR) and classical learning are two very different methods of providing information. While virtual reality provides an interactive experience, traditional learning consists solely of facts.	29	53	11	20	15	27	4	4.00
(VR)Virtual reality can be used to develop students' creativity.	36	65	11	20	8	15	4	4.00
Virtual reality allows students to learn how to react in dangerous situations.	45	82	8	14	2	4	4	4.00

7. Conclusions

Past research has shown that the use of virtual reality (VR) in training can enhance learning outcomes. The goal of this study was to provide preliminary evidence that using an HMD VR over a 2D screen would increase participant motivation in positive coaching content and thereby enhance learning outcomes. Studies performed previously on VR in training show that the benefits offered by using this interactive medium outweigh its drawbacks. This collection of studies confirms the benefits of using VR structures, particularly because they include especially young people who are still inside the training machine and those who have left it and are ready to have enjoyed and evaluated at present-day country of the training machine. While the results of this study support the notion that there may be a place for VR in academic training, it's important to remember that social interaction remains critical for respondents, whether or not in an academic group or a digital environment. Even with unresolved concerns about the advent of this interactive medium in training structures, all the research that has been conducted still confirms that the advantages of such technology are considerable. This merely underscores the reality that ways to introducing VR structures in training facilities must be carefully addressed if students are to have access to traditional instruction, which might therefore enhance their learning experience.

References

- [1] Radianti, J.; Majchrzak, T. A.; Fromm, J.; Wohlgenannt, I. A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education*, 147, 103778.,2020.
- [2] Bartels, J.; Van Vught, F. Institutional Profiles: Towards a Typology of Higher Education Institutions in Europe. *IAUhorizons*, 13(2-3), 2007.
- [3] Lavrijsen, J. Characteristics of educational systems. How they influence outcomes in the short and the long run, 2013.
- [4] Mazuryk, T.; Gervautz, M. *Virtual Reality History, Applications, Technology and Future*, Institute of Computer Graphics, Vienna University of Technology, Austria, 1999.

- [5] Fuch, H; Bishop, G. Research Directions in Virtual Environments, NFS Invitational Workshop, Univ. North Carolina 1992.
- [6] Gigante, M. Virtual Reality: Definitions, History, and Applications. "Virtual Reality Systems", Academic-Press, ISBN0-12-22-77- 48-1, pp. 3-14, 1993.
- [7] Cruz-Neira, C. Virtual Reality Overview. SIGGRAPH'93 Course, No. 23, pp. 1.1-1.18, 1993.
- [8] Mealy, P. Virtual & Augmented Reality for dummies, John Wiley & Sons, Inc., New Jersey, 2018.
- [9] Mykhailovska, O.V.; Chervynskiy, A.I.; Fokin, D.P. The Prospects of Virtual Reality (VR) Technology in Educational Process and Business, Scientific bulletin of Polissia no 1 (17), 2019.
- [10] Cochrane, T. Mobile VR in Education: From the Fringe to the Mainstream, International Journal of Mobile and Blended Learning, Volume 8, Issue 4, 2016.
- [11] Shumaker, R., Lackey, S. Virtual. Augmented and Mixed Reality – Applications of Virtual and Augmented Reality, 5th International Conference, VAMR 2014, Part II, HCI International 2014, Heraklion, Crete, Greece, June 22 – 27, 2014.
- [12] Haar, R. Virtual Reality in the Military: Present and Future, Faculty of Electrical Engineering, Mathematics and Computer Science, University of Twente, Netherlands, 2015.
- [13] Yildirim, G.; Elban, M.; Yildirim, S. Analysis of Use of Virtual Reality Technologies in History Education: A Case Study, Asian Journal of Education and Training 4(4): 62-69, 2018.
- [14] Pantelidis, V.S. Reasons to Use Virtual Reality in Education and Training Courses and a Model to Determine When to Use Virtual Reality, Department of Library Science, College of Education, East Carolina University, Greenville, North Carolina, USA, 2009.
- [15] Taxén, G.; Naeve, A. CyberMath: A System for Exploring Open Issues in VR-based Education, Department of Numerical Analysis and Computer Science, KTH, Stockholm University, Stockholm, Sweden, 2001.