THE PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON VIRTUAL REALITY

15-16 NOVEMBER 2022

HARRAN UNIVERSITY
ŞANLIURFA
TÜRKİYE

ISBN: 978-605-86579-2-2

Welcome

Hoş Geldiniz

सुस्वागतम्

خوش آمدی

خوش آمدید

Karibu

Bem Vinda

Akwaaba

Harran University
Şanlıurfa
Türkiye

ISBN: 978-605-86579-2-2

December 2022

Editors:

Dr. Dursun Akaslan
Dr. Ramesh C Sharma

Editor Assistants:
Songül Akdağ

CONFERENCE INFORMATION

Conference Name	4th International Conference on Virtual Reality
Conference Book ISBN	978-605-86579-2-2
Conference Website	http://virtualreality.harran.edu.tr
Conference Date	15-16 November 2022
Conference Place and Form	Harran University, Şanlıurfa, Türkiye – Online
Conference Chair	Assoc. Prof. Dr. Dursun AKASLAN
Conference Co-Chair	Prof. Dr. Ramesh C. SHARMA
Conference Youtube Channel	https://www.youtube.com/@intlconferenceonvirtualreality

INVITED SPEAKERS

Country	**Full Name**
Brazil	Andreaia de Bem Machado
Ghana	Samuel Kojo Kwofie
India	A S N Chakravarthy
India	Vinod Dumbleekar
India	P. V. Suresh
Italy	Paola Rizzi
Malaysia	Rafidah Abd Karım
Portugal	Maria Jose Sousa
Romania	Alin Zamfiroiu
Spain	Jordi Martos
Singapore	Deepak L. Waikar
Türkiye	Fred Barış Ernst
USA	Helga Hambrock
Venezuela	Doris Molero

PAPER PRESENTATIONS AND KEYNOTE SPEECHES

Country	**No. Of Papers**	**%**	**No. of Speeches**	**%**
Brazil	1	3.03	1	7.14
Ghana	0	0.00	1	7.14
India	17	51.52	3	21.43
Malaysia	2	6.06	1	7.14
Malta	1	3.03	0	0.00
Peru	1	3.03	0	0.00
Portugal	0	0.00	1	7.14
Romania	1	3.03	1	7.14
Spain	1	3.03	1	7.14
Singapore	0	0.00	1	7.14
Taiwan	1	3.03	1	7.14
Tanzania	2	6.06	0	0.00
Türkiye	5	15.15	1	7.14
USA	1	3.03	1	7.14
Venezuela	0	0.00	1	7.14
Total	**33**	**100.00**	**14**	**100.00**

AUTHORS AND SPEAKERS

No	Full Name	Country	No. of Authorships	No. of Speeches
1	A S N Chakravarthy	India	0	1
2	Aarti Yadav	India	1	0
3	Alin Zamfiroiu	Romania	1	1
4	Andreaia de Bem Machado	Brazil	1	1
5	Anil Sharma	India	1	0
6	Anjana Anjana	India	2	0
7	Chien-Ju Lo	Taiwan	1	0
8	Deepak L. Waikar	Singapore	0	1
9	Dimpy Kumari	India	1	0
10	Doris Molero	Venezuela	0	1
11	Dursun Akaslan	Türkiye	3	0
12	En-Chen Chen	Taiwan	1	0
13	Fred Barış Ernst	Türkiye	1	1
14	Helga Hambrock	USA	1	1
15	J. V. Madhusudan	India	3	0
16	Jasmeet Kaur Tandon	India	1	0
17	Jeremy Grech	Malta	1	0
18	Jonathan Barbara	Malta	1	0
19	Jordi Martos	Spain	1	1
20	Julieta Flores Michel	Mexico	1	0
21	Kezia H. Mkwizu	Tanzania	2	0
22	Luis Cesar Molina Almanza	Peru	1	0
23	Margarita Emilia Gonalez Trevino	Mexico	1	0
24	Maria Jose Sousa	Portugal	0	1
25	Mehmet Şah Akcan	Türkiye	1	0
26	Mehmet Umut Salur	Türkiye	1	0
27	Mohammad Fikrey Roslan	Malaysia	1	0
28	Mustafa Ulukavak	Türkiye	1	0
29	P. V. Suresh	India	0	1
30	Paola Rizzi	Italy	0	1
31	Priya Singh	India	1	0
32	Rafidah Abd Karim	Malaysia	2	1
33	Rajeswari Pradhan	India	1	0
34	Ramesh Chander Sharma	India	2	0
35	Runi Mani Das	India	1	0
36	Samuel Kojo Kwofıe	Ghana	0	1
37	Sanchaita Narth	India	1	0
38	Sarita Sharma	India	1	0
39	Saurav Negi	Omman	1	0
40	Shahana Rafiq	India	1	0
41	Shalini Attri	India	1	0
42	Shantanu Trivedi	India	1	0
43	Sharmila Jajodia	India	1	0
44	Siran Mukerji	India	2	0
45	Soumya Ranjan Das	India	1	0
46	Sumedha Agarwal	India	1	0
47	Tsai-Yen Li	Taiwan	1	0
48	Varuna Dahiya	India	1	0
49	Vinod Dumbleekar	India	0	1
50	Yogesh Chander	India	1	0
51	Yogesh Punia	India	1	0
52	Yusuf Elmuhammed	Türkiye	1	0

Contents

Foreword

We have been very pleased to have the opportunity to arrange the 4th edition of the International Conference on Virtual Reality. International Conference on Virtual Reality (VR) started in 2019 to bring together leading and industrial researchers, scientist, engineers, practitioners and students from universities, research institutes, industries and organizations all around the world to exchange their latest research ideas, methods, findings and to share their experiences.

14 invited speakers from Brazil, Ghana, India, Italy, Malaysia, Portugal, Romania, Spain, Singapore, Türkiye, USA and Venezuala participated in our conferences. All invited speakers attended our conferences and presented their speeches.

Our conference started on November 15, 2022 and ended on November 16, 2022, lasting two days. Additionally, our conference was broadcast live to the public on Youtube and received 1588 views.

We hope that this conference will have a tangible effect on the future development of virtual reality, augmented reality and other related technologies.

Thank you again for contributing to this conference

Dr. Dursun AKASLAN and Dr. Ramesh Chander Sharma

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Tanzania

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Indira Gandhi National Open University
India

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PROGRAMME

MAJOR HALL
15 NOVEMBER 2022

Opening Speech and Welcome Speech by the Chairs of Conference
Assoc. Prof Dr. Dursun Akaslan
Prof. Dr. Ramesh C. Sharma
(08:00-08:30)

Welcome Speech by the Dean of Engineering Faculty
Prof. Dr. Husamettin Bulut
(08.30-08:45)

Welcome Speech by the Rector of Harran University
Prof. Dr. Mehmet Sabri Celik
(08:45-09:00)

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BASDA VACES HALL
15 NOVEMBER 2022

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Experiencing Virtual Reality in Heritage Attractions of India: Perceptions of Gen Z Users
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(11:40-11:50)

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15 NOVEMBER 2022

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16 NOVEMBER 2022

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16 NOVEMBER 2022

Closing Speech by the Chairs of Conference
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Prof. Dr. Ramesh C. Sharma
(17:00-17:15)

Goodbye Speech by the Chairs of Conference
Assoc. Prof. Dr. Dursun Akaslan
Prof. Dr. Ramesh C. Sharma
(17:15-17:30)

Goodbye Speech by the Dean of Engineering Faculty
Prof. Dr. Husamettin Bulut
(17:30-17:45)

Goodbye Speech by the Rector of Harran University
Prof. Dr. Mehmet Sabri CELIK
(17:45-18:00)

CLOSING SESSION CHAIR
Prof. Dr. Ramesh C. Sharma

ABSTRACTS

Our Cities: Our Future

Fred Barış Ernst[1]

Abstract: During the last 50 years urbanization has accerelated at a never seen rate in many regions including Türkiye. According to numbers of the UN the year 2007 became the turning point when more than % 50 of the wordl population lived in cities. This rapid urbanization has been driven by migration from rural areas and from abroad due to political, security and economic crisises leading to environmental, health and transportation problems especially in slums areas at the fringes of cities.However, the question is whether these are the causes or the sypmtoms of a problem. I would argue that they are the symptoms of the underlying problem of an ineffective planning system and its missing implementation. There are many countries that had to struggle with migration during some part of their history. For example, in Germnay after the second world war 12 million refugees from the former Eastern region had to be accomodated. Still, no slums were erected. It can be stated that city planning is more important than ever. Traditionally, the results of city planning have been laid down in the form of lengthy reports and 2D maps. For the preparation of these maps, the use of Geographic Information Systems (GIS) has become standard in developed and developing countries as well since the 90ies. The disadvantage of such planning is that most people are reluctant to read through hundreds of report pages and have difficulties reading and understanding 2D maps in the right way. This applies not only to the general public that thus is excluded from the planning process but also to most decision-makers as well (Ernst et al. 2020). Given these circumstances, it is no wonder that in many cases city planning cannot be considered to be a very efficient process. Fortunately, new developments in Geomatics like 3D city models, virtual reality (VR) and Geodesign offer the tools to bring city planning to the next level. For example, Geodesign tools combine geography with design by providing stakeholders with tools that support evaluation of design alternatives (Ernst et al. 2022).
The purpose of this study is to explain the current state of art Geodesign and Virtual Reality applications for VR, how it has been applied

Keywords: Urban Planning, Geodesign, GIS, Virtual Reality

References

Ernst, B., F. & Çullu, A., M. & Benek, S. & Siverekli, E. & Erdoğan, S. & Aydemir, A. & Yenigün, İ. & Memduhoğlu, A. & Karabulut, İ., A. & Yıldırım, A., Ö. & Karagöz, M. G. (2020). Design of Development Scenarios for Şanlıurfa Region Based on Geodesign. GSI Journals Serie C: Advancements

Ernst, B. F., Karabulut, İ., A. & Yeşilnacar, M.İ (2022). Geodesign – a New Approach for RapidDevelopment of Planning and CarbonSequestration Scenarios. In M. Ben Ahmed et al. (eds.),Innovations in Smart Cities Applications Volume 5,Lecture Notes in Networks and Systems 393,https://doi.org/10.1007/978-3-030-94191-8_45559

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Understanding Student Engagement in MOOCs

Aarti Yadav[1] and Sanchaita Narth[2]

Abstract: This study tests a model of student satisfaction in MOOCs to identify the factors that have a significant influence on student satisfaction in MOOCs. The famous modified E-Learning Satisfaction (ELS) Model, Technology Acceptance Model (TAM), and the Construction of an E-learning Course Evaluation Model were broadly used to build the student satisfaction questionnaire which was also enriched by several other related works of literature. The self-constructed questionnaire on students' satisfaction was used to collect data from 240 students who had completed at least one MOOC course. The questionnaire included questions related to student satisfaction with four quadrants of MOOCs, such as e-tutorial, e-content, discussion forum, assessment, and also overall satisfaction related to instructional design. Descriptive and inferential statistics were used for the derivation of the student satisfaction model. The model derived after the statistical application revealed new elements such as customized course content, feedback, interaction, and organised video content which are the four elements of MOOCs determining Student Satisfaction. Customized Course Content, Interaction, and Feedback in MOOCs were statistically significant in determining student satisfaction in MOOCs. The findings will help planners and developers of MOOCs to improve the design of MOOCs and consequently, the quality of the teaching-learning process in higher education.

Keywords: Student Satisfaction, Massive Open Online Courses, Higher Education

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Augmented Reality and Virtual Reality in the Post-Covid-19 Tourism

Kezia H. Mkwizu[1]

Abstract: Post- COVID-19 era is characterized with nations opening their tourism activities and engaging in recovery programs to attract tourists to destinations. According to this paper, tourism activities after the COVID-19 global pandemic is termed as Post-COVID-19 Tourism (PCT). Equally, technology advances can shape how tourists experience tourism. For instance, Virtual Reality (VR) and Augmented Reality (AR) technologies as indicated by Mkwizu (2021a, 2021b), Pestek and Sarvan (2021), and Siang et al. (2021). Therefore, this paper was motivated to explore technologies after the pandemic in Africa. An integrative literature review method was adopted to review literature. Findings indicated minimum usage despite benefits or advantages from these technologies. The outcome of this paper can guide tourism stakeholders to integrate AR and VR as advanced technologies to improve tourists' experiences when visiting tourist attractions. Additionally, future researchers may conduct actual data collection using mixed methods in understanding patterns in the use and application of these technologies for Africa's tourism.

Keywords: Augmented Reality, Virtual Reality, Post-COVID-19 Tourism

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Experiencing Virtual Reality in Heritage Attractions of India: Perceptions of Gen Z Users

Sumedha Agarwal[1] and Priya Singh[2]

Abstract: A crucial problem that is affecting tourism all around the world is the deterioration of attractions, sites, artefacts, and destinations. Due to the complexity and expense of managing preservation with on-site tourism involvement, the closing of tourist destinations and attractions is becoming more frequent. The demolition or closure of tourist attractions, however, poses difficulties for the growth of the tourism industry. The inability to encourage significant visitor involvement at sites affects the experiences that visitors have while visiting. The solution to this problem lies with virtual reality (VR). The potential uses of virtual reality to improve the travel experience have recently attracted more attention. Although Gen Z is one of the largest virtual reality user groups, very few research have qualitatively examined the experience from their perspective. So, the purpose of this study is to investigate how VR affects the travel experience of Gen Z. The goal of this study is to examine how Gen Z travellers perceive the use of virtual reality technologies as a tactical countermeasure to the negative consequences of overtourism at well-known Indian tourist destinations. The present study interviewed 21 Gen Z tourists at an Indian cultural heritage tourism destination in order to accomplish the goal. Thematic analysis was used to analyse the interviews, and the results showed how VR affected Gen Z's experience as well as what was needed for VR applications at cultural heritage sites. The study's findings revealed conflicting opinions about the use of virtual reality in relation to historical and cultural tourism attractions.

Keywords: Virtual Reality, Tourism, Over Tourism, Gen Z, Heritage Sites

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Virtual Reality and Inclusive Education: Teaching Students with Special Needs

Shalini Attri[1] and Varuna Dahiya[2]

Abstract: Inclusion and integration confirm equal opportunities so as to provide active participation of every member in society. Inclusive education understands the challenges faced by individuals with special needs with reference to language, remembrance, reasoning and knowledge acquiring. In order to teach special students, there is a requirement of certain strategies and different approaches. Technology in contemporary times becomes a significant tool of learning in the classroom and an important aid for students with special needs. Teachers can make use of assistive technologies for the teaching learning process, hence making classroom inclusive. Virtual Environment has caused a paradigm shift in the education system and has proved to be advantageous for the students with special needs. Virtual reality is a stimulating tool that provides a supportive environment for transferring of knowledge between real and virtual worlds. It can help students with special needs identify their capabilities, skills, learning preferences through effective interventions. The paper will study the effect of virtual reality for improving of pedagogy to teach students and cultivate the sense of belongingness among children with special needs in inclusive classroom.

Keywords: Special Education, Virtual reality, Pedagogy, Inclusive Classroom.

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Immersive Learning Experiences in the Eduverse: A Reality Bridging the Gap between Virtual Innovation and Social Interaction

Siran Mukerji[1] and Anjana Anjana[2]

Abstract: Metaverse, a collection of all virtual worlds created with blockchain technology, is the latest in technological innovations. As is commonly known, a metaverse may be entirely virtual like a virtual reality (VR) system or only partially virtual, like the usage of augmented reality (AR) in real-world settings. Its implications are widespread and far-fetched, being applied in many sectors including education. Metaverse in education i.e. Eduverse, is a cutting-edge online learning environment offering institutions a secure and private "metaverse." It helps the teacher and the taught to explore rich virtual worlds in a welcoming and safe atmosphere. With the help of Eduverse, students work together in virtual environments that provide a new method of learning and social interaction. In the present paper, while discussing the concept of metaverse, the authors intend to provide an insight into the application of metaverse with specific reference to education “Eduverse in perspective”, and its present status in India. They also propose delving on the challenges faced by the Indian institutions in inducting the nouvel technology in transferring knowledge and skill to the learners.

Keywords: Metaverse, Eduverse, Immersive Learning, Virtual Reality, Higher Education

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Metaverse and its Role in Supply Chain Management

Shantanu Trivedi[1] and Saurav Negi[2]

Abstract: Firms are eager to adopt new technologies, such as Virtual Reality, Artificial Intelligence (A.I.), Augmented Reality, Big Data, etc., as they witness successful business applications. As one of the technological disruptions, Metaverse has been drawing attention stemming from both the supply chain and overall business. Metaverse is being strengthened with various factors, from mobile-based always-on access to connectivity with reality using virtual currency. Furthermore, the burgeoning of Metaverse and non-fungible tokens (NFT) has raised Metaverse to another notch. This study conducts a holistic literature review on metaverse features, applications, and implications in supply chains across the globe. In particular, by reviewing and analyzing up-to-date articles that reveal metaverse applications across various echelons of the supply chain, this metaverse-focused study reveals the research status and delineates future research directions. It is shown that, among various characteristics of the metaverse, it is providing better visibility into processes, facilities, inventory, and capacity, it is also helping companies remove supply chain constraints and connect better with their customers. These characteristics fuelling the metaverse's application in supply chain management and logistics operations. We further find that metaverse-related research has been extremely growing in healthcare, retail and infrastructure, while there is still scope for study in the areas of supply chain security and traceability. Finally, it is emphasized that metaverse-related research in logistics, supply chain operations and agriculture supply chains have the potential to be explored.

Keywords: Metaverse, Supply chain management, Immersive Experience, Logistics Operations, Retail Operations, Urban

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Virtual Labs: Refreshed Experiential Virtual World of Learning

Anjana Anjana[1] and Siran Mukerji[2]

Abstract: Recent advancements in Information Technology in India have fuelled the expansion of web-based digital learning across the majority of subjects including practical based disciplines. In resource-constrained nations with a large number of potential students, distance education provides an edge to the learners by extending educational opportunities. However, imparting practical knowledge through distance mode is a challenge. Mitigation of such constraints can be made possible through Virtual Labs, an initiative of the Government of India, under the umbrella of National Mission on Education through Information and Communication Technology. It is expected to be a milestone by creating a paradigm shift in ICT-based education especially for practical based courses. Although virtual and open learning initiatives have the potential to significantly alter education in practical based programmes, they cannot be a substitute for practical laboratories in face to face mode. However, utilizing the virtues of virtual labs, scientific education can be effectively expanded and the global community of students, scientists, and citizens can undoubtedly benefit from creative and forward-thinking initiatives through e-learning and virtual labs. In the proposed paper, it is intended to provide the holistic view of the virtual labs project being implemented in India, its current status in terms of extending practical knowledge to the students, and the future prospects of integrating virtual labs for practical training with the mainstream methods for the distance learners. Besides, it is intended to provide the audience a walk through the online platform of virtual labs in the presentation

Keywords: Virtual Reality, Experiential Learning, Virtual Labs, Distance Education, Practical Training

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Efficacy of AR Based Blended MOOC in Teaching Geometry to Elementary Students

Yogesh Punia[1]

Abstract: Improved teaching methods can now be achieved through the use of augmented reality (AR). To support user perception, AR combines multimedia data with his 3D visuals, photos, animations, and sounds. In a blended learning environment centered on MOOCs, this study looked at how well AR technology may be used in the classroom to teach geometry to elementary school pupils. The suggested study integrated augmented reality (AR) learning applications into interactive learning settings. It was found that children were satisfied with the majority of learning activities and had made considerable progress in terms of the Learning Indicators for Elementary Students as set forth by NCERT using a non-randomized control group pre- and post-test quasi-experimental method.

Keywords: Augmented Reality, Blended MOOCs, Geometry

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Designing and Implementing Al Supported Virtual Fitting Room

Dursun Akaslan[1] and Mehmet Şah Akcan[2]

Abstract: The desire of people to touch the product, try that product and see the real dimensions of the product affects shopping. A fitting or dressing room is used to meet these desires of people in shops. A fitting room is described as a room or area in a shop, where people can put on clothes to check that they fit before they purchase them. A virtual fitting room might bring great opportunities to online shopping by enabling people to virtually try on clothes. Therefore, the purpose of this paper is to design and implement an artificial intelligence-supported virtual fitting room by following three steps. First, we model items such as shirts and trousers that people wear on their bodies by using the Three.js library. Second, we detect key points of a body such as a nose, eye, ear, shoulder, elbow and wrist by using a TensorFlow library. Third, we match the key points of people's bodies with virtual clothes by using the React library. By the virtual fitting room, people can view the clothing animation on the various angles and can change the color and size of items while they try on through their webcam.

Keywords: artificial intelligence, virtual reality, fitting room.

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FULL PAPERS

Virtual Reality and Augmented Reality Applications in Smart Tourism

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Abstract: Technological developments have forced society to change on many issues. Tourism activities, which constitute a crucial source of income for many countries, have also been affected by this situation. The future of tourism will be determined by the consequences of tourism's adaptation to smart tourism technologies. Smart tourism is defined by tourism centers or tourism activities that offer solutions based on important technologies such as artificial intelligence, virtual reality, and augmented reality. Today, it is possible to see the applications of VR and AR technology in many areas. These technologies have been used in smart tourism solutions in recent years. This study focuses on VR/AR applications in the domain of smart tourism. The VR/AR solutions developed for smart tourism have been examined, and the opportunities and challenges in this field have been emphasized to researchers working on VR/AR and smart tourism

Keywords: Virtual reality, Smart tourism, Augmented Reality

Introduction

Today, it is possible to see the applications of advanced information and communication technologies in many sectors, one of which is tourism. The widespread use of smartphones and the accessibility of internet technology from anywhere have caused changes in traditional tourism business models and solutions. The notion of smart tourism refers to tourism solutions that include applications of technologies such as artificial intelligence, mobile computing, virtual reality (VR), augmented reality (AR), big data, wireless networks, and the internet of things (Ye, Ye, & Law, 2020). These technologies can be seen being applied in various aspects of smart tourism. Among these technologies, VR/AR is directly related to the user experience. While VR provides users with an interactive virtual environment through computer graphics, AR provides an environment for interaction with virtual elements in the real environment (Jung & tom Dieck, 2018). The use of VR/AR technology in smart tourism has significant potential to contributions to visitor and tourism center revenues. Increasing visitor satisfaction with VR/AR applications and providing economic and cultural gains as a result are among the goals of many tourism centers. Considering that tourism is an important sector of the economy for many countries, smart tourism can assist in sustainable tourism development. Moreover, it has the potential to have an impact on tourist destinations. Thus, it is possible to encourage visitors to visit tourist centers with VR.

VR/AR is one of the critical technologies for smart tourism. VR/AR provides visitors with opportunities such as remote virtual tours, visiting existing works through games, guiding and promoting the tourism center (Boletsis & Chasanidou, 2018). In addition, VR/AR-based solutions offer visitors accommodation, audio guides, interactive street maps, and other services that increase travel comfort for visitors. In this way, the spread of tourism centers leads to positive results, such as increasing their awareness and frequency of visits. Social media, blogging and other technologies cause an increase in the number of tourists. Users' experiences of a trip affect each other. In this context, the use of cutting-edge technology in tourism center services is crucial for boosting tourism and generating substantial revenue. Smart tourism solutions equipped with artificial intelligence and VR/AR technologies in tourism centers have increased the satisfaction level of customers (Van et al., 2020). The advancement of VR and AR technology will improve the standard of smart tourism services and offer a variety of service options. The concept of smart tourism has attracted the attention of scientists relatively new to VR/AR technologies. It means that VR/AR solutions in the smart tourism field are yet to be developed and increased. This study focuses on VR/AR solutions developed in the area of smart tourism. Applications of the concept of smart tourism in VR/AR have been investigated, and these solutions have been methodically addressed. The current position of VR/AR technologies in smart tourism and the opportunities for future studies are discussed. The study's second section introduces VR/AR technologies, followed by its third section on smart tourism, and its fourth section covers methodology. The study summary and future research are addressed in the final section.

Purpose of the Study

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Through a thorough examination of the literature on the application of virtual reality in the field of smart tourism, we want to uncover any research gaps in this study. Moreover, we categorize the empirical research from 2017 to 2022 and lay the groundwork for future research.

Virtual Reality and Augmented Reality

VR and AR are closely related concepts. VR offers users the experience of interacting with a computer in a virtual environment. In VR, the user wears an eye-closing headset and a headset to replace the real world with a purely virtual one. Among the factors affecting the development of VR technology are graphics processor cards, the development of virtual modeling technologies, the development of software frameworks, and wearable VR glasses. One of the factors affecting the prevalence of VR is Unity 3D being free and the affordable prices of VR glasses (Kondo, Ikezawa, & Ozeki, 2017). VR is used in many areas, such as health, education, culture, tourism, industry, games, and entertainment. It is still a new research area for the concept of smart tourism. AR is a technique that stimulates our senses and enriches the user with visualization of computer-generated data such as graphics, video, text, and GPS (Katkuri, Mantri, & Anireddy, 2019). In AR, the relationship between the real environment and virtual objects is mostly realized with mobile applications running on smartphones or tablets. AR basically allows virtual items to interact with real items in order to create their intended meanings. Although VR and AR were terms that were sometimes used interchangeably in the past, today the boundaries of these two concepts are separated. Applications that contain both VR and AR technologies together are called Mixed Reality (MR) today. Figure 1 shows the visuals of VR, AR, and MR technologies. While AR technology is grounded in reality, VR offers a completely virtual environment experience. On the other hand, MR includes both technologies together. In MR, users can collaborate and control both physical and virtual things.

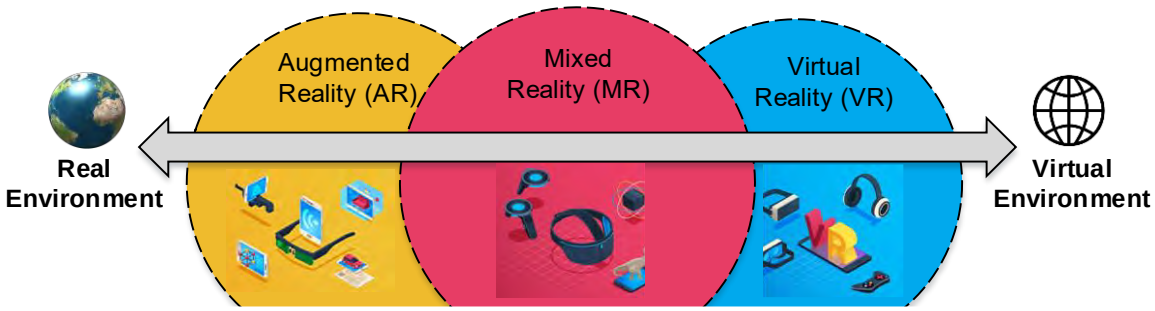

Figure 1. The relation of VR, AR, and MR between the real and virtual environment.

Literature Review

Smart Tourism

Technological developments have directly entered people's lives in many areas in society. Technologies such as VR, AR, big data, artificial intelligence, mobile computing, wireless networks, and the internet of things, which have gained great development momentum in recent years, have led to changes in the production and service sectors. The tourism sector is essential source of income for many countries, which includes many sub-sectors (transportation, accommodation, food and beverage, etc.). With the use of social media and the increase in the accessibility of the internet, the tourism sector has reached more tourists as a result of the communication between people and the situation of mutual influence. It is important for tourists to have a comfortable trip, to have sufficient facilities in the tourism center, and not to have high travel costs. In order to meet the expectations of tourists, the tourism center is equipped with technological solutions. The concept of "smart tourism" basically refers to solutions consisting of smart technologies offered to visitors (Gretzel, Sigala, Xiang, & Koo, 2015). A smart tourism destination is expected to offer visitors cutting-edge experiences. At the beginning of these technologies are VR, AR, smart audio guides, 3D simulations, the internet of things, sensors, smart camera systems, and mobile applications. In Figure 2, indispensable technologies for smart tourism are given. VR is one of these technologies that has been extensively used in tourist attractions.

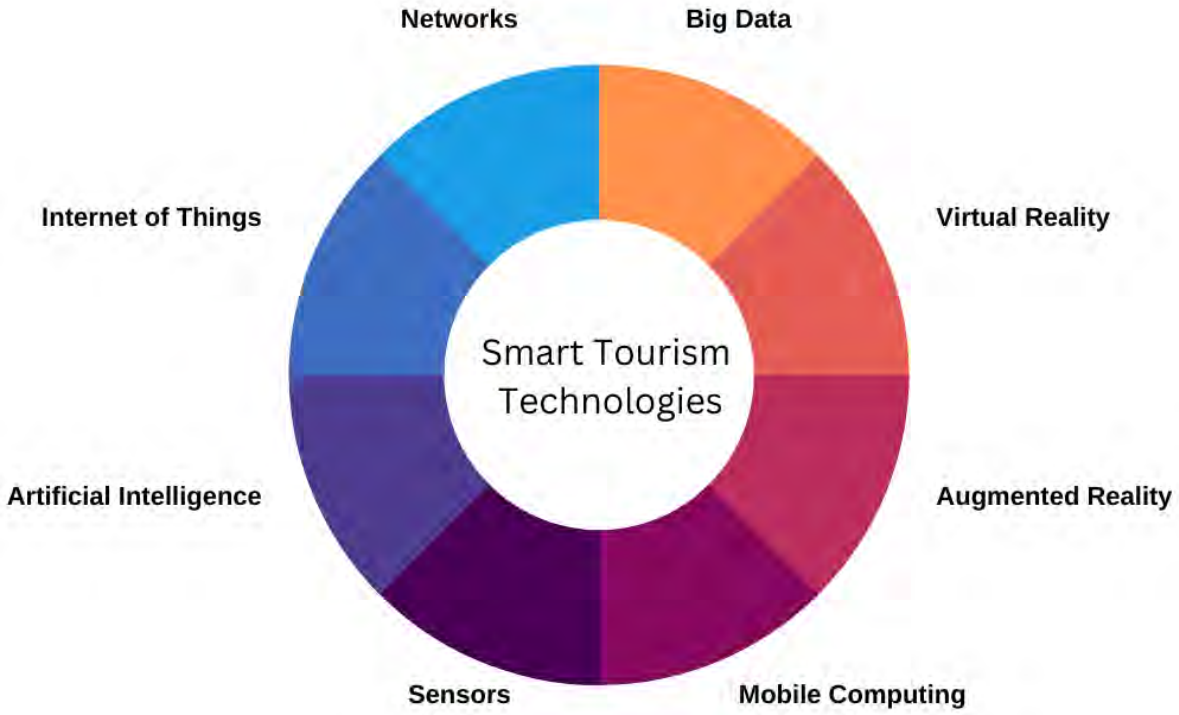

Figure 2. Smart tourism technologies

Smart tourism is also a subset of smart cities. Smart cities are of critical importance for providing today's energy needs, raising living standards, efficient use of natural resources, reducing environmental pollution, and ensuring a sustainable life. Smart cities aim to solve people's health, social and economic problems with technological solutions based on information and communication technologies (Khan, Woo, Nam, & Chathoth, 2017). While smart tourism narrowly aims to eliminate similar concerns for tourism centers, it serves the same purpose as the concept of smart cities in a broad sense. Smart tourism deals with management, service, and marketing concepts in tourism centers in a multi-faceted manner. In addition, tourism centers are expected to be built in a sustainable structure to meet the changing needs of tourists (Rongrong, 2017). One of the key goals of smart tourism centers should be to offer goods and services that can satisfy visitors' demands and expectations. The future of tourism will be built on smart tourism solutions and technologies. Smart tourism expands the inner thinking of tourists, breaks the boundaries of traditional cultural tourism, and removes the space and time limitations of real-life tourism. For example, the fact that a smart tourism center provides virtual browsing on the internet will excite and motivate visitors to visit this destination. In addition, the accessibility of the tourist attraction will improve as a result of the virtual tour, which will enhance the attraction's popularity.

Methodology

In this study, smart tourism VR/AR applications published in the Web of Science database between 2017 and 2022 are discussed. The articles were first searched from the titles, keywords, and abstracts of the articles indexed together with the keywords "Smart tourism" and "augmented reality" or "virtual reality". Articles containing VR or AR applications developed for smart tourism were selected directly from the search results. From these articles, it has been researched that VR and AR technologies are used for which purposes in smart tourism and for which problems they are used. The study employed the content analysis method. With the help of content analysis, patterns in existing research and theories can be discovered and new patterns can be created. When deciding which publications to include in the review, the application-oriented nature of the articles was considered, and non-application-oriented articles were eliminated from the study.

Use of VR/AR in Smart Tourism

The concept of smart tourism requires both technological and management policies to work in sync. Smart tourism center technologies have brought along structural changes in tourism centers. In this section, VR/AR applications in smart tourism are discussed terminologically. The VR/AR for smart tourism development phase is presented.

The study of VR's potential applications and contribution to smart tourism is still in its infancy. Therefore, VR studies are in a way preliminary studies for the concept of smart tourism. VR application was implemented in order to stimulate the economy and contribute to digital tourism in the Skellig Kerry region of Ireland (Keogh, Hyland, & Nassar, 2017). In this direction, studies were carried out to present the images taken with the help of drones from the mountains in the Skellig Kerry region of Southern Ireland, to the visitors with the help of VR by modeling them in three dimensions. Image capture, 3D model creation, 3D outputs, VR and AR are addressed. A novel framework has been developed for automatic modeling of components of Japanese ancient architectures (Kondo et al., 2017). With the help of this framework, it was possible to develop VR/AR applications. The created framework allows for simple modeling and implementation of features typical of ancient Japanese buildings. It is essential for visitors to tourism centers to have access to a guiding service in order to make the most of their time there and have a comprehensive understanding of the location. Tourist center guides cannot always tour every part of tourism centers. To solve this problem, MR guidance service was created by combining intuitive interaction and Cardboard (Lee, Chen, Hsieh, & Chin, 2017). To provide an intuitive museum guide mode, the MR guidance service system has been implemented. The system offers visitors an MR experience thanks to 3D objects, smartphone, and motion detection.

Developments in cloud computing, location-based services, VR/AR, big data and mobile communication technologies have led to the development of tourism services and systems. Mobile AR tour guides are used in the tourism industry today. As a smart tourism application, AudioNear, an AR application with sound, was designed to support tourists' exploration of open, urban environments (Boletsis & Chasanidou, 2018). It aims to contribute to smart tourism with the augmented reality application prototype developed for Muğla Gökova in Türkiye (Demir & Karaarslan, 2018). With the developed application, it is aimed to introduce important touristic places, hotels, restaurants, and sightseeing places to local and foreign visitors. There are VR/AR applications in various parts of Rome. A VR/AR experience is provided to the visitors with the help of glasses at the Forum of Augustus, Augustus Ex Cinema, and Ara Pacis (Geropanta, Karagianni, & Parthenios, 2019). A VR application called “Vis comes true” has been implemented for the island of Vis (Rácz & Zilizi, 2019). In “Vis comes true”, it is possible to tour the Croatian island of Vis virtually. The whole island is 3D modeled and you can navigate the island. People who do not have the opportunity to physically visit tourist destinations may nonetheless enjoy the experience of touring those places through the use of solutions that provide access to such virtual tours.

Typically, museum visitors desire to be able to touch the artworks they view. Due to the high value and fragility of the artworks, visitors are prohibited from touching them. A system that combines Natural Interaction and AR has been developed to solve the problems of fragile structures, inaccessibility, and non-interaction of cultural heritage artifacts applied in a cultural heritage museum (Kyriakou & Hermon, 2019). In this system, 3D copies of the artifacts in the museum are presented to the users' experience of touching and interacting with AR technology. The proposed method has been tried in a museum and has been widely accepted by visitors. The ArkaeVision project has been proposed to create a technological infrastructure for the permanent development of cultural resources (Bozzelli et al., 2019). ArkaeVision is built on the foundations of digital fiction and engaging storytelling. As a new communication paradigm, it offers an experience of game-like exploration in a three-dimensional environment. This experience finds application in VR in the Temple of Hera II Paestum and in AR in the discovery of the Tomb of the Swimmer. VR and AR experiences are presented together in the application. Ensuring the security of touristic areas is important for the sustainability of tourism revenues and visitor safety. A smart video surveillance system based on VR technology has been developed on the Android platform to realize video surveillance of tourist sites (Huang, Huang, & Wang, 2020). The application of VR technology helps to secure the safety of regions that tourists frequently visit in this way.

Smart tourism platforms are technological solutions that allow tourists' and tourism centers' needs to be coordinated from a single point. A platform for smart tourism is presented that combines WEB GIS (Geographic Information Systems) and VR technologies (Wang, Liu, Fang, Ding, & Zhang, 2021). On this platform, tourism management, tourism services, and functional functions related to visitors are combined under one roof. On this platform, visitors can take virtual tours of the tourism centre. They also perform basic operations such as route planning and tourist centre search. The android-based smart SIPADU application developed for smart tourism uses VR as a promotional strategy (Idris et al., 2021). SIPADU basically serves the users in the categories of Destinations, Accommodations and

Amenities. VR is one of the technologies that enables human-computer interaction. Smart tourism includes technologies that provide human-computer interaction, automatic perception of human behavior, and the development of technologies dependent on human behavior. A method based on human action behavior recognition technology has been developed for smart tourism (Ma, 2021).

A human behavior detection algorithm to be used for VR applications is proposed. Automatic determination of tourist behavior is important for smart tourism solutions. Tourist centers experience deterioration over time as a result of natural events. After these deteriorations pass the threshold level, the relevant tourism centers are closed to visitors. The role of VR for the continuity of visitor reception of tourism centers against these disruptions has been discussed (Bec, Moyle, Schaffer, & Timms, 2021). The use of VR and AR in tourism education is critical for the development of smart tourism solutions. Factors affecting the acceptance of AR and VR applications in higher education and tourism education during the COVID-19 pandemic were investigated (Shen, Xu, Sotiriadis, & Wang, 2022). The research was carried out on students studying tourism at some universities in China. As a result of the study, usefulness, hedonic motivation/acting, and price value were found to be determining main factors in students' use of AR/VR applications for purposes of learning activities.

VR/AR Usage Areas in Smart Tourism

Among the studies discussed in this study, it is seen that VR / AR technologies are among the smart tourism solutions today. VR/AR technologies are used in many different areas, especially in order to increase the quality of sustainable smart tourism centres and tourism centre services. Considering the smart tourism and VR studies examined in this study, the domains where VR and AR find applications are given in Figure 1. In smart tourism, VR/AR solutions were initially used only for virtual tours, promotion, and tourist guides, but in recent years they have started to be used in the fields of security, second chance tourism and education. The usage areas of VR/AR will expand further with increasing smart tourism investments and increasing accessibility of VR/AR technologies.

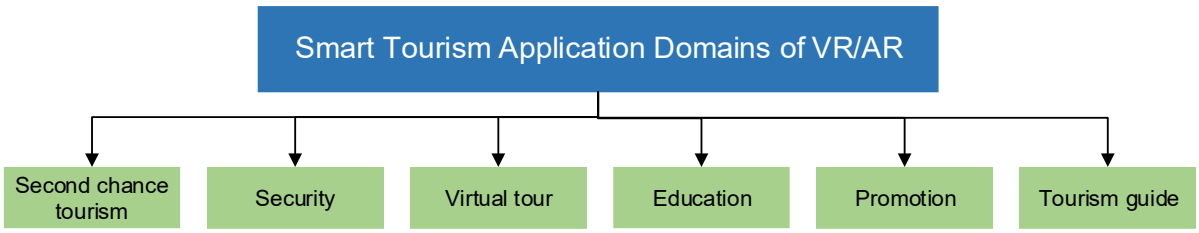

Figure 3. The usage domains of VR/AR in smart tourism.

Virtual tour: Virtual tours offer visitors the opportunity to see about a tourism center without visiting the tourist center physically. This allows visitors to explore the tourism center without more effort. In addition, virtual tours arouse excitement and curiosity for visitors to actually visit a tourism center. Virtual tours allow visitors to verify and reinforce what they have acquired in the virtual environment. In the field of smart tourism, VR/AR applications are being integrated with mobile applications for tourism guides.

Tourism guide*:* Guidance service is important for tourists to be able to visit the tourist center well and to benefit from its opportunities. Although guidance service is not provided in every tourist center today, this service may be limited in centers with guidance service. Tourist guides can't always highlight the places that attract the attention of tourists, and they can't tour every part of the center in detail. VR/AR-based tourism guides overcome such problems and offer an experience that is under the control of the visitor. Tourism guides do not only include VR/AR technologies while visiting tourism centers. They are generally designed to meet the basic needs of tourists, such as accommodation, transportation, weather, route planning, and ticketing.

Promotion: The definition of tourism centers and advertising activities are one of the most important factors in ensuring that the tourism center is visited more. Today's mobile devices and social media applications are powerful communication tools for the promotion of tourism centers. However, promotional applications enriched with VR/AR technologies attract more attention from users and visitors. Many VR/AR promotional applications are built on the user's curiosity and interest in the tourism center.

Second change tourism: The erosion of artifacts in tourism centers, the disappearance of landmarks, etc. naturally occurring disruptions are a threat to sustainable tourism activities. VR/AR technology creates an opportunity to protect tourism centers against the consequences of these natural events. Reconstruction and renovation of destroyed or deformed cultural monuments and buildings can be done easily with the help of VR/AR. Artifacts or tourism centers deteriorated by natural events can be made available to visitors using VR/AR. Physical artworks can be protected by closing them to visitors. Thus, the life span of touristic monuments and artifacts is extended.

Security: The security of tourism centers is generally provided by security cameras. These cameras are usually controlled by operators. However, with VR/AR-based solutions, it can be ensured that tourists do not damage valuable monuments. In terms of smart tourism solutions, it is necessary to ensure the safety of both visitors and tourism center components.

Education: VR/AR solutions for healthcare, engineering, manufacturing, etc. It is used for educational purposes in many fields. Applications of VR/AR technologies in smart tourism are used in the training of tourism center staff and in tourism education at the undergraduate level.

The objectives of smart tourism solutions are to provide economic growth and to provide a more comfortable experience for visitors during their travels. VR/AR technologies are used for these purposes. In Table 1, VR/AR usage areas, author information, and year of publication of the studies discussed are given.

Table 1. The summary of papers that focus on solutions to smart tourism via VR/AR.

Year	Domain	Referance
2017	Virtual tour	(Keogh et al., 2017)
2017	Virtual tour, Promotion	(Kondo et al., 2017)
2017	Tourism guide	(Lee et al., 2017)
2018	Tourism guide, Promotion	(Boletsis & Chasanidou, 2018)
2018	Tourism guide, Promotion	(Demir ve Karaarslan, 2018)
2019	Virtual tour, Tourism guide	(Geropanta et al., 2019)
2019	Virtual tour	(Rácz & Zilizi, 2019)
2019	Tourism guide, Promotion, Second change tourism	(Kyriakou & Hermon, 2019)
2019	Tourism guide, Promotion	(Bozzelli et al., 2019)
2020	Security	(Huang et al., 2020)
2021	Virtual tour, Tourism guide	(Wang et al., 2021)
2021	Tourism guide	(Ma, 2021)
2021	Promotion	(Idris et al., 2021)
2021	Second change tourism	(Bec et al., 2021)
2022	Education	(Shen et al., 2022)

The utilization areas of VR/AR in the research shown in Table 1 have expanded in recent years. Although Virtual tour, Promotion and Tourism guide are the main areas of use in smart tourism, it is possible to see their applications in the fields of Second change tourism, Security, and Education in recent years. In Figure 4, the number of usage areas of VR/AR applications of the studies covered in this study are given. In the publications analyzed for this research, VR/AR technologies were used mostly for tourist guide (8 studies) and at least for tourism education/security (1 study).

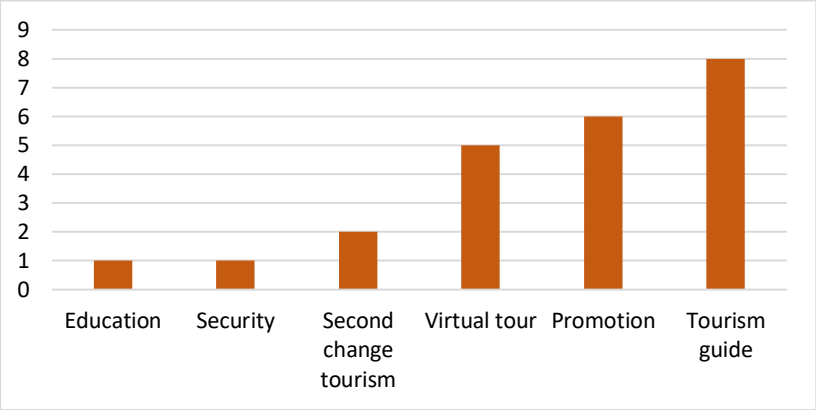

Figure 4. The number of usage areas of VR/AR for smart tourism in total studies that are examined in this study.

Conclusion

The concept of smart tourism is a new concept compared to VR and AR technologies. Therefore, it is possible to say that the number of VR/AR-based solutions developed for smart tourism is relatively low. The number of VR/AR-based solutions in education and healthcare is growing. The fact that VR/AR-based solutions in the field of smart tourism are still a new subject, shows that this field is open to new research and new developments. It is also possible to say that the usage areas of VR/AR-based solutions are also limited. In line with this study, it is suggested that researchers related to smart tourism and VR/AR should investigate the applicability of VR/AR solutions for different areas in order to use tourism resources efficiently and to increase tourism revenues.

In the concept of smart tourism, it is possible to create smart virtual tours and smart travel guides for visitors by combining VR / AR solutions with artificial intelligence technologies. In the studies examined within the scope of this study, it has been observed that VR/AR solutions are simple and do not contain any artificial learning techniques. In fact, it is possible to integrate VR/AR solutions with soft computing techniques to make visitor experience and decision-making more effective. It is possible to say that one of the obstacles to the diversification of smart tourism-based VR/AR-based solutions is the low number of smart tourism centers. Today, the number of tourism centers that have adopted the concept of smart tourism is not high. This makes it hard for researchers to work on VR/AR solutions to these problems while still being interested in them. In this study, application-based VR/AR solutions developed for smart tourism are discussed. Studies in the literature of the last five years have been systematically examined. With this study, the usage areas and limits of VR/AR-based solutions in smart tourism have been revealed. Barriers to the expansion of VR/AR-based smart tourism solutions and solutions are highlighted.

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Digital Pedagogy in Higher Education

Andreia de Bem Machado[1]

Abstract: Digital education with mobile technology is becoming a global trend with the intensive implementation of pedagogies that make use of information and communication technologies. Because they enable professors to support online teaching and learning while involving students in the use of interactive digital resources with an emphasis on pedagogy to impact learning, digital pedagogies are in line with social constructivism theory. Therefore, the issues addressed in this study were: 1) What is Digital Pedagogy? and 2) What are the main digital pedagogies applied to higher education? Thus, the objective was to map the most important digital pedagogies applied to higher education. the methodology used was an integrative literature review carried out in the Web of Science databases. The findings support a methodology that fosters teacher-student interaction while effectively utilizing technology in order to advance knowledge for the development of future professionals' competencies.

Keywords: Integrative Literature Review, Higher Education, Digital Pedagogies, Pedagogy, Methodologies, Education System

Introduction

Education linked to new technologies has been driving a significant change in the educational scenario. The pedagogy imbued with scientific and technical knowledge studies the reality of the educational context that, in the pandemic year of 2020, underwent a great transformation regarding the use of information and communication technologies. Such knowledge associated with scientific methods seeks to explain pedagogical practices, methodological intervention processes and organization of actions and knowledge related to the transmission and appropriation of knowledge. In this scenario, it is urgent to rethink educational strategies, in all types of teaching, and the focus of this research is higher education.

Thus, higher education institutions (HEIs) have been forced to redefine themselves and reconsider in order to keep up with the technological challenges of the post-modern world in this scenario marked by the COVID-19 pandemic, linked to profound social, economic, and cultural transformations, and the exploding development of digital information and communication technologies. Rethink new pedagogical techniques and practices that involve technological tools in pedagogical practice. This practice can be called Digital Pedagogy, which uses technological means in teaching methods, combined with the adoption of more dynamic learning processes. Therefore, the issues addressed in this study were: 1) What is Digital Pedagogy? and 2) What are the main digital pedagogies applied to higher education? Which will be answered with the following objective: to map the main digital pedagogies applied to higher education institutions.

Digital Pedagogy

In educational research, the term "digital pedagogy" has only lately appeared. P.N. Bilenko, et. al. (2020), Loginova et. al. (2018), Volkova, Lizunova and Komarova, (2021) and others examine the critical notions of digital pedagogy and the concerns of its inevitable evolution for the education system.

Digital didactics is described as "the science of organizing the learning process in a digital society" by the authors of "Didactic concept of vocational education and training" (Eremeev, 2020), highlighting that the focus of digital didactics is human activity (students' activity), not the operation of digital educational environments (Bilenko et al., 2020).

The cornerstone of digital pedagogy, according to the numerous definitions of the term, is traditional pedagogy, which makes use of modern digital means to enhance educational outcomes. In order to ensure the quality of education, current digital tools are used in the analysis and description of the pedagogical process, which is what modern digital

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pedagogy does. The research shifts its attention to challenges with "digital pedagogy" and educational quality (the difficulties that hinder learning achievements).

Due to the fact that "digital pedagogy" can be viewed from a variety of perspectives, it is difficult to comprehend (Väätäjä and Ruokamo 2021). Simply expressed, digital pedagogy is the application of technological aspects to improve or transform the educational process (Unesco, 2019). Digital pedagogy is the ability to incorporate digital technologies into teaching in order to improve learning, teaching, evaluation, and curriculum, according to Kivunja (2013, p. 131).

Methodology

A systematic search in an online database was employed as a method of literature search, and the findings were then subjected to an integrative analysis. As a result, it was attempted to work with the five steps of Torraco (2016), which were elaborated in the integrative literature review phase and are described below.

The research problem is formulated in the first step, research sources are defined in the second phase, articles and conferences are chosen in the third phase, the selection is evaluated in the fourth phase, and the research problem is resolved in the fifth phase.

Methodological Procedures

The integrative review aids in the systematic visualization of the current state of knowledge on the research topic and its timeline to the level of production by area, preventing minimization or repetition of studies as well as the propensity to bias when focusing on a particular theme (Machado et al. 2020; Torraco 2016). The research for this analysis was divided into five stages: problem formulation, research source definition, article selection, screening evaluation, and analytical synthesis of the findings. The creation of the research issue that will steer this investigation is the initial stage. What are the key digital pedagogies used at HEIs? will be answered by this. A database search was done to get the answer to this question; it began in October 2021 and ended in October 2021. Some criteria for the selection of the research were determined in the second phase, which dealt with the determination of research sources, including the defining of the research base. The number of its indexed, peer-reviewed abstracts and references, as well as its influence on the academic field in an interdisciplinary scope, led to the selection of the Web of Science electronic database.

The third phase is the selection of articles and conferences. Accomplishing it meant to delimit the search terms or expressions: ("pedagogy* digital" OR "digital education") AND "higher education". Because a concept depends on the context to which it is tied, as well as on its historical trajectory and conceptual analysis, the variations of the expressions used for the search are provided in a broader context, in the same proposal. It was decided to enter the words and phrases in the "Title," "Abstract," and "Keyword" columns as the search's guiding concept. There were no limitations on time, language, subject matter, or anything else. The fourth phase, evaluation of the selection, based on the previously defined criteria, totaled 156 papers published in indexed journals. This bibliometric analysis will be explained in section Bibliometric Analysis. The fifth step of the research contains the solution to the research problem. The inclusion and exclusion criteria were applied during this phase.

The following were specified as inclusion criteria for the study: a) peer-reviewed articles, in order to guarantee the quality of the selected publications; b) the descriptors should appear in the title, abstract or keywords in the three bases; c) article between the years 2017 to 2021; d) linked to the researched topic (digital pedagogy in higher education); e) articles using the following methods: Empirical research and literature review. The exclusion criteria for articles were: a) books and conference articles; b) articles without adherence to the research objectives and c) unavailability of full access to the article, either through the database itself, contact with authors or through parallel platforms such as Google Scholar, Research Gate and Esmerald Insight.
Thefore, of the 156 articles, 68 were excluded by the criteria explained above and by because they did not answer the research question: What are the main digital pedagogies applied to higher education? First, the remaining 88 documents were selected only for abstract reading. A thorough reading and analysis of the remaining articles resulted in the exclusion of 77 articles due to the absence of the main digital pedagogies applied to higher education. After this step, 11 articles were selected answering the research question , in order to map the main digital pedagogies

applied to higher education, thus establishing the schematic summary presented in Section 3, entitled Digital Pedagogy in Higher Education .

Bibliometric Analysis

To analyze the bibliometric data generated in the fourth phase, the Bibliometrix software was used, because through the R Bibliometrix package, called Biblioshiny, it had the most extensive and adequate set of techniques among the tools researched for bibliometric analysis (Moral-Muñoz et al. 2020). Three laws were applied for the analysis of bibliometric data (Figueiredo et al. 2019):

1) Bradford's Law, which measures journal productivity and identifies the one that publishes the;
2) Lotka's Law, which checks the productivity of each author, interpreting it as the probability of productivity, in which the number of published works increases the probability of the publication of new works related to the same topic by the author; and
3) Zipf's Law, frequency of keywords in works with correlated subjects.

Bradford's Law

The analysis began by referencing the global growth rate in the annual number of scientific publications on higher education and digital pedagogy, which was 36.22%. The number of publications in the last four years analyzed (2017 to 2021) was 115 articles, significantly higher than in the previous period (2005 to 2015), which totaled only 41 articles. Figure 1 indicates the growing interest in the topic, also indicating the average number of citations received annually, that is, the impact of the publications.

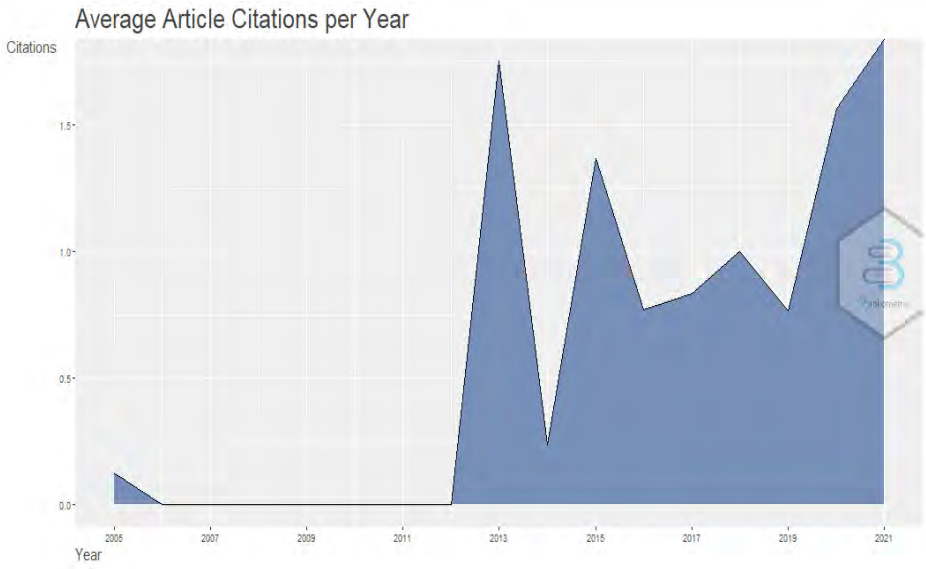

Figure 1. Annual scientific production

According to Bradford's law, the degree of relevance of journals should be estimated by measuring the journal productivity (Figueiredo et al., 2019). The three journals with the highest publication productivity in the area of digital pedagogy in higher education are: *Digital Education Review*, with 28 publications, *Digital Education: Out To The World And Back To The Campus*, and *Disco 2015: From Analog Education To Digital Education*, both with 6 publications in the area.

Lotka's Law

This analysis began by identifying the twenty most relevant authors on the subject of this research, which are explicited in Figure 2.

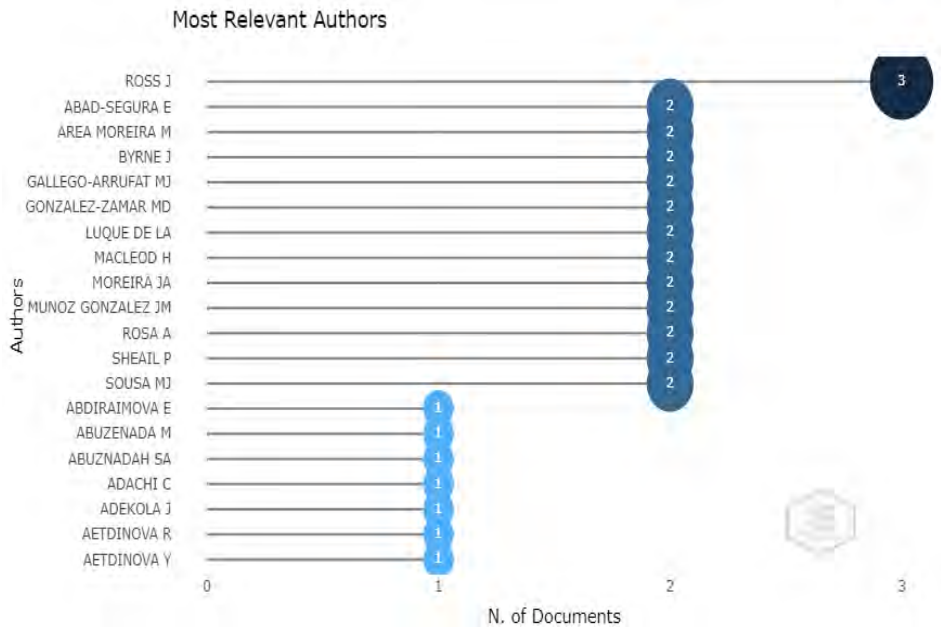

Figure 2. Most relevant authors

The interpretation of Lotka's Law was based on the number of publications per author, in which 97.2% of the authors have only one publication, while 2.6% of the authors have two publications. The largest number of publications per author is three works by author Jen Ross, representing only 0.2% of the authors, as shown in Figure 3.

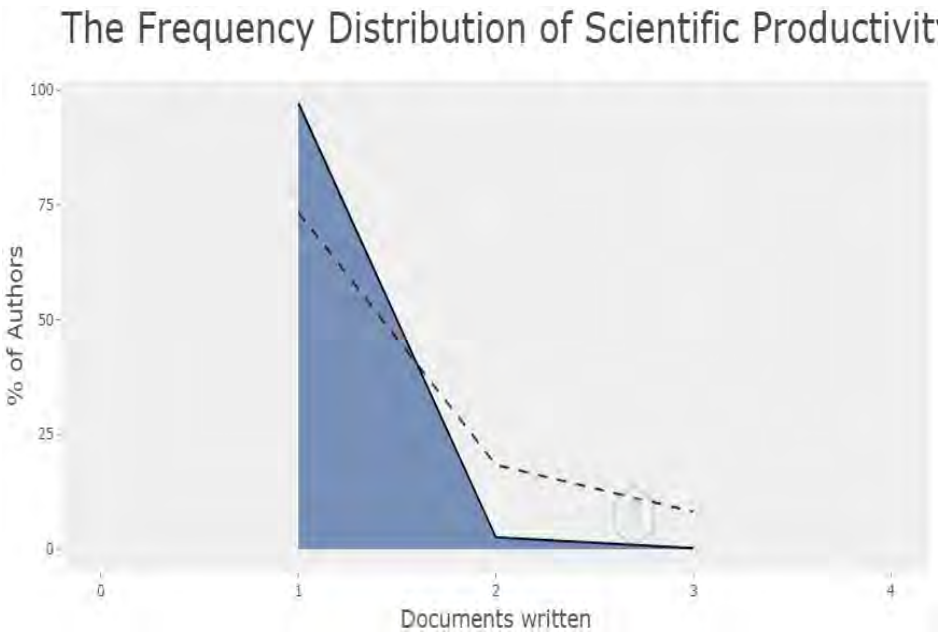

Figure 3. Author productivity by Lotka's Law

Zipf's Law

For the analysis according to Zipf's Law, the main keywords were classified according to the frequency of occurrence: the higher the frequency, the greater the area that a given word occupies in the word cloud. The words education, impact and students are the most frequent words in the published works. Figure 4 shows a keyword cloud following Zipf's Law.

Figure 4. Keyword cloud following Zipf's Law

Countries

The countries that published the most about Higher Education and Digital Pedagogy were: Spain, with 37 publications, and Russia, with 19 publications. Figure 5 shows the intensity of publication by country and the relationship established between them, through citations between published works. In Figure 5, the countries with the most publications on the subject of this study are highlighted in dark blue on the map, and those colored in lighter blue are the countries with fewer publications. The countries colored in gray are those that have no publications on the subject.

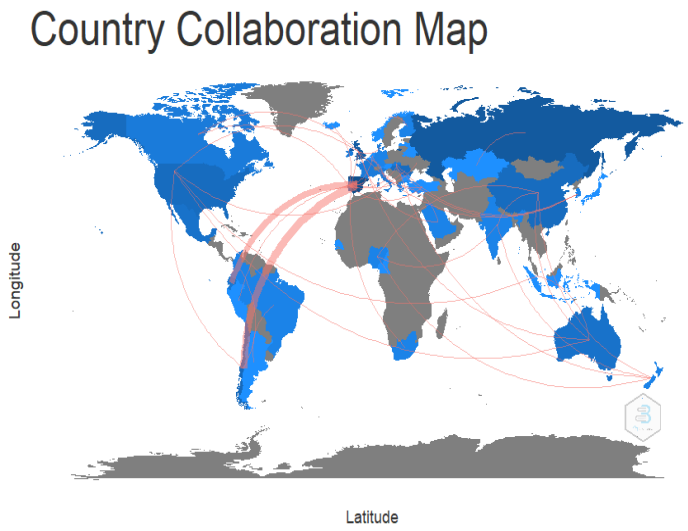

Figure 5. Country Collaboration Map

Figure 5 shows the flow of collaboration between countries. The thicker orange bands demonstrate an intense collaboration between Portugal and the countries of South America. The thinner bands represent less collaboration between countries in North America, Asia, and Oceania.

Most impactful authors

Figure 6 represents the co-citation network in three clusters. The cluster in blue indicates anonymous, Knox J. and Bayne S. as the most influential network in the area of Digital Pedagogy and Higher Education.

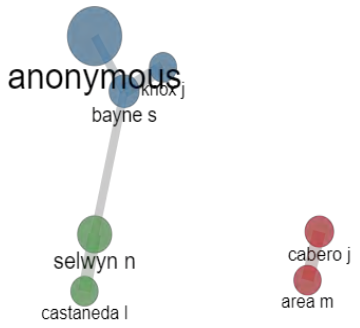

Figure 6. 10-node co-citation network of authors and institutions

Digital Pedagogy in Higher Education

Education is the subject of pedagogy, a science that concentrates on the teaching-learning process. In the COVID-19 pandemic phase, when society was impacted by its spread, changes were needed across a number of societal domains, including education. It was necessary to reinvent the teaching process by requiring fresh and inventive teaching methods from educators. Teachers were rapidly confronted with new demands, and they were forced to adapt by coming up with fresh ways to carry out their didactic plans. In order to engage students in the learning process and to fulfill the goals set forth in the lesson plan, teachers should use digital languages and information and communication technology. This pedagogy that uses information and communication technologies is called Digital Pedagogy. In this research, a mapping was performed using the Web of Science database and, according to the fifth step proposed by Torraco (2016), 11 articles were selected that answered the research question and were selected to compose the systematic summary.

Thus, it is determined that the primary digital pedagogies employed in higher education are based on the growth of mobile learning, smartphones, and computers, which aided the adaption of teaching methods in all subject areas. The use of technology has removed geographic, psychological, and temporal barriers from teaching.. Because of this, it is possible to learn wherever you are and establish a habit of lifelong learning (Xu, 2019). Numerous domestic and foreign colleges have created their own online teaching platforms recently, utilizing the internet and other digitalization tools to give students access to an interactive, individualized learning environment that is not constrained by time or space for independent learning (Cornali et al. Cavaletto, 2021).Mobile technology and applications for tablets and smartphones help in learning (Sousa and Rocha, 2020). Students learn new material by watching instructional films with auditory and visual content, in line with digital tools such as gamification and MOOCs (Lehmann, 2019).

Conclusion

According to research, there has been a shift in the pedagogical paradigm from traditional on-campus higher education to digital and online higher education as a result of increased globalization and the emergence of digital learning, enabling the main pedagogies and digital educational strategies used by higher education institutions. be based on actions taken during research studies that offer transparent and honest feedback. MOOCs, digitalization, gamification, interaction design, and Blockchain—a technology for secure data transmission that enables the control of the educational process through its feedback—are the major technologies used in this scenario.

People who are proficient in digital education are able to communicate with others and seek out knowledge using a number of digital tools and applications, including social media and mobile phones, and analyze the material they find online. As a result, possessing a solid understanding of information and communication technology as well as moral awareness and cognitive abilities all fall under the category of having a digital competency.

When using technology effectively for teaching and learning, this environment should enable interaction between teachers and students. Therefore, it is crucial to have a solid understanding of online learning theories, online instructional design, and particularly when and how to employ digital teaching technologies in order to effectively implement them in higher education. This is made possible by possessing the conceptual understanding, organizational principles, and technology expertise required for teaching in a digital environment in the twenty-first century.
It is suggested that future studies look at active methodology design for the digital teaching and learning process.

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4. International Conference on Virtual Reality	**15-16 November 2022**

Virtual Reality in Open and Distance Education: Innovations and Challenges in Pandemic Era

Sharmila Jajodia[1]

Abstract: Open and distance learning provide a golden chance for those who do not get opportunity to learn formally due to any reason. There are many who believe in earning and learning at the same time due to the unexpected inflation, the high cost of education and to have the much-needed feel of work experience for a bright future. In 21st century when information and communication technology is booming, e- learning provides an extension to open and distance learning. With the changing scenario, new employment avenues and introduction of choice-based grading and semester system of examination and evaluation pattern in formal and regular system of education, open and distance education has a great challenge to meet expectations of its customers i.e. distance learners. It has to deliver them information related to various traditional and vocational courses at the click of the mouse, supply them not only study material but also provide employability. To achieve these goals it has to maintain the quality of education for its sustenance. Therefore, keeping the demands of the current global scenario in mind, it is essential that these institutes make use of virtual reality maximum possible for teaching, learning and evaluation of the students though COVID-19 has provided these institutes too enough opportunities to make innovations at every step from admission, counseling, teaching, providing audio-video contents, examination, evaluation and result declaration. In the light of the said observations, this research article investigates how these institutes can adopt online methods to meet the demands of the present century; what are the various possibilities and problems ahead if open and distance education institutes make innovations or attempts in this direction in the post pandemic era.

Key words: Communication, Distance and open education, Employability, Virtual Reality

Introduction

Open and distance education initiated in varied progressive countries globally aims to bring education to the home of those who could not or cannot go to schools, colleges or universities owing to any of the reasons - poverty, family obligations, geographical reasons - lack of educational institutes in the proximity, hilly areas, age, health etc., and attracted the attention of those who are fond of education. Moore (1990) defines distance learning as "all deliberate and planned learning that is directed or facilitated in a structured manner by an instructor . . . separated in space and /or time from the learners."(Powar, 2002, p.269)

It is not a traditional education system which tries to address the basic requirements of education of a special target group – a heterogeneous learner group and includes all other situations except traditional classroom situation where students and teachers communicate face to face throughout the course. While open learning is described as "arrangements to enable people to learn at the time, place and space which satisfy their circumstances and requirements." (Manpower Service Commission) Powar, 2002, p.270). In distance education, the teacher and student are not physically in proximity, so the distance is spatial and temporal while in open education, education is available to learners according to their choice as far as time and space is concerned, and at a speed appropriate to the learners without taking into consideration their earlier educational qualifications, abilities and capabilities or age. Distance and open education system is flexible, highly productive, and able to respond immediately to market demands. It also satisfies the needs of equality and universal education as it is an alternate, cost-effective channel to reduce the burden on the formal and regular education system. It gives second chance to the dropouts and disadvantaged sections of society such as poor rural, women and adult citizens who desire to update their knowledge, skills etc.

The utilitarian aspect of distance learning is recognized so much these days that 60 countries have jointly established an International Council of Distance Education in 1938 in Canada. Distance and open learning is the 3rd stage as far as the evolution of Indian education is concerned and symbolizes the transition of education from the stage of craft to the stage of technology.

Objectives:

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i) To understand the prevailing open and distance education in Indian subcontinent and review it critically.
ii) To evaluate the various methodologies and technologies which can be used with respect to the speedy glocal changes
iii) To investigate the probabilities of innovations in open as well as distance learning in digital era and the challenges those lie ahead in the post pandemic era.

Literature

The Government of India in 1966 recommended that "opportunities for part-time education through evening colleges and own-time education through programmes like Correspondence Courses should be extended as widely as possible and these programmes should also include courses in science and technology." (Powar, 2002, p. 281)

The three key parameters of the 21st century college and university education are – "the need and demand of lifelong learning, the requirements of learners for alternative types and modes of educational provision; and the impact of media technology on changing patterns of the education processes in the backdrop of massification of education, explosion of technology and globalization of knowledge." (Madan,2002,p.) It is more than necessary especially during pandemic and post pandemic era.

Methodology
Sources of Data Collection:
The research method mainly used is systematic literature review so the secondary data is collected from books and website.

Findings

At present, India is the country at the second rank having higher numbers of open universities at international level. Indira Gandhi National Open University which is the largest university globally, offers undergraduate, postgraduate, doctoral degree courses in a number of disciplines- management, library and information science etc., in addition to traditional streams- arts, commerce and science, certificate and diploma courses besides.
.
Garrison has recognized 3 generations of distance education wherein the teaching aids for the first generation were mainly print media and audio-video cassettes but it was extended to second generation and education through air i.e. broadcast and telecast, talk back TV, interactive TV and teleconferencing (audio and video) became the trend. For the third generation, computer based technologies such as software packages, CD-ROM, multi-media, e-mail and internet are being used.

Virtual Reality in Indira Gandhi National Open University
Indira Gandhi National Open University has employed an appropriate instructional strategy which integrates multiple media. It consists of not only old media - printed study materials, audio-visual aids such as radio and TV, teleconferencing (audio and video conferencing). It also engages physical counselling sessions through its study centres throughout India. It has also implanted MOODLE and mobile learning. It also telecasts many programmes which have general as well as specific themes every week on all working days through the country wide television network, Doordarshan.

These are the national classrooms and the open channels of this university whose main target is the undergraduate students. These programmes are of 18-30 minutes duration and the larger part of the content i.e., about 80% is prepared in India and the rest 20% is imported from the other countries for high quality and relevance. In the year 2000, IGNOU established virtual classrooms through multipoint video conferencing system in collaboration with technologically advanced and educationally committed cable operators in Chennai, Trivandrum, Bhopal and Calcutta. This was the first initiative to exactly create a conventional classroom situation through virtual campus/ classroom to catch up with learners habitual of conventional education.

Gyan Darshan (GD) channel, an educational television is an excellent step in the field of distance and open education in India. It is a joint collaboration of the various ministries -education, information and broadcasting and agencies- Prasar Bharati and IGNOU. GD, started in 2000, offers the best programmes 24 hours a day. It covers lots of subjects to cater to the needs of learners across cross sections of society ranging from pre-school to university students such as

job seekers, homemakers and working population. The software is ensembled from institute and organisations engaged in education and development. GD conducts live sessions of two hours every day to make Open and Distance Learning interactive and participatory.

Its designated academic counsellors, subject experts and regional center staff interact with its bonafide learners for academic and administrative purposes. Induction programme for freshers and degree certificate distribution ceremony for outgoing- graduate, postgraduate and Ph.D, students are yearly features. These are conducted live through teleconferencing and are available on multiple platforms - DTH, Cable TV and IP TV. GD is available on webcast too and thus its scope is extended to audiences all over the world. Its telecast is also useful for the students of the conventional education system. It can be accessed easily through the link https://www.ignouonline.ac.in/gyandarshan/ and is a must carry channel by a number of private operators including DTH and Cable according to the Gazette notification of the Indian government. GD is currently available on channel no. 25 of Swayam Prabha of education department.

Gyan Vani (GV), a network of educational FM Radio channels, was launched in 2001. It operates from different cities of India to supplement the teaching and learning in non-conventional system to enhance its capacity. Each GV Station covers approximately 60 kilometres. It includes nearby rural areas too. It is a suitable medium for focused target group of learners for their local needs of education and socio-cultural development. The language preferably is either local/ regional, Hindi or English. The content caters to all- primary, secondary, technical, vocational, higher education in addition to adult, distance, open, extension education etc.,. The facility provided by GV Stations- Interactive Radio Counselling (IRC), gives students an opportunity to converse with the teaching and non-teaching support staff. The programmes are popular in live phone-in mode and are broadcast through each stations. Its content can be both- pre-recorded and live. The IRC sessions scheduled daily include the participation of more than 20 schools, many Divisions of IGNOU besides STRIDE and RSD.

"Two live sessions are broadcast every day on FM Gyanvani Delhi and online at Gyandhara from 11:00am to 1:00pm with repeats broadcast from 5:30 p.m. to 7:30 p.m . In addition, every Thursday, 4-5 pm a special IRC session is conducted for Students Support Services. Other special IRCs on different themes and issues are also conducted from time to time. Students can listen to these live discussions by the teachers and experts on the topic of the day and interact with them through telephone, email or through chat mode on Gyan Dhara". (IGNOU, 2022)

IGNOU students also receive the benefit of another internet based audio counselling service Gyandhara. They listen to the live discussions and interact with subject experts and teachers through chats, email and telephone. In the absence of live sessions, the learner can avail Gyanvani Delhi on this platform. The Gyandhara streaming can be accessed globally. To broadcast important programmes by GV Delhi Gyandhara feed is used to relay it too on all GV stations. The link for it is https://www.ignouonline.ac.in/gyandhara/ and available on the university website.

The IGNOU eGyanKosh, an all India level digital treasure trove of resources for college and university education is accessible by clicking the link: http://egyankosh.ac.in/ . It is freely available for all the stakeholders including common citizens. It presently stores the e-content for approximately 3920 courses of 380 programmes. IGNOU e-Content Mobile App is an official application for a digital learning initiative to extend technology enhanced learner support services and to distribute and circulate the digitised course material to its student fraternity. This app can be used through smart phones and tablets too.

Live sessions are webcast at http://ignouonline.ac.in/ and also conducted via Facebook while counselling sessions are generally held as scheduled by the student support centres beyond the working hours of institutions which host these sessions where these centres are set. If the strength of students in a particular programme is small, the university provides web enabled academic support to the learners.

Edusat, an exclusive educational satellite, was conceived in 2005. It was a historic moment because it led to the growth and development of distance education when initially 100 Edusat supported Satellite Interactive Terminals were established in its regional study centres throughout India. It also launched an online portal Samarth to share guidelines and information in addition to enhance interaction with students as well as partner institutes. It lists every detail like all programmes and has support services for solving queries related to registration and evaluation so has a robust query management systems. Its learning management system gives learners a space to interact through community blogs and discussion forums. It also displays a list of partner institutions. Thus from traditional system it has stepped into a

technically virtual system to reach the student community. Its learning material is prepared not only by in-house faculty but also by experts from higher education institutes all over the country. Therefore, the university received the "Award of Excellence for Distance Education Materials" (IGNOU, 2022) by The Commonwealth of Learning on 4th March 1999.

IGNOU has also ventured into web enabled academic support for its many programmes. It is a single window platform for study material in varied formats, quiz, discussion forum, academic calendar as well as counselling in addition to links of multiple resources etc.,. It is very simple to use as ICT tools are easily available. The students enrolled through it get access to specific portal related to their programmes of study and they get the digital course content. Online peer-to-peer and teacher-taught interaction, discussion with experts is also possible through the link - https://sites.google.com/ignou.ac.in/weas.

IGNOU became the first open university to receive A++ grade on 19 January 2021 by National Assessment and Accreditation Council. For the fourth generation of distance education- video desktop and virtual classrooms, Web conferencing and Webinars, Mobile Web 2.0, ipad, ipod, e-reader devices and software for e-books, digital library, open source educational websites, tablets etc., are the teaching aids. The web based content delivery through podcasting, T.V., zoom, meet, teams, webex and LMS- Google Classroom, MOODLE and Whatsapp, telegram, youtube, cable, radio and its availability and accessibility 24 ×7 × 365 is a reality now. Virtual classrooms enable students to interact with the professors online and even measure their own progress with immediate feedback after completing every topic through real time tests.

Conclusion

Hunger, electricity, network connectivity, unemployment, lack of hard and soft skills, employability skills and digital divide are the major threats. With the changing scenario, new employment avenues and introduction of choice based grading and semester system of examination and evaluation pattern in formal and regular system of education, open and distance learning institutes have a great challenge- to meet the expectations of its customers i.e. distance learners. It has to deliver them information related to various traditional and vocational courses at the click of the mouse, supply them not only study material but also provide employability in post pandemic era.

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Exploring the Environmental Factors for Anxiety in Public Speaking with Virtual Reality

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Abstract: Virtual Reality environments are becoming useful and popular in the design of psychological experiments due to their low cost and controllability. In this study, we focused on the environmental factors possibly affecting a speaker's anxiety in public speaking. Indeed, giving a speech in public often makes some people anxious. Our research attempted to design a parameterizable virtual environment for this type of psychological experiment. We have designed a VR system that can parametrically simulate the public speaking environment, which allows us to study how three environmental variables, the number of audiences, the attitude of the audience, and the brightness of the ambient lighting, can affect the anxiety of a presenter. We have experimented with VR to study these factors. In our system, we can customize a scene by adjusting the parameters and scenarios of the lecture scene in the virtual reality environment. Customization is done through parameter settings in a script file, allowing researchers to control the environmental factors during the experiment. Ten participants took part in this pilot experiment. The experiment results reveal that the simulated VR environment can stimulate a speaker's anxiety. However, there is not enough evidence showing which factor is significantly more influential than the others. Instead, through interviews, we have found that the elicitation of anxiety seems to be affected more by personal experience and traits. Therefore, we believe that the anxiety response of all environmental variables to speakers varies from person to person. Although the result is different from what we expected, it allows us to observe the nature of these individual differences and shed some light on future directions.

Keywords: VR Application, Public Speaking, Anxiety

Introduction

In daily life, we sometimes need to give a speech in public, but this makes some people feel anxious. Consequently, many of us refuse to speak because we are anxious physically and psychologically. Besides, not all of us have the opportunity to practice in public to reduce anxiety. If we can design a realistic virtual reality environment simulating a lecture scene and such a safe and controllable environment can be used to reduce people's anxiety in the physical and psychological aspects and help us cope with the anxiety of public speaking.

Virtual reality environments can be designed to simulate various situations that are not easy to produce or control in our daily life. This includes simulating the audience and lecture environment and allowing speakers to practice alone. In addition, in the speech situation, we are curious about different states of the environment, or the audience may cause different degrees of anxiety to the speaker. If so, we would like to study how these factors affect the elicitation of anxiety and learn how to adjust the environment settings in VR to reduce the anxiety of a speaker progressively by using the system desensitization method to gradually relieve the speaker's anxiety about public speaking.

Another advantage of conducting experiments in VR is controllability. In a real psychological experiment, it is often difficult to completely control all environmental factors and make the experiment reproducible, especially in situations with dynamic elements such as the audience. In addition, the setup of an experiment often requires considerable production costs and may involve inevitable environmental interference. Consequently, preparing a psychological experiment in VR can have the potential advantages of reducing cost and improving controllability.

Indeed, in recent years, the technologies and applications of Virtual Reality have become more affordable and popular. We now can use off-the-shelf hardware and well-supported software development environments to design a VR application. We would like to make better adoption of these technologies to design realistic and controllable public speaking scenarios to elicit the anxiety of a user.

In our study, we will first study if an effective public speaking scene can be constructed in VR to stimulate the anxiety of a user and then explore the relationship between environmental factors and anxiety in public speaking through the collection of subjective scales and objective physiological signals.

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Related Work

Public speaking anxiety

Anxiety in public speaking is one of the common anxiety situations in our daily life. The ways that psychological studies assess the degree of anxiety often include the speaker's subjective assessment scale and the physiological data reflecting the speaker's anxiety status.

Hanin and Spielberger (1983) designed “The Situational Trait Anxiety Scale” to evaluate the anxiety of the participants in the research. The scale is divided into two parts, the Situational Anxiety Scale and the Trait Anxiety Scale. The first part is for a temporary and transient emotional state, and the second is for the frequency and feelings of anxiety symptoms in general.

According to the European Society of Cardiology, & the North American Society of Pacing and Electrophysiology (1996) measuring Heart Rate Variability and Physiology are defined in the international standard of significance and clinical application. Therefore, measuring the subjects' physiological reactions provides another way to assess their anxiety status.

In the study, we will use the speaker's self-evaluated situational anxiety scale as well as collect and analyze the speaker's heart rate and heart rate variability during the experiment to assess the speaker's anxiety state.

The of virtual reality to the public speaking anxiety

There have been several studies interested in applying virtual reality simulation to the psychotherapy of speech anxiety. Harris et al. (2002) and Wallach et al. (2009) confirmed that virtual reality cognitive behavioral therapy is an effective treatment for public speaking anxiety. Anderson et al. (2005) also presented that cognitive therapy using progressive exposure therapy through virtual reality can reduce public speaking anxiety.

However, the current application of virtual reality for this purpose often requires psychologists to use the Wizard of Oz method and play some role in the loop, and it is difficult to simply use the system of virtual reality for progressive exposure therapy. We wish to design a system that can parameterize the virtual environment for speech so that psychology professionals can adjust the parameters to provide progressive exposure therapy to the speakers' training when needed.

Pertaub et al. (2002) showed that the negative attitudes of virtual audiences could make speakers more anxious. Daly et al. (1989) did not use virtual reality in their research on public speaking anxiety, but it shows that high-anxiety speakers pay more attention to themselves than their surroundings. Ayres (1990) proposed the influence of five audience characteristics on speaker anxiety, including the size of the audience, status, familiarity, similarity, and behavior. In our system, the audience's attitude is related to the behavior and status of the audience, the number of audiences is directly related to the size of the audience, and the level of ambient lighting, which may affect the degree of the speaker’s attention to the surrounding environment.

System Design and Example Scene

We have employed HTC Vive® (High Tech Computer Corp., Taiwan) as the HMD device in our study to offer a fully immersive experience for the virtual reality environment during the experiment, an example scene is shown in Figure 1.

Figure 1: The scene for public speech

During the speech, the speaker can use the handheld controller to control the slide in the virtual reality environment, and a bell rings as instructions for the start and end of the speech, and the audience will applaud and greet when the bell first rings in the virtual reality scene. Figure 2 shows the architecture diagram of the system that we have designed.

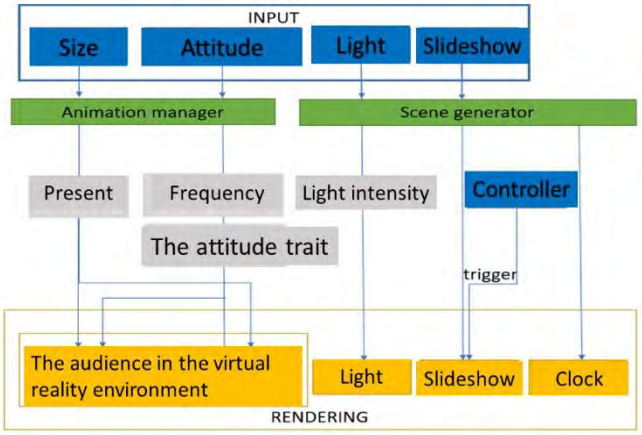

Figure 2: The architecture diagram of the System

Parameterized environment settings

As shown in Fig. 2, in our system, we can customize a scene by adjusting the settings of the lecture scene in the virtual reality environment, including the number of audiences, the attitudes of the audience, and the brightness of the ambient lighting. The customization is done through parameter settings in a script file, allowing researchers to control the environmental factors during the experiment.

Before the formal experiment, we conducted a pilot study to explore the proper ranges of the parameters for the environmental factors. Through the pilot studies, we aim to find the appropriate ranges for the environmental settings including the audience's attitude and the level of ambient lighting. In the formal experiment, we will set each environmental factor into two states: low and high to compare their effects. Therefore, we need to find the appropriate values for the two states such that the participant can feel the difference between the two states while the immersion of the participant can remain the same in either one.

The number of the audience

According to Ayres (1990) who proposed the number of the audience as one of the five audience characteristics of speaker anxiety, we set the number of virtual audiences as a parameterizable environmental variable.

The Animation manager in Figure 2 determines the number of audiences in the virtual lecture environment according to the parameter setting and then makes each virtual audience visible or invisible. Examples of the different audience sizes, large or small, in a virtual lecture environment, are shown in Figure 3 and Figure 4, respectively.

Figure 3: An example scene with a large virtual audience

Figure 4: An example scene with a smaller virtual audience

The attitude of the audience

Pertaub et al. (2002) show that the attitude of the audience has an influence on the speaker in a public speech, and Ayres (1990) also proposed that audience behavior is one of the five audience characteristics inducing the anxiety of a public speaker. In the study, we try to create different attitudes for the audience and include this variable in our environmental settings. Examples of bad attitudes include their tendency to be distracted by other things in the environment, often changing their actions impetuously, looking at the clock on the wall to show their impatient, changing their sitting posture frequently, and shaking their heads to express disagreement. Sometimes they may talk to each other and even whisper or make some noise. In contrast, Otherwise, we make a good audience attitude, the audience presents positive behavior and will quietly focus on the speaker.

The Animation manager adjusts the frequency of switching postures and the percentage of friendly or hostile gestures by the parameter of the degree of friendliness for the attitude of the audience. In other words, according to the setting, the system will choose a posture or action animation according to the degree of friendliness and set the length of the posture animation to a random value within the given interval setting. These actions include the actions of entering and leaving the lecture room, which creates disturbances for the speech. Since the selection and the duration of the animation for each audience is somewhat random, the overall animation for the whole scene can look more natural and avoid the need for a tedious setting for each audience.

While anxiety is a typical emotional phenomenon in a public speech, studies have shown that high-anxiety speakers pay more attention to themselves than the surrounding environment (Daly, J.A et al., 1989). Therefore, we incorporated the brightness of the lights into the parameterizable environmental variables of the system. The brightness setting of the ambient light may further affect whether the speaker can see the reactions of the virtual audience during the speech. The brightness variable in our study can be set to the value of bright, normal, or dim. The scene generator in Figure 2 is responsible for the generation of the corresponding scene. An example of bright and dim lighting is shown in Fig. 5 and Fig. 6, respectively.

Figure 5: An example of a dim scene in the virtual lecture

Figure 6: An example of a bright scene in the virtual lecture

Slideshow and clocks

The Scene generator in Figure 2 will show the slides given by the designer and projects them on two walls, one facing the speaker and the other facing the virtual audience. In our system, the participant can replace the slides easily. In the course of the speech, the speaker can also use the handheld controller to control the pace of showing the slides.

The Scene generator will also display the current time on the wall with a clock, allowing the speaker to practice time control during the speech, which may induce anxiety for some people. The system displays the animation of the clock according to the time such that the realism of time pressure can be enhanced in a virtual environment.

Experiments

In this work, we would like to make good use of the reproducibility and function simulation of virtual reality for the training of public speaking.

As mentioned in the previous section, we have adopted three variables in the virtual reality environment for giving a speech. We would like to know if a speech scenario in virtual reality can stimulate the anxiety of a speaker. If so, how he/she will be affected by these environmental factors? We would like to study the influences of these factors on anxiety by observing the physiological indicators of the speakers.

Participants

Participants were recruited via social media as well as an online database. In total, 10 participants took part in this pilot experiment. The sample consisted of 6 (60%) women and 4 (40%) men; all were students and the age range between 18 years to 25 years. All participants had no dizziness, headache, and Vestibular disease.

All participants gave written informed consent before the experiment. After filling out an initial questionnaire about their background, the participants were asked to speak in a lecture in the virtual environment when the conditions of the study changed in different sessions of the speech.

Materials and procedure

We use the HMD that is the HTC VIVE in our study, with a 90Hz refresh rate and a total of 110° FOV, and the participants can interact with the VRE with the HTC controllers.

The virtual environment for the speech was designed on the Unity 3D platform. We measured the physiological signal of the participants through their peripheral blood vessel flow rate during the speech session and the rest session with the ProComp Infiniti™ version 5.0.3. (Thought Technology Ltd., Montreal, Quebec, Canada).

After a subject finished the informed consent, he/she had five minutes to prepare the contents of the speech, and then a four-minute rehearsal session follows. The topic of the speech is an introduction to Taiwan, which is a familiar topic for every participant. The briefing and reference materials are given to every participant in the study. Then, the subjects were asked to sit down, put on the head-mounted display, and present the speech sessions in front of the virtual audience in the virtual reality scene. Every session is four minutes.

After finishing a session, the subjects took off the head-mounted display and fill in an assessment (STAI) about the anxiety scale for that session. Then they were asked to close their eyes and take a rest. The experimental session was repeated six times with two values (low and high) for each of the three conditions while the other two conditions are set to a nominal value. The ordering of the condition variation is selected randomly to reduce the ordering effect. The blood flow rate of the subject was measured all the time during the speech session as well as the rest session. After the six practice sessions, the subjects were asked to fill out another questionnaire and receive an in-depth interview about their experiences.

Results

We used The ProComp Infiniti™ version 5.0.3 to measure the subjects' biological data during the speech and the rest sessions. We got the parasympathetic active index (high-frequency, HF) and the sympathetic active index (low-frequency, LF) through the Fourier transform for heart rate variability (HRV). According to the international standard of "Heart Rate Variability Measurement, Physiological Significance, and Clinical Application" [2], when the subjects feel anxious, their heart rate and the percentage of low-frequency (sympathetic actively) components should be increased.

To analyze the differences in the physiological data of the participants between the lecture section and the break section, we employed the paired sample t-test with the IBM SPSS Statistics 25 to see if there exist significant main effects.

Analysis of physiological data in the lecture and break sessions

In the analysis of the Heart Rate and Heart Rate Variability (HRV), we found that there exist significant differences between the speech session and the rest session, with a p-value < 0.01, as shown in Table 1 and Table 2. The result shows that the virtual environment can successfully induce anxiety in the subjects during the speech session. The comparative analysis of the heart rate variability also showed that there exists a significant difference in the ambient light condition.

Table 1. The Paired Sample t-test of rest/speech heart rate

	mean	**SD**	**t**		**Sig**
Rest-Speech	-3.805	4.258	-6.923		0.000*

Table 2. The Paired Sample t-test of rest/speech Heart Rate Variability (HRV)

	mean	**SD**	**t**	**Sig**
Rest-Speech	-0.068	0.172	-3.069	0.003*

Analysis of the State-Trait Anxiety Inventory (STAI)

We used the paired sample t-test to analyze the results of the STAI questionnaire filled out by the subjects. We try to find whether the anxiety of the subjects can be manipulated by the change of a single variable while keeping the other two variables fixed. The analysis of the STAI suggests that there was no significant difference in the alterations of the VR Scenes on the subjects' State-Trait Anxiety Inventory, as shown in Table 3.

Table 3. The Paired Sample t-test result of STAI

Group	mean	SD	t	Sig

number	2.4	5.947	1.276	0.234
attitude	-4	8.232	-1.536	0.159
light	-0.9	4.383	0.649	0.532

Although we can stimulate the subjects with the virtual lecture scenario, we cannot find evidence of how environmental factors affect the anxiety of the subjects. The inconsistent results in the study of the environmental parameters are probably due to two reasons. One is that the number of subjects is not large enough to show significant results. The other is that there exist personal traits or preferences about these factors. Therefore, we look into the individual differences in the following subsection.

Individual differences

To investigate the individual differences, we show the comparisons of the heart rates of each subject for the two extreme values of each condition (size of the audience, audience attitude, and the ambient light in Figure 7 to Figure 9, respectively. It can be seen from these figures that for most speakers, the change of a single environmental variable will affect their heartbeat data and anxiety state. For example, some people are more anxious when the audience is large, while others are the opposite. In other words, there is no consistent behavior when the condition is changed.

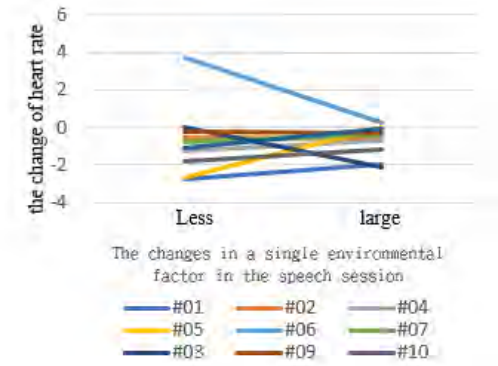

Figure 7. Heart Rate changes for the factor of the number of audiences

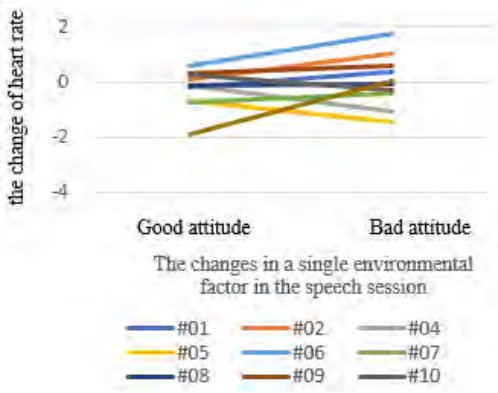

Figure 8. Heart Rate changes for the factor of audience attitude

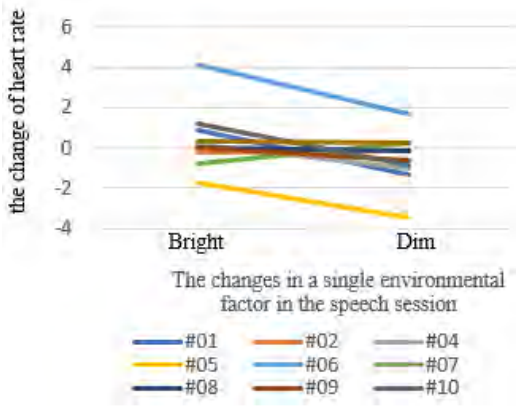

Figure 9. Heart Rate changes for the factor of ambient light

In the interviews after the experiment, we also found that different speakers have different perceptions of their anxiety responses to different environmental variables. Five speakers felt more anxious when the audience was large, and three speakers were more anxious when the audience was small. Regarding the audience's attitude, eight speakers believed that the virtual audience with a bad attitude made them more anxious, but two speakers thought that they felt less anxious when the virtual audience with bad attitudes did not focus on them.

Regarding the level of ambient lighting, four subjects felt that they were more anxious when the ambient lighting was bright, five felt that the ambient lighting was dim, and one felt that there was no difference. When the light is dim, some speakers may focus more on themselves than on the audience, which makes some of them feel more anxious. In contrast, for the same lighting condition, some speakers feel more anxious because they cannot see the reaction of the virtual audience. In other words, the anxiety reaction may highly depend on the perception and interpretation of the environment.

For further analysis, regardless of our experimental hypotheses, we discuss the speaker's perception of environmental variables, anxiety responses, and the resulting cognitive effects. It is difficult to obtain consistent results in the within-group analysis no matter the speakers' cognition, self-rated situational anxiety scale, or heart rate. Therefore, we believe that the anxiety response of all environmental variables to speakers varies from person to person. Although the result is different from what we expected, it allows us to observe the nature of these individual differences and shed some light on the future direction.

The limitations of this study include the generality of the participants. It is important to note that we may not be able to extrapolate the results obtained from a small-size sample to the entire population. Additionally, the subjects involved in the research are the students in the university, instead of a wider population.

Conclusion and Future Work

Virtual reality environments will be becoming useful and popular make the design of psychological experiments due to their low cost and controllability. In this study, we have designed a psychological experiment to study the environmental factors that may affect the anxiety of a speaker in a public speech. We found that we can successfully stimulate the anxiety of a speaker in a virtual environment with an appropriate design. However, there is no significant difference in the statistical analysis of the anxiety response for the three environmental factors we have parameterized in the experimental system. in this study. Nevertheless, through the analysis of individual data and the interviews, we found that there exist individual differences in the perception and interpretation of these environmental factors. The results encourage us to design a customizable system that can stimulate the anxiety of a speaker more effectively. In the future, we would like to detect more physiological factors or observable behaviors such as body movements, eye contact, and cadences to study their relations with the anxiety of a speaker in a virtual public speaking scenario. We can also set the parameters that can induce anxiety at different levels and then provide the training through the control of environment variables for the progressive desensitization method for reducing people’s anxiety in public speaking.

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The Future of AR and VR Technology in a Mobile Learning Environment

Rafidah Abd Karim[1]

Abstract: For many decades, VR (virtual reality) and AR (augmented reality) have been used in education. Many empirical studies show that using VR or AR in education has many positive impacts for students' learning. In addition, AR and VR solutions have the potential to improve classroom experiences and expand prospects at all educational levels. AR and VR technologies are reshaping education by allowing students to learn and educators can teach in a more immersive, technological setting. In higher education, AR and VR can help students grasp abstract concepts and gain hands-on experience. However, not all universities have the same level of access to these and other emerging technologies. Therefore, this paper explores what is the AR and VR and their differences, benefits of the AR and VR toward education, the prospect of mobile learning environment and the potential of future AR and VR using the mobile technologies in the teaching and learning. Therefore, AR and VR, when combined with mobile technologies, education will enter a new era of virtual learning, connecting current learning and teaching environments.

Keywords: Augmented Reality, Virtual Reality, Mobile Learning, Students

Introduction

With advances in new technologies, education is rapidly moving in new directions that will significantly alter not only how students learn but also how teachers teach. For students in higher education, augmented and virtual reality make learning an immersive experience and these technologies have the potential to change classroom learning and enhance student outcomes. These technologies provide creatively engaging and prepare students for new opportunities. AR and VR can provide K-12 educators with interactive and engaging tools for classroom learning. There are many immersive learning tools and activities that apply these technologies in teaching and learning.Thus, this paper will explore several parts of AR and VR areas: (1) AR and VR, (2) the difference between AR and VR, (3) benefits of AR and VR in education, (4) barriers of AR and VR in education, (5) mobile learning environment and (6) the future of AR and VR in mobile learning.

Augmented Reality (AR) and Virtual Reality (VR)

Augmented reality (AR) and Virtual reality (VR) are two technologies that are altering how we interact with screens, resulting in new and exciting interactive experiences. Both technologies are generating a lot of news because of their potential applications in marketing, gaming, brand development, and entertainment. In the next section, the paper discusses AR and VR technologies and their differences.

Augmented Reality (AR)

Augmented Reality (AR) is a technology that allows users to overlay digital content (images, sounds, and text) on pinnacle of a real-world environment. According to Milgram and Kishino (1994), augmented reality is an experience environment. The digital media products are used instead of real-world objects. Using the camera or smartphone, it is equipped with digital features to an on-screen view. It is currently one of the most well-liked technological trends, and as more smartphones and other devices with AR capabilities become accessible, its popularity will only increase. These examples are not all that different from what you might currently have on your smartphone thanks to advancements in AR technology. In fact, augmented reality is extensively used and can be found in a wide range of applications, such as Snapchat lenses, parking lot navigation apps, and several shopping apps that let you try on things without ever leaving your house. The education industry has been transformed by augmented reality (AR), which has been steadily following in the footsteps of its precursor virtual reality by digitising classroom instruction and making training more varied and engaging. Over time, educators' attention has been drawn to the new opportunities provided by AR technology for education.

Virtual Reality (VR)

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Virtual reality (VR) applications have become increasingly popular in recent years. Because virtual reality (VR) is becoming more affordable, educational institutions are incorporating technology into their curriculum. According to research, 96% of UK universities and 79% of UK colleges now use augmented or virtual reality in some capacity (UK Authority, 2019). The high-immersion VR, as defined by Kaplan-Rakowski & Gruber (2019), is a computer-generated 360° virtual space that can be regarded as being spatially realistic due to the high immersion provided by a head-mounted device. Virtual Reality (VR) refers to the use of computer software to simulate real-world properties and scenarios (Sidanis et al., 2021). The creation of a virtual environment that can be viewed 360 degrees using computer technology and it alludes to a fully submerged experience that blocks out the outside world.

The difference between AR and VR

People experience a virtual environment using the AR and VR technologies. Businesses are using augmented reality more and more because it can produce informational overlays that offer practical, real-world scenarios in addition to entertainment scenarios. The fundamental technologies that AR and VR rely on differ, and their target audiences also differ. Table 1 illustrates the differences between AR and VR technologies. First, AR uses an existing real-world environment whereas VR technology uses a complete virtual environment. With virtual data superimposed as a visual layer within the surroundings, AR keeps users rooted in the real-world setting. A 3D environment is created for VR so that users may move about and interact with the surroundings. AR will require a smartphone /tablet/ glasses/ projections whereas the VR requires a headset device (VR headset) for the applications of these technologies. For AR, While VR only improves a virtual reality, it improves both the virtual and actual worlds. Finally, VR can be controlled by the system, and the AR can control their presence in the actual world.

Table 1. Difference between AR and VR

AR	**VR**
Existing real-world environment	Completely virtual environment
Keeps users grounded in the real-world environment, overlaying virtual data as a visual layer within the surroundings.	Individuals are positioned in a 3D environment where they can walk around and engage with the artificial surroundings.
Requires a smartphone /tablet/ glasses/ projections.	Requires a headset device (VR headset)
Improves both the actual and virtual worlds	Only enhancing an imaginary reality
Can regulate their physical presence	Being managed by the system

Benefits of AR and VR in Education

VR and AR are now being used for teaching in schools, colleges, and workplaces. In education, the educational benefits of AR and VR technologies include enhanced collaboration and heightened learning. There are numerous advantages of AR and VR technologies in education as shown in Table 2. In education, the benefits of AR technology such as the combined learning, make learning interesting, interactive sessions, grasping complex concepts, flexible learning, diversity of content and low cost. VR technology has several advantages like increase knowledge area, active experience rather than just passive information, expand the understanding level of students, fun, virtual tour and existing game-based education. There are no distractions while the study, expand a student's imagination power, and cultivating memory power by linking feelings with education.

Table 2. Benefits of AR and VR in Education

AR	**VR**
Combined learning	Expand your knowledge base
Making Learning Interesting	Experience that is active rather than merely passive Information
Interactive Sessions	Students' understanding should be improved
Grasping Complex Concepts	Fun, virtual tours, and game-based instruction now available
Flexible learning	No interruptions while studying
Diversity of Content	Enhance a student's capacity for inventiveness.
Low cost	Enhancing memory by linking emotions to learning.

Barriers in AR and VR in Education

However, despite the numerous benefits in education as discussed in previous sections, there are also several barriers of AR and VR technologies. AR and VR technologies also face challenges such as information overload, teacher resistance, and usability (Akçayır & Akçayır, 2017). Several barriers of AR and VR in education are highlighted as following:

- Lack of vision
- Lack of investment
- Lack of support from administrators
- Educators are not tech savvy
- Lack of state-of-the-art infrastructure
- Conservative mentality toward technologies among teachers/educators
- Difficulty in framing the curriculum

Though, several issues and challenges emerged, which help to explain why AR and VR are still not extensively applied in education and educational settings. Their comprehension, along with research aimed at overcoming some of them, would be beneficial to educators and students interested in implementing this technology. However, it appears clear that government, industry, and educational institutions should increase their investments in projects focused on the development of AR an VR technologies to expand the advantages of this technology.

Mobile Learning Environment

M-learning, also referred to as mobile learning, is defined as learning that uses mobile technology. This learning does not necessitate being in a specific location with specific people at a specific time. Individuals can learn from anywhere using portable lightweight devices in this case. Both teachers and students can access course materials and pertinent information using mobile learning at any time and from any location. A student or educator should incorporate or integrate communication tools to establish a mobile learning environment. The concept of mobile learning (m-learning) environments envisions students who are constantly on the go, learn across location and time, switch between topics, and engage with technology in and out of the classroom. Furthermore, mobile technologies are a relatively adaptable gadget trend that students frequently employ (Karim et al., 2022). Learners now have new opportunities for richly improved presentations and engagement thanks to mobile learning environments. The productivity of learners who use mobile learning has been demonstrated to increase by 43%. Additionally, using mobile devices increases learners' motivation to learn by 70%. The completion of courses by students is 45% faster on mobile devices than on laptops, and 64% of students believe that accessing learning on a mobile device is crucial to their advancement. Using mobile technologies can boost student engagement in learning by 72%.

AR and VR: The Future in Mobile Learning

Incorporating real-world and computer-generated platforms, virtual and augmented reality (VR/AR) are novel ideas and methods that allow portability, accessibility, flexibility, and timelessness in a variety of learning activities and resources. Teachers believe that integrating VR/AR into a mobile learning environment is a good way to boost their students' creativity and practical skills. Many of us will see the family doctor in the early 2030s, and the doctor will examine us while using AR glasses. In addition, the worldwide AR/VR market could grow to $94.4 billion by 2023. By 2030, surgeons, radiologists, and many other medical specialists will frequently use augmented reality headsets. Today, most people use an augmented reality application using mobile phone or smart phone such as android or iPhone. Users only need to start on AR application using the mobile devices.

No additional hardware’s are needed. This can include information on where to go on foot or how to recognise stars in the night sky. The superpower of x-ray vision is now a reality thanks to augmented reality headsets and innovative methods for recording 3D medical pictures to a patient's actual body.This technology is expected to grow at a CAGR of 82% by 2021 in education. Is AR the future of Mobile App? There are some potentials for AR such as there is manufacturing trends and stagnation of hardware, increasing demand for AR, easy integration with AI, the use of ARCore & ARKit and it is a safe investment for the technology. The examples of AR apps for the classroom are experience real history, 3D bear, Metaverse, Catchy Words AR, and World Brush.

Is VR the future of Mobile App? VR has significantly improved mobile learning as well as developed into a potent tool for online learning. It will give us full immersion in learning. VR has some potential in providing us with an amazing virtual experience, improved user engagement, enhanced brand loyalty, branding, seamless UI, enhances

productivity, and high conversion rate. The example of VR apps is Anatomyou VR, number hunt, Google Earth VR, ImmerseMe VR, and Timelooper.

In this context, the utilisation of mobile devices and applications in educational contexts has recently become more prevalent. With the swift advancement of mobile technologies, interactive new media worlds have emerged. provide the user with an increasing number of services. One of the settings that enables this connection and can combine real objects with those found in virtual surroundings is AR technology. These technologies allow virtual objects to be placed in real-world photographs. A camera, computer infrastructure, a marker, and actual objects make up AR tools. Similar to this, virtual reality is a multimodal technology with pedagogical uses that encourages learning. Through the screen of your smartphone and mobile applications, virtual reality on the go offers VR pleasure, learning, and commercial operations. Generally, you open an app, slip your phone into a VR headset, then sit back and enjoy the view. There are also VR apps for smartphones that can be used with headsets, which come with a helmet and VR glasses.

Conclusion

As immersive technologies advance, new applications in educational settings emerge. As mobile technologies proliferate and the cost of telecommunications consumption falls, more applications and programmes are incorporating VR and AR technology, which has had an impact on a variety of businesses. With the help of these technologies, education will enter a new stage and become more connected to the outside world. AR and VR technologies in higher education have the power to change how students learn in the classroom and enhance student performance, all while engaging students creatively and preparing them for future prospects. These technologies have the potential to significantly improve learning at all levels and across disciplines, especially via a mobile learning environment. Thus, The classroom of the future will be a fully digital environment that supports experiential learning and fosters teaching and learning that closely resembles face-to-face contact.

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Marriage, Divorce and Restitution: A study of Marriage counselling through Virtual Reality

Shahana Rafiq[1]

Abstract: Conventionally, a marriage is considered to be a permanent, social and legal contract and a relationship between two people based on mutual rights and obligations, which is regarded as a stable system based on the sexual bond. It is a union of two individuals who have come together for life but at times, their relationships don't work out due to the reasons like incompatibility, lack of understanding, financial instability, and many more. In many cases, the couples decide to get separated from each other and take divorce, which not only impact their lives but their families, children too. Nowadays, people look for marriage counselling in order to save their marriages or to give another chance to their relationship. Family courts have been working and helping couples in the restitution of their marriages. "Through this paper, the main purpose was to explore the role of virtual reality in providing marriage counselling in the context of India. How the concept of virtual reality is facilitating the restitution of marriage by providing online marriage counselling to the couples in comparison to the non-virtual counselling and how easy or difficult is it for the couples to obtain an online counselling. One of the advantages of virtual reality counselling is that it can be provided when the persons are at their own locations. This makes them feel safe, comfortable and inhibited. Virtual reality environment is immersive and non-confronting. Although the counsellor may be at a distance, however VR environment makes it like "being there" and creates a sense of presence. "Further, this study explores how VR helps in providing privacy to the couples and maintaining secrecy of their marital problems in the context of India".

Keywords: Marriage, Divorce, Restitution, Virtual Reality, Counselling

Introduction

The latest and trending technology named virtual reality come into existence in the year 1965 by Ivan Sutherland in which there is an illusion of virtual world but seems to be real. Virtual Reality is also called as 3D simulated environment. Virtual Reality resembles the real world but it is virtual. The main objective of Virtual Reality is to knock up an illusion of physical appearance in real world or imaginary world. It enables users who use VR headsets or glasses to have an interaction with a computer similar to the interaction with a computer in real world. Virtual reality involves the interaction of human with simulated environment by using some of the VR devices like VR glasses, VR helmets and VR headsets. Virtual Reality is of three types mainly. They are Non-Immersive, Fully-Immersive and Semi- Immersive.

In the context of north India Parveez Mody (2002) in her article 'Love and the law: love-marriage in Delhi' described marriage amongst hindus as a sacred and religious union. Amongst muslims, it is viewed as a contract. In both cases, however, the gift of a virgin girl is made by her parents to the family of a boy. For all communities, it is celebrated as a public event and the occasion of lengthy ceremonies and lavish presentations. It is believed that marriage is an occasion which sanctifies and acknowledges the relationship of the boy and girl as husband and wife (Mody,2002). In Hindu society, marriage, previously regarded as essentially ' dharmic has now become secularized and disannexed from its moorings in religion. Modern trends are to make it consensual, as is evident from the recent matrimonial jurisprudence and legislation as embodied inter alia in the Special Marriage Act, 1954, and Hindu Marriage Act, 1954 (Fonseca, 1963).

According to Hindu dharma, a wife's duty was to remain under the shelter and protection of her husband, and her life centered around him. Separate residence and maintenance for her were not contemplated and could not arise except where she had been abandoned or compelled to stay away from him (Fonseca, 1963). In Indian Societies, marriages are largely governed by their specific 'personal or customary laws' which govern each religion. Under The Hindu Marriage Act 1955, any person belonged to Hindu, Sikh, Jain or Buddhist community can register their marriage. The marriage between two Muslims is governed through The Muslim Personal Act 1935.Christian marriages are being governed under The Indian Christian Marriage Act 1872 and the Parsis marriages are governed under The Parsi

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Marriage and Divorce Act 1936. According to the Roman Catholic Church marriage is a sacrament and a consummated marriage between two baptized persons cannot be broken by any human power. Catholic belief is that state legislation cannot come within the ken of the holy state of matrimony. Any attempt in the circumstances to tear asunder this: matrimonial bond is averse to Catholic teaching. Only a particular section of Christians therefore will take resort to the law courts, that is, those who consider marriage a contract as among the Protestants (Fonseca, 1963). Marriage according to Mahommedan Law i.e Muslim law, is not a sacrament but a civil contract. Muslims are governed by their personal law, Shariat Act, 1937.

In recent years, with the decline in the view that marriage was a permanent relationship and a sacred union, the nature of the commitment between husband and wife becomes a more important factor affecting both the permanence of their relationship to each other and the kind of relationship they form. In the article 'Commitment and the Long-term Marriage Relation' Swensen & Trahaug says that married couples who have a relationship that is based upon a mutual commitment to each other as persons will have a more intimate relationship, express more love to each other and be more successful in solving the problems that arise, so they should have fewer marriage problem (Swensen, Trahaug.1985). A decline in the marriage relationship takes place if that commitment is to the institution of marriage or the state of being married and not with the person. In such scenario, the couples want to gets separated or may want to take a divorce when things do not work out between them.

The Census 2011 data provides a good opportunity to understand some macro-level aspects of this phenomenon. It reports about 13.6 lakh individuals as being divorced, equivalent to 0.24% of the married population and 0.11% of the total population. Further, the separated population is almost treble the divorced population, and, to the extent that divorce is more likely to be reported as separation in India than elsewhere, this brings India's figures closer to the global distribution center (Jacob & Chattopadhyay, 2016). In his study on 'Family Disorganization & Divorce in Indian Communities' Fonseca (1963) reported that the basic cause of broken homes and divorce is 'domestic discord', this is important, for it shows that the primary problem is marital unhappiness and not the divorce in which it eventuates.

Fonseca (1963) also says that we are in a period of rapid transition and we cannot determine the trend of divorce. There is always a possibility that the alternative to an unhappy marriage may be even less attractive than the marriage itself. From the Court cases, he reported that, it is not necessary to assume that there is now more maladjustment in the family, but simply less willing to tolerate such mal- adjustment. In other words, the attitude to divorce is now more favorable, or to be more precise, divorce is looked upon at least as less unfavorable. Amongst certain communities, there is a very small number taking resort to Courts. This is largely due to religious scruples, social status, responsibility towards children, economic dependency of women, the taboos, and the loss of face' suffered by the woman who gets the divorce (Fonseca 1963).
Thus, this paper explores the role of virtual reality in providing marriage counselling to the couples who want to give another chance to their marital relation or need a direction to resolve the disputes that arise in their marriage in the context of India.

The Idea of Marriage Counselling:

Nowadays, people look for marriage counselling in order to save their marriages or to give another chance to their relationship. Family courts have been working and helping couples in the restitution of their marriages. The Central Government enacted the Family Courts Act in 1984 with an intention to encourage prompt settlement of disputes dealing with family affairs and matrimonial issues. As per the Family Courts Act, 1984, it is an Act to provide for the establishment of Family Courts with a view to promote conciliation in, and secure speedy settlement of, disputes relating to marriage and family affairs and for matters connected therewith. Marriage Counselling is also playing a role in order to resolve the disputes that are arising in a marriage.

The most astonishing and distinctive feature that strikes one when one begins to think about the issue of marriage counselling is its very newness, according to Kathleen Bannister (1957), in her paper on "The Development of a Professional Marriage Counseling Services" (Bannister, 1957). Twenty years ago, the phrase had little meaning to the general public or even to social professionals with formal training. Work with marriage issues was only tangentially a part of social casework and typically took the form of criticism and advice, in which even the consultant had little faith. Family casework, work with delinquents, and other such areas were recognised fields of social work. Because divorces were uncommon, people were less aware of "poor" marriages, and over the past fifty years, possibly the

majority of progressive and liberal intellectuals have supported making divorce more accessible and encouraging a more relaxed view of marriage. Perhaps this opinion was also affected by the growing body of psychological science, which places a strong focus on the wants of the person (Bannister, 1957).

Currently, a lot of this image has changed. Both professional workers dealing with these issues and the general public have been horrified by the massive rise in divorce during the War and Post-War years and the problem of thousands of children with no stable homes that has resulted from this. Meanwhile, growing understanding and research into issues relating to interpersonal conflict and child development have brought the significance of families once again to light. Recent research seems to indicate that a child's growth and development are unlikely to occur normally if the significant adults who are caring for them are constantly changing. The ultimate inability of the parents to coexist seems to reinforce the child's fantasies about the utter destructiveness of anger and hatred, and tends to send the child into his own marriage with a fundamental, if unconscious, hopelessness about relationships between men and women, according to Kathleen Bannister's personal experiences. However, if the marriage is still intact, the constant fighting around the child makes his or her issues with love and allegiance to both parents so challenging that he or she may become highly upset by the strife. Marriage counselling has been essential in addressing these issues since it helps married couples reach a choice and point them in a route that would be advantageous to both of them and to their children as well, as they are the one who are the most suffered when their parents decide to get separated.

Marriage Counselling through VR

The process of marriage counselling is one of the very personal matters of individual of which people hesitate to talk about and therefore, they reluctantly visit to any counsellor. Studies show that married couples, in a situation of marital disputes tend to hesitate to talk with an outsider about their marital disputes and the conflicts arising out of it, and hence, they tend to ignore such situations sometimes by exaggerating the relationship or by leaving each other. However, the use of Virtual Reality in providing marriage counselling can act like a helping hand for those who hesitate going for a non-virtual counselling.

If we look at the basic definition of Virtual Reality, it is the use of computer technology to create simulated environments. The user is immersed in a three-dimensional experience thanks to virtual reality. Users engage with 3D worlds instead of just seeing a screen in front of them. Hardware and software are combined in the VR process to produce immersive experiences that "trick" the eye and brain. While software provides the depicted virtual environment, hardware supports sensory stimulation and simulation like as noises, touch, smell, or heat intensity (Joe Bardi, 2019). Since virtual reality aims to replicate reality, audio plays a crucial part in producing authentic experiences. Together, audio and visuals give the environment more presence and space. For users to be guided through their digital experience, audio cues are equally essential. A person's ability to perceive space depends on their hearing and vision as well. Audio cues prompt responses more quickly than visual clues do. VR is now being used in a wide range of industries, including tourism, healthcare, the military, retail, and entertainment.
There are three basics categories of virtual reality which are known to us. The first is: Non-Immersive Virtual Reality, where the user is concurrently aware of and in control of their actual world while experiencing a computer-generated virtual environment. With graphic computers and huge projector systems, semi-immersive virtual reality, which is the second category, which makes sense for educational and training applications, as does fully immersive virtual reality, the third category. Although fully immersive VR technologies are not yet available, they might be just around the corner given how quickly technology is developing. Thus, it is clear how virtual reality can be used to our advantage in the present to create an immersive setting. An individual can enjoy and take most of all the benefits while being at a distant location.

In the context of marriage counselling, this paper tries to explore the role of Virtual Reality in India. How VR can benefit those individuals who need a help or counselling in order to resolve the disputes that are arising in their marital relationship. How the concept of virtual reality is facilitating the restitution of marriage by providing online marriage counselling to the couples in comparison to the non-virtual counselling and how easy or difficult is it for the couples to obtain an online counselling. One of the advantages of virtual reality counselling is that it can be provided when the persons are at their own locations. This makes them feel safe, comfortable and inhibited. It will provide them anonymity and confidentiality. Virtual reality environment is immersive and non-confronting. Although the counsellor may be at a distance, however VR environment makes it like “being there” and creates a sense of presence.

Futures expert Anat Baron stated that soon, VR will give producers and storytellers the singular capacity to put consumers in other people's shoes. Corporate training can benefit from this sympathetic process, particularly in support of diversity, equity, and inclusion. In the matters of family disputes like marriage, a counsellor needs to be the one who can place himself or herself into the place of the client so that he or she can understand the situation well and without any personal bias, they can arrive at a decision which benefits both the partners in marriage. Virtual reality is a stimulating tool that involves a safe and supportive environment to transfer knowledge between virtual and real worlds. Thus, it will be a great facility and opportunity for those who need a marriage counselling and want to re-allocate and recover what is lost in their relationships.

Methodology and Findings

This is a descriptive study on the basis of secondary data, in which the couples were interviewed and their opinion were short on various aspects which tells how the marital disputes happens and how they resolve their conflicts. The data were analyzed as were available in the published literatures and from there, the key things were identified i.e. less compatibility, family disorganization, anxiety and depression were the most common reasons for opting for divorce in India. In certain Western nations, there is a trend toward liberalising divorce laws under the flimsy justification that it is socially unacceptable to keep unhappy married couples bound together. In India, it has always been the policy to prevent divorce as much as possible, only allowing it when it is absolutely necessary due to extreme hardship or when it is impossible for one partner to cohabit with the other. Thus, family courts and personal counselors have been working in providing their best to the couples in order to resolve their marital disputes and hence, this is how virtual reality can also play a role in facilitating the marriage counselling.

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Impact and Legal Implications of Artifivial Intelligence in Higher Education in India

Rajesh Hooda[1] and Dinesh Kumari[2]

Abstract: The paper includes the role of AI in Higher Education in India. AI is a recent solution for teaching and learning in different situations. It manifests the growing demand and the urgency to grapple the AI access mechanism, guidelines and the regulations. It is important to understand that If any policy, plans, incentives, schemes or the vision is available to enhance the en cash the benefits of AI in India and take the Higher Education system to a new level. Does the system afford to reach to the grass root level in near future? What is expected in Higher Education in India in Next decade with the help of AI? All such questions will be tried to be answered in the full paper. It is about using computer intelligence to help teachers and students and making the education system much better and effective. It describes the concept of AI, its evolutions and its pros and cons including impact and applications of AI in education. It also highlights some examples of AI which is used for the betterment of education. The paper highlights some AI technologies i.e. Thinkster math, Brainly, Nuance, Cognil, Kidsense, Content Technologies etc. and also the current usages of AI in Education and how it benefits teachers, students and educators. The it will be a focus of research paper that in the near future, how AI will have a good impact on the education sector. AI has influenced education industry a great but will take moretime to transform it completely. Observation methods are intended to be used to collect the experiences of the teachers, students and other stake holders regarding AI and desirable trends in future.

Keywords: Artificial Intelligence; Teachers; Students; Education Sector; Teaching & Learning

Introduction

The paper is including the Impact and legal concerns of Artificial Intelligence (AI) in higher education in India. The survey reportsuggeststwo fold problems of students and teachers while using AI. Problem- 1. Transformation is always challenging and to attune to the digital, technical transformation is found more demanding and more challenging. Lack of awareness about the advantages and use of AI is restricting its intended users to avail its benefits. 2ndly, the implications and the legalities that users fears to invite for inadvertent violations of policies and laws while using AI like implications arising out of IPR domain and research Integrity. It means discussions and awareness are required on possible implications and ways to avoid this. We tried to reach to the problems and possible solutions with the AI users in HE; how AI system afford to reach learners at the grass root level in the near future? and, what is expected from higher education Institutions in India in the next decade for AI users? How does the Policy framework of Higher Education respond to the Legal Implications and Fears? Observation methods are used to collect experiences from teachers, students and other stakeholders regarding AI and desirable trends in the future.

Understand AI and VR: It is Important

The way AI works is different from computers. It's an advance and innovative version performed using computer based technology and the devices. Virtual Reality, same way a one step forward using AI to develop and make human sensory as real or near to reality. VR, in fact, helps to induce the pleasure and pain in virtual world using technology as much similar to real world. For the information of new participants novice to the concept of AI and those not from technical background mean belonging to group of humanities, I need to share that AI can perform activities generally done by human. AI structure perform work with the help of machine and other algorithmic based tools. It copy human behavior through mathematics and algorithms. It is used for sound recognitions, data storage and organization or to find same patterns in data etc. AI as perceived by many may replace the human in future. But every perception does not turn true.

Objectives of the Study

Some aims of study are as under:-

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- to describe the use and impact of AI in education;
- to describe the legel implications of AI in India;
- to know the hinderences in use of AI.

Methodology

For this purpose descriptive method is used. Literature has been collected through different online resources i. e. google; Research gate and other open access platform.Data was collected through google form to observe AI mechanics in Higher Education. A total of 134 responses have been received from the faculty and students.

Measures

The survey was sent by whats App groups including close ended as well as open ended questions with the categories of respondents.

- Do you know about AI/VR?
- Can you name any one or more AI apps ?
- Have you ever experienced VR in your learning/teachings ?
- Have you ever attended any training/Programme to know how the use of AI/VR ?
- Do you agree AI and VR are beneficial/helpful in education ?
- Have you ever experienced VR in your learning/teachings ?
- Are you satisfied with the role of your institution in making you verse with AI/VR ?
- Do you feel lack of training/workshop/practical on use of AI/VR ?
- Do you feel that AI & VR can bring a difference to aspirants and educational standards ?

Review of Related Literature

Yadav (2020) in a comparative study based on survey concluded that "AI learning tools to be additional learning aid to classroom learning and are perceived as a supplement by higher education students in India to the current classroom learning".Ladda and Saraf(2019) conducted research on the impact of AI in some institutions in Pune.The study explored AI, its adoption and future in education.The study concluded that AI will soon become integral part of education system including institutions, teachers and student.Bhatnagar (2020)described the role of AI in the area of higher education.The paper's main themes were interactive learning, staff empowerment, and the improvement of human capacities.The study revealed that "the use of AI in higher education institutions is accompanied by a number of modern obstacles, including excessive costs, a shortage of expert staff, insufficient soft skills, a lack of ethical behaviour and attitudes, technological disorder and others".

The study suggest that teachers must help pupils learn higher order thinking, creativity, metacognition, and human skills that machines can't master in order to prevent the complete replacement of humans by machines.Lameras and Arnab (2021) in their exploratory review highlighted the impact of AI in education. The results of this review contribute to a better understanding of how artificial intelligence may strengthen teachers' roles as catalysts in developing, visualising, and orchestrating AI-enabled teaching and learning. As a result, more AI-systems that produce computational representations based on useful data-driven inferences of the pedagogy, domain, and learner models will be developed.Huang and Shiri (2021)in their study, focus on LIS and librarianship, overviews "some of the discourses emerging on the integration of AI into the higher education setting, considers the role of LIS and librarianship in intervening in the trajectory of AI in learning and teaching, and weighs in on the place of professional LIS ethics in relation to facing AI-led technological transformations."

Results and Discussions

In upcoming discussion, we would try to find the truth. Sharing some concerns of the users on AI use and Impact in Higher Institutes. A survey conductedthrough google form helped to observe various dimensions AI in Higher Education. A total of 134 responses have been received from the faculty and students.

Designation wise Response:

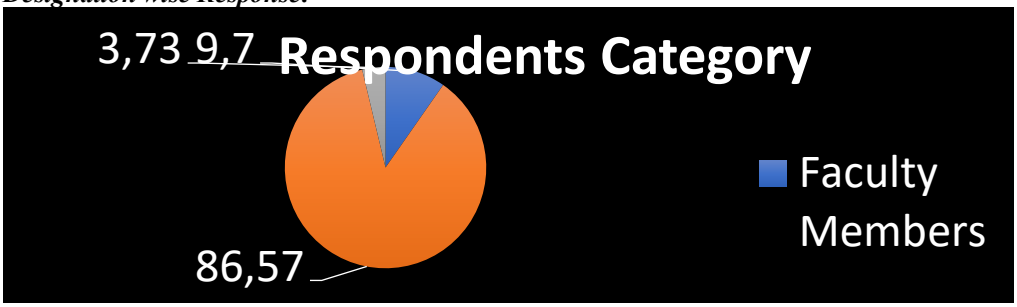

Figure 1. Respondents Category

The Figure 1 shows that out of total 134 respondents majority of respondents were from the student category followed by teachers. That further reflects the leniency of the teaching communities on Use of AI.

Do You know about AI/VR?

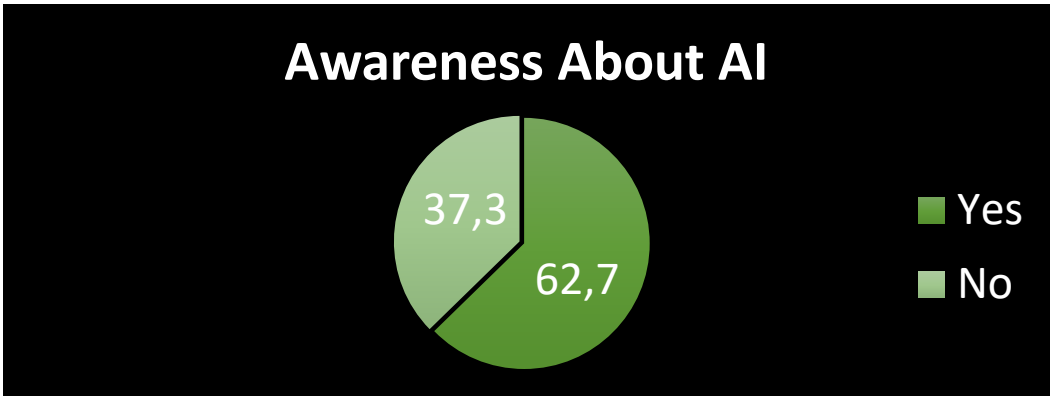

Figure 2. Number of respondents aware about AI,survey 2022

It shows that 62.7% respondents are aware about Artificial intelligence and 37.3 % show lack of awareness of this term.

Can you name any one or more AI apps ?

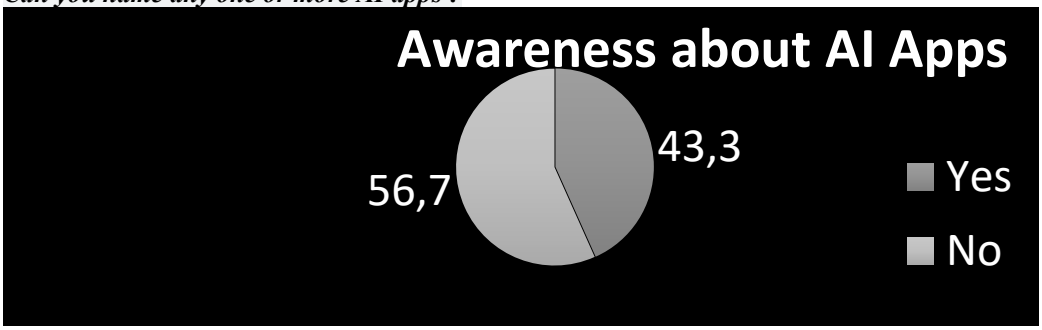

Figure 3. Awareness about AI Apps, Survey 2022

It shows that 56.7% respondents aren't aware about any AI Apps.

Have you ever attended any training/Programme to know how the use of AI/VR ?

Figure 4. Number of respondents attended training programme,survey, 2022

It shows that 80.6% respondents never attended any training program to know how to use AI.

Have you ever experienced VR in your learning/teachings ?

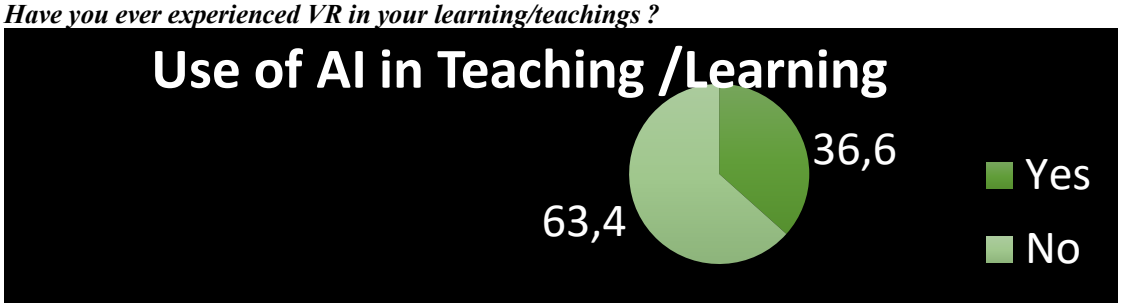

Figure 5. Usage frequency of AI in Teaching/Learning,survey,2022

It shows that 63.4% respondents don't use AI in their teaching/learning.

Do you agree AI and VR are beneficial/helpful in education?

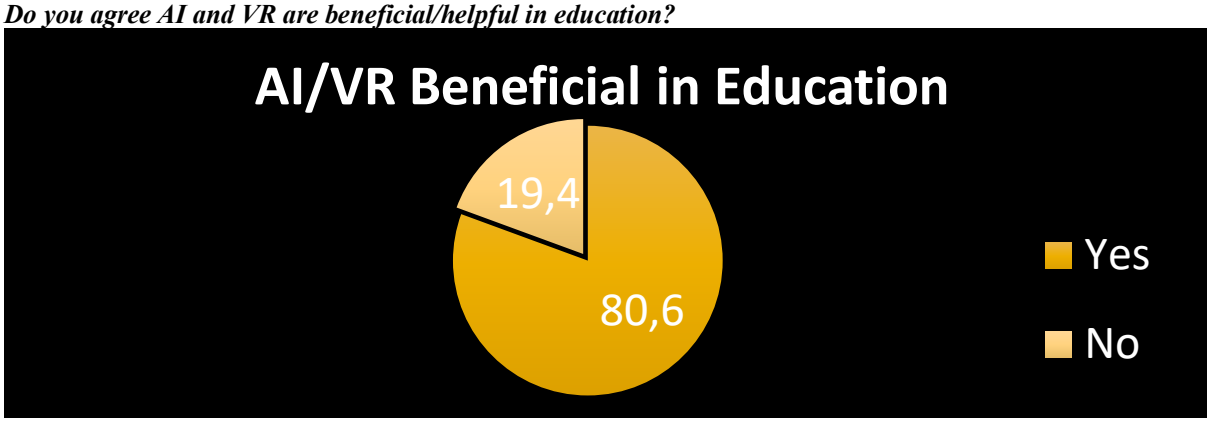

Figure 6. AI beneficial in Education

It shows that 80.6/% respondents consider AI /VR beneficial in Education.

Are you satisfied with the role of your institution in making you verse with AI/VR ?

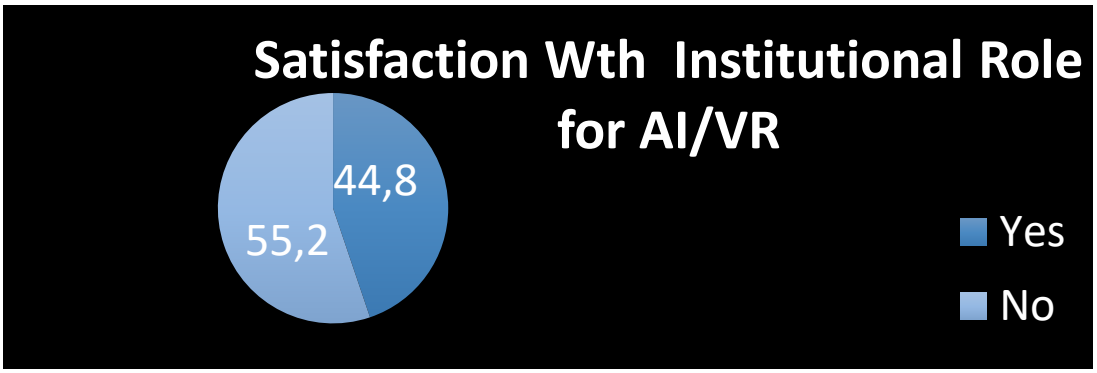

Figure 7. Level of satisfaction with Institutional role, survey,2022

It shows that majority of respondents (55.2%) have no satisfaction with the role of institution in making them verse with AI/VR.

Do you feel that AI & VR can bring a difference to aspirants and educational standards ?

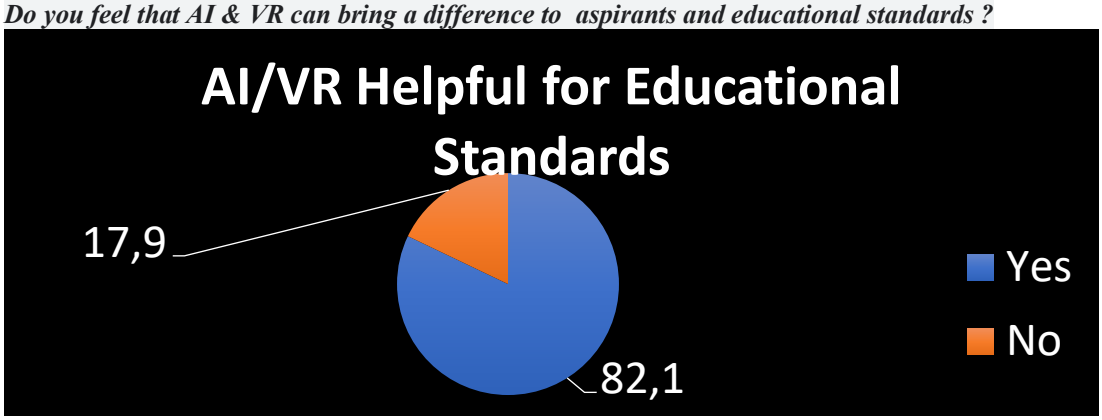

Figure 8. AI/VR helpful for educational standard.

It shows that 82.1% respondent agree that AI can bring difference to aspirants and educational standards. Respondents that included Teachers and students shared their Concerns and Implications with AI in Education

- They shared Technical and Financial concerns, find Health related issues and see Legal problems while using AI.
- Expensive and High cost, Lacks the human touch, No feelings and emotions, No original thinking, May tend to replace human jobs , Can't think beyond the limits, Making human lazy, Make dependency on Machine, Health issues i.e. effect on eyes etc., May impair Intellectual ability of young generation
- There is no specific legal mechanism created so far to deal with the use of AI and the issues emerging out of this domain.
- There is problem of blending the legal knowledge to the users of AI in Higher Education whichis tough for many to equip with both and this creates a hindrance in use of AI. Users do not want to entail any legal implications out of ignorance of the laws.
- Technology and Law, both requires special and extra efforts on part of Users.

AI: Applications and Technology

Despite some of the obstacles AI is very significant in legal education, forensic science and crime investigation like any other subject. AI aids teaching, learning especially in law and humanities. It is common experience that users in humanities like Law are not versed with statistical tools which are efficiently done for its users by AI and various apps besides providing significant information, analysis and compilation of data.

Additionally, AI strengthens research and also help in recreation and dissemination of ideas efficiently.AI example used in higher education

- Plagiarism or Literary theft Detection
- Exam honesty
- Chatbots for registration and retention
- Learning Management Systems
- Recapitulation of Faculty Lectures
- Online Discussion Forums
- Analysis of Student Related Metrics
- Scientific Research
- Connected Campus

In fact, Students can access the relevant data and information which can be tested and verifiable scientifically. Law teachers and students found AI very advantageous for conducting Moot Court, quick retrieval of recent decisions and analytics on the basis of collected information. Forensic science is not just law and medical jurisprudence but in fact the whole crime profile can be assimilated and developed using suitable AI apps.

Some useful AI applications in education and law is discussed hereunder:
AI is experienced by new users in Education especially those engaged in Humanities and social sciences as having: Now- a- days in higher education, there are many technology which are based on AI and are used frequently.Like, there is subject specific tutoring programme which are personalised;virtual teaching assistance;virtual sites for classroom questions;speech recognition software;virtual learning assistant;some voice to text tools and some content technologies, text- Editors and Autocorrect. Some examples of these technologies are as under:

- Tutoring programme like Thinkster Math
- Virtual teaching assistant like Jill Watson
- Sites for classroom questions like Brainly
- Speech recognition software like Nuance
- Virtual learning assistant like Cognii
- Voice to text tools like KidSense

In the field of law some AI based startup are SPOT DRAFT, CASEMINE, CASEIQ and NEARLAW which provides legal solutions to law community.

Issues in implication of AI:

- Lack of practical approach
- Lack of Technical knowledge and unawareness about the AI are major issues in adoption of AI/VR
- lack of training for both students and teachers for proper implementation of the techniques
- Connectivity is another issue especially in rural areas
- There is also financial issue as many students are unable to afford the necessary gadgets for AI educationand system has no planning to serve these needs.
- Lack of Augmented reality app designs and development standards
- Accessibility due to cost. And also the technology is still evolving.
- Lack of resources and training is felt asthe technology is still evolving and changing rapidly.

Higher Education in times of AI- Aims and Expectations
AI in recent years establishes itself as an emerging technology that maybring drastic changes in the ways ahead. AI is assisting in the field of education through its applications.

- It is helpful for teachers in time management for improvement of the weak areas of their subject knowledge wisely. NEP in India also envisages inclusion of multi disciplinary skills and grapple to the specific needs of the students.
- AI can definitely be a role maker as it would facilitate both teachers and learners.

To meet the expectations of present and prospective users, HE governing bodies has taken certain steps and initiatives to promote the use of AI and to avoid its misuse which is considered big fears in the minds of expected users.

AI in Higher Education and UGC guidelines

Due to explosion of information, it is difficult to keep pace with. Education sector is facing challenges in the fast growing world. The problem becomes big with the inadequacy of financial resources. It is realized that higher education institution should be supported by government and the public also. UGC in its new regulation and guidelines, notified that the distance online degrees will be valid.

BCI and ICSSR have not come up with any specific guidelines or plans to promote AI in HE in any way. It may do so in near future, it should be. AI needs continuous regulation to avoid misuse. AI users concern data protection and safety. Research findings of a researcher can be exposed during process and be a threat. This may create new legal and proprietary issues. Users find all these tough strands while using AI and expect to be designed in a way that assures their privacy and protection.

AI and Regulatory Frame work – International Instruments

Don't worry, Law is taking its course to avoid every possibility of Misuse of AI. European Union is working on framework of laws. General Data Protection Regulations are framed by EU. GDPR provides privacy and security through rights and duties, principles and remedies regarding various AI issues. The proposal of European Commission for Regulation of AI is in pipeline to facilitate legal aspect for the upcoming upgrades in the area of AI.

AI and Regulatory Frame work in India

In India, Personal Data Protection Bill 2019 is pending. Besides, Government of India intends to build up a Digital India and has started many schemes related to AI. NITI Aayog has adopted a three-step theory to Initiate AI projects, building an ecosystem of AI in India. Planning Commission of India, NITI Aayog introduced the National Strategy on AI and its report suggests that "A panel consisting of The Ministry Of Corporate Affairs and the Department Of Industrial Policy and Promotion to look over the regulations needed in intellectual property laws."

This is required to form IP structures to upgrade AI and felt the need to Introduce legal networks for data privacy and security. It also aims to create ethics manual concerning each sector while using AI.AIRAWAT – AI Research, Analytics and Knowledge Assimilation platform. It is an approach paper given by senior adviser, Anna Roy and in his opinion, AI Specific Cloud Computer Infrastructure should be built up in India. AIRAWAT, which is established by NITI Aayog, will set up a specialized AI structure that will support the computing needs of the Centre of Research Excellence, International Centers of Transformational AI, startups on campuses, researchers, etc.

Suggestions

Some suggestions are outlined in the present scenario where AI is grounded and promised to enhance the efficiency of all involved.

- There should be short term programs/courses for awareness and training of the faculty and the students. UGC and Higher Education Directorate, ICSSR and BCI can play active role in popularising the use of AI by extending Grants and Scholarships for AI workshops and training programs
- Cross-sectoral collaborations are required. Like to handle safe platform the Regulatory bodies of HE, UGC and Technical streams should join hands and create a desirable system. Additionally, IPR Law is a big deal to commit that can serve the needs of Data Protection and Privacy of Data.
- Change should be introduced in Teaching scheme and structure by acknowledging equal grades and credits for promotion of AI based teaching and Learning.
- AI can create new jobs in Higher education for AI experts to assist Teachers and students if they desire so for any of the discussed reasons. Team of experts should be enrolled or empanelled to open up AI to one and all interested to assist teachers, researchers and the students if so required. It would be wrong to see AI as a mechanism to reduce man power and one for cost cutting.
- Awareness of the Laws and regulations regarding use of AI can make the users confident in Higher Education as they will be able to avoid the violations of norms either in research and further developments.

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Immersive Collaboration: Issues and Challenges for Energy Management in Malaysia

Mohammad Fikrey Roslan[1] and Rafidah Abd Karim[2]

Abstract: As the usage of alternative energy sources grows more widespread in developing nations, it will be crucial to monitor their development. Moreover, control of the utilization of these renewable energy sources is crucial. Rapid advances in virtual reality (VR) and augmented reality (AR) have paved the way for immersive visualization to expedite the study of particular types of complex scientific and technical data (AR). The rising demand for energy consumption in Malaysia continues to be influenced by development and economic growth. The main challenge facing Malaysia's energy sector at present is the question of sustainability. This report addresses the current energy scenario and examines problems in the energy management of Malaysia and an initial assessment of the Malaysian energy industry can be given by the study. The review will cover in depth the potential of energy management using the immersive collaboration, challenges, and future policy opportunities in this sector. In addition, the aim of this review is to describe the various energy policies adopted in Malaysia to ensure long term reliability and security of energy supply.

Keywords: Virtual reality, Immersive collaboration, Sustainable energy, Energy Resources

Introduction

The energy market is rapidly evolving in a number of directions, and with the advent of virtual reality (VR) and augmented reality (AR), immersive visualization is expected to facilitate the interpretation of certain types of complex scientific and engineering data (AR), including data from energy sectors. During daily usage of the large-scale immersive virtual environment at the National Renewable Energy Laboratory (NREL), it was observed that immersive visualizations enhance scientific operations and have implications for energy-rich nations. Many NREL scientists and engineers are beginning to use commercially accessible AR/VR head-mounted displays (HMDs). These immersive displays may offer unique qualitative insights, but they have little use for quantitative research.

In the past decade, the energy business has been significantly influenced by the growth of unconventional oil and gas (O&G) production and renewable energy sources. The latter provides alternatives to fossil fuels, which can be vital to diversifying energy sources and sustaining greenhouse gas emissions reduction pledges as mandated by states who signed the Paris Agreement (2015), which Malaysia did (Oh et al., 2018). Energy is an essential element for the economic, social, and long-term growth of many nations. Global energy consumption is anticipated to expand faster than population growth. Global energy consumption is anticipated to increase faster than population. The International Energy Agency anticipates a 53% increase in worldwide energy use by the year 2030. 88.1% of energy consumption is derived from fossil fuels, including 34.8% crude oil, 29.2% coal, and 24.1% natural gas (Ong et al., 2011).

Malaysia is one of the rapidly expanding economies in South-East Asia. The country's economic growth is fueled in part by the government's industrialization program, which encourages both domestic and international investment (Basri et al., 2015). This continues to have an influence on Malaysia's expanding energy consumption due to the fast growth of infrastructure and economy. This energy consumption is affected by population growth, per capita income, and demographic shifts (such as increasing urbanization and economic growth). The recorded increase in energy consumption in 2012 was 7.5%, and future increases are anticipated to range between 6% and 8% (Shaikh et al., 2017).

The economic growth of a nation is contingent on a constant energy supply that fulfils all of its needs. Energy efficiency and government policies designed to promote energy security play a significant role in sustaining economic growth in a nation. Nations are rapidly understanding that, in terms of their energy portfolio, they cannot continue business as usual in light of climate change. Therefore, nations are establishing policies and strategies that utilize a mix of renewable and nonrenewable energy sources (Shaikh et al., 2017).

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Figure 1 depicts the Malaysian government's energy strategy, which encompasses the production, supply, and use of energy. The Energy Sector is administered by the Department of Electricity and Gas Supply. In addition to energy suppliers, utility companies, R&D organizations, and customers, additional actors act (Hannan et al., 2018). Energy management is an integrated approach meant to oversee energy consumption, reduce energy expenditures, increase efficiency, and foster a healthier work environment. In reality, compared to other phases of building development, the operational cycle consumes the most energy during the building's lifetime. Typically, energy is consumed in structures during peak activity for heating and cooling, lighting, and other equipment or supplies (Tahir et al., 2017).

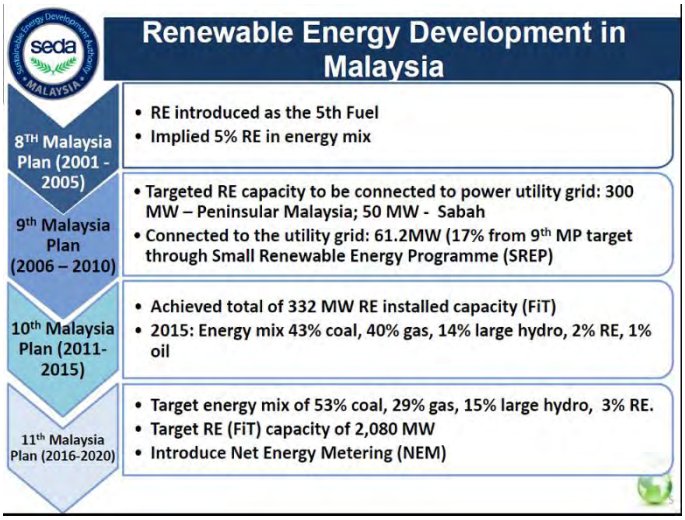

Figure 1.1: Renewable Energy Development in Malaysia (Tahir et al., 2017)

The energy consumption per capita of the majority of the population, particularly in industrialised nations, has grown significantly. Recent improvements in residential, commercial, industrial, and transportation sectors have resulted in an increase in energy production in emerging nations. Primary sources of energy, such as crude oil, natural gas, and other traditional fuels, are limited resources formed by geological processes through the absorption of solar energy into the ground over millions of years, owing to price fluctuations and greater power station expenditures.

The technology for exploiting non-conventional energy sources is still in its infancy. The adoption of energy conservation and consumption control programmes and the enhancement of the generating sector's capacity are two possible solutions to this issue. However, compared to the cost of its creation, the cost of conserving a single unit of energy is minuscule. Therefore, it is crucial to examine new energy efficiency measures in both developed and emerging nations (Al-Mofleh et al., 2009).

In the Ninth Malaysia Plan, yearly growth in energy consumption is anticipated to average 6.3%. To promote the economic growth of the nation. To meet its rising energy demand, the Malaysian government has created, over the course of more than three decades, the policies and initiatives outlined in Figure 2 in order to assure energy protection and sustainability, promote energy saving, and reduce environmental consequences (Ong et al., 2011). The most important component of energy conservation operations that energy audits may do is the examination of energy usage patterns and the identification of energy-saving measures (Muhammad, 2017).

Malaysia has several problems and issues in terms of energy supply and demand, including energy security, fuel supply and pricing, particularly gas pricing, renewable energy, energy efficiency, and conservation. Currently, Malaysia's energy production is governed by the National Energy Policy, which was approved in 1979 with three objectives. There are three objectives: supply, consumption, and environmental (Muhammad, 2017).

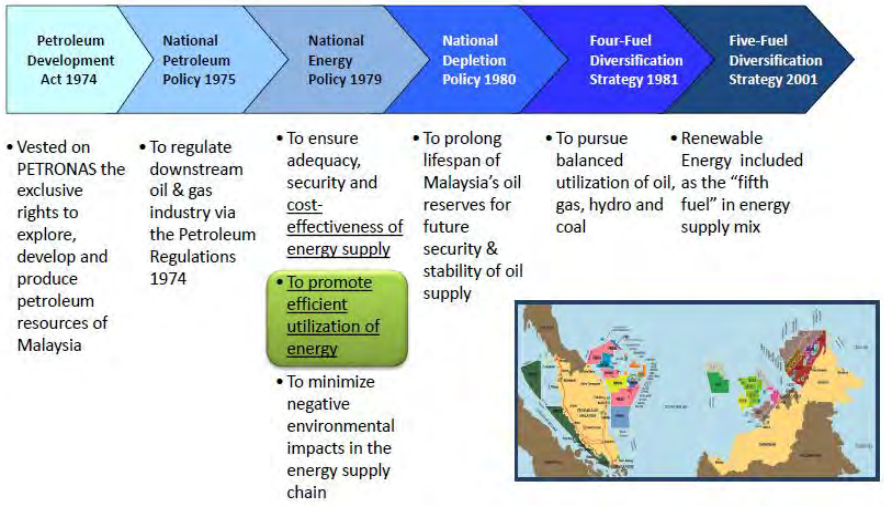

Figure 1.2: Energy Efficiency is Embedded in Energy Policy (Muhammad, 2017)

The objective of the supply is to ensure an adequate, reliable, and cost-effective supply of energy; the objective of the consumption is to encourage the efficient use of energy and prevent inefficient and non-productive practises of energy use; and the objective of the environment is to ensure that environmental conservation considerations are not overlooked in the production and use of energy (Tan et al., 2013).

Literature

Current Energy Management in Malaysia

By combining the actual environment with a digital or virtual reality, immersive technologies produce unique experiences. Virtual Reality (VR) and Augmented Reality (AR) consequently have a significant influence on the energy business. In the rapidly changing energy market context, industry actors must be able to foresee the future with precision. Virtual Reality (VR) is frequently delivered via a VR headset or a portable device, such as a mobile phone, as it is one of the most effective means of interaction. This technology enables users to control and direct their activities in a simulation of the real world.

Today, new Augmented Reality (AR) technology on mobile devices is redefining the relationship between the real environment and digital pictures (e.g., Pokémon Go). Moreover, Microsoft HoloLens is an augmented reality (AR) headgear that enables hands-free use of several overlaid screens in front of the user. As fossil fuels account for around 80% of the world's total primary energy consumption, renewable energy is a drop in the ocean. In the future years, there are compelling grounds to believe that a combination of variables will favor the development of renewable energy.

Factors to support the development of renewable energy in future

Dramatic cost reductions

In addition to incremental innovation, economies of scale and learning-by-doing have benefitted wind and solar energy projects tremendously. Especially true in the case of solar photovoltaics (PV). The 2020 goal for solar power (a levelized cost of energy of $0.06 per kWh4) was met in 2017, and a new plan with a target of additional cost reduction by 50 percent ($0.03 per kWh) was set for 2030 (Suruhanjaya Tenaga (Energy Commission), 2017). Recent energy auctions in many markets have demonstrated that renewables are cost-comparable with or even less expensive than natural gas and coal (IRENA, 2018). However, this does not necessarily imply that we can now rapidly cut the percentage of fossil fuels in the energy matrix.

Electrification of energy demand

The digital economy has the potential to alter energy demand on multiple fronts, including the increased use of electricity-powered equipment, the decentralization of energy production, in which generators also serve as consumers, and the transformation of customers from passive to active through smart meters and the Internet of Things, which control loads and add flexibility to the energy grid (Yatim et al., 2016).

Policy activism and consumer's preference

Scientists and politicians agree that the pace of CO2 and other greenhouse gas emissions is correlated with global warming, and if we want to keep it below 2°C over pre-industrial levels, the world must rapidly transition away from carbon-based energy sources. This is reflected in the aims of the Paris Agreement (2015), the most recent in a series of summits and conferences designed to coordinate a cohesive response to the global warming crisis.

If politics fails, citizens concerned with environmental implications can potentially restrict energy consumption through their purchasing power. Some firms participate in carbon offsetting programs to differentiate their products and promote sustainable consumption, so communicating to consumers that they are contributing to climate change mitigation (Yatim et al., 2016). It is impossible to predict the precise effect that the enforcement of local regulations or customer preference for environmentally friendly suppliers will have on company activities. Nonetheless, the confluence of political lobbying and consumer demand for renewable commodities are issues that fossil fuel-based energy firms will need to consider in order to increase their business expenses (Yatim et al., 2016).

The electrical energy market

Malaysia, which has autonomous electricity producers, utilizes a single buyer approach (IPPs). The Energy Commission, which was established in 2001, and the Ministry of Energy, Technology, Science, Climate Change and Environment (MESTECC) formulate the policy. As its lengthy name implies, MESTECC has no shortage of concerns to address. To stimulate renewable energy, it is necessary to increase the proportion of renewable energy in the country's energy mix. To this end, Malaysia has implemented the necessary regulations and policy tools (Oh et al., 2018).

Given these state policy aims and the fact that Malaysia is a gas-rich nation, it is startling to learn that Malaysia's economy is growing more carbon-intensive, not less so. Coal may be dying in the rest of the globe, but not in Malaysia, where its primary energy share increased from 5% in 1996 to 20% in 2016 (Oh et al., 2018). Additionally, the energy business is ideal for Virtual and Augmented Reality. When oil prices fell in June 2014, several energy companies instantly lowered their rates.

However, the lower-for-longer scenario that existed from 2014 to 2016 prompted firms around the globe to reduce capital expenditures by roughly 40 percent. Now, the stability of the market at this level has caused these firms to modify their business models, signaling the transfer from old business methods to innovative concepts that will not only save money but also increase productivity. These revolutionary innovations include astounding new technologies such as Virtual Reality (VR) and Augmented Reality (AR).

In Malaysia, most of the coal used to generate energy is imported. Beginning in the late 1990s (see Figure 3), Malaysia placed a large wager on coal by increasing its consumption by more than 17 times, from 964 ktoe in 1998 to 17,101 ktoe in 2016 [18]. In 2016, coal accounted for 46% of the total 150,442 GWh of electrical energy generation, while solar and wind accounted for a negligible portion (Oh et al., 2018).

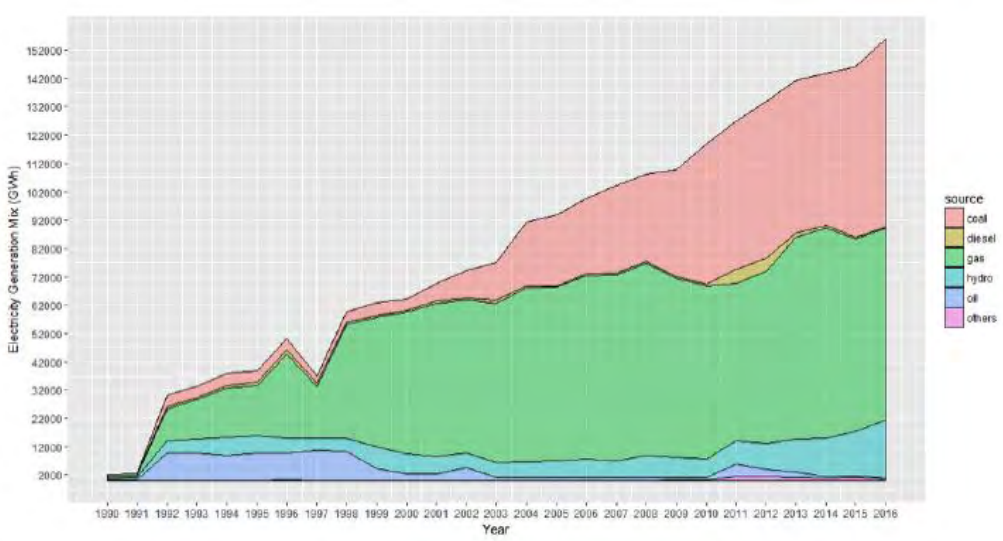

Figure 2.1: Electricity generation mix (in GWh) of Malaysia (1990-2016) (Suruhanjaya Tenaga (Energy Commission), 2017)

Findings

Energy Management Issues in Malaysia

Energy security is one of the primary challenges lingering in practically every nation's energy policy. The question to be addressed is how these countries are coping with, and to what degree, the energy security crisis affects their economies, their climate, and their citizens (Abd Rahman et al., 2019). As one of Southeast Asia's largest countries and economies, Malaysia is a good case study for review of the energy security scenario. First, there is a need for a concept of 'energy protection' as this is of the utmost importance in the twenty-first century for energy policy making. Energy security can be defined as 'adequate and uninterrupted energy supply at an affordable cost. So, in the context of this idea, let us examine how Malaysia is addressing the energy security concerns it confronts (Yusuf, 2018).

In Malaysia, the demand for energy is always increasing, but the supply cannot keep up. Present trends in electricity output and request show that the nation has a retain gap that will last for the next few years only. Malaysia needs more financing, analysis and to meet this ever-increasing inquire for electricity, rise in its power sector (Abd Rahman et al., 2019). In addition, the authority's diversification strategy and high selective plan for the power sector stresses the meaningful to integrate renewable energy sources (RES) and alternative sources with reduced CO2 emissions into the national energy mix, such as nuclear power (Yusuf, 2018).

For several years, the government has been implementing various measures. These include, for instance, the 1979 National Energy Policy, the 1981 Four Fuel Diversification Policy, the 8th and 9th Malaysia Plans' Fifth Fuel Policy (2001-2005 and 2006-2010), and the development of a new concept for technology in the 10th Malaysia Plan (2011-2015). The new one project is the 11th Malaysia Plan (2016-2020) stated in Figure 4, which has prioritized achieving sustainability through cleaner sources of energy. In addition, renewable energy has been initiated into Malaysia in the 'Fifth Fuel Scheme' as its fifth fuel, but is the policy being used as planned? The reply is no.

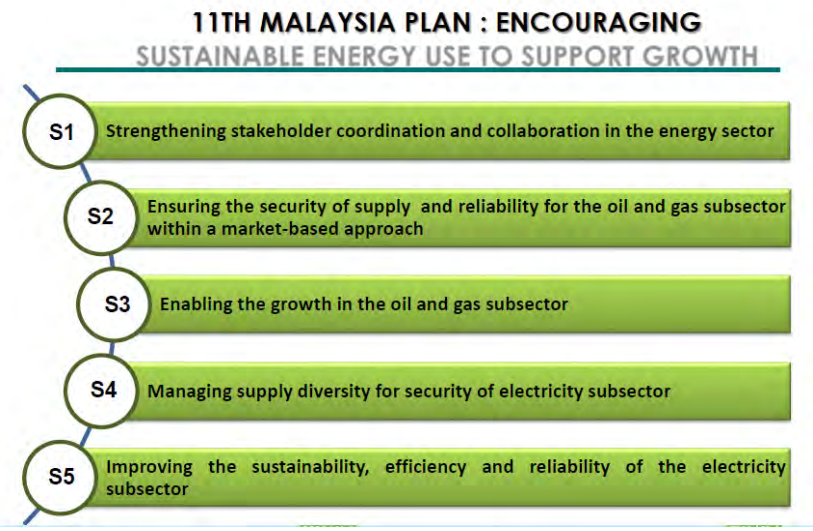

Figure 3.1: 11th Malaysia Plan Series (Al-Mofleh et al., 2009)

Energy efficiency is the aim of reducing energy efficiency. The number of resources required to deliver goods and products facilities (Al-Mofleh et al., 2009). The conservation of energy, on the other hand, is the striving to reduce the use of electricity by using fewer energy service. There are considerable helps for practice of power quality of energy programs especially when energy effective systems are used (Al-Mofleh et al., 2009). The authority administration, initiatives, and projects for energy production and control systems have altered little during the past two decades. By implementing more energy efficient technology in different industries, the government needs to strengthen the delivery mechanism (Abd Rahman et al., 2019).

The best ranking of alternative electricity for energy efficiency is part of the notion of sustainability that eliminates the use of electricity supply. That, in turn, promotes the reliability of the environment, domestic protection, private financial protection and greater savings. Less energy is discovered as a self-sufficient solar house effective as a passive solar house equivalent because the passive house will reduce the demand for life cycle energy (Abd Rahman et al., 2019). Besides, opposed to totally self-null of passive design, the use of passive design combined with active technology will substantially lower the market for fossil fuels for building energy life cycle energy. In the life cycle scope limited structures are considered more efficient than inner (negligible operating power) structures (Abd Rahman et al., 2019).

In response to the COVID-19 outbreak, the Ministry has periodically tested the procedures being taken, i.e., a Movement Control Order (MCO) centered on a country's new COVID-19 scenario. Under the National Economic Recovery Plan (PENJANA) outlined in the 6-Phase Economic Recovery Plan, Malaysia was in the fourth phase of recovery (6Rs). On August 28, 2020, Malaysian Prime Minister Tan Sri Muhyiddin Yassin announced that the Recovery Movement Control Order (RMCO) would be extended until December 31, 2020 (Li et al., 2020).

With the exception of Perlis, Pahang, Kelantan, and Sarawak, the government of Malaysia has issued a revised version of the Conditional Movement Control Order for the majority of Malaysian states from 9 November 2020 to 6 December 2020 on 7 November 2020. Currently, the majority of businesses are able to restart operations with stringent standard operating procedures (SOPs) [3]. Modifications to the SOPs or rules will be communicated on occasion. On 9 October 2020, the Malaysian Ministry of Health confirmed that Malaysia has officially entered the third wave of the COVID-19 pandemic. As of 13 December 2020, there are a total of 83,475 COVID-19 cases in Malaysia, of which 415 are fatal, 13,667 are hospitalized, and 69,375 have recovered (Li et al., 2020).

As of 2 October 2020, the nationwide number of COVID-19 instances has increased dramatically due to a major portion of local broadcasts. The East Malaysian states of Sabah and Sarawak are the most affected by the surge of COVID-19 cases. As of 5 November 2020, Sabah and Sarawak reported a total of 18,083 and 942 COVID-19 cases, representing over fifty percent of the total number of COVID-19 cases in Malaysia. The two-week referendum campaign for local elections and the COVID-19 outbreak in a detention center in Sabah that shelters illegal immigrants

from the Philippines and Indonesia aggravated the spike in COVID-19 cases in Sabah, East Malaysia. Total weekly reports in Malaysia have remained above one thousand per day due to clinical evaluation of foreign workers (Li et al., 2020).

The Malaysian government has implemented a high level of Movement Regulate Order (MCO) in locations with COVID-19 cases to monitor and control the new COVID-19 problem, based on the severity of the situation. Thus, 60 facilities in Malaysia are capable of analyzing 41,000 specimens every day. The Malaysian government is now discussing the purchase of COVID-19 vaccinations with the medical device company Pfizer and the Global Access to COVID-19 vaccine (COVAX). The Minister of Science, Technology, and Innovation of Malaysia stated that the country's medical authorities must approve the vaccination arrangements (Li et al., 2020).

In order to effectively control the current COVID-19 situation, the Malaysian government has implemented the Conditional Movement Control Order (CMCO) for areas with the presence of COVID-19 cases; the Enhanced Movement Control Order (EMCO) for Zones with a high number of COVID-19 cases; the Targeted Enhanced Movement Control Order (TEMCO) for a much smaller area with a high number of COVID-19 cases, such as a housing community or a commercial house; and the Administrative Movement (Li et al., 2020).

It requires both Malaysians and foreigners wishing to return to Malaysia in order to download and update MySejahtera software on their mobile phones. MySejahtera is an application created by the Malaysian government to aid in the control of the COVID-19 outbreak in the country. During the COVID-19 pandemic, it assists users in doing health exams and monitoring their progress in terms of wellness. MySejahtera aids the Ministry of Health (MOH) in monitoring the medical condition of customers and its ability to take actions to guarantee adequate treatment (Li et al., 2020).

Ex-Prime Minister Muhyiddin Yassin stated that the banking industry lost an unprecedented MYR 2.4 billion each day in the MCO, for a total of MYR 63 billion, as a result of the cessation of all corporate operations. According to the Malaysian Ministry of Finance, Malaysia's gross domestic product (GDP) is projected to decline by 4.5 percent in 2020, before resuming growth from 6.5 percent to 7.5 percent in 2021. The implementation and subsequent expansion of the Movement Control Order had a substantial impact on the economic performance of Malaysia (MCO) (Li et al., 2020).

Immersive collaboration for Energy Management: Paving the Way for Malaysia's future

Virtual and Augmented Reality have a significant influence on energy industries such as the Oil and Gas Industry. New digital technology may ensure that corporations extract more energy, more efficiently, and most importantly, with less environmental impact, resulting in less harm to the planet, given that the Oil and Gas industry is experiencing a prolonged period of declining prices. Moreover, as the Internet of Things (IoT) increases, a growing number of exploration and production companies are contemplating embracing the artificial intelligence (AI) and machine learning that VR and AR may provide. Using augmented reality, companies in the Energy business might significantly reduce operating costs and make more accurate judgements. Simultaneously, VR can improve the Energy industry's overall safety and training quality (Suruhanjaya Tenaga (Energy Commission), 2017).

Technological advancements are altering the energy economy with major economic and geopolitical implications. After a decade of more conjecture than reality, renewable energy is catching up and becoming cost-competitive without subsidies in the production of electricity. This likely situation would make Malaysia very difficult. Lower oil prices will have a significant impact on the local oil sector, which has already struggled to maintain production levels due to its high production costs and limited fields.

Increased royalties, such as those requested by oil-producing states, will have the same effect on new investment. The combination of economic expansion, political efforts to keep energy costs down, and limited availability of natural gas has already had an effect on the national energy grid by increasing coal use, which currently accounts for 46% of Malaysia's power output (Suruhanjaya Tenaga (Energy Commission), 2017).

Challenges and Barriers in Energy Management in Malaysia

The Ministry of Green Energy and Water (KETTHA) has been named by the obstacles and problems found and evaluated meeting the energy industry for the up to the introduction of energy conservation programs in 2015 the primary challenges described are:

- Socio-culture barrier: Investments in energy efficiency since the returns in terms of energy are not attractive, because of low energy prices, the savings are small.
- Financial barrier: Dedicated plan of financing from commercial lending institutions for electricity efficiency It was difficult to acquire because banks lacked the capacity to handle project evaluation for energy management and project finance programs.
- Economic barrier: Absence of a comprehensive national strategy devoid of an underlying road map or road map, energy production action plan. The drills are without a defined medium-term and long-term goal, poorly coordinated programs often cover individual short-term projects.
- Administrative barrier: This involves political, political, institutional conditions and regulatory criteria. No clear clarity, no authority responsible for guaranteeing holistic energy performance programs are laid out and organized properly. The planning also relies heavily on demand forecasting. Planning and supply, without considering electricity, side management for productivity and demand.
- Lack of coherence in the promotion and embarkation of energy performance, as most services are project-based run-on minimal allocation of budgets with short frame of time.

COVID-19 is a global problem that needs researchers, policy makers and policymakers to resolve several aspects that go well beyond the health and well-being consequences of this pandemic. One of the first manifestations of COVID-19's attempts to regulate the spread was to try to limit the movements of people; but remaining at home is a privilege that only some can afford (Al-Mofleh et al., 2009). Mobility restrictions might have negative impacts on the 79.5 million displaced persons in the globe, the majority of whom reside in confined spaces with limited access to work or services. The first major barrier to the Global Compact on Refugees and the Global Compact on Secure, Orderly and Routine Migration could be COVID-19, both of which offer a “whole approach to society” (Abd Rahman et al., 2019).

Conclusion

The immersive collaboration in the energy business can increase teamwork, communication, inspection, and maintenance, as well as tackle crucial issues such as dealing with risks, physical constraints, a lack of practical experience, and the need to enhance staff training. All of these factors can result in safer and more effective operational procedures and boost a technician's knowledge and skills. AR and VR technology offer two primary advantages. First, they can reduce the industry's formidable difficulties.

The technology can aid in enhancing company operations and inspections, lowering expenses, and boosting employee morale and retention. It also boosts data accessibility, enables process optimization, and enhances value chain performance. Between 2010 and now, Malaysia's energy mix has not changed much. Coal and natural gas remain the two most significant sources in the world. It is expected that the nation will be charged up and their consumption increase as more power plants go based on these two properties by online by the year 2020.

In the nutshell, virtual reality and augmented reality solutions can provide tremendous promise to the energy management and utility industries by paving the way for improved safety and efficiency. This is especially true for training, modelling, visualization, and remote operation involving complicated information structures and ideas. In addition, this study finds that Malaysia might be well positioned for future energy growth if the appropriate policy mix for improved management and collaboration with immersive technology are implemented. To create a competitive and sustainable energy economy in Malaysia, policymakers are tasked with having a precise directional vision and calibrated policy tools that support the long-term aims of enhancing the nation's innovation and institutional capacity.

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Virtual Reality in Cultural Heritage

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Abstract: The epidemic has likely expedited the use of technology, with institutions and artists becoming more receptive to coming up with new ways for audiences to engage with art and culture. There's no denying that VR and immersive technologies are here to stay in museums, especially with so many more projects in these areas ready to be completed. For the sharing of cultural knowledge in Virtual Heritage, Augmented Reality, Virtual Reality, Augmented Virtuality, and Mixed Reality has recently gained popularity as immersive reality technologies. VR exhibits have the potential to improve museum displays. It enables curators to bring subjects to life and alter the viewer's perspective. In this paper, we present the importance of Virtual Reality in Cultural Heritage and some examples of using Virtual Reality in Museums.

Keywords: virtual reality, cultural heritage, museums, technology, culture, virtual exhibition

Introduction

The term exhibition in the broad sense indicates that someone tries to expose a concept or topic explaining logical content or by reference to other concepts or topics that helps to highlight the meaning (Ciurea et. al, 2014). The exhibition term indicates an event with a specific place and time during which the public can enjoy a range of objects, paper or multimedia, books, paintings, sculptures and other objects linked together and organized according to logical criteria, thematic, space, history and made available permanently or temporarily by one or more narrative routes and having a scientific, educational and / or promotional objective (Çizel and Ajanovic, 2018). When there is a virtualization environment in which items are located, the term "virtual exhibition" is typically used to refer to 3D reconstruction. Through the digital exhibition, it is implied that historical objects are not put through any reconstruction processes. Instead, each work of art is treated uniquely, and it may even be included in a way that considers the logical combination of materials based on various criteria, including subject, author, time, and technique. Exhibitions are replacing the traditional constraints of space, time, and IT technology in cultural organizations. These can be displayed in galleries, museums, and online places; in that case, they are referred to as online virtual exhibitions.

Virtual reality (VR) has quickly become a mainstay for exhibiting arts and cultural organizations. When looking at it as a concept, “VR has the potential to simulate imaginative and existing physical environments along with their processes. The simulations can be tuned to a highest level of multisensorial realism in order to affect users' visual, auditory, tactile, vestibular, and even olfactory and gustatory senses.” But what does it mean to museums and cultural organizations, and how can it help the arts? (Leslie, 2022). For the sharing of cultural knowledge in Virtual Heritage, Augmented Reality (AR), Virtual Reality (VR), Augmented Virtuality (AV), and Mixed Reality (MxR) have recently gained popularity (VH). With the use of these technologies, heritage sites and museums have been enhanced with digital information that is suited to their historical and cultural context and individualized visitor experiences. These immersive reality systems have also used a variety of interaction techniques, including sensor-based, device-based, tangible, collaborative, multimodal, and hybrid techniques, to allow engagement with the virtual surroundings. However, the utilization of these technologies and interaction methods isn't often supported by a guideline that can assist Cultural Heritage Professionals (CHP) to predetermine their relevance to attaining the intended objectives of the VH applications. In this regard, our paper attempts to compare the existing immersive reality technologies and interaction methods against their potential to enhance cultural learning in VH applications. To objectify the comparison, three factors have been borrowed from existing scholarly arguments in the Cultural Heritage (CH) domain (Bekele and Champion, 2019).

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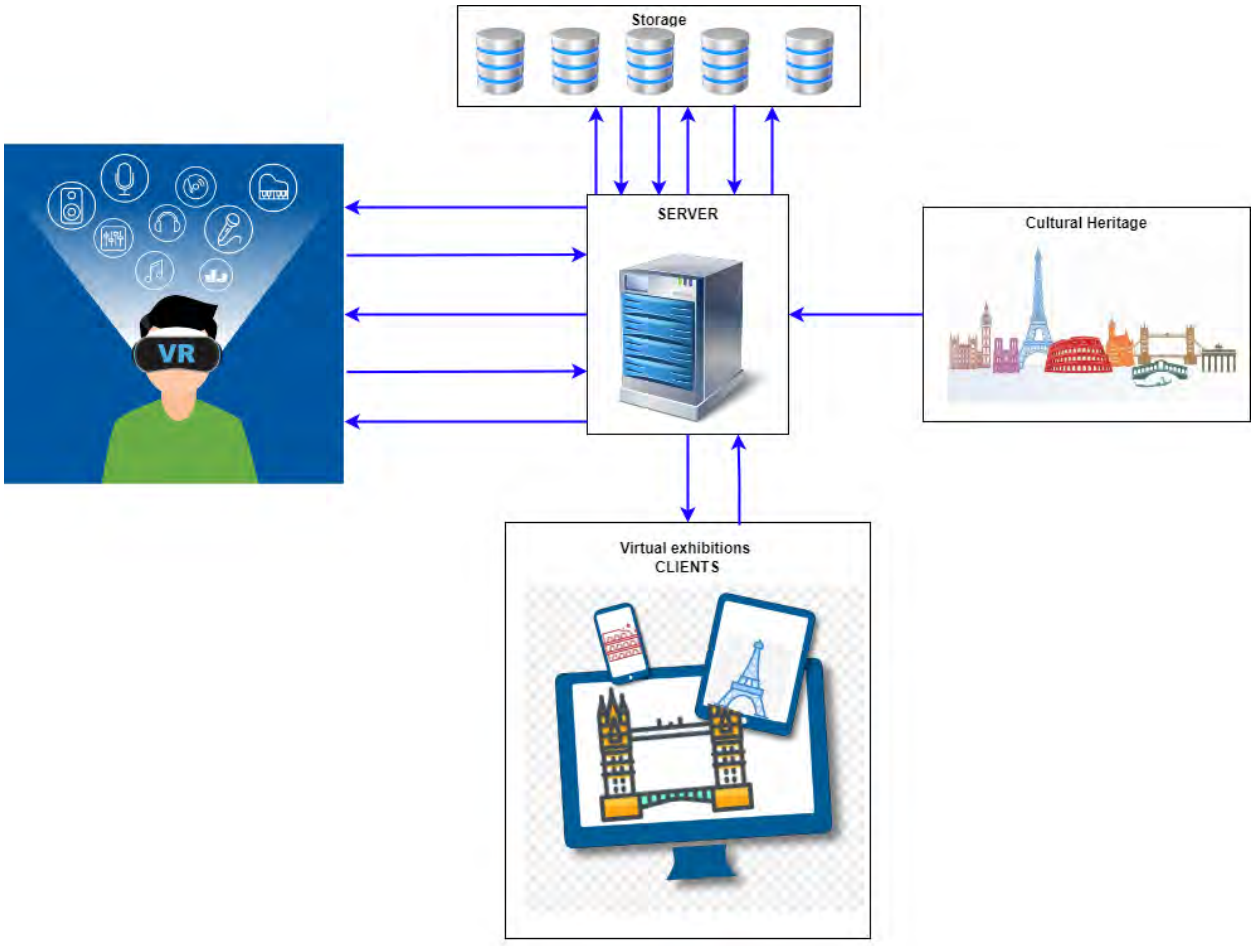

Figure 1. Virtual reality vs Virtual exhibitions

In (Zara, 2014) are classified the web presentation techniques that can be used in Cultural Heritage. Also are presented different examples of using with 3D navigation and user interfaces for websites.

Virtual Reality in Museums

Virtual reality is a fantastic tool for museums to employ to bring their treasures to life. It provides a unique experience that allows for complete immersion in an exhibit. Already, many museums all over the world are embracing its possibilities. In (Coates, 2021) are presented the most important museums that are using VR:

Louvre - ***Mona Lisa: Beyond the Glass.*** As part of the landmark Leonardo da Vinci exhibition at the Louvre Museum, which marks the 500th anniversary of the artist's passing in France, This is the first VR experience made available to the general public by the museum in 2019. Through amazing virtual reality representation, Mona Lisa: Beyond the Glass brings to life the most recent academic studies on Leonardo da Vinci's aesthetic originality, as well as his painting methods and procedures., Figure 2;

Figure 2. Mona Lisa: Beyond the Glass

The National Museum of Finland - *The Opening of the Diet 1863*, By donning a VR headset and entering the painting "The Inauguration of the Diet 1863 by Alexander II" by R. W. Ekman, visitors to the museum will be able to travel back in time to 1863 after the opening of the new VR display. The exhibit gives visitors a distinctive look at the Diet of Finland, a body of lawmakers that was active from 1809 to 1906. The Emperor and members of the various social groups will be available for them to talk with. They can also tour the Hall of Mirrors in the former Imperial Palace, now known as the Presidential Palace. The VR experience is a component of a larger exhibition built on Finland's status as a self-governing Grand Duchy of Russia in the 1860s. The exhibition aims to create a sense of walking into history by fusing historical artifacts with a digital environment. The largest VR studio in Finland, Zoan Oy, created the VR experience. Making Finland the most virtual society in the world is the company's stated goal, Figure 3.

Figure 3. The Opening of the Diet 1863

The Tate Modern - The *Modigliani VR*. Even though Modigliani's final studio is still standing nearly 100 years after the artist's passing, it no longer resembles what it once did. The setting in which Modigliani created his final works is imagined through research into documentary information and the artist's own creations. You can immerse yourself in a virtual reality replica of Modigliani's final studio in this VR experience, which uses the genuine studio area as a model, Figure 4.

Figure 4. The Modigliani VR

Natural History Museum - Hold the *World*. The chance to have a one-on-one conversation with Sir David Attenborough is a special opportunity provided by Sky's virtual reality experience, Hold the World. With the revolutionary interactive experience, you can travel from the comfort of your home to London's Natural History Museum, where you may hold rare specimens from its famous collection and go behind the scenes to see regions that are often off-limits to the public, Figure 5.

Figure 5. Hold the World

VR exhibits have the potential to improve museum displays. It enables curators to bring subjects to life and alter the viewer's perspective.

Conclusions

VR technology may have a number of drawbacks in the museum setting. It's an expensive technology that takes a lot of effort, resources, and education. Unsensitized headsets and simulation sickness pose health and safety issues. It is a novel technology that can necessitate drawn-out introductions and make new users uneasy. However, virtual reality has a lot of potentials. VR may enrich and complement a museum's collection and exhibitions in addition to making them more accessible. There are some worries that VR will ultimately replace museums entirely, but it may also be utilized to attract new audiences and improve the experience of present visitors. Large museums like the Smithsonian, the Louvre, and the British Museum, institutions with the time and money, should aim to use VR in ways that can improve a visitor's experience despite the fact that it can be a costly and time-consuming technology. Hopefully, smaller museums will be able to experiment with VR in their own establishments in the future when VR is more widely used and less expensive.

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Integrating Artificial and Virtual Reality into Education via a Seamless Experience Design.

Helga Hambrock[1]

Abstract: The focus of this study is on the integration of virtual reality and artificial reality into education in the time of the 4th industrial revolution. It identifies the need of educators from 5 Universities in 5 continents to have a better understanding of the meaning of the concept terms and the need of integrating them actively into their course designs. This calls for good training of educators. The study concludes by suggesting the application of a seamless learning experience design approach (DeVilliers and Hambrock; in press 2023), with specific examples in the field of education.

Keywords: Artificial Reality and Virtual Reality, Augmented Reality, Education, Seamless Learning Experience, Design, 4th Industrial Revolution.

Introduction

Designing quality courses for students in the 4th Industrial revolution may seem rather daunting as virtual and physical realities have become part of students' and workplace experiences. The term, 4th industrial revolution was coined and explained by Klaus Schwab (2016) as virtual and physical systems that are connected globally. Anonymous (2022, p.1) explains AR and VR as "the fusion of [these] technologies and their interaction across the physical, digital and biological domains". However, if AR and VR are understood and applied correctly, they can elevate the educational experience of the instructor and the student. Technology innovation can improve engagement of students and increase effective teaching. The main cause of concern amongst educators is the question how to use these tools and where to begin. The aim of this article is to clarify the terms of Artificial and Virtual reality as well as the concept of seamless learning design and concludes with examples and suggestions for implementation of these concepts.

Background

The United Nations identified seventeen sustainable goals that need attention globally. One of these goals is to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all by 2030. Over the years, many challenges have prevented access to quality education to various groups of students within developed and developing countries. The challenges in developing countries are mostly in areas where students are from low-economic areas and do not have access to proper infrastructure and resources. On the other side of the spectrum an overload of information and screen time have been reported to be causing mental health challenges in developed as developing countries. (Dutta, 2020; Madigan, 2019; Radesky, 2015; Nelson, C. 2022)

More challenges to achieve seamless quality education include: cultural diversity, lack of experiential learning, inadequate use of technology, teacher centered teaching style, no fun, little application, no personalized learning, no accommodations for mental health, focus on theory and no "hands on" learning, no student voice, no integration of learning, working in partnership with other groups and peer support.

Besides the global concern as indicated by the United Nations, these challenges are also a concern for educators, parents and mostly students and call for a solid design model to achieve the quality of learning they want to offer to the students and adults of the future.

More recently, AR and VR have become part of the changing world of education too. This can seem rather overwhelming especially if educators are used to a chalk and talk approach and using physical textbooks.
This takes us to the clarification of the terms, virtual and augmented reality. According to Team viewer (2022, p.1) "VR creates an immersive virtual environment, while AR augments a real-world scene. VR is 75 percent virtual, while AR is only 25 percent virtual. VR requires a headset device, while AR does not. VR users move in a completely fictional world, while AR users are in contact with the real world". These two realities can be added to a learning experience on their own or together for a mixed reality experience.

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Designing a seamless learning experience –of an example of a case study

Research Design and Methodology

During a research project that was conducted from 2019 to 2020 by five researchers from five continents the instructors were asked what their understanding of seamless learning was and what the pros, cons as well as suggestions for a successful seamless learning experience would be. (Hambrock et.al. (2020). The data was collected from the five respective environments and combined.

Data Analysis and Findings

By following a thematic data analysis approach five concepts crystalised. These include core concepts, positive concepts, practical concepts, human concepts and design concepts.

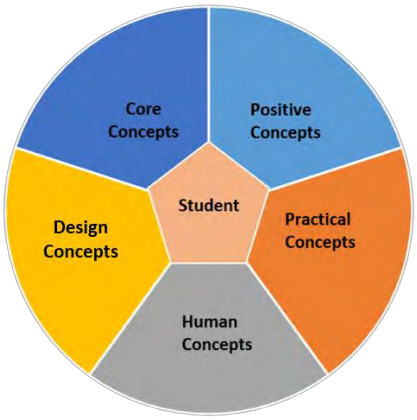

Figure. 1 De Villiers and Hambrock (2023)– Seamless learning experience design framework

Each of these concepts represents sub criteria that were compiled into a useful rubric. (Hambrock, et. al. 2022) The core concept includes pedagogical approaches such as the

- Behaviorist approach which may be necessary in the first part of the course for the student to familiarize themselves with terminology and theories.
- Constructivist approach where students create their own reality by learning as they are doing.
- Exploratory learning is the next recommended approach as the students learn while they explore and research and
- Experiential learning which focusses on learning by experience in the field of work.

An example of experiential learning is when William, a student, is getting hands-on experience in the field of work by using AR and VR tools and software (Verizon; 2021).

The next theme consists of the positive concept. This concept includes the

- Mindset of the student and the lecturers, as well as the mindset of the institution.
- If the mindset is positive, the approach can grow from strength to strength, but if the mindset is negative, change takes place very slowly or not at all.
- Innovation
- Inclusion and flexibility.
- Accessibility

An example of innovative learning with AR is Christopher, who studies engineering and uses VR to understand certain concepts (Verizon; 2021).

Practical concepts include elements such as:

- Technology for educational purposes but does not need to be the state of the art, as we have learned during COVID-19

- A simple mini video lesson via WhatsApp can be powerful and effective. It can be sent to the students' phones. The videos can also be sent from the student to the teacher as part of an assignment.
- Learning designers and stakeholders at universities need to think about using simpler and more affordable approaches to include technology.
- Seamless learning does NOT rely on the state-of-the-art technology. It relies on the quality of the design to achieve an effective learning experience.

An example of using AR for learners to become creators, is Giovanni the music student who uses software and apps to create music (Verizon; 2021).
Human concepts include the stakeholders that are involved in the higher education environment. The students, instructors and the university leadership all play a huge role in contributing to the success story of the student. If students are offered exploratory learning, their interest in the topic can improve.

A great example of this concept is Minu, a sport technology student, who became an instructor and supports other students because of her learned expert abilities in using innovative technology is (Verizon; 2021). Her interest grew as she became more immersed into the sports world. She was a student that understands how teaching needs to be adjusted to improve the student's experience. The roles in this learning experience need to understand each other's perspective extensively well.

Lastly, the design concept plays a huge role in achieving the envisaged seamless learning experience. From an instructional designer perspective, the design of a seamless learning experience including AR and VR has become a crucial and fascinating matter. It expands the students' experiential learning to prepare them for the world of work.

The design process is supported by following the ADDIE model (De Leeuw, et.al. 2019; XLPRO; 2018) as an instructional design framework as well as Bloom's revised Taxonomy (Krathwohl; 2002). This means that the focus of the design is student centered. It needs to be developed with clear goals and clear instructions to avoid confusion and chaos (Merrill, 2002).

Conclusion
To achieve the 4th SDG of the United Nations during the time of the 4th Industrial Revolution with specific focus on achieving a quality seamless learning experience by including AR and VR the following suggestions have evolved:

- Know the environment and build relationships.
- Keep the lessons student centered.
- Ensure an inclusive design.
- Create a positive and meaningful user experience.
- Include more experiences as learning is a journey.
- Include research-based findings to make design decisions.
- Seek input from users and participants.
- Use real metrics to measure performance improvement.
- Recognize the value of sharing and social engagement.
- Be innovative and flexible.

For an augmented experience example, the educator could plan an excursion with coordinates indicated on a map. Educators can ask the student to take a picture of what they found and to answer some questions. When back in class the students present what they have collected and explain what was fascinating to him or answer questions the educator has prepared ahead of time.

The students can ask Siri or Alexa to answer some questions and use them for the class discussion. For an VR experience the students can be requested to use their VR headset and to virtually travel to a specific art museum and visit all the rooms and look at the artwork. Students can be provided with questions that can again be discussed in the classroom.

The opportunities of AR and VR are endless and with the SLED model the learning experience can be structured and organized for an optimized, quality, student-centered approach. As a guide for designing quality learning experiences for students of the future.

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Motion Capture and Intangible Cultural Heritage Immersive Virtual Reality for Education

Jonathan Barbara[1] and Jeremy Grech[2]

Abstract: For decades, VR has served cultural heritage by providing digital conservation and accessibility to remote or restricted cultural sites. However there has been a recent call for delivering cultural heritage as an experience, often provided by the visual and aural representation of tangible cultural heritage and by the six degrees of freedom afforded by the VR technology that provides sensorial immersion for the virtual visitor. However most digital representations of cultural heritage limit navigation and lack believably realistic and authentic representations of intangible cultural heritage. The paper reports on the use of VR technology in a project aimed to help history educators present the prehistoric intangible cultural heritage of a Neolithic site in Malta. The project used motion capture technology to present human behavior that matches the realism achieved by a LIDAR scan augmented with realistic lighting and textures. A custom director-actor VR setup was created to streamline the animation production workflow producing an experience that scored 4 out of 5 on a Likert scale for authenticity when evaluated by educators (N=8).

Keywords: Immersive Virtual Reality, Motion Capture, Intangible Cultural Heritage, Education

Introduction

For decades, Virtual Reality (VR) has served cultural heritage by providing digital conservation and accessibility to remote or restricted cultural sites. However there has been a recent call for the experiential aspect of cultural heritage which is often met with the provision of Presence, provided by the visual and aural representation of tangible cultural heritage, while taking advantage of the six degrees of freedom afforded by the VR technology providing sensorial immersion for the virtual visitor. In this paper we report on the Re-Live History project's contribution to the provision of presence in an educational historical VR experience by portraying prehistoric intangible cultural heritage using motion capture and a streamlined animation capture workflow.

Literature

Immersive VR technology, particularly Head Mounted Devices (HMDs), offers six degrees of freedom for position and orientation in each of the three axes and thus allows the sensory information needed to portray reality (Nochlin, 1971) that reflects head movements that the wearers can perform while wearing the HMDs. This provides the illusion of presence ('being there') which is known as Place Illusion (Slater, 2009). However, limiting the use of VR for the representation of space is barely exploiting the capabilities of VR technology and providing only a limited sense of presence. In its use to digitally represent cultural heritage, the primary objectives for the past two decades have been those of conservation and accessibility. There is now a call for the "experiential aspect of cultural heritage" (Ch'ng, Cai, & Thwaites, 2018), that is, to go beyond the representation of tangible cultural heritage, being the historical sites and artefacts (UNESCO, Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972), and to include representations of intangible cultural heritage, that is representations of human behavior in and around these cultural sites and using these cultural artefacts (UNESCO, Text of the Convention for the Safeguarding of the Intangible Cultural Heritage, 2003).

Thompson notes that digital representations of cultural heritage often lack representations of 'cultural insiders' (Young, 2005) that meet realism expectations, as well as limited freedom of navigation due to a fixed camera as a result of financial and/or technological limitations (Thompson, 2017). Providing such a richer experience heightens the level of presence through the illusion of realism: the Plausibility Illusion (Slater, 2009). In the context of cultural heritage, however, realism in the sense of 'truth' is nearly impossible to achieve, particularly with prehistoric cultural heritage where primary sources are minimal and weathered across millennia while secondary sources do not exist or are too ambiguous to provide certainty. Moreover, the portrayal of realism also depends on technological limitations such as display resolution and rendering performance degradation as detail increases. Furthermore, sensory realism is often limited to sight and hearing and marginally haptics, with research still in its infancy with respect to smell and taste (Jones & Dawkins, 2018). Intangible cultural heritage is, by its own definition, intangible and cannot be physically manifested except for artefacts used in the ritual and the sites within which it was performed. It is a behavior that needs to be seen in action, providing 'functional realism' (Ferwerda, 2003) (Pujol-Tost, 2011), and contextualized in its original place of activity (Bouchenaki, 2003).

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Thus, realism in cultural heritage is interpreted in terms of 'authenticity', which is a subjective criterion whose judgement and consideration must be carried out relative to the heritage artefact's cultural context (ICOMOS, 1994). This reflects the suggested measurement of functional realism in terms of fidelity, rather than accuracy (Ferwerda, 2003).

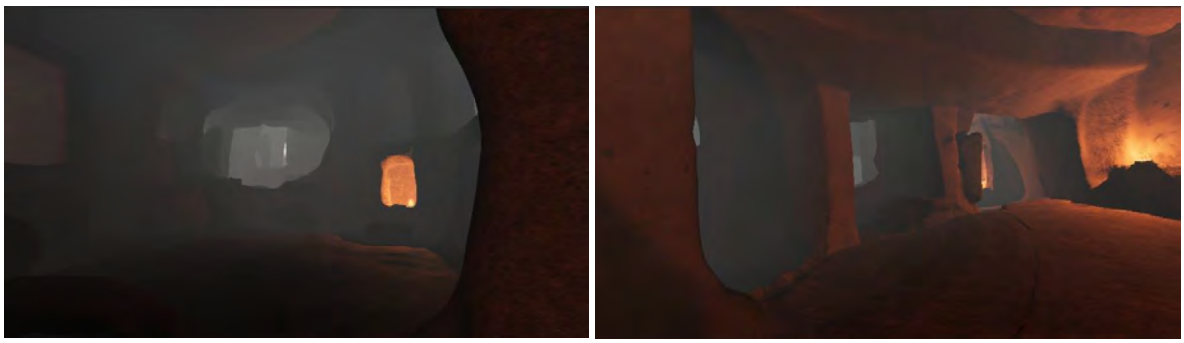

Figure 1. Realistic light and shadows in the Re-Live History project VR experience

Methodology

In the light of the above, the Re-Live History project's objective was to augment a tangible cultural heritage VR representation of a prehistoric site in Malta with character behavior in order to provide an intangible cultural heritage experience that could serve educational purposes (Barbara, 2022). The site in question is a UNESCO World Heritage Site, the Ħal-Saflieni Hypogeum, which was discovered underneath residential housing in the 1900s close to the island's much coveted natural harbor. The Hypogeum spans three levels excavated across thousands of years between 4000 BC and 1500 BC. The site, under the curation of Heritage Malta, is accessible by a cordoned off walkway with a limited number of visitors allowed per hour in order to maintain its microclimate to protect its unique Neolithic wall paintings in red ochre. The project's VR experience is based on a LIDAR scan of the site commissioned by Heritage Malta during renovation works in the late 2000s. This provided a highly realistic benchmark against which to match our efforts. Thus, the project applied High Definition Rendering Pipeline (HDRP) and Physically Based Rendering (PBR) textures to present its tangible cultural heritage so that raytracing could be used for realistic lighting and shadows (see Figure 1).

Motion Capture

To recreate believably realistic character behaviour that delivers authentic intangible cultural heritage matching the realism of the site's representation, a motion capture (mo-cap) suit was used to capture the character movements needed to represent the character behavior. Mo-cap suits are reported to be a popular technology for the preservation of intangible cultural heritage, but have mostly been used to capture dance movements (Skublewska Paszkowska, Marek, Powroznik, & Lukasik, 2022). Choosing which character behaviour to represent involved meeting with heritage experts and history teachers to focus efforts on intangible cultural heritage that was both authentic and relevant to its educational function. Thus the original digging of the site was chosen to be represented, using 3D models of stone and bone tool artefacts found on site and, in order to reach the realism levels set by the LIDAR scan and the HDRP and PBR systems, a mo-cap suit complete with gloves was used to capture the movements in as much detail as technically possible, specifically the Rokoko Smartsuit Pro II, including Smartgloves.

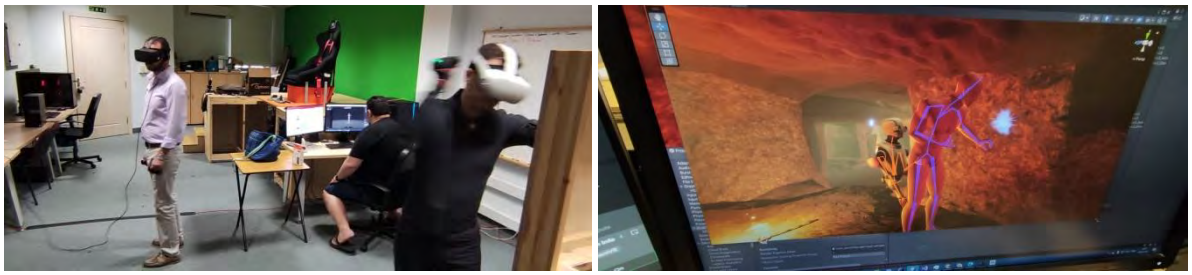

Figure 2. Physical (a) and Virtual (b) dimensions of the director-actor dual VR system

Networked Dual VR System

Given the complexity of the site, capturing animations using just the mo-cap suit using traditional techniques would require a lot of back and forth with respect to recording animations, placing them into the scene and then checking to see if they would work. It was thus decided to give the actor some context of the virtual world that he would be controlling by wearing the VR headset while performing the behavior, helping him situate himself in the working environment. This in turn meant that a separate system for the director had to be created, that would connect with the actor's virtual environment so that choreography instructions could be delivered within that same virtual space, using the Photon engine[1]. The physical setup is shown in Figure 2a above, with the director (left) and actor (right) using props to dig into and as well as the virtual environment with the director, here seen as a robotic avatar, indicating the area to be dug up using a laser pointer (see Figure 2b). The resulting animation consisted of about 40 animations set up in a loop including light and heavy hammering, brushing dust off the wall, depositing and picking up tools on and off the floor, as well as wiping his brow and resting on his haunches. Readers of this paper who undertake similar VR projects in the digitisation of intangible cultural heritage may well take note of a particular challenge that was encountered: a mismatch between the physique of the actor and the 3D character used to manifest the animation in the final experience resulting in behavioural inaccuracies. The solution to this was manually tweaking the animations once applied to the 3D character, taking up some of the time that was saved from the reduction of retakes.

Findings

With respect to evaluation, we first had the heritage experts review an advanced prototype of the system, giving us feedback on the appearance of the character, the artefacts used for housing the firelight and the enacted character behaviour. Based on statues found in the complex and other contemporary sites, the curators remarked that Neolithic men were clean shaven and their hair was cut long, even braided. The scene's depiction of the use of movable torches and firelight bowls on the ground is supported by the lack of fumes found on the ceilings or walls of the site. The use of 3D models of bowls similar to, but not exact replicas of, the ones found in the site was accepted in preference to attributing an unsure function to the actual bowls found on site. Following the heritage experts' recommendations, the VR experience was refined accordingly before being presented to 8 history educators of 11 to 12 year old pupils to assess its level of authenticity by first donning the VR headset and experiencing the virtual environment for about 10 minutes during which they were free to navigate around using a simple interface based on the headset's orientation and forward and backward motion controlled by the left controller's joystick. Subsequently, the participants filled in a short questionnaire rating different aspects of authenticity on a Likert scale from 1 to 5, followed by a brief focus group interview to gather further insights.

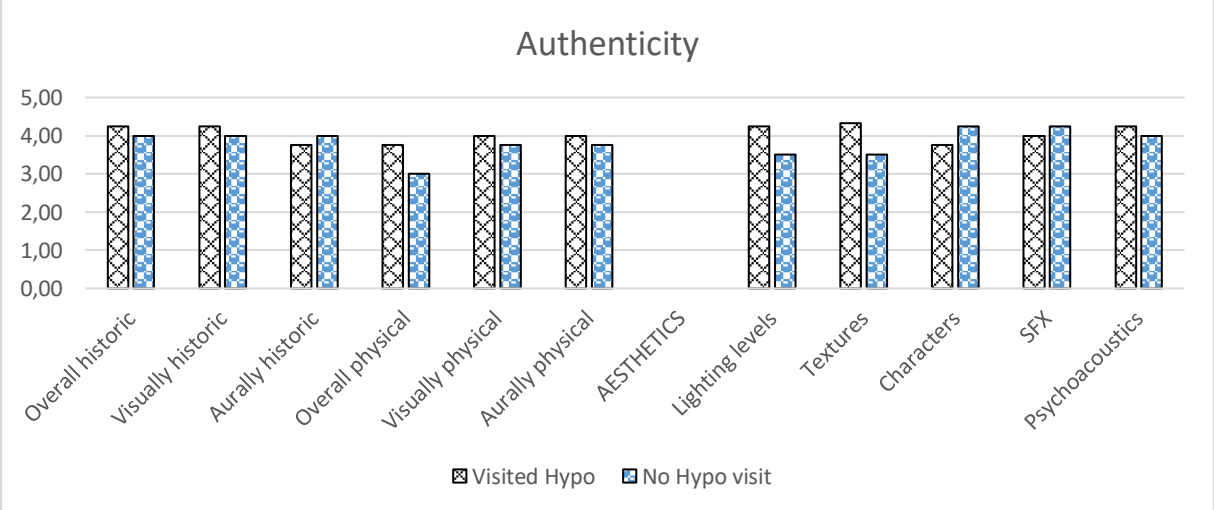

Figure 3. Likert scale ratings of overall authenticity, and by aesthetic category

Authenticity was gauged relative to the cultural heritage site itself in the case of participants who had visited the site, and relative to a physical place in general. Figure 3 above shows the results on a Likert scale with the first column of each pair of columns belonging to those who had visited the site and the second column representing those who had not visited the Hypogeum specifically, but had visited other Neolithic sites on the island. Visitors to the site scored the overall and visual authenticity, particularly the lighting and textures, higher than those who had not visited it, except for audio, which was not an aspect addressed in this project. The authenticity of the

[1] http://www.photonengine.com

character suffered a bit, as explained in the focus group discussion, not due to the behavior, but because of the character's appearance which was seen to be too young for his age and maybe too robust and exceptionally fit.

Discussion

The sensorial immersion offered by VR technology may provide a sense of presence once the wearer has acclimatized to the place illusion (Slater, 2009) provided by the experience. However, limiting the experience to a virtual representation of a cultural heritage site only minimally supports plausibility illusion (Thompson, 2017; Slater, 2009). This project attempted to provide a realistic portrayal of prehistoric human behavior as intangible cultural heritage by using motion capture techniques and a novel approach towards directing the action in virtual space. To gauge the success of this attempt, heritage experts were engaged to assess the faithfulness of the portrayed behavior to the known record while history educators evaluated the experience in terms of authenticity, as suggested by UNESCO (2003).

Results showed a constantly higher appraisal of the experience's authenticity by those educators who had actually visited the Hypogeum of Ħal-Saflieni, when compared with those who had visited other contemporary sites above-ground, such as temples, but not the site itself. The ratio of participants belonging to each group was equal at 1:1. The site's distinguishing feature is its subterranean nature as opposed to the contemporary temples constructed above ground, making it dark, smaller, and highly echoic. Thus the expectation of those who judged the virtual site in comparison with the above-ground temples may have been higher than the ones who had actually visited the site and compared the experience to their memory of the site. This variation in expectation may account for the slightly higher authenticity ratings given by the first group who had visited the site.
The high level of realism achieved overall is supported by similar scores in visual authenticity both when compared to the site and to other contemporary sites. Visual authenticity includes not only the description of the character's static attributes (such as skin colour, musculature, and clothing) but also the behavior performed via motion capture. The aural dimension of the experience was not within the scope of this particular project; however it was served with sound effects accompanying the character's behavior, with the audio contextualized using reverberations based on an impulse response measured on site. The impact of this contextualization is reflected in the high authenticity score given by the site's visitors to the psychoacoustics of the experience.

The overall positive feedback encourages further work on the project, by maybe adding more character behaviours, such as the painting of the red ochre spirals on the site's walls and ceilings. Another direction could be focusing on high-fidelity aural representation of the site's highly echoic chambers. A more urgent area of attention however is how to make this experience accessible to schools perhaps through lightweight variations that can be experienced on one's mobile device.

Conclusion

The portrayal of human behaviour representing intangible cultural heritage goes a long way towards supporting the plausibility illusion offered by VR technology. The realism needs of such behaviour depend on that of the representation of the site's tangible cultural heritage. When this is based off a LIDAR scan of the site, one expects high realism in the representations of the character, its animated behaviour, and the scene's lighting. Getting the animations right is a painstaking iterative endeavour unless a real-time collaboration of the director and actor in the virtual environment is facilitated.
Short-circuiting the animation acquisition from the motion capture suit process in this project not only shortened the process, greatly reducing the number of errors and retakes, and thus increasing efficiency and performance, but also resulted in highly authentic behaviour representations as judged by history educators and augurs well for future endeavors using this technique.

Acknowledgements

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Application of Virtual Reality in Sports Psychology

Yogesh Chander[1]

Abstract: This research examines the possible use of virtual reality in sports psychology and related areas. Sports psychology practitioners have been utilizing information and communication technology since the introduction of digital communication tools. Virtual reality and cybertherapy are thought to be future sports therapeutic methods. In particular, virtual reality (VR) technology may soon be found in many consulting rooms. The use of virtual reality in sports psychology is effective and may be cost-effective. Physical therapy, robotic and remote surgery, athlete education, preventive medicine, medical education, visualization of extensive data, teaching, training, structuring of healthcare facilities, and physiotherapy are all currently carried out in virtual environments. The potential of VR in sports psychology is also being increasingly acknowledged. VR therapy and counseling for athletes may be beneficial. This article helps to address pathologies like anxiety disorders, binge eating disorders, and weight management, as well as sports psychology issues like goal setting, performance planning with imagery, concentration, and attention control techniques, and building self-confidence, self-esteem, and competence in sports. It also discusses counseling and clinical interventions. The best users of this stuff in professional interactions with athletes are coaches, physical education instructors, strength and conditioning coaches, sports psychologists, and educational specialists.

Keywords: Virtual Reality, Sports Psychology, Cybertherapy

Introduction

Technology changes how people interact, communicate, and live quickly and profoundly. Internet, email, and video teleconferencing were seldom utilized ten years ago but are now commonplace in diagnosis, therapy, education, and sports training. Cybertherapy, an emerging field, focuses on using communication and information technology to enhance healthcare delivery. One essential component of best practice in sports psychology is the use of technology. Numerous mental health issues are being addressed, as well as the performance of athletes training in remote locations and the expense of the application. In particular, in the sports industry, sports psychologists' use of technology strikes the finest balance between knowledge and performance. Therefore, it is recommended that additional research be conducted to examine both the advantages and disadvantages of technology as part of a balanced strategy for researching sports psychological concerns on a big scale in India.

The goal is to conduct additional studies on technology's potential application in sports-related psychic difficulties and the most effective strategies for promoting technology adoption in the industry. In addition to building and maintaining a skill database, research in sports psychology also includes generating industry-specific competency standards and certifications, offering career advice, comparing local standards to those of other countries, and identifying sports intervention technologies. Virtual reality is an integral component of the infrastructure underlying the digital transformation of sports pedagogy and associated challenges. Action must be taken to guarantee and enhance the quality of digital learning for sports trainees and trainers. As a public benefit and a human right, quality education and lifelong learning must be made available to all, with a particular emphasis on the most disadvantaged. To do this, the power of the digital revolution must be fully utilized. Sports psychology must undergo a systematic transformation to adapt to the digital age.

This transformation must touch on pedagogy, curricular content, assessment, social responsibility, and learning organization across sports facilities and in lifelong learning settings. The infrastructure of the digital transformation of psychological therapies includes virtual reality. To provide sports as a public good, it performs a unique role in tying together disjointed areas of decision-making processes and facilitating workflow creation. Virtual reality is one of the critical digital transformation technologies, which serves as a catalyst and enables the architecture for the revolutionary upgrading of theories about how to use technology to benefit the sports industries. By integrating virtual reality with digital infrastructure, sports psychology architecture can become more dependable and cost-effective. Solutions for learning management systems, sports psychology, and virtual reality can improve intelligent workflows, enable data-based monitoring, and help people make good decisions.

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Methodology

Data was collected from secondary sources, including research papers, case studies, magazines, newspapers, books, blogs, articles, etc.

Sports Psychology: What is it?

The field of sports psychology is specialized in assisting players with their training and competition preparation. It is challenging to handle the pressure of competition. It requires much mental toughness. High-level competitors are, by nature, more prone to physical injuries and psychological traumas. Athletes can develop coping mechanisms for dealing with competition-related demands by using sports psychology. Pressures from competition extend beyond the actual game or event. In the practice setting, it could be challenging to recreate external circumstances. It's possible that an athlete will not fully appreciate the distinctive atmosphere, spectators, and noise of a sports stadium until game time. This could result in negative repercussions. Fortunately, sports psychologists have been introducing these "game time" characteristics healthily and safely by using virtual reality.

Virtual Reality: What is it?

Through computer-generated scenery and objects, virtual reality (VR) allows the user to immerse themselves in their surroundings fully. It came across as genuine and placed the user in that specific setting. To put it another way, virtual reality is a form of reality that feels like an imaginary (virtual) setting. The first person can explore a computer-generated, three-dimensional world called virtual reality. In a nutshell, it is an entirely virtual environment that a user can enter and very slightly influence. VR has enabled people to have never-before-seen experiences with settings and events. These encounters can serve as both an amusement and a therapeutic tool. VR opens up new opportunities amongst sports psychology and players at all levels. Athletes can watch simulations repeatedly to see how they react since sports psychologists can mimic circumstances, regulate the sportsperson's environment, and repeat simulations. With a head-mounted box/gear, this virtual experience is achievable. Virtual reality is used for training in various sports, including performance evaluation, technique analysis, and clothing and equipment design and development. Virtual reality might be fully immersive, partially immersive, or none.

Application of Virtual Reality in Sports Psychology

The benefits of virtual reality (VR) and other new technologies for sports psychology come mainly from the importance of imagination and memory in psychotherapy. The interaction between athletes and sports psychologists has changed due to virtual reality. This relationship's new configuration is founded on having improved abilities in the challenging stages of retrieving past experiences via memory and anticipating future experiences through imagination. The ability to simulate and employ a real experiencing environment inside the walls of their sports psychologist clinical offices is perceived as a benefit by the subjects getting therapy (1999 Vincelli).

Findings

After a thematic data analysis from research papers, case studies, magazines, newspapers, books, blogs, articles, etc., the following findings were drawn:

Virtual Reality as Assessment and Rehabilitation Tool

Researchers from various disciplines, including communication, medicine, sociology, education, psychiatry, social work, and nursing, have been drawn to related fields like "Psychology of the Internet" and "Psychology of Internet Behavior." Acknowledging the influence and impact of human experience with computers in virtual worlds on the one hand and applying psychological techniques through (or with the help of) computers and the Net on the other, are the two main directions in which these new fields have developed quickly, accumulating knowledge and making innovative assertions and propositions. A considerable accomplishment in this subject, the great majority of psychological applications have been clinical and clinically related. According to Levin, Weiss, and Keshner's (2015) research, VR rehabilitation environments are more motivating than traditional rehabilitation. They can keep patients interested in the process because they are a more interactive environment.

Modeling and Control

Simulators for virtual reality come in a variety of sizes and designs. They can range in size from a wearable headpiece to an immersive room. Depending on the situation, either one can offer more realistic or electronic imagery. The advantage of simulation technology is that it allows sports psychologists to design or reproduce scenarios rather than relying just on the athletes' imaginations. Physical therapists can build an environment

particular to the player's game, trying to recreate outside elements that may make a significant difference. Athletes are known to feel more strain when there are distractions like crowds, lighting, and loud noises.
These and other factors can be controlled to improve athlete preparation and training. Psychotherapists can also use simulation models to replicate a single action, event, or condition repeatedly, allowing athletes to fine-tune their response. In addition, virtual reality simulation can enable psychologists to observe specific movements and performances that athletes want to improve (Ohio University, 2020).

Playback Simulation
Sports and games of different types, including soccer, baseball, basketball, hockey, and more, can be played with virtual reality devices. Some simulators are used for enjoyment, allowing users to engage virtually in various activities such as skiing, biking, racing, and more. Even though these simulators are not frequently utilized for psychological reasons, they have evolved to meet various needs. Another significant advantage that virtual reality provides to sports psychology is the ability to replay games. Sports performers can use a first-person viewer or a computer display to visit and revisit events or motions. Sporting motions are being replaced with precise measurements thanks to virtual reality. Virtual reality may significantly improve visualization, a crucial skill in athletics. Now, coaches and athletes can accurately assess an athlete's performance from previous contests or enhanced simulations. Coaches might identify shortcomings or strengths to emphasize by comparing the motions of several athletes as they are repeatedly observed. They can also apply fresh approaches to gameplay circumstances previously overlooked due to their indecisiveness.

Effect on the Imagery Skills
Imagery is how we create or recreate our mental experiences using sensory experiences. A broader definition of imagery is the ability of humans to retrieve previously stored perceptual information from memory to create a complex and complete mental representation of things, people, or places. The most extensively cited topic in sports psychology is imagery. Physical training has long drawn the attention of researchers and athletes due to its numerous advantages, including time and energy savings, independence from the training environment, and a low risk of disability (Jowdy, Murphy, and Durtschi, 1989; Ungerleider, 2005; Weinberg & Gould, 2015). Bedir and Erhan (2021) discovered that visualization abilities had significantly improved with virtual reality technology.

Development of Perception
Virtual reality (VR), following Craig (2013), can unquestionably assist in the growth of perception skills. He made a compelling case for using VR to develop perception-action abilities. The usage of virtual reality (VR) is an extension of this concept since it has the tactical decision-making capacity of this application type to effectively and creatively fulfilled the demands of both coaches and players. It would be more useful if the application offered a range of viewpoints development of psychological abilities and skills could be achieved through various individual decision-making. Which include coaching in tactical, calculative, and decision-making processes, as well as adapting to unexpected events and increasing emotional well-being.

Decision-making for changing direction and attention
Training athletes to recognize opponents' deceptive movements by focusing on particular moves or body components that signal such intentions is another possible benefit of VR that has been discussed in decision-making (Bideau et al., 2010).

Augment psychological resilience
Additionally, VR may be utilized to improve psychological resilience. In a virtual penalty-defending assignment, Stinson and Bowman (2014) studied the use of VR to elicit anxiety in soccer players. They discovered that athletes who use VR could experience anxiety, and they made the case that VR training could help athletes develop psychological fortitude. However, findings from a related study that used a virtual reality audience to create a pressure situation for rowers from a related study that used a virtual reality audience to create a pressure situation for rowers revealed that the audience had no impact on the athletes' psychological responses (Wellner et al., 2010).

Conclusion

Because it allows athletes to immerse themselves in the game to comprehend it better entirely, virtual reality is particularly beneficial in sports psychology. It aids in giving a distinct viewpoint on the game and from various places. It can also help in visualizing, which is essential in sports psychology. Since many athletes have trouble picturing themselves competing, VR can significantly ease their preparation. Additionally, Liu, Li, Guo, Chai, and Cao (2022) argued that stress and pressure are significant aspects of athletics. Sports psychologists can assist athletes in getting ready for pressure situations and learning how to handle them while competing. The secret of

VR technology is emphasizing the word "virtual." It is imaginary compared to reality, yet it is more realistic than purely imaginative works and conventional two-dimensional presentations.
The sense of immersion has increased due to advancements in science and technology. Future sensory stimulation endlessly close to reality is anticipated to be available to people in the virtual setting. However, based on what is known and understood today, VR has the most potential for applications involving the development of specific skills and perception/decision-making.

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Using Photogrammetry for Modelling Realistic Characters in Virtual Reality

Dursun Akaslan[1] and Mustafa Ulukavak[2]

Abstract: Photogrammetry is described as the science of obtaining, measuring and interpreting reliable information about the properties of surfaces and objects without physical contact. Photogrammetry provides a cost-effective, fast and effortless alternative to established 3D imaging and is also used in many areas such as archaeological artefacts and the game world. The purpose of this study is to model and texture a human body with photogrammetry for the use of realistic characters in virtual reality. First, a scene is established to have sharp images without motion blur and without depth blur by ensuring that there is no change in the settings of lighting and in the position of objects from the perspective of cameras. Second, a camera is used to take multiple images from the top, middle and bottom sides of the human body from various angles. Third, an open-source 3D reconstruction software (i.e., Meshroom) based on a photogrammetric computer vision framework is used to obtain a 3D model from multiple images. Fourth, a free and open-source 3D creation suite (i.e., Blender) with the Adobe Mixamo is used to clean up and animate 3D objects. Finally, a JavaScript library (i.e., Three.js) and Unity 3D are used to load, orbit and control 3D human models through the web. Our study revealed that photogrammetry might be used to construct realistic 3D characters in a cost-effective and fast way for the use in virtual reality.

Keywords: Photogrammetry, Virtual Reality, Mesh, 3D Scan, Camera

Introduction

3D imaging devices promise to open up a wide variety of applications, especially those involving the need to know the precise 3D shape of the humn body in e-commerce, medicine, antropometry, post-production and industrial design for clothing, evaluation, inspection, diognasis, planning, vehicle design, virtual actors and workspace design (Siebert and Marshall, 2000). Photogrammetry might be used to get the 3D shape of a person into a computer for use in virtual reality. It is preferred as one of the most frequentşy used methods to create a three-dimensional virtual character with a human-like appearance.

Photogrammetry is described as the science of obtaining, measuring and interpreting reliable information about the properties of surfaces and objects without physical contact. Although photogrammetry covers the meaning of the words light, drawing and measurement, it literatly means measuring with the help of images (Oruc, 2021). Photogrammetry provides a cost-effective, fast and effortless alternative to established 3D imaging and is also used in many areas such as archeological artefacts and the game world. For instance, an archeological artefact namely Demeter Sculpture is modeled by Uslu and Uysal (2017) using photogrammetry method.

3D models as a photogrammetric product are usually integrated into virtual reality environments with additional datas such as text, video or sound (Portales, Lerma & Navarro, 2010). The purpose of this study is to model and texture a human body with photogrammetry for the use of realistics characters in virtual reality. To deal with our goals, two objectives are mainly followed in our study. A full three-dimensional model of a real person is created and cleaned and animated with Mehsroom, Blender and Mixamo and then controlled by game engines namely Three.js and Unity 3D.

Literature Review

Traditionally, photogrammetry has been usually described as the process of deriving metric information about an object through measurements made on photographs of the object (Mikhail, Bethel & McGlone, 2001). The processing algorithms used in photogrammetry have been continuously developed for the last 20 years for the automation of information extraction from digital images, based on image analysis methods (Baltsavias, 1999). The bottom, middle and top parts of a human that is desired to be designed in 3D are usually photographed in approximately 100 exposures each, with the help of a camera as illustrated in Figure 1 (Oruç, 2021).

Nowadays, although the same method is used to create objects with photogrammetric methods, more advanced technologies can be also used. For instance, a machine called Botscan Neo is produced by the Botspot company in Germany as illustrated in Figure 2. The Bootscan Neo can be used to create the 3D models of objects, and people

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in seconds. Photogrammetry is informally divised into two main categories based on the height of the platform namely traditional (or aerial) and nontraditional (or close-range) (Matthews, 2008).

Figure 1. Creating 3D Objects with Photogrammetric Method

Close-range photogrammetry is used to refer to photographs with an object-to-camera distance of less than 300 m whereas aerial one uses large-format, vertical aerial images (Matthews, 2008). Close-range photogrammetry is considered as an efficient tool to derive geometrical information from digital imagery in a fast and economic way for modelling objects coexist with success (Portales, Lerma & Navarro, 2010).

Figure 2. Botscan Neo

Two different techniques are mainly used in for modelling objects coexist with success namely virtual reality and visual reality (Grussenmeyer, Hanke & Streilein, 2002, as cited in Portales, Lerma & Navarro, 2010). While the texture and objects are not required to correspond with real objects in the former, 3D models in the latter are considered as a replica of physical objects (Portales, Lerma & Navarro, 2010).

Methodology

Several stages play a critical role in the establishment of 3D model using a photogrammetry method. However, all photogrammetric projects involve at least three distrinc stages: acquisition, localisation, and modelling (Chapman & Deacon, 1998). At the first glance, image data should be captured on site by establishing an environment. Then, the interior and exterior orientation parameters for each camera position should be destermined. Finally, the geometric features of interest to the client should extracted manually or automatically. Moreover, floating artifacts, background noise, holes and irregularities should be cleaned up from the mesh by importing into a CAD

environment. Five stages are used in our study for modelling realistic characters for the use in virtual reality as illustrated in Figure 3.

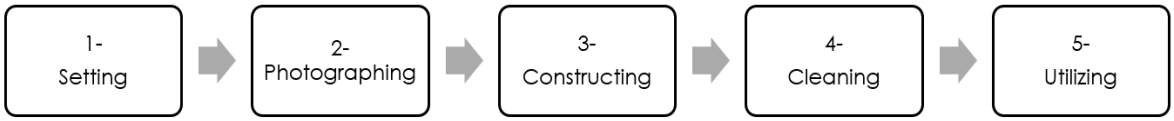


Figure 3. Stages

Findings

Environment Setting

A scene is established to have sharp images without motion and depth blur by ensuring that there is no change in the settings of lighting and in the position of objects from the perspective cameras as illustrated in Figure 4 and Figure 5. As illustrated, the human is positioned motionless in the center of the circle and the camera takes a picture from the bottom, middle and top of the human at least at every 9 degrees while the camera is moving. Figure 4 illustrates a scene for modelling the half body of a human whereas Figure 5 is for the full body. A camera with a 23.5-megapixel resolution is used to take multiple images from the top, middle and botoom sides of the human body from almost all angles.

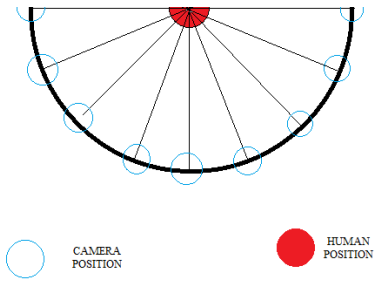


Figure 4. Camera and Human Positions for Half Body

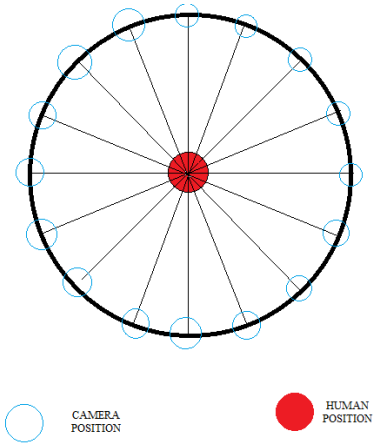


Figure 5. Camera and Human Positions for Full Body

An open-source 3D reconstruction software namely Meshroom based on a photogrammetric computer vision framework is used to obtain a 3D model from multiple images. The output of the Meshroom is cleaned by a free and open-source 3D creation suite namely Blender. A JavaScript library namely Three.js and Unity 3D are used to load, orbit and control 3D human models through the web.

Image Capturing

The photogrammetry software (i.e., Meshroom) emphasizes that the shooting quality is considered as the most important and challenging part of the photogrammetry process because it has important impacts on the quality of the final mesh. The fast shutter speed plays a critical role in avoiding motion blur, in reducing the high f-number to have a large depth of field and in reducing the ISO to minimize the noise. Table 1 and 2 illustrate the details of images taken from the top, middle and bottom parts of the human body. As illustrated in Table 1 and 2, images were taken by using a Sony-ILCE-6000 with higher shutter speed (i.e, 1/160 second). Moreover, the details of Sony-ILCE-600 were introduced to Camera Sensors Database as **Make;Model;SensorWidthInMM** in the Meshroom software as follows:

- Sony;ILCE-6000;23.5

The Meshroom software relies on a camera sensor database to determine camera internal parameters and group them together. Moreover, all images captured and used in our study have metadata in their header (Meshroom, 2002).

Table1. Images from the Bottom, Middle and Top Sides for the Full Body

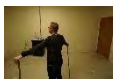
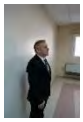
Part	Photographs and Samples					Device	Details	Resolution
Top					16	Sony ILCE 6000	Depth of Field: f/4.0 Grain: ISO-800 Shutter Speed: 1/160 s Focal Length: 16mm	350 dpi 6000x4000 24 bit
Middle					17			
Bottom					17			

Table 2. Images from the Bottom, Middle and Top Sides for the Half Body

Part	Photographs and Samples					Device	Detail	Resolution
Top					25	Sony ILCE 6000	Depth of Field: f/3.2-4.0 Grain: ISO-1600 Shutter Speed: 1/160 s Focal Length: 16mm	350 dpi 6000x4000 24 bit
Middle					23			
Bottom					22			

Mesh Reconstruction

Meshroom and AutoDesk ReCap Photo wereused to reconstruct the 3D model from multiple images. It is important to note here that Meshroom relies on a nodal system which exposes all the photogrammetry pipeline steps as nodes with parameters. Figure 6 and 7 illustrates the interface of the Meshroom, which allows use the nodes with parameters from the CameraInit to Texturing. For the images in Table 1 and 2, two projects are created within the Meshroom and nodes with default parameters are used to reconstruct the 3D human from images. Nodes within the Meshroom represents a task that can be executed to reconstruct the 3D model. The default pipeline used in our study to reconstruct the 3D model from 2D images contains 11 nodes as illustrated in Table 3.

Table 3. Photogrammetry Pipeline in the Meshroom

No	Nodes	No	Nodes
1	CameraInit	7	DepthMap
2	FeatureExtraction	8	DepthMapFilter
3	ImageMatching	9	Meshing
4	FeatureMatching	10	MeshFiltering
5	StructureFromMotion	11	Texturing
6	PreperaDenseSense		

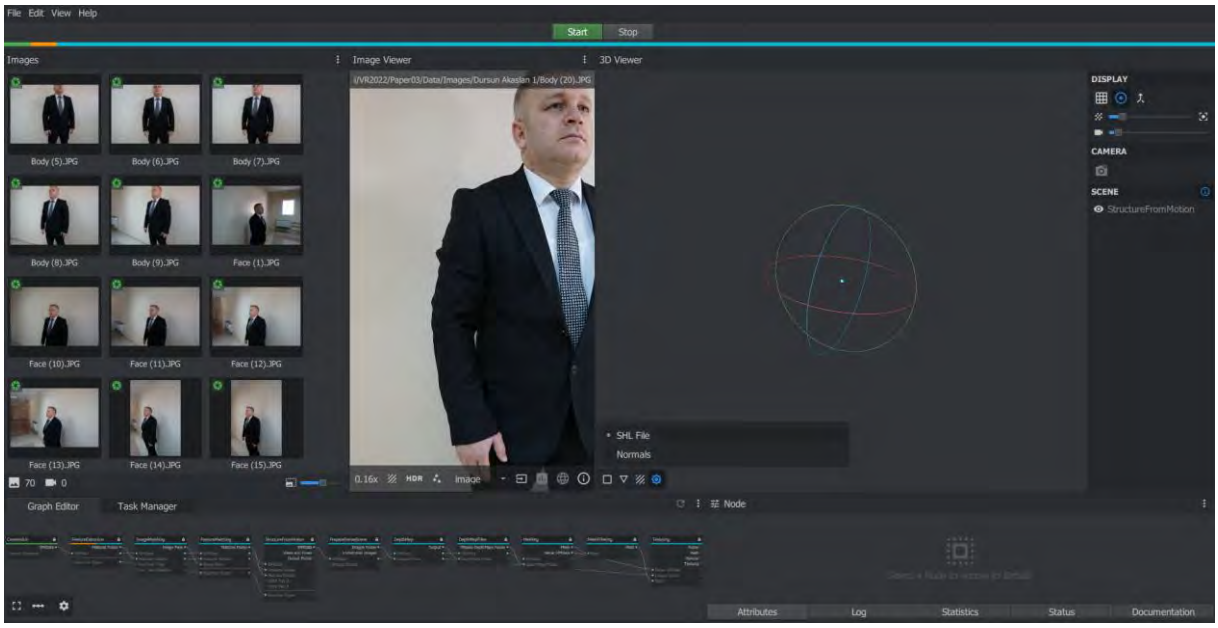


Figure 6. Meshroom Interface for Reconstructing the Half Body

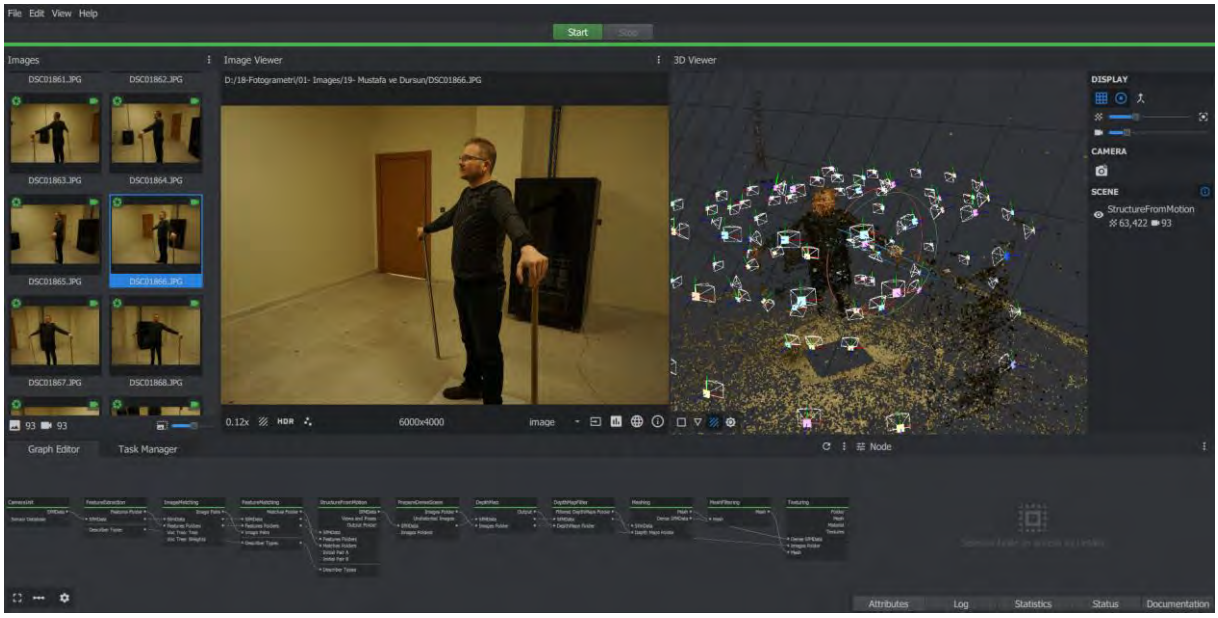


Figure 7. Meshroom Interface for Reconstructing the Full Body

Mesh Cleaning

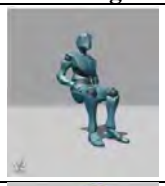
Meshroom outputs a messy high poly, photogramatry 3D model. However, it should be converted into a clean, but detailed low-poly, game-ready asset for use in virtual reality. The mesh generated by the Meshroom is illustrated in Figure 8. As illustrated, the legs of the body are not well reconstructed. Therefore, it is important to ensure that the the Meshroom generates a complete body by recapturing images on site and by modifying the default parameters in the nodes of the pipeline. After cleaning the 3D model, either Blender or Adobe Mixamo might be used to animate the model. The Adobe Mixamo has thousands of character animations such as Idle, Walking, Running and Jumping as illustrated in Table 3. The clean 3D model is used as a character and uploaded to the Mixamo for several animations as illustrated in Table 1.

Figure 8. Meshroom Output

Utilizing

The realistic 3D model can be used as an asset in game engines such as Three.js and Unity 3D. Both game engines have many advantages features for controlling the 3D characters during the game such as Character Controller, Rigid Body and so on.

Table 3. Character Animations with Adobe Mixamo

Sitting	Idle	Walking	Running	Jumping	Swimming
					
					

Conclusion

Our study revealed that photogrammetry might be used to construct realistic 3D characters in a cost-effective and fast way for use in virtual reality. However, our experiences reveals that there are several points to be considered while scanning a human into a 3D model.

First, devices such as cameras to be selected in the process of scanning a model must be used correctly. Instead of using automatic settings, cameras should be set to manual use for image capturing such as resolution and lens. The lens with around 24 milimeters or lower do not distort the image captured. Additionally, captured images with more pixels help to design much better 3D models.

Second, some C stands should be used for stabilizing the actor (i.e., human) because the human model should be motionless as mush as possible. This is important because the human model that needs to stand in the T-pose with the bit wider spread legs will need support when its arms get tired.

Third, the human model should have as much detail as the clothing because image capturing is basically tracking thousands of points on the human model. Moreover, glossy transparent or reflective materials should be avoided.

Fourth, a soft wet environment with unchanging light and background should be selected as a location. For example, an inner courtyard conference room or a street on a cloudy day might help.

In sum, all surfaces on the human model such as armpits should be clearly captured for manufacturing the best 3D model for the use in virtual reality.

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Conceptualizing Artificial Intelligence: An African Perspective

Kezia H. Mkwizu[1]

Abstract: Artificial intelligence (AI) is trending and very important to the entire world as economies advance. Crisis such as global pandemics announced by WHO accelerated the need to explore AI in various economic activities particularly the service sector in areas such as education, hospitality, tourism and research. There is existing literature on AI, however, the discussion on the broader conceptualization of AI from an African point of view is limited. Hence, this paper is conceptualizing AI from an Africa perspective and specifically to shed light on the conceptualization of AI within an African context. This study's methodology relied on the application of a desk top review and documentary analysis. The findings revealed that AI conceptualization varies and this may pose both challenges and opportunities in its application. This paper contributes to literature on the conceptualization of AI in the context of Africa. Therefore, a conceptual implication is for researchers to consider the conceptualization of AI when applied in Africa settings. Future studies may explore AI and other concepts for purposes of aiding the use of research paradigms whether quantitatively or qualitatively to further understand the phenomenon of AI

Keywords: Africa, Artificial Intelligence, Conceptualizing

Introduction

Artificial intelligence (AI) is trending and very important to the entire world as economies advance. Crisis such as global pandemics announced by WHO (2020) necessitated to explore AI in various economic activities particularly the service sector in areas such as education, hospitality, tourism and research. Chilunjika (2022) noted that AI comprise various technology applications that can interface with the environment and capacity to process information. There is existing literature on AI in Africa (Chilunjika, 2022; Gaffley et al., 2022; Gwagwa et al., 2020, 2021a, 2021b; Kiemde & Kora, 2022; Mkwizu, 2022) with concentration on AI development, adoption, education, promotion, agriculture, healthcare, ethics, and frameworks. Wairegi et al. (2021) also confirmed that there is a vibrant AI ecosystem growth in the continent of Africa. However, the discussion on the broader conceptualization of AI in Africa is limited. Hence, this study conceptualizes AI from an Africa perspective and specifically to shed light on the conceptualization of AI within an African context.

Literature Review

The Concept of AI internationally

Artificial intelligence (AI) on a broader scale has received many definitions. For instance, Martinez (2019) opined that a general definition can be used as long as the definition is flexible and considers new development of autonomous AI.

Conceptualizing AI in Africa

Africa is a continent with a large youth population and therefore AI framework is needed (Wairegi et al., 2021). The term AI is already been documented in Africa by scholars such as Kiemde and Kora (2022). Some of the African literature are listed in Table 1 to show how AI is conceptualized in the context of Africa.

The concept of AI already received attention by both African and non-African scholars like Saleh (2019) and Martinez (2019). In Africa, the study by Wairegi et al. (2021) advocated on AI for Africa by presenting an African AI stakeholder framework so that AI in Africa is not reliant on western voices.

The suggested stakeholder framework for AI in Africa comprise primary, secondary and tertiary stakeholders whereby; primary are direct inputs in AI for example, from customers and investors; while secondary stakeholders are indirect inputs from entities like regulatory agencies and advertising companies; and the tertiary stakeholders can be community groups or continental unions like the African Union (Wairegi et al., 2021).

Gwagwa et al. (2020) established the benefits and challenges of AI in the Africa settings and stated that inclusion as one of challenges while benefits include AI focused activities involving adoption of cutting-edge technologies as noted in countries like Ethiopia and Uganda as well as technology hubs of Africa like in Kenya, Nigeria and South Africa.

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Additionally, Gwagwa et al. (2020) stated that AI inclusion in the Africa settings should be in areas such as diversity. In fact, Gwagwa et al. (2020) commented that the top five African countries which are ready for AI are Mauritius, South Africa, Seychelles, Kenya, and Rwanda. Chilunjika et al, (2022) added that AI is beneficial in improving public service delivery and reduce biasness in recruitment and selection processes for the public service.

Table 1: Conceptualization of AI in Africa

Source	Definition of AI
Gadzala (2018)	AI enables machines to exhibit human-like cognition.
Smith and Neupane (2018)	An area of computer science devoted to developing systems that can be taught or learn to make decisions and predictions within specific contexts.
Saleh (2019)	AI or sometimes called machine intelligence.
Rutenberg et al. (2021)	Tool for processing large amounts of data and improving predictions from those data.
Wairegi et al. (2021)	AI from an African ecosystem as the African AI ecosystem refers to the groups, and their interdependent relationships, who impact and are impacted by AI. We refer to these groups as stakeholders.
Naidoo et al. (2022)	AI for healthcare
Chilunjika et al. (2022)	AI refers to the input, development and imitation of human intelligence capabilities in computer systems to aid in human resource functions either autonomously or in collaboration with humans.
Kiemde and Kora (2022)	AI is a technological innovation.

Source: Compiled by Authors

Methods

This study's methodology relied on the application of a desktop review and documentary analysis. The desktop review involved reviewing documents (journal articles and reports) on AI in Africa. The utilization of documentary analysis assisted in conceptualizing AI from an African perspective.

Findings and Discussion

It is observed that the concept of AI is generally defined along the lines of "technological innovation", "machine" and "tool". The findings further revealed that AI conceptualization varies and this may pose both challenges and opportunities in its application. For instance, AI conceptualization varies with sector and stakeholders.

Based on Wairegi and others, settings of AI framework based on stakeholders should be in levels of primary, secondary and tertiary. At the same time, the conceptualization of AI is linked with a particular sector such as the health sector as the case for the study by Naidoo et al. (2022).

The conceptualization of AI in Africa can also vary depending on the field of research interests, for example, conceptualizing AI in relation to Human Resource Management (HRM) as the case for Chilunjika et al. (2022).

Whilst the conceptualization of AI poses the challenge on a common meaning of AI in the African context due to its unique sectoral demands and large youth population, it should also be taken as a venue of opportunity to enrich the depth of AI conceptualization that is inclusive and flexible. Inclusivity and flexibility in conceptualizing AI will assist to strengthen the concept of AI in Africa that aligns with progress of AI within the continent.

Conclusion

This paper contributes to literature on the conceptualization of AI from the African perspective. From the reviewed documents analysis, this study noted that the conceptualizing of AI from the context of Africa is generally defined along the lines of "technological innovation", "machine" and "tool".

In addition, this study found that conceptualizing of AI varies and this may pose both challenges and opportunities in its application. The variance of AI conceptualization is by sectors, field of research interests, and stakeholders hence poses the challenge of no common definition of AI in the African context.

However, this study shows that despite the challenge on conceptualizing AI in Africa, this challenge should be taken as a venue of opportunity to enrich the depth of AI conceptualization that is inclusive and flexible. Therefore, the inclusivity and flexibility in conceptualizing AI will assist to strengthen the concept of AI in Africa that corresponds to progress of AI within the continent.

Implication

Therefore, a conceptual implication is for researchers to consider the conceptualization of AI when applied within Africa in relation to stakeholders such as investors and advertising companies

Study limitations and suggestions for further studies

The desktop review and documentary analysis applications were the limitations of this study. Further studies may explore AI and other concepts for purposes of aiding the use of research paradigms whether quantitatively or qualitatively to further understand the phenomenon of AI.

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Edutainment XR

Jordi Martos[1]

Abstract: Playing with the presence of Morpheus, I emphasize Storytelling as the narrative hook for this presentation. Introducing myself into my work experience that I will show later. I give importance to how we do things. Learn to unlearn in order to educate ethically on how current technological systems communicate within Extended Reality. This technology offers us new models of doing things and optimizing our doing with technologies as tools.

Keywords: Storytelling, Virtual Reality¸ Extended Reality¸ Technologies Impact ¸ Education.

Introduction

Experienced professional in extended reality, and now I am committed to unlearn, what is the same as being updated in how current technological structures work, communicate or develop. I created an ID who investigated the psyche and the audiovisual impact on society. At that moment, I detected the ethical importance of digital content. In 2014, I had my first experience with virtual reality, and I introduced myself in understanding at full time this technology and educating users. This new empirical knowledge keeps me in a continuous comparison between experience machines and simulated reality. This is where critical analysis is born.

The first educational VR app by @all_VR_edu at HackatH2On at the Agbar Museum in Barcelona

In 2015, I developed the first educational app in Catalan from the All VR Education project. As you know, in those times it was a very early VR mode. Unity at the time and GoogleCardboard were in development builds within the XR. It took us a long time and a lot of work to optimize the typology of XR content. Currently, I admit to being addicted to the development of technological solutions applied to the interactive 3D universe.

WebXR

When I started programming Extended reality content in web format, I discovered the importance of accessibility and thus, I started teaching the user how to move within an immersive space. The interesting thing is the interaction capabilities thanks to these immersive experiences and with it, retention or learning based on user experience. How the user moves from one scene to another was already a challenge at that time. Another challenge was eye tracking from 2015 headsets. Today, we have a great webXR library which simplifies the definition of a misconception about Neal Stephenson's original metaverse. This current qualifier is contaminating the original meaning of the word. I hope it remains misused only in blockchain marketing.

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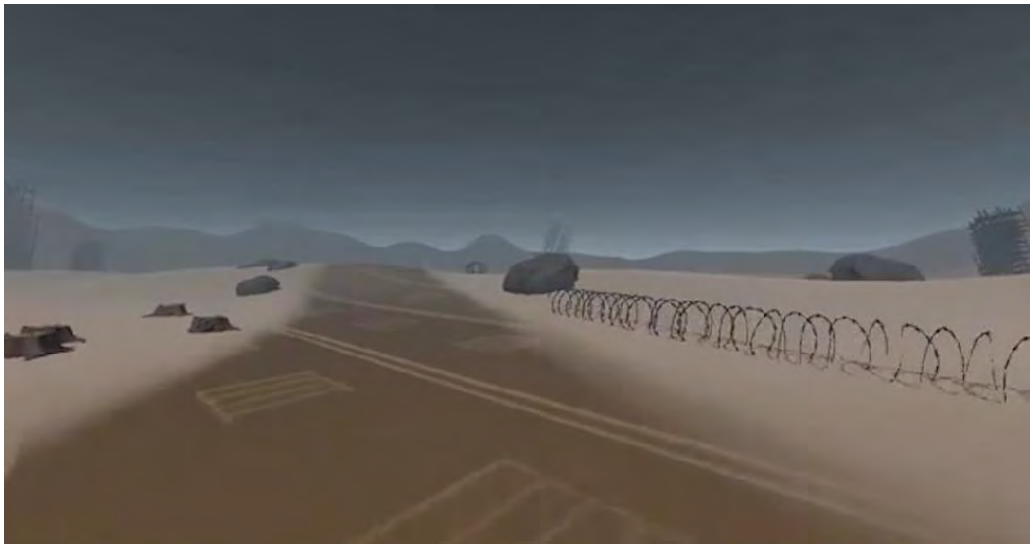
Emotions VR
In a residence that I participated in Sabadell, Barcelona, we developed an application called Emotions VR. It was based on four scenarios where we contemplated fear, sadness, joy and anger. The nice thing about this app is that it was in VR cardboard format and in AR format from a tablet. When the boys and girls, who lived the experience in the first person, finished it, they went through the augmented reality app and then saw what each scenario meant and got them to loosen up by talking about their emotions. Something unusual between people unknown to each other. Personal conflicts out! This application revealed to us the potential of this type of XR technology.



PressStart VR
We also participated in an exhibition in a museum with PressStart VR. We developed this application explaining the concept of user experience within this technology and the evolutionary origin from the digital to the virtual reality.

Cogame

With another type of storytelling, we participated in a European project called Cogame. It's a 2D video game mode developed with RPGMaker, based on historical heritage, a curious investigation for students that even helped train teachers and thus be able to introduce students to computational thinking thanks to the video game technology. During the first years, in 2016, we did different types of workshops for civic centers in Barcelona. We gave visibility to the work of students who were beginning to learn how to handle Unity, aimed at a virtual reality format. The sets were low poly. The training sessions lasted only a few hours. They developed scenarios in an artistic way and even applied the first physics and programming, with which they could understand how the different elements in a 3D scenario interacted.

VRMOOC

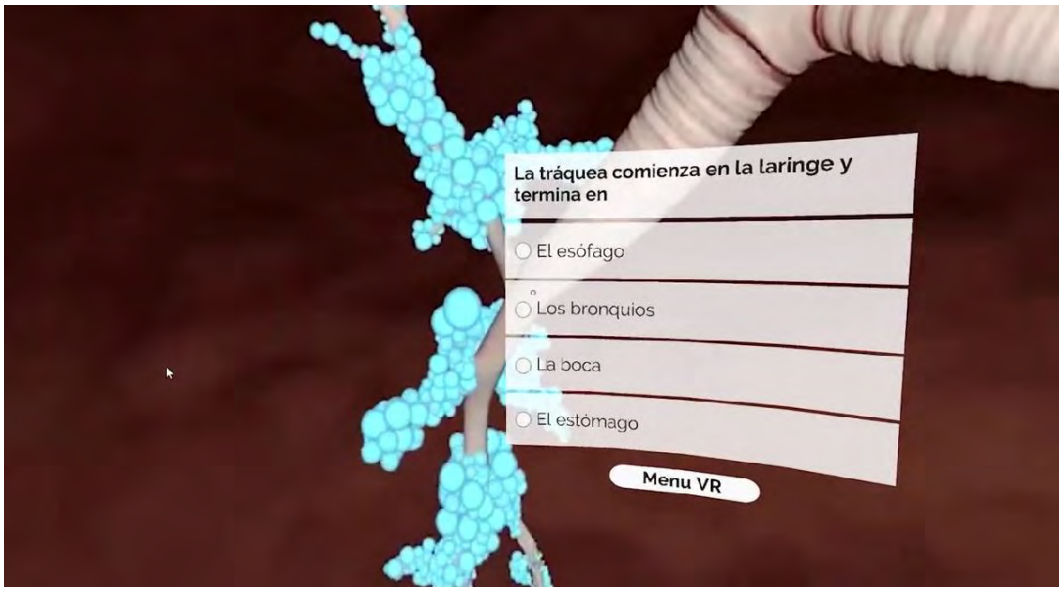
As a technical profile, I have participated three times in the VRMOOC, it was the first MOOC that was made in Spain of virtual reality for the Ministry of Education. It was a collaboration with acanelma from the AllVREducation project. We held different events within the metaverse and taught teachers how to use this content in the classroom.

Cospaces

A different type of training, with a different type of online programs. Being for boys and girls, we have always focused on the importance of historical heritage as storytelling. Children developed their video game in Cospaces, a platform for very young profiles, and it is interesting to see that as storytelling within 360 audiovisual productions is becoming a useful tool for non-technical profiles. Cospaces allows us to develop the Merge cube in an augmented reality mode, and in this way, we can develop XR Storyboards in an interactive way. I don't know if you know the Merge cube but with it, you can do very interesting experiments.

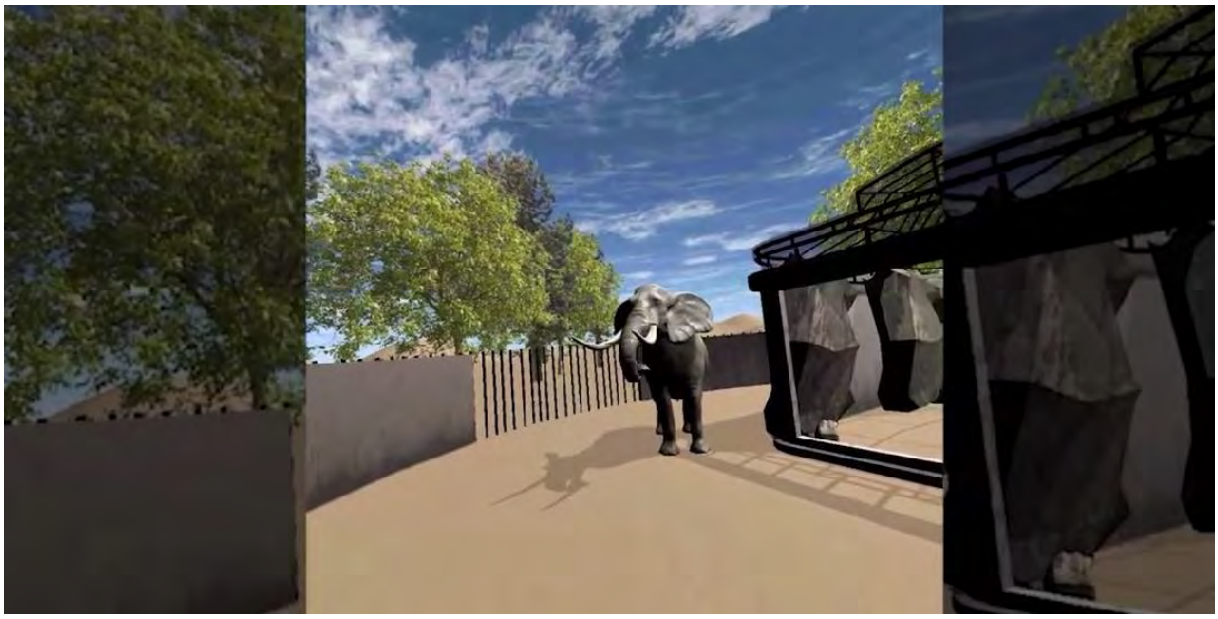
Uiduu

We developed a virtual reality application in which teachers assigned a new subject and generated some questionnaires. Then, the students downloaded the application, registered, entered the code that the teacher had given to them and then they could experience the virtual reality experience in first person. It contained the subjects with the different video galleries and questionnaires. This app recorded the user experience with the responses of the students and the teacher saw the real-time metrics of the interactions that each student had executed.



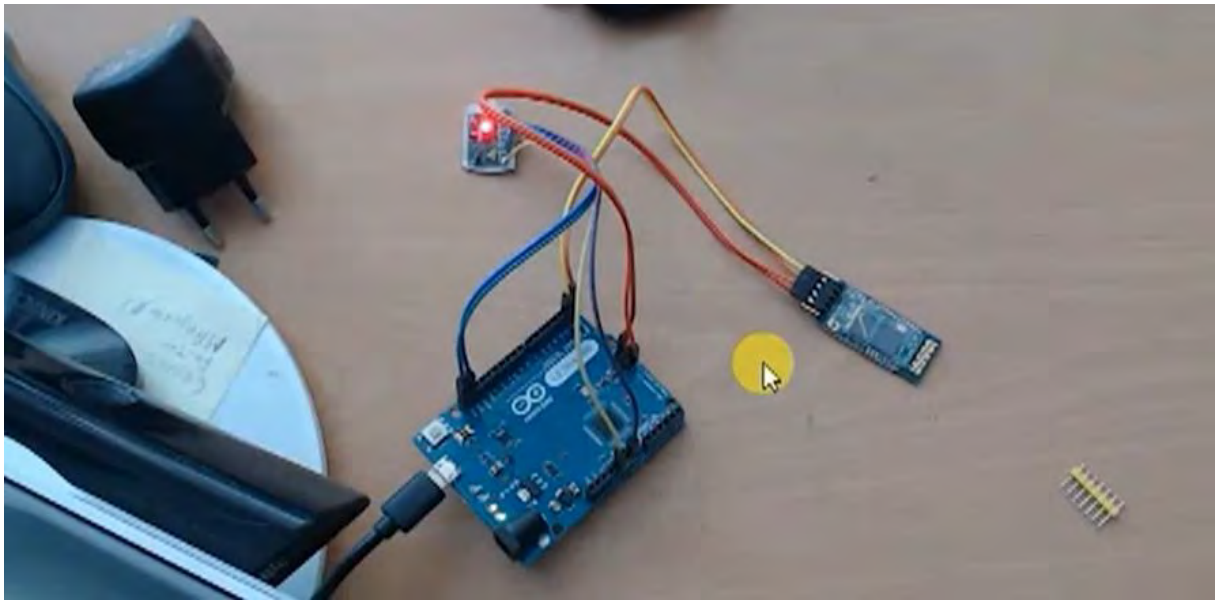
Susi VR

I also developed an application that was used for animal awareness. It was based on the story of Susi, an elephant in the Barcelona Zoo who was old. She was sacrificed and we developed a small experience, where I accompanied the user through the VR experience, and later we accessed a documentary that these clients had previously developed.



Virtue

The emotional theme was gaining strength in all this type of technology, and I participated in developing animations and biofeedback connectivity in another vr experience. Thanks to a psychologist who accompanied you, he analyzed your emotional state according to your interaction with the animal within the VR experience. We had different devices, sensors that gave us readings to be able to reinterpret the data.



AR Dam Safety

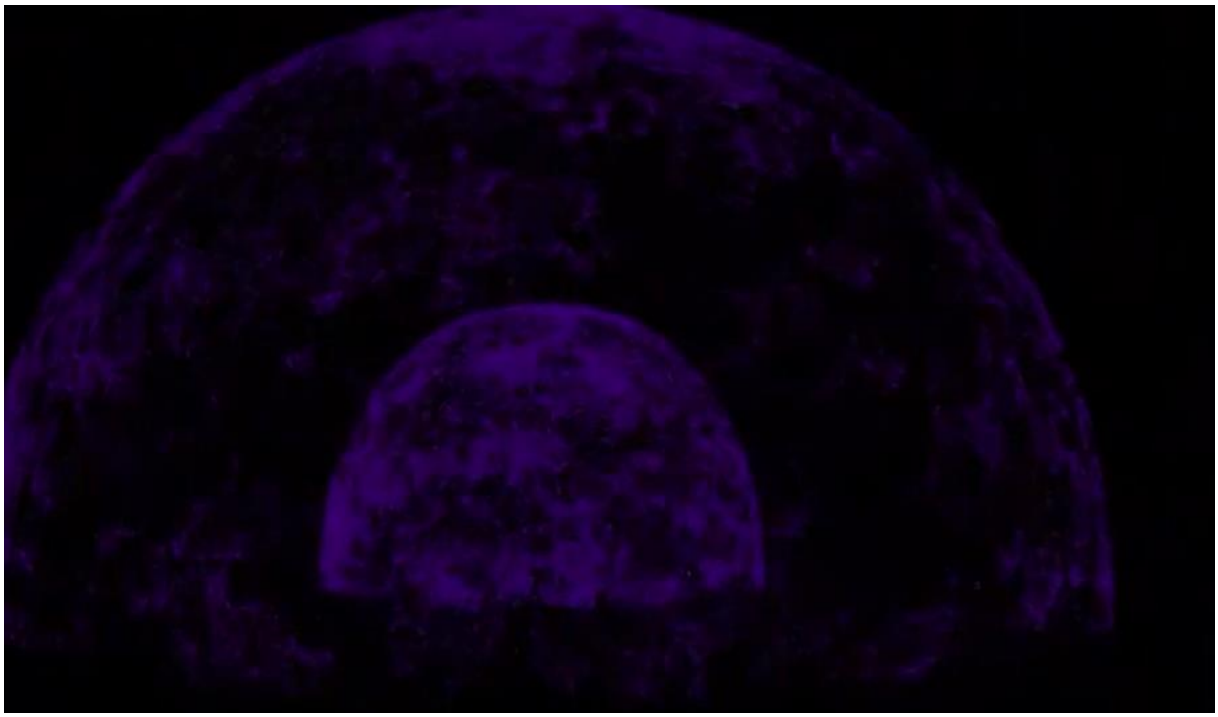
Coming to another work in augmented reality, this time it was a reconstruction of a river that had been dammed and how the construction of the dam had modified the ecosystem of that river. What happened when that dam collapsed? And how long did it take for that ecosystem to recover?

Heritage Almacelles

Another type of development is the point cloud of scanned images. It had to do with cleaning the object to rebuild it as optimally as possible and recreated a scene from a certain era with developments in four languages, showing the evolution of different stages of some ruins and explaining the historical heritage so that the user has knowledge of the different cultures that passed during the stage or the life of this place.

Hackathon Cuantica CCCB

I Participated in a quantum hackathon with data that had to be represented, where the conflict that we found, it was the existing amount of data and the little content that could show us or had visibility to this type of information or graphic representation.



Bombers VR

Continuing with the historical heritage, another application was the 360 image combination. Making a staging with a chroma key to superimpose a composition. With a machine from the future one went to the past, historical information was recreated for the Barcelona firefighters for example and. We had to recreate all the environment and volumes of the objects.

VRaiLexia

Another European project that I participated in, it was VRAILexia, developing scenarios for the treatment of users with dyslexia. It included elements of gamification, and the pace of the storytelling was built on the basis of the user experience, with the feedback that we received thanks to artificial intelligence, and we could process and automate the data, which as the level of difficulty of the experience. A powerful proposal for health.

TwinMotion
With Unreal's TwinMotion, we render premium quality 3D objects from content and allow us to make stunning experiences. This tool is used in architecture and engineering. I liked the level of ability to generate surreal scenarios for Storytelling.

Methodology
The applied method is “learning by doing”. The most functional methodology in my experience has always been based on showing the different developments and showing the resolution of conflicts detected in the different types of audiovisual developments and extend reality XR.

STEM
I work for projects and with the STEM methodology (science, technology, engineering, mathematics). Logically we have had to update the different technological systems and even the ways of visualizing the project for proper optimization. And so, it still lacked a more visual element.

STEAM
It is time to add the arts to the STEM method. So, in a more visual society, we manage to motivate students with this type of development. Although I always emphasize that it is a very visual model. With the previous model, all the necessary representations for digital environments were already included.

Findings

The following recommendations go online from newer or young students to more professional or adult profiles.

Table 1. Technologies

Softwares	Students	Architecture
Cospaces	Boys	coblocks
Blender	Teenagers	3D
Adobe Premier /After Effects	Adults	Video
Unity	Adults	C#
A-Frame	Adults	HTML5
Three.js	Adults	Js
Unreal	Adults	Python
TwinMotion	Adults	3D

These are just a few examples among many more.

Discussion
The need to simplify technology against the current of offering an exclusive service is retarding the evolutionary development of an agile Society. Another use of this technology is for personal, animal and ecosystem awareness. With bioFeedbacks that generate a database mapping behaviors and AI Artificial Intelligence generating new possibilities by gamifying XR Extended Reality experiences. As from another perspective of development, we find the difficulties of graphic representation of the amount of current data that exists in different communities. Even the optimization of 3D objects from point clouds created with image data. Allowing more and more agile and optimized digital representation.

Conclusion
Learning to detect communication needs between development teams and the technologies used will help us generate smart cities. Arousing emotions in users with the double experience in VR Virtual Reality and AR Augmented Reality, and thus verifying that people can empathize more thanks to a shared experience, is a pleasant surprise. For this reason, the social impact of the content of extended experiences is important. Collaboration in museums gives me a critical vision of our history. And applying it in education has been my pillar as a methodology applied in face-to-face classes. Training educators to develop in videogame mode the different subjects under the STEM + Heriatge ethic. Even in some European project. Extended education is divided into different models that can be applied in different types of centers and entities. Even the experience as a consumer is always educational. The different engines or online development platforms for XR Extended Reality content. They allow us to understand the physics and logic of mathematics to apply it in classes with students. Optimize not only student learning or methodologies applied by teachers with Extended Reality technology, but also centers and entities, thanks to connectivity between technologies to record user processes. The Important thing is the storytelling of the experience we offer. As you all already know, I specialize myself in the development of this type of hardware…

Remember
The world keeps updating itself continuously for its constant optimization. By now, you can see, I haven't talked about headsets or market implementation strategies for this technology. For me, the important thing is the power or rather the need to connect the different technologies with each other and thus enable users with experiences that are not simply based on entertainment. I prefer to offer an Edutainment that teaches than that only entertains. The quantity of consumers scares me in contraposition with the lack of creators. For this reason, I invite you to focus on making your developments to be interactive teaching experiences that train users. We are in times of Ethics in the near future. Thanks to all the attendees and especially to the organization for allowing me to insert this seed of knowledge based on my experience. Cordial greetings and many hugs, which are more pleasant.

Remember
The world keeps updating itself continuously for its constant optimization.

Acknowledgement

Thanks to the Assoc. Prof. Dr. Dursun AKASLAN The Head of the Department of Software Engineering, Harran University, Türkiye, by cons with my presence at the event. Thanks to all the professionals from the different guilds with whom I have worked in my career. Thanks to Alicia Cañelles for accompanying me during the All VR Education project. Thank you to all my students for submitting concerns to investigate and optimize. Thank you to all of you who continue to offer me your questions so that I can present you with the solutions. Thank you all for working in community.

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Building Learning Power through Virtual Reality and Metaverse in Education

Ramesh Chander Sharma[1]

Abstract: Virtual reality (VR) application are computer-generated simulations of three-dimensional environments, which can be experienced in a realistic or physical manner through interaction. Virtual reality (VR) and the metaverse, a virtual shared space where users can interact in real time, have the potential to revolutionize education by providing immersive and interactive learning experiences. The use of virtual reality (VR) and the metaverse in education has the potential to significantly change and improve the way we learn. This paper will explore the potential of building learning power among the students through the lens of virtual reality and metaverse.

Keywords: Virtual Reality, Metaverse, Learning Power, Engagement

Introduction

Virtual reality (VR) application are computer-generated simulations of three-dimensional environments, which can be experienced in a realistic or physical manner through interaction. The user is able to interact with and explore this simulated environment in a seemingly real or physical way. VR typically involves the use of a headset or other device that displays a virtual world to the user and tracks their movements, allowing them to look around and interact with the environment in real time. Virtual reality has many potential uses, including gaming, architecture, training, defence, education, fashion and entertainment. This paper will explore the potential of building learning power among the students through the lens of virtual reality and metaverse.

Literature Review

The Metaverse Roadmap (2006) defines metaverse as "a virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual space, including the sum of all virtual worlds, augmented realities, and the internet. It is a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual space, including the sum of all virtual worlds, augmented realities, and the internet" (Metaverse Roadmap, 2006). The word "metaverse" is a combination of the prefix "meta" (meaning "beyond") and "universe" (Hackl, 2021).

It is a virtual reality space that is created and accessed through the use of computer software and hardware, and can be entered and explored by multiple users (Sharma & Sharma, 2021). It allows users can communicate and interact with each other and with virtual objects and environments as if they were in the same place at the same time. These interactions take place in real time, meaning that there is no delay between the actions of the users and the response of the virtual environment. The concept of the metaverse has been popularized in science fiction and has also been explored in the fields of technology and education as a potential platform for immersive and interactive learning experiences.

Finding and Discussions

Virtual reality (VR) and the metaverse, a virtual shared space where users can interact in real time, have the potential to revolutionize education by providing immersive and interactive learning experiences. By building learning power through these technologies, students can develop skills that will be increasingly relevant in the 21st century.

Experiential Learning

One way VR and the metaverse can build learning power is through experiential learning. Instead of simply reading about a concept or watching a video, students can interact with virtual simulations and environments that allow them to apply their knowledge and make mistakes in a safe and controlled setting. This can help students better understand and retain information, as they are able to engage with the material on a deeper level.

Collaoration and Communication

Another way these technologies can build learning power is through collaboration and communication. In a virtual environment, students can work together and share ideas in real time, regardless of their physical location. Using

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the metaverse can help develop teamwork, problem-solving, and critical thinking skills, which are important for achieving success in today's global economy.
These skills allow individuals to work effectively with others, find solutions to challenges, and think critically about problems and situations. As such, they are valuable assets to have in a rapidly changing and interconnected world.

Personelized Learning Experiences
Moreover, VR and the metaverse can provide personalized learning experiences that cater to the needs and learning styles of individual students. For example, students can work at their own pace and choose the learning materials and activities that best suit them. This can help improve motivation and engagement, as students are able to learn in a way that is tailored to their needs.

However, it is important to note that VR and the metaverse are still in their early stages of development and adoption in education. There are also concerns about the potential for these technologies to be used in a way that reinforces existing inequalities, such as the digital divide. To ensure that the benefits of VR and the metaverse are realized in education, it will be important to address these issues and work towards creating inclusive and equitable learning environments.

Conclusion

VR and the metaverse have the potential to build learning power in education by providing immersive and interactive learning experiences, promoting collaboration and communication, and offering personalized learning opportunities. Although there are some challenges that need to be addressed, the use of virtual reality (VR) and the metaverse in education has the potential to significantly change and improve the way we learn.

These technologies can provide immersive and interactive learning experiences, promote collaboration and communication, and offer personalized learning opportunities. By using VR and the metaverse, students can develop skills and knowledge that will be valuable for their future.

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A Study on Restoring the Indian E-Commerce Ecosystem with an Open Network for Digital Commerce

Dimpy Kumari[1] and Anil Sharma[2]

Abstract: In the world of digitization, when customers are more focused towards ease of shopping experience, which dually supported by enhanced customer experience with the help of e-commerce platform. India with the largest youngest population who are very fastly becoming tech savvy. The combination of internet and technology may become toughest competitor for the traditional businessmen in India. With large capital and technology know how global players are looking India as their potential market, which may make them e-commerce giants and the battle between modern & traditional retail would become one sided. India where majority of the people belonging to humble economic conditions and to sensitize the sales. ONDC is being introduced as a serious government endeavor. It's an Open Network for Digital Commerce is a campaign that promotes open networks for all elements of the trade of goods and services over digital or electronic networks. This research aims to study the approach & thought process behind the development of ONDC and also to understand the prospects & challenges behind the successful implementation of this government initiative. The research concludes that collaborative efforts of customers, retailers & government is at nascent stage, only time would answer that can e-commerce monopoly be avoided or not.

Keywords: E-commerce, Brick and Motor retail, Virtual monopoly, ONDC

Introduction

Mobile devices and the internet are increasingly popular in India. 830 million people connected to the internet globally in 2021, largely as a result of the "Digital India" initiative. 97% of internet connections were wireless and made up 55% of all connections in urban areas. Another significant increase has been in the number of smartphones, which is expected to reach 1 billion by 2026. This has benefited India's digital economy, which is predictable to be worth US$1 trillion by end of 2030. The rapidly expanding e-commerce business in India is benefiting from the country's increasing affluence, the quick expansion in people using the internet, and the widespread usage of smartphones. Because of the growth of the e-commerce industry in India, a number of previously unattainable market niches have become feasible (Agarwal, A., & Yadav, V. K. ,2015) These market niches include business-to-business, direct-to-consumer, consumer-to-consumer, and consumer-to-business. In recent years, major markets such as direct-to-consumer and business-to-business sales have experienced tremendous growth. It is anticipated that the direct-to-consumer market in India will reach $60 billion by FY27. It is estimated that the market for international electronic commerce would increase by 21.5% in 2022 to reach $74.8 billion, and it is anticipated that the market will reach US$350 billion by 2030 (SHAHA & SHINDE, 2013).

History of e-Commerce in India

In 1991, when the concept of electronic commerce first evolved, India lacked Internet connection. But by the late 1990s, more and more people knew about the Internet and realized that it might be used for business. Up until a few years ago, it was still a luxury for the majority of Indians. The general public started to see the Internet as a useful tool in 2002 when the IRCTC launched an online reservation system. People became aware of Amazon, world's largest retailer, which signaled the beginning of e-commerce in India. Flipkart was one of the important companies that contributed significantly to the regional e-commerce giant.

A few years later, India's e-commerce industry started to grow when Mukesh Ambani, the face of Reliance Industries, announced the establishment of Reliance Jio. He gave out free SIM cards, which caused a big change in the country's Internet environment. With this, the number of users in India simply grew, and consumers started taking advantage of the ecommerce market, creating the conditions for the industry to thrive and have great potential (Devi, B., & Gangal, N. 2020). Nowadays, people can order almost anything online and have it delivered right to their door, including everyday essentials like electronics, milk, and food, with straightforward return policies. In India, e-commerce has so far grown in a pretty fascinating way.

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Recent Scenario of e-Commerce

Amazon India and the government-run Manipur Handloom & Handicrafts Development Corporation Limited inked a Memorandum of Understanding (MoU) in June 2022 to help craftsmen and weavers across the state. In the year 2021, the venture and private equity capital markets in India invested a combined total of 15.2 billion dollars in the country's e-commerce sector of the economy. This is a 5.52-fold increase in comparison to the previous year. The rate of return on investment in pursuing this line of work in India is currently at an all-time high. Xpressbees, an e-commerce platform for the logistics industry, was valued at $1.23 billion in February 2022, propelling it to the rank of a unicorn company.

The company was able to secure US$300 million through its Series F round of investment. To support micro, small, and medium-sized businesses (MSMEs), In February 2022, Amazon India began hosting a virtual bazaar known as "One District, One Product" on its website. The "sell back program" was introduced by Flipkart in February of 2022, and it gave customers the opportunity to exchange their old electronics for store credit. In January of 2022, Walmart will open its marketplace in the United States to Indian merchants with the intention of increasing India's annual exports to US$ 10.8 billion by the year 2027. As part of an expansion of its grocery based business, Flipkart said in January 22 that it will now offer its services in 1,910 additional towns located within India.

Further The Indian e-commerce industry provides cash, technology, and training to micro, small, and medium-sized enterprises and other sectors. The second-largest E-commerce market will be India by 2035. Digital payments, hyper-local logistics, analytics-driven consumer engagement, and digital marketing will help the sector's growth. New markets are expected for Indian e-commerce. India's e-commerce sector grew 36% to Rs. 1.96 trillion in FY20. By 2025, the Indian e-commerce market is predicted to attract 300-350 million consumers, raising its online Gross Merchandise Value to 100-120 billion US$ (Dey, E. S., & Ghose, D. D. ,2020).

Literature review

(George, 2022) COVID-19 has boosted worldwide digital trade. Digital commerce surged in retail but fell in mobility and travel services. Sales increased due to B2C sales. The ONDC project prevents digital monopolies. ONDC intends to provide a platform for all online stores by open-sourcing e-commerce procedures. This article covers ONDC's core beliefs. The author investigates Open Network for Digital Commerce's origins and main ideas. Prospects and difficulties. To assess ONDC's impact on India's digital monopolies. Businesses seek inventive ways to engage with customers. ONDC, a new network, wants to simplify this. The platform intends to attract new customers, break online monopolies, and let micro, small, and medium-sized firms join online markets.

The ONDC program, led by the Ministry of Commerce and Industry's Department for Promotion of Industry and Internal Trade (DPIIT), aims to make digital or e-commerce more democratic by shifting from a platform-centric paradigm to an open network model (ON). Digital commerce will change platform-centric Indian e-commerce (DC). ONDC won't require transaction-level data. An open network may expose even a tiny retailer to several platforms (Rajput, Kesharwani, 2012). The ONDC intends to dismantle digital monopolies and generate new opportunities. This might transform e-commerce, especially in India. Online startups will be millions. Revolution if the government's approach works. Indian e-commerce might reach $200 billion by 2020. The administration must plan to overcome various challenges. Amitabh Agrawal thinks small-to-medium-sized players will succeed.

The researcher discovers that an ONDC government initiative promotes open networks for digital goods and service commerce. Users may shop at any business without switching e-commerce sites. Internet companies should have equal visibility and growth opportunities. The ONDC allows market creation that will impact the economy. This platform prioritizes law enforcement. Expect some network expansion issues. (Pandey, Soodan 2014) says the growth of online shopping in India is exploding. E-commerce is driven by factors such as demography, economic levels, and lifestyles. The research investigates a variety of topics, including how innovative minds are coming up with fresh concepts to keep customers interested.

The purpose of this research is to investigate the variables that led to the rise of e-commerce in India as well as the obstacles that it faces. The researcher investigates why experts and e-com companies expect India's e-retailing to grow. Rising youth aspirations to adopt e-commerce, widespread internet use in both urban and rural areas, increases in customers' disposable income, nuclear families, changes in government e-commerce initiatives, enhanced transaction security mechanisms, mobile telephony, and others are driving the growth of the Indian e-retail sector.

Excellent products, modern technology, 24/7 accessibility, low advertising costs, and India's e-retail bottleneck are Trusting customers, inefficient logistics, Shipping charges, product delivery delays, Margin management, Lack of touch, feel, and try, Brand loyalty, Internet access, Linguistic communication, and Secure transactions. The researcher found that internet shoppers had different experiences. Online shoppers are wary. Safer payment alternatives, a broader assortment of products, and reduced costs have impacted Indians. (LAKSHMI, 2018) E-commerce is online buying and selling. E-commerce and e-business are well-known terms. E-business is using the internet to reach a big customer base. The Indian e-commerce industry researcher found that the internet is an important component of our daily life. We use the internet for almost everything. E-commerce has made life easier in India as it replaced physical markets. Indian e-commerce websites allow us to buy and sell items at affordable costs, hence most consumers shop online. E-commerce affects many markets and enterprises. This study discusses markets, merchants, and e-implications. The researcher found that e-commerce affects offline stores both positively and negatively. E-commerce reduces advertising costs and builds client loyalty. Online shoppers buy cheaply, causing offline merchants to lower their pricing.

Objectives of the study

To study the approach & thought process behind the development of ONDC.
To comprehend ONDC's opportunities and problems.

Research Methodology

We use a meta-analysis methodology in this paper. It's a way to analyze data from several separate studies that all pertain to the same topic. Gathering relevant studies and extracting relevant data from them is the first step toward building a body of work that addresses the research question at hand.

Problem statement

Retailers and other types of small businesses are facing difficulties as customers increasingly prefer to complete their purchases online rather than in physical stores around the world. By the year 2021, India is projected to have 214 million customers shopping online and 2.14 billion shoppers overall. This suggests that more over one among the worldwide people make utilize the online, has the ability to access one e-commerce webpage, and has successfully completed a minimum one purchase via the internet. This exemplifies the enormous breadth of the e-commerce market as well as its rapid expansion in recent years. If the growth of this market continues at its current rate, then enormous e-commerce firms such as Amazon and Flipkart will have a stranglehold on it.

Websites such as Amazon and Flipkart primarily rely on the marketplace model, also known as the retail third-party seller service. This forces smaller retail firms to collaborate with such platforms in order to survive, which ultimately results in the monopolization of the market by those major players. At the moment, digital marketplaces are closed and platform-centric, which means that buyers and sellers are required to conduct business on the same platform. RAGHURAMAN, A. (2022) The current paradigm of e-commerce stifles innovation, creates a gap between online demand and the environment of local retail stores, and puts high entry barriers for new competitors. As a consequence of this, participation in online commerce is significantly lower than it should be and has the potential to skyrocket.

Solution to the Stated Problem

The Open Network for Digital Commerce makes it possible for any network-enabled application to learn about and take part in all types of local commerce, including but not limited to mobile, commerce, restaurant purchase and deliver, hotel reservations, and travel. This is now practical thanks to ONDEC (Open Network for Digital Commerce). By facilitating the participation of sole proprietorships, small enterprises, and microbusinesses in online marketplaces, this platform hopes to undermine digital oligopolies, open up new markets, and inspire novel business models. The initiative is being spearheaded by the Directorate for the Industry Promotion and Internal Trade within the Minister of Commerce and Industry.

The Indian government's Open Network for Digital Commerce implementation plan is a positive development that will help ensure the success of India's burgeoning SME sector. The commitment of e-revolutionary commerce needs to be met, and this project is a step in the right approach toward doing just that. The leveling of the playing field for owners of small and medium-sized firms as well as operators of microbusinesses will be accomplished via ONDC's democratization of online commerce. By providing support for network systems for all facets of e-commerce, the ONDC proposal, which is operated by the government, empowers both sellers and buyers to break away from the marketplace that really is prevalent at the current time and move away from the system that is pervasive at the present time (LAMA, S. ,2019).

The ONDC fights against the formation of monopolies in the e-commerce business by utilizing open-source protocols. The vast majority of Kirana stores are at a disadvantage in a platform-centric e-commerce strategy since they do not have the necessary level of technological skills. They will have access to business procedures and resources that are frequently utilized by large e-commerce platforms, which will help ONDC foster fair competition. As more of these businesses move their operations online, the e-commerce network will see an increase in the increase in their online visibility and reach (vohra, Rani (2022). The ONDC is able to be of even greater assistance to proprietors of small businesses by standardizing inventory management, order management and fulfillment, as well as other operations, with the goal of lowering the expenses associated with conducting business online. Deep discounts, predatory pricing, collusion, and inventory-owning activities are all things that can be avoided in e-commerce by utilizing open-source protocols for product cataloguing, vendor matching, and price discovery. ONDC is able to do this.

The ONDC can support a diverse e-commerce ecosystem.
Because of ONDC, the e-commerce industry will undergo a paradigm shift, moving from one that is operator-driven and platform-centric to one that is facilitator-driven and interoperable and decentralized. Everyone will have an equal chance at the things they want. The hurdles that prevent merchants from entering digital marketplaces, such as the requirement that they make significant investments, will be removed. It is possible that the proportion of locally based start-ups in the e-commerce industry will grow as a result of the fact that major platforms will no longer be the only ones able to generate value. The ONDC will allow customers the freedom of choice when it comes to making purchases by providing a lot of different options to choose from at a variety of price points as additional suppliers become available online.

Because ONDC will match customer demand with the nearest available supply, consumers will have the freedom to choose the locally owned companies that best suit their preferences. By digitizing the whole value chain, the ONDC would both standardize operations and encourage the employment of local suppliers. This would be accomplished through standardization. This would also prevent the formation of digital monopolies, increase the efficiency of logistical processes, and increase the value to consumers. Businesses will be able to get analytically important insights on the marketing of their products across digital channels as ONDC expands access to customer data. These insights will be available to businesses as ONDC expands access to customer data (Wadhawan, Seth (2016). The ONDC may one day operate on a worldwide scale. ONDC is able to maintain uniformity throughout an online store, despite the existence of a large number of merchants, because it provides a cutting-edge standards framework that can be adopted by the worldwide e-commerce ecosystem (domestic or cross-border).

ONDC is working on unifying the ecosystem of online commerce very soon. Because of this, a significant number of people are beginning to become members of the ONDC network. In order to improve conversion rates in ONDC, there needs to be a greater acceptance of digital payment methods that provide users with an experience that is streamlined, quick, and easy.Shillong, Bengaluru, Coimbatore, Delhi, and Bhopal are the locations where test runs of new initiatives are now being conducted. It is anticipated that between 75 and 100 Indian municipalities will install ONDC this year. The present focus of the activities is on providing assistance to retail and restaurant enterprises in the process of enabling real-time transactions. In the not too distant future, the open network will expand to incorporate more functions, such as communication and transportation. Depending on the findings of the pilot program and once the network has reached a stable state, the ONDC will be implemented in one hundred cities and towns across India by the end of the year 2022. The goal is to provide assistance to 10 million brick-and-mortar stores and 30 million online businesses. It has goals of attracting 900 million customers, 1.2 million merchants, and $48 billion in gross product value during the next five years (GMV). In the year 2020, the gross merchandise value (GMV) of the e-commerce industry in India was 38 billion dollars. It is expected that by 2025 it would reach 140 billion dollars, and by 2030 it will reach 350 billion dollars.

Relevance of ONDC
Increase the Scope and Economic Impact of Electronic Commerce. The government predicts that by the end of this decade, the gross merchandise volume of India's e-commerce industry will have increased from much more than US$ 55 billion in 2022 to US$ 355 billion. This objective appears to be considerably more feasible with the help of ONDC.

Encourages Competition: According to the government, many smaller businesses are shut out since the current platforms are tightly regulated and run like monopolies. Over 60% of internet retail is already under the control of Amazon and Flipkart. Showcasing products and offerings from all ONDC's affiliated e-commerce websites is a way that the company plans to reduce the amount of competition in the market and encourage the development of innovative new businesses. Additionally, it will restrict the chances that select retailers will get special treatment (Lakshmi, Shayena, 2018).

Large online retailers sometimes face criticism for supposedly treating customers unfairly. Additionally, it will help put an end to predatory pricing, particularly for commodities with high margins and high value.
Varieties: It is expected to raise consumer consciousness about and participation in e-commerce. They have more alternatives since they can use any application or platform that is compatible with the one they want to use to locate a merchant, product, or service.

Cost savings for Merchants - With the ONDC, SMBs would be free to use any app that is ONDC-ready, regardless of the requirements of any one platform. It's no longer necessary for small businesses to pay exorbitant fees to aggregating platforms to gain access to the resources they need to launch their operations and establish their identities in the digital sphere.

Simpler investments, more transparent regulations, and lower startup costs should all help businesses attract investors. As an added bonus, it is expected that both production time and time to scale would be drastically cut. All of these things will help the e-commerce sector attract more capital.
Diplomatic aid: a new way of thinking about international relations is taking shape in online communities. India's identification and financial system has attracted attention from throughout the world. India has just opened up the Co-Win platform to any countries that want to use it.

Future Prospects of ONDC
The Open Network for Digital Commerce (ONDC) is an ambitious and forward-thinking endeavor, but it still has many open questions that need answers. These include concerns about the project's operational strategy, the availability of competition, the proficiency of MSMEs in using the system, and the clarity of responsibility allocation. A tectonic change may have occurred in India's e-commerce sector if ONDC is effective in shifting the industry's focus from a platform-centric to a platform-agnostic paradigm. In the future, anyone with a product catalogue to share can do so through the ONDC, either independently or by employing the services of a platform or technical service provider.

Data analysis results and Discussions
At the moment, 80 businesses are utilizing the platform and integrating at various levels. Throughout the pilot, the platform plans to add 150 merchants in 5 sites, the authorities added. "Going ahead, the ONDC's ambition is to enroll 3 crore sellers & 1 crore retail merchants online," Agrawal said while describing the organization's future objectives. We want to travel to 100 cities in the next phase, which will take six months.

He mentioned that the app will soon have more local language support, which would help to boost the number of buyers and dealers. ONDC will include payment processors and logistical firms in addition to suppliers and buyers. Its principal advisors include CEO of the National Health Authority Rs Sharma, former Mc Kinsey India head Adil Zainulbhai, and Infosys co-founder Nandan Nilekani.

In India, there are currently more than 4,000 small and major e-commerce companies, 500 logistics service providers, and more than 20,000 enterprises that supply services through the emarket, including travel agencies and hotels. The Indian e-market is predicted to reach USD 200 billion by 2026.

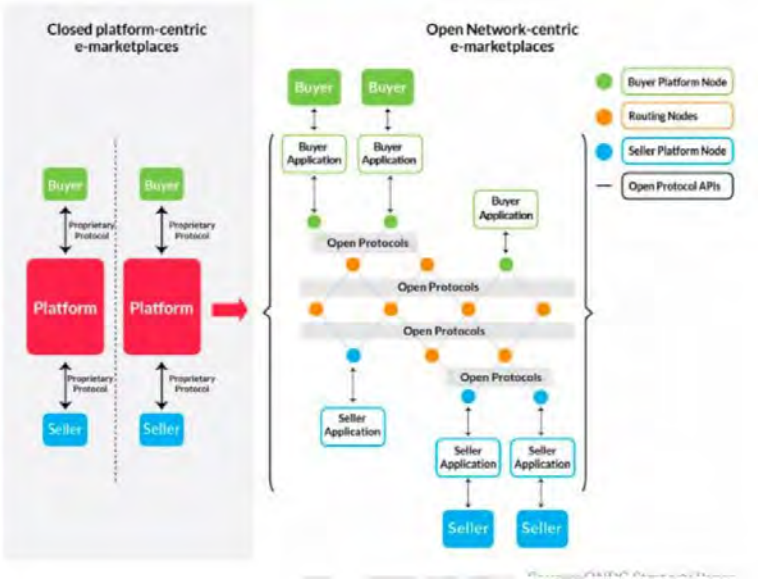

Figure 1. Types of E-market places

Through open-source standards and protocols, this open network connects buyers, sellers, payment services, and logistical companies. It won't be controlled or owned by a single platform or app. To create the ONDC, the present system will be unbundled (split into more manageable, smaller operations).

The ONDC, on the other hand, does not mandate that a buyer and a seller conduct business transactions through the utilization of the identical platform or application. Independent of the websites or applications that they use, buyers and sellers are able to conduct business with one another so long as they remain connected to this open network. It is akin to the "UPI of e-commerce," in that sense.

Existing Platform-Centric Model

The ONDC will play an essential role in the dismantling of monopolies held by large corporations and the expansion of market opportunities for proprietors of small firms. It will also assist in increasing the number of customers that have access to all of the network's suppliers, which is a significant benefit. Both new and returning customers will enjoy the benefits of this program. Its goal was to promote open networks for all aspects of conducting business online or digitally, including the buying and selling of goods and services. ONDC will use open standards and open network protocols, and it will operate independently of any particular platform (Peicheng et. al, 2021).

The mission of the Open Network for Digital Commerce (ONDC) initiative is to provide open networks for all elements of conducting business over digital or electronic networks, including the buying and selling of goods and services. The government is under the impression that ONDC will assist in breaking up monopolies held by large enterprises and expanding the market for proprietors of smaller businesses. In April, the Ministry of Commerce and Industry inaugurated the testing phase of the open network for digital commerce in five cities: Delhi NCR, Bengaluru, Bhopal, and Shillong, and Coimbatore. These cities were selected for the pilot program. The ONDC is presently in the very beginning stages of its development. The Quality Council of India and Protean eGov Technologies Limited were the original promoters of the organization back in December 2021, when it was initially established as a Section 8 corporation. The Network-Centric Model of ONDC: Customers will be able to use a single network to access all of the services that are currently provided by a wide variety of retailers on a wide variety of different platforms.

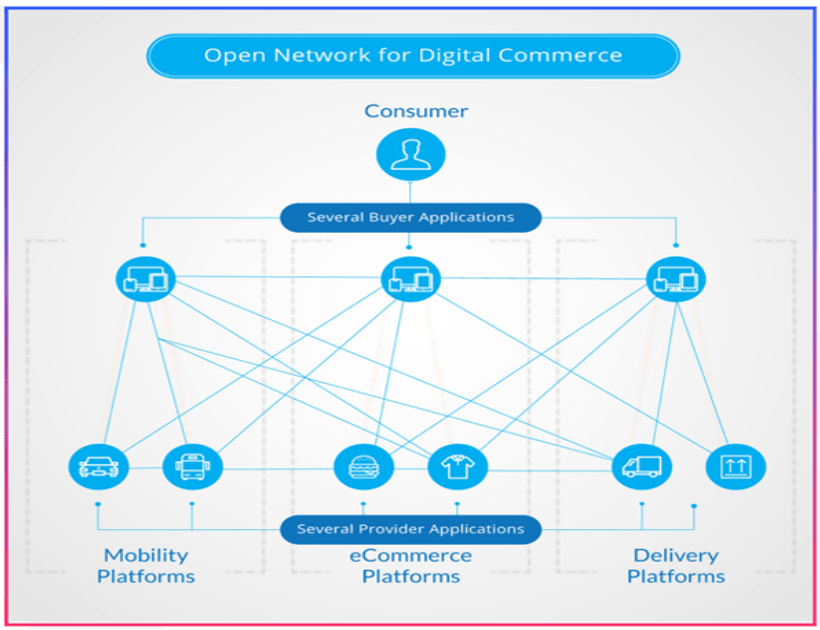

Figure 5. Network- centric model

The government's Open Network for Digital Commerce (ONDC) project will enable both commodities and services, democratizing digital commerce by shifting it from a platform-centric paradigm to an open-network one. Furthermore, platform users' security, data privacy, and confidentiality must be ensured.

Researchers propose a conceptual framework for the success of ONDC.
The study claims that Open Network for Digital Commerce is an initiative supported by the government that encourages the use of internet open networks for the sale of all digital goods and services. Customers do not need to visit any other e-commerce websites to purchase products and services from any company using its network-centric methods. All internet businesses would have the same visibility, accessibility, and development opportunities in an ideal world. Additionally, the platform ought to provide reputation management, transparent feedback, and fair distribution of search queries. The ONDC has the potential to establish a market that, like UPI did for digital payments, will have a huge impact on e-commerce. The upholding of laws and regulations is the main goal of this platform. There will be some growing pains while the network is being established, which should be anticipated and prepared for.

Despite the fact that ONDC is still in its early stages, the researcher is of the opinion that precise model implementation is essential to achieving the expected results and fulfilling the model's objectives. Additionally, the platform's technological capabilities and data security need to be enhanced. The software has to be easier to use in order for small and medium-sized businesses, kirana owners, and shop owners to easily switch from the brick and mortar model to the digital platform and offer their services there. Users must comprehend how this application functions properly, whether they are on the seller's or buyer's side. Similar to how increased choice availability benefits customers, it also accelerates the transition from offline to online and enhances the customer experience. Adoption of the platform is made easier by this. Another area where government oversight is necessary to prevent malpractice and unethical benefits is the enforcement of laws and regulations. To reduce the likelihood of user misunderstanding, the government must be clear about how the program will be funded.

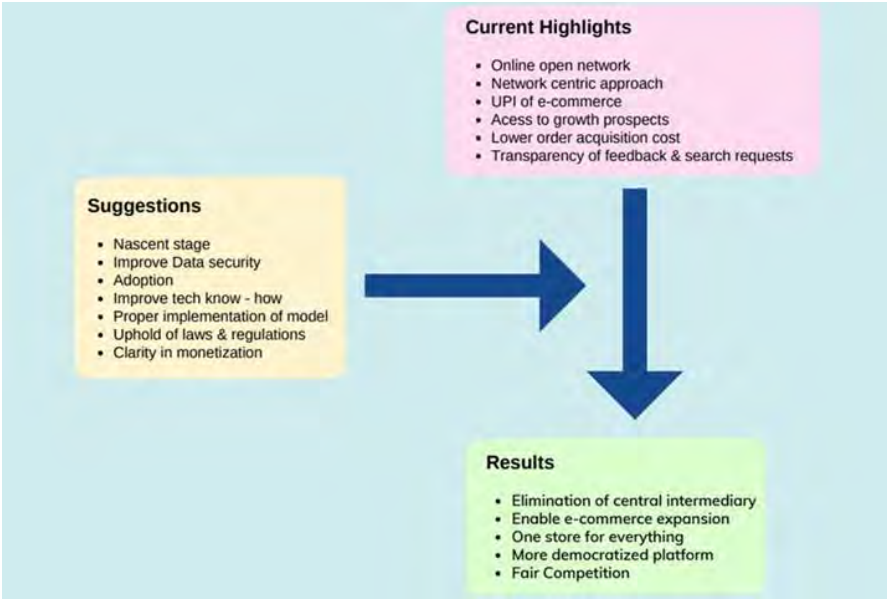

Figure 3 Suggestive model of ONDC

Opportunities

- Reduce entry barriers to encourage competition and, eventually, market growth.
- The democratization of the digital commerce industry will lead to lower channel costs for all businesses, including incumbents.
- Using a single seller registration will greatly expand all players' seller bases.
- If vendors can transfer their reputation, they would be encouraged to provide superior customer service across all channels.
- Networking effects, like UPI, have a tendency to create positive development cycles over time.
- A significant amount of adoption will be fueled by current users joining the network.

Challenges

- Unlike UPI, ONDC calls for the creation of a sophisticated ecosystem.
- It will be difficult to persuade customers to stop using the incumbents, who are providing a good service.
- Network players may not have to make significant first market development investments.
- The consumer experience on the network won't necessarily get better just because there are more sellers.
- It's unclear how the network will generate revenue.
- In the past, such strategies didn't scale up successfully.
- The imbalance between the buyer and seller sides will make it challenging to reach critical mass.

Conclusion

By 2020, it is anticipated that the Indian e-commerce market would increase to $200 billion. However, the government must address several problems and come up with solutions. The future is promising for small and medium-sized enterprises. As people continue to spend more money on items that represent their culture and identities, their daily routines and way of life will alter even more. These must be employed increasingly as the Indian economy expands. As a result, the retail e-commerce market will expand. These characteristics will dismantle virtual monopolies in the e-commerce industry when used in tandem.

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A Systematic Review on Effect of Artificial Intelligence and Augmented Reality on Students' Academic Performance and Motivation

Pradhan Rajeswari[1] and J.V. Madhusudan[2]

Abstract: Artificial intelligence and Augmented reality provide a real-world learning environment to the learners as the only medium of giving them a real stimulus of learning which optimize academic performance and motivation. A prospective technology that could assist learners in connecting what they are seeing and experiencing in the real world to their prior knowledge is augmented reality and artificial intelligence. The study aims to find out the effect of Artificial intelligence and Augmented reality on students' academic performance and motivation. The systematic literature review method has been followed with twenty-five studies of experimental, meta-analysis, exploratory survey, data mining, and mixed method published between 2016-2022. The study shows that Artificial intelligence and Augmented reality both positively affect student academic performance and motivation. At the same time, the study also revealed that Artificial intelligence and Augmented reality develop learning performance on a field trip, develop higher-order thinking skills, helpful in an inclusive classroom and develop student self-efficacy. This review helps to offer new insight and ideas to investigator and provide educators with effective suggestions on how to improve the quality of learning outcomes as well as increase students' motivation.

Keywords: Artificial Intelligence, Augmented Reality, Academic Performance, and Motivation.

Introduction

The future generation of tools, applications, services, experiences, and so forth will be powered by the union of Artificial Intelligence and Augmented Reality. With this convergence, immersive computing will transform how we work, live, entertain, educate, communicate, learn, and share. The education sector can employ this combination, where Artificial Intelligence is used to deliver educational information, programs, and tools through learning assistants, and Augmented Reality is used to provide an immersive and interactive environment to support learners' and students' learning processes (Lele. C, 2019).

The use of Artificial intelligence is becoming more popular (AI) in educational settings to improve learners' academic performance (Ali and Mustafa, 2019). AI also significantly alters the educational system by enhancing and supporting students' educational experiences. According to Ouyang, F., and Jiao, P the application of AI in education will result in a paradigm shift in the educational environment, with (1) AI-directed learners acting as recipients, (2) AI-supported learners acting as collaborators, and (3) AI-empowered learners acting as leaders (Ouyang, F., and Jiao, P. 2021). The assessment of student academic achievement in educational institutions showed that with the help of artificial intelligence, one could improve the learner's academic performance (Harikumar, Bankuru, T. Sanchez, and John V. de ,2021). Interactions with the help of artificial intelligence and engagement in learning have a favourable and significant effect on learners' academic achievement (Ramadan, Ali, and Nima, 2022).

Researchers have hypothesised that learning environments based on augmented reality have performed better than those utilising web-based applications, and students at private schools reported being more motivated to utilise the augmented reality programme than students in public schools (Ibanez, Portillo, Cabada, and Barron, 2020). Technology such as Augmented Reality used within mathematical content improves students' achievement and increases their motivation to learn mathematics (Estapa, Nadolny, 2015). Moreover, the use of Augmented Reality technology in education field is more specific. For example, AR technology is frequently used in a few subjects like natural sciences, mathematics, and statistics but rarely used in the arts and humanities (Garzón, J., Pavón, J., & Baldiris, S., 2019). Garzón, J., Pavón, J., & Baldiris, S. (2019), were doing a meta-analysis and found both advantages and disadvantages in educational environments that directly or indirectly influence student academic performance.

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Both AI and AR have an association with the academic performance and motivation of the student. However, no comprehensive study of AI, or AR, on academic performance and motivation has been conducted. Most of the research work has been done separately, making an interdisciplinary collaboration necessary to understand and apply the principles of both technologies in an educational setting. As a result, the current review will provide a broad framework about the areas primarily considered important by previous studies as well as areas that previous researchers have not yet considered, on AI, AR, academic performance, and motivation. It will be helpful for researchers or future researchers and also policymakers. The following research questions are attempted to be answered by this study, which focuses on the effects of AI and AR on students' academic performance & motivation:

1. what are the effects of Artificial Intelligence on students, academic performance, and motivation?
2. what are the effects of Augmented Reality on students' academic performance and motivation?

Methodology

The method and guidelines proposed by Barbara & kitchenham (2007) were adopted as method of systematic review using the different stages. The systematic review method used the following procedures: The search began with selected articles that were published between 2016-2022. The period was selected to incorporate effect of Artificial Intelligence on academic achievement and motivation and the effect of AR on academic achievement and motivation. The title, abstract, and keyword search of the term included effect of AI on achievement, effect of AI on motivation, effect of Augmented Reality on achievement, effect of AR on motivation, effect of AI and AR on education, the impact of AI and AR on students' academic performance, and the trend of AI and AR on education in English-language articles and databases including Google Scholar, ERIC, Research Gate, ProQuest, and Web of Science. The search resulted in 85 articles related to the topic. The list was then refined to remove the articles addressing the main theme. The finding resulted in 25 articles meeting the criteria. The results of these 25 articles must be properly organized and analysed to find and discuss the result properly.

Results

Table 1 explains the review report on the Effect of Artificial Intelligence on student academic performance and motivation. It's shown that Artificial Intelligence helps to develop the academic performance and motivation of students. Artificial Intelligence creates an effective learning environment for the students to develop knowledge, ideas, critical thinking, creativity, and so on. Artificial Intelligence is a satisfactory predictor to develop the student's academic success.

Table 2 explains the review report on the Effect of AR on student academic performance and motivation. The table-2 showed that the Augmented Reality based gaming approach improves the student's academic performance as well as motivation level of the student. The table report showed that most of the experimental results revealed that the Augmented Reality-based approach improves the student's academic success. Augmented Reality provides an interesting learning environment for the student for a better learning experience. The table result showed that Augmented Reality increased student achievement levels and motivation compared to traditional educational teaching.

Discussion

The findings of the study showed that Artificial Intelligence has a positive impact on academic performance. This result aligned with (N. M. Saravana Kumar, 2019) who found with artificial intelligence, AI delivers a complete smart learning environment that helps students with everything from course selection to evaluation and even certification. As all the data is created and updated online, it might assist the instructors with lecture preparation, maintaining course content in the cloud database, and monitoring student progress. Chatbots & artificial intelligence can also assist students in becoming more engaged learners (YenFen Lee, GwoJen, and Ying Chen, 2022). Most of the studies revealed that artificial intelligence has a positive impact on student achievement as well as motivation. Students always want to study through different educational techniques, and AI may help develop student enthusiasm. Most of the studies also revealed that teaching through artificial intelligence produces better academic results as compared to the traditional method of teaching.

Table 1. Review report on the Effect of Artificial Intelligence on student academic performance and motivation

Authors and year	Title	Method	Result
(Saravana Kumar, 2019)	"IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE IN IMPARTING EDUCATION AND EVALUATING STUDENT PERFORMANCE"		AI guiding the students from course selection through evaluation and even certification, the artificial intelligence provides a fully intelligent teaching-learning environment.
(Hamadneh et al., 2022)	"Using Artificial Intelligence to Predict Students' Academic Performance in Blended Learning"		The study's findings showed that the four variables are in charge of how well pupils succeed academically.
(Lee et al., 2022)	"Impacts of an AI-based chabot on college students' after-class review, academic performance, self-efficacy, learning attitude, and motivation"	Quasi-experimental method	The study's findings suggested that using chatbots powered by artificial intelligence to assess public health courses could enhance students' academic performance and motivation.
(Ebadi & Amini, 2022)	"Examining the roles of social presence and human likeness on Iranian EFL learners' motivation using artificial intelligence technology: a case of CSIEC chatbot"	Mixed method	The results showed that human similarity and social presence were important determinants of learner motivation. Thematic analysis of the qualitative data demonstrated that the teacher's CSIEC-attributed descriptions increased the learners' motivation to study English.
(Alomari & Jabr, 2020)	"The effect of the use of an educational software based on the strategy of artificial intelligence on students' achievement and their attitudes towards it"	Quasi-experimental method	The results of the study revealed that there were statistically significant differences in the learners' accomplishment scores between the experimental group and the control group that was in their favor.
(S. Hwang, 2022)	"Examining the Effects of Artificial Intelligence on Elementary Students' Mathematics Achievement: A Meta-Analysis"	Meta-analysis	The study's findings demonstrated that grade level and the topic of mathematics learning had a substantial moderating effect on the impact of artificial intelligence on arithmetic achievement scores.
(Bucea-Manea-ţoniş et al., 2022)	"Artificial Intelligence Potential in Higher Education Institutions Enhanced Learning Environment in Romania and Serbia"	exploratory survey	The study's findings indicated that the opportunities and challenges given by artificial intelligence affect teachers' motivation to apply it at HEIs.
(S. Hwang, 2022)	"The effectiveness of artificial intelligence on learning achievement and learning perception: A meta-analysis"	Meta-analysis	The results show that AI had a significant impact on pupils' ability to learn.
(S. Hwang, 2022)	"Examining the Effects of Artificial Intelligence on Elementary Students' Mathematics Achievement: A Meta-Analysis"	Meta-analysis	The study's conclusions showed that grade level factors and themes for math instruction considerably reduced the impact of AI on math achievement.
(Alzahrani, 2022)	"A systematic review of artificial intelligence in education in the Arab world"	Systematic review	The study's results demonstrated that students who learned in an AI-based environment experienced a significant difference in their mean achievement scores as well as a

Authors and year	Title	Method	Result
			significant improvement in their decision-making abilities compared to those who learned in a traditional setting.
(Bailon et al., 2021)	"Machine Learning as A Key Element in The Prospective of Academic Performance in Peruvian Universities"	Data mining	The study found that it is possible to predict university students' academic success with reasonable accuracy.

Table 2. Review report on the Effect of AR on students' academic performance and Motivation.

Authors &Year	Title	Method	Findings
(G. J. Hwang et al., 2016)	"Effects of an augmented reality-based educational game on students' learning achievements and attitudes in real-world observations"	Experimental	The study's results demonstrate that the AR-based gaming technique can enhance students' learning performance on the field trip as well as their attitudes toward learning.
(Azi & Gündüz, 2020)	"Effects of Augmented Reality Applications on Academic Success and Course Attitudes in Social Studies"	semi-experimental method, semi-structured interview	The study's experimental findings revealed a substantial difference between the experimental and control groups in terms of the student test results.
(Sirakaya & Cakmak, 2018)	"Effects of Augmented Reality on Student Achievement and Self-Efficacy in Vocational Education and Training"	Quasi-Experimental	According to the study's findings, the usage of augmented reality improved student performance in motherboard assembly but had no effect on students' self-efficacy in terms of theoretical understanding and assembly abilities. This experiment's outcome demonstrates how AR applications can raise pupils' academic achievement levels.
(Chin et al., 2019)	"Effects of an augmented reality-based mobile system on students' learning achievements and motivation for a liberal arts course"	Experimental	The findings showed that students who had access to the AR system for learning were more motivated to learn and had superior learning performance and comprehension skills than students who studied using the conventional outdoor instruction method.
(Badilla-Quintana et al., 2020)	"Augmented Reality as a Sustainable Technology to Improve Academic Achievement in Students with and without Special Educational Needs"	quantitative approach and a pre-experimental design	The study's findings revealed that the learners' made immediate strides in their academic performance.
Omurtak, E. Zeybek, G. (2022)	"The Effect of Augmented Reality Applications in Biology Lesson on Academic Achievement and Motivation"	mixed method	It was discovered that students in the experimental group had significantly greater academic success scores than students in the control group. Another finding of the study showed that there was no statistically significant difference between the experimental group and the control group of students'

Authors &Year	Title	Method	Findings
			motivation scores for a biology lesson.
Turkan (2021)	"The Efect of Augmented Reality based applications on achievement and attitude towards science course in distance education process"	Experimental	The results of this study's investigation revealed that applications based on augmented reality (AR) considerably improved students' academic performance.
Kul1 & Asiye (2022)	"The Effects of Augmented Reality in a 7th -Grade Science Lesson on Students' Academic Achievement and Motivation"	quasi-experimental design,	The study's findings demonstrated that using AR strategies improves students' academic performance and motivation for learning science. The study also demonstrated that there was a significant level of student motivation for AR materials.
(Yildirim & Seckin Kapucu, 2021)	"The Effect of Augmented Reality Applications in Science Education on Academic Achievement and Retention of 6th Grade Students"	quasi-experimental design	In comparison to students in the CG who just utilised the textbook in their learning process, the employment of augmented reality techniques in the processing of the course was effective in boosting the academic performance of the EG students and in the permanence of the knowledge they learned.
(et al., 2022)	"The Impact of Augmented Reality-Activities on Middle School Students' Academic Achievement and Motivation in Science Classes Based Argumentation"	Quasi experimental design	The findings indicated that augmented reality-based argumentation activities were superior to argumentation and conventional astronomy training in terms of raising students' achievement and motivation.
(Cevahir et al., 2022)	"The Effect of Animation-Based Worked Examples Supported with Augmented Reality on the Academic Achievement, Attitude and Motivation of Students towards Learning Programming"	Quasi-experimental (Non-equivalent Control Group Model")	The findings showed that when compared to students who studied on TWEs, those studying on ARAWEs had significantly higher achievement and motivation levels. Students' interest and enthusiasm in the subject are increased by instructional materials that include animation-based work examples created utilising augmented reality techniques.
(Ziden et al., 2022)	"Effectiveness of Augmented Reality (AR) on Students' Achievement and Motivation in Learning Science"	mixed-methods	The study found a significant achievement difference between the experimental and control groups. The results of the paired t-test revealed that the pupils' motivation varied significantly as well.

Authors &Year	Title	Method	Findings
Yuliana et al. (2020)	"The Effectiveness of Mobile Augmented Reality Assisted STEM-Based Learning on Scientific Literacy and Students' Achievement"	Quasi-Experimental	The use of mobile AR in STEM-based education helps students become more scientifically literate. Mobile AR-assisted STEM-based learning strategies are more successful at raising students' accomplishment levels. Students who are taught using mobile AR-assisted STEM-based learning demonstrate higher levels of scientific literacy and accomplishment than students who are taught using more conventional educational methods.
(Ateş & Özdemir, 2021)	"The Effects of Argumentation-Based Teaching on Primary School Students' Academic Achievement, Science Attitudes and Argumentative Tendencies"	semi-experimental design techniques	The results showed that the activities associated to ABT had a big impact on the pupils' academic success.

Further study showed that researchers have discovered Augmented learning has a favourable impact on academic performance and motivation. These findings associated with (Chiang et al., 2014; Radu, 2014) who found that greater learning outcomes and increased motivation are the two most important benefits of AR applications in education. Further, (Wahyu, Y; Suastra,W; Sadia,W & Suarn,K. 2020) found that the use of mobile augmented reality in conjunction with STEM-based schooling is very effective at raising students' scientific literacy, the usage of mobile AR in conjunction with STEM-based learning is successful in raising student achievement, and students who receive instruction utilizing STEM-based learning supported by mobile AR perform better academically than those who receive instruction using traditional methods. However, (Cagdas Erbas and Veysel Demirer, 2019) reported that AR activities do not significantly affect students' academic achievement but positively affect their motivation for the course.

Conclusion

This systematic review's objective is to give a review of the literature on the idea of how artificial intelligence and augmented reality affect students' academic performance and motivation. The following conclusion can be drawn from the study, 1)- Most of the experimental studies revealed that Artificial Intelligence and Augmented Reality have better academic achievement as compared to the conventional learning system. 2)- Artificial Intelligence and Augmented Reality have been used as aids to assist the teaching-learning process. 3)- This study also showed that Artificial intelligence and augmented reality help to develop the academic performance of the student as well as increase their motivation level. So, the teacher should use AI and AR tools in the classroom setting to increase the student's achievement levels and motivation. This work and the systematic review suggest applying Artificial Intelligence and Augmented Reality applications in the educational field to improve student academic performance and motivation. These systematic review works help to give new ideas and knowledge to policymakers and teachers with suggestions on how to improve students' academic performance and motivation.

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Mixed Reality in Education: A Bibliometric Analysis of Ten Years of Research

Das Runi Mani[1] and J. V Madhusudan.[2]

Abstract: Mixed reality is the overlay of the real world with a digital, computer-generated object. It is an emerging field with limited studies in educational settings. This study aims to analyse the research trends of mixed reality in an academic environment using a bibliometric analysis method. Eighty-one studies were extracted from the Web of Science Core Collection between 2013 to 2022. The result indicates the growth of publications concerned with mixed reality in education. The analysis finds that Research in Learning Technology was the most productive journal in terms of publishing documents related to mixed reality and the USA with 23 documents was the top country in terms of using mixed reality in documents. The study may provide knowledge to researchers, educators, and teachers to understand the trends and issues that may help the stakeholders to know the future work in mixed reality.

Keywords: Mixed Reality, Education, Bibliometric Analysis

Introduction

Mixed reality is the fusion of factual and digital environments, which provides a flexible canvas for users' mental and conceptual representations, consisting of physical and digital objects and responding to users' actions in real time (Milgram et al., 1995). Mixed reality is directed with the hybrid form of learning environment where interaction is possible with the virtual object in a physical setting. Over the last few years mixed reality (MR) has gained great significance in teaching-learning experience. Mixed reality has the potential to deliver highly interactive experiences with the use of numerous applications that change the way people work and train (Du et al., 2019; Pellas et al., 2020).

In education, studies found that MR is supportive for science and social science subjects. Mixed reality is helpful for learners to build conceptual knowledge through augmentation. The use of MR prominently benefiting students' ability to solve problems and motivation (Chang et al., 2010; Mateu & Alaman, 2013), participation and learning satisfaction and improve learning performance through embodied interaction (Kalpakis et al., 2018; Palaigeorgiou et al., 2018; Sugimoto, 2011). Moreover, mixed reality provides fun and engaging activities compare to traditional teaching-learning approaches (Bayon et al., 2003; Rowe, 2014; Tolentino et al., 2009). Most of the past studies have focused on learning design, importance of MR in science education, mobile mixed reality, MR in healthcare education (Barmaki & Hughes, 2015; Donthu et al., 2021; Gerup et al., 2020; Stretton et al., 2018; Tang et al., 2020; Weng et al., 2019). No detailed studies have been found on quantitative analysis of mixed reality in education in terms of publication outputs according to the countries, citation, keywords that used mostly by the author, productive authors, productive journals in relation to mixed reality in education. The study may help stakeholders to understand the trends and issues that may help to know the future work in mixed reality. Similarly, it may be helpful for readers to understand the development of a research field in mixed reality and may provide knowledge to understand the application of mixed reality in all the learning domain.

Therefore, the present study seeks to explore quantitative analysis of existing studies of mixed reality in educational setting. The researcher has applied bibliometric analysis to understand the current trends of MR in education. The objective of the study seeks to understand knowledge based on current trends, key terms of the studies, topics, sources, authors, most cited articles and country of mixed reality in education which will be helpful for the authors, educational stakeholder and knowledge seekers to understand the usability and future direction of mixed reality in education.

Methodology

A bibliometric analysis, adding to analyse the publication outputs, countries cooperation, citation and authors contribution was conducted. This approach uses a quantitative technique to measure, track and analyse scholarly literature (Gonzalez, 2019). Bibliometric analysis can be used to uncover current trends in article and journal performance, collaboration patterns, research components (Donthu et al., 2021; Verma & Gustafsson, 2020) and its software programs such as VOS viewer, CiteSpace make it easier for readers to understand the development of a research field. For the present analysis, VOS viewer software was used specifically.

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Data Collection, Cleaning And Retrieval

VOS viewer software was used for collecting data from Web of Science database from 2013 to 2022. The studies are compiled of the keywords: "mixed reality", mixed reality in education" to find out all the publications related to the present area. Records from Web of Science were exported and generated in a standardized format, in which plain text format containing the title, author, year, keywords, cited reference, abstracts were acquired. Out of 638 documents, 81 chosen articles were examined to remove noise from the database. On the other hand, documents that have no connection with mixed reality are eliminated from the present study.

Results and Discussion

Most trending topics and keywords

Most trending keywords can be seen in Figure 1. Among the keywords, augmented reality, mixed reality, virtual reality and education found to be the most trending keywords. Mixed reality has the 64-link strength, whereas; augmented reality has 66 total link strength. The data might be suggesting that mixed reality has the strong connection with augmented reality and virtual reality. It can be said that authors may not only focusing on mixed reality, but discuss the correlation between augmented reality and virtual reality.

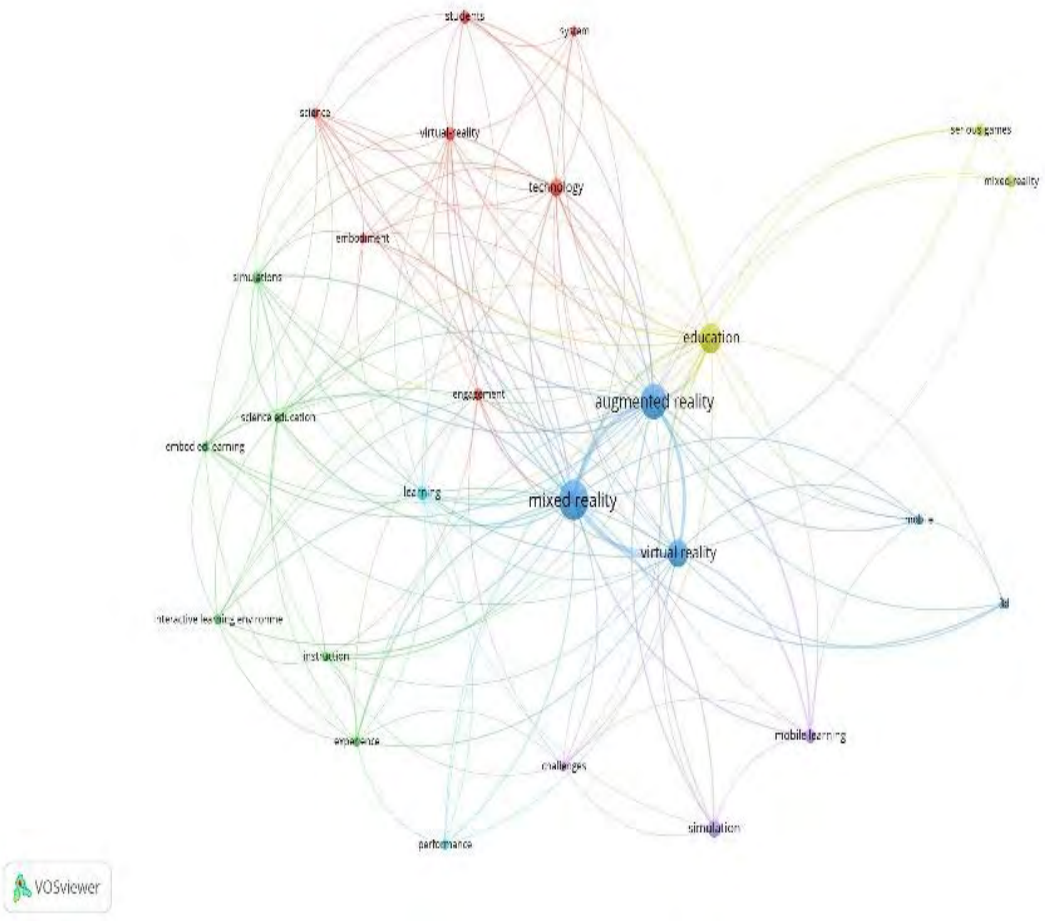

Figure 1. The most trending keywords and topics

Most frequently author keywords used

It can be seen from the Figure 2 that the keyword of mixed reality with 41 occurrences can be seen as the most frequent keyword author has used. Similarly, virtual reality, mobile learning, science education, embodied learning, interactive learning environment might be among the all keywords that author used the most. All these author keywords may help to understand the application of mixed reality in all of these fields.

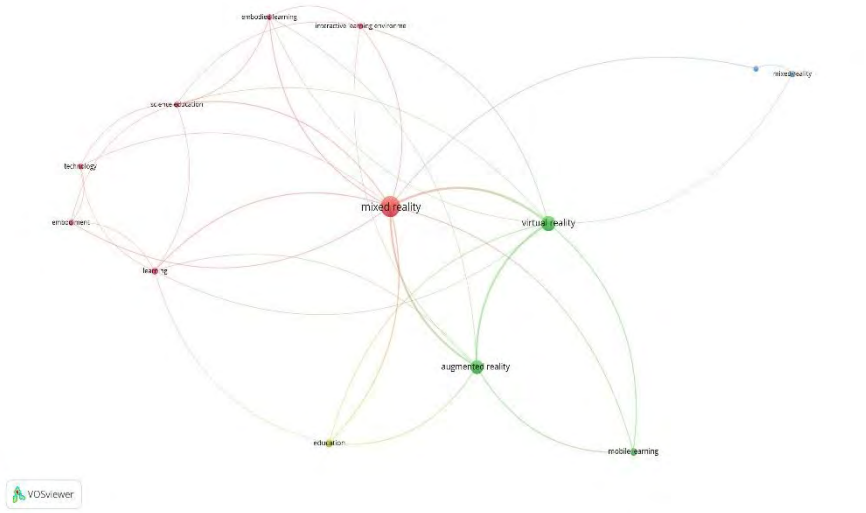

Figure 2. Most frequently author keywords used

Major journals and their publications

Research in Learning Technology found to be the top most journal with 10 publications (see Table 1.). Similarly, Education and Information Technologies found to be the second top most journal with 5 articles in the present field. It can be said that all the top 5 journals may relate to educational technology field specifically focuses on online learning experiences. Hence, the importance, application, useability of augmented reality, virtual reality and mixed reality in education have discussed in these journals.

Table 1. The major journals and their publications

Journal	Number of articles
Research in learning technology	10
Education and information technologies	5
Computer & education	3
Virtual, augmented and mixed realities in education	5
12th international technology, education and development conference	3

Most prolific authors

Cochrane Thomas with 5 published articles found to be the most productive author. His published articles were based on mobile mixed reality, mixed reality in healthcare education, paramedicine mixed reality learning etc. Birt James found to be the 2nd most productive author in relation to mixed reality. He focuses on mobile mixed reality simulation, mixed reality for comparative visualisation pedagogy, improvement of distance education through mobile mixed reality.

Table 2: Most prolific authors with number of articles

Author	Number of articles
Cochrane, Thomas	5
Birt, James	4
Narayan, Vickel	3
Aguayo, Claudio	2
Cowling, Michael	2
Lindgren, Robb	3
Moldoveanu, Florica	2

Geographic distribution and international collaborations

Based on the geographic distribution and international collaborations, 28 countries can be seen involved in mixed reality research in education. USA can be seen as the most productive country with 23 articles and 557 citations (see Table 3.). Figure 3 displays the network visualization between countries mixed research in education.

Table 3. presents the top 7 most productive countries based on total number of articles published and citations

Country	Documents	Citations
USA	23	557
Australia	8	77
New Zealand	6	25
England	7	61
Taiwan	4	17
Italy	4	4
Germany	6	15

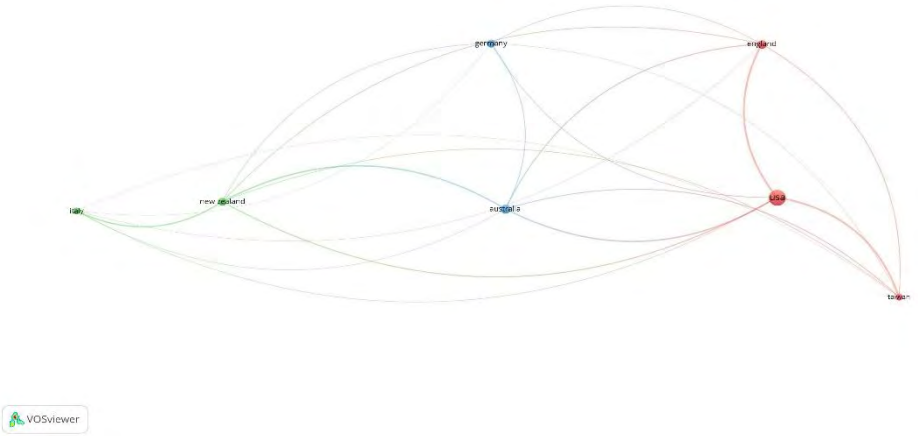

Figure 3. Network visualization showing collaboration between countries with minimum number of four articles

Conclusion and Future Direction

Major findings of the present analysis can be listed as:

1) The mainstream studies on mixed reality in education found to be in simulation, embodied learning, interactive learning environment. Similarly, the most keywords authors used can be said as virtual learning, mobile learning etc.
2) It is found that United States has the highest production in relation to mixed reality in education. Collectively, it is found that mixed reality has been used mostly to enhance learners' performance.
3) The study shows that mixed reality is a useful technology in an educational setting. It is applied for embodied learning, science education, interactive learning environment, serious games in an educational setting.
4)

This study provides glimpse of current trends of mixed reality. The study concerns to analysis from 2013 to 2022. It focuses to understand the trends and issue, application of mixed reality with the bibliometric analysis. The study revealed that mixed reality can be embodied in science education, interactive learning environment, game-based learning to enhance learner performance. Overall, this study may help to provide new insight of the current trends of mixed reality in education. The researcher and educator may understand the use of bibliometric analysis in the research field. It may help educational stakeholders to understand the advance usage of mixed reality in education which may be helpful learners to achieve their learning goals. Further research should address the application of mixed reality from primary to higher education to enhance creative thinking, motivation, conceptual clarity of learners. Development of mobile application, pedagogy for mixed reality, designing and developing curriculum for MR should be considered as the future concern.

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Uses and Impact of Virtual Reality in Open and Distance Higher Education: A Systematic Review

Das Ranjan Soumya[1] and J.V. Madhusudan[2]

Abstract: Virtual reality (VR) provides a real-world learning environment to the learners by giving them a natural classroom stimulus of learning. When it comes to distance higher education, VR becomes more significant. The study attempts to find out the uses and impact of VR in open and distance higher education. A systematic literature review strategy has been followed. Sixteen studies related to the theme of VR and distance higher education in terms of VR uses and effect have been selected and analyzed. The study finds that VR has a positive impact on improvement of students' achievement, student participation, imagination and the interactive experience etc. in distance higher education. Students found to be using both the high-end and mass distributed VR technologies. The study also revealed few challenges in using VR like access, high cost, lack of educational resources, lack of collaboration and technical requirements.

Keywords: Virtual reality, Open and Distance Education, Higher Education

Introduction

Virtual reality (VR) provides a real-world learning environment to the learners by giving them a natural classroom stimulus of learning. Virtual reality is a medium to envision, deal with, and work together with computer systems in a virtual environment. According to Yin, (2022), "the goal of the virtual environment is to create to the user the illusion that he is naturally placed in a synthetically produced environment, through his representation by an entity". The virtual environment, which enables synchronous teaching and discussion in real-time, is a replicated setting that resembles the real world in terms of things like communication, movement, and gravity (Gorini et al., 2009). By giving students a somewhat authentic university environment, virtual reality also replicates campus and classroom environments into their real-world counterparts. Users of virtual reality can communicate with one another through avatars and other digital representations, enabling them to socialise and explore virtual worlds. It can also promote behavior-based communications, which has significant potential to improve students' cognitive and practical abilities (Burdea et al., 2003).

Now VR has been referred to as the 21st century learning tool (Rogers, 2019). According to a study, students who engage in VR exercises, retain more knowledge and are better able to apply it (Krokos, Plaisant, & Varshney, 2019). When it comes to distance higher education, VR becomes more significant, because there is increasing interest among researchers, educators & pedagogues on using new visualization techniques like VR to improve distance education.

There is growing research attention given to VR technologies in other fields (Radianti et al., 2020) & in education such as VR application in education (Nerchant et al., 2014) and use of Head Mounted Devices (HMDs) (Jensen & Konradsen, 2018). But very rare studies available which addressed the use and impact of VR in Open and Distance higher education (Mkwizu, 2022; Ntaba & Jantjies, 2019) which found that virtual laboratories, Gamification, and role-play-based augmented reality are being used & there is increasement in student's enrollment, flexibility in studying, quality, examination as well as lack of access, equality, collaboration, health problems (skin allergies, rashes, etc.), weight, and cost etc have been faced by the students & teachers. Hence, to explore the use and impact of VR in open and distance higher education, the present study has analysed sixteen prior studies by applying systematic literature review (SLR) method. This study will be helpful for the stakeholders of education to know and understand the uses and impact of VR in Open and Distance Higher Education. Therefore, the effort is made to study the following research questions.

1) What are the VR technologies and devices are being used in open and distance higher education?
2) What is the impact of VR in open and distance higher education with reference to its benefits and challenges?

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Methodology

A systematic literature review method has been followed to address the above research questions. Further a thorough literature search has been conducted from various databases by using the keywords "Virtual reality," "Distance Higher Education," and additional keywords such as "usage," "impact," and the Boolean operators (And, Or, Not) in the search strategy. Sixteen articles from the publication year 2011 to 2022 has been selected after excluding the studies related to 'Mixed reality', 'ICT integration' & 'artificial intelligence' for the systematic analysis of the uses, benefits and challenges of virtual reality. The review summary of total sixteen articles is given in the following Table 1.

Table 1. Summary of Related Literature

Authors	Study	Method	Result
Coban and Goksu (2022)	"Virtual reality learning environments to encourage and facilitate social interaction among distance learning undergraduates"	Experimental	Significant difference found between the groups in favour of the VR group with regard to motivation and perceived sociability. Distance learning students' sociability and motivation in the 3D VR environment were much higher than in the web-based setting.
Li, Fang & Jiang (2022)	"Improved distance learning using VR technology"	Mixed	VR space-time factors had a substantial impact on students' knowledge and creativity, demonstrating the benefits of VR's immersive and trans-time features for both teachers and students.
Franas et al. (2021)	"Virtual reality and its possible integration into the process of distance learning focused on technically oriented subjects"	Experimental	It was discovered that the capacity to disassemble/assemble assembly CAD models and the interaction of numerous users are the key benefits of the possibility of teaching in this environment.
Keil et al. (2021)	"Effects of virtual reality locomotion techniques on distance estimations"	Experimental	After training, distance estimates in both locomotion scenarios improved, and DS accuracy increased when teleportation locomotion was applied.
Lee et al. (2021)	"Immersive virtual-reality (IVR)-based streaming distance education system for solar dynamics observatory"	Case study	Found some benefits such as Student engagement, enabling students to express their opinions and get over any anxiety, asking questions, increase the sense of realism but challenging to wear the HMD for an extended period of time.
Civril and Ozkul (2021)	"Factors affecting open and distance education learners' intentions to use a virtual laboratory"	Mixed Method	Found factors such as views of students positively impact behavioural intention. In this study, the only factor that significantly influenced learners' opinions was perceived usefulness.
Valenti et al. (2020)	"Virtual reality as a tool for student orientation in distance education programs"	Experimental	Found Positive perceptions about the technology, improvement in assessment score, decrease in program anxiety
Altnpulluk et al. (2020)	"Usability of augmented reality in open and distance learning systems"	Qualitative Delphi study	Found some usability in student's interaction which draws student's attention, enhance collaboration, prepares course, provides flexible environment, easy comprehension of the lesson and motivates students also.
Mystakidis (2020)	"Social virtual reality and distance education Gamification with	Case Study	Found that students' engagement enhanced, because it fosters curiosity, initiative, creativity, and a long-lasting interest in experimenting

	regard to student engagement"		with and modifying technology-based solutions.
Liu et al. (2019)	"Application of virtual reality technology in distance higher education"	Qualitative	Revealed Five applications; self-directed learning, Simulation experiment learning, group discussions, and challenges; Lack of educational resources, Technical needs for the design, Cost of development of teaching resources is too high, Teachers find it challenging to keep an eye on the teaching process, There is a lack of systematic and ideal virtual instructional theory direction.
Brazley (2019)	"Virtual Reality and Distance Education"	Mixed-method	Found that younger designers (seniors) are more adept at using 3D software and training than older designers (graduate students). 3D virtual reality project is Made simpler by collaborative effort. Students' ability to visualise 3D space is improved by virtual reality technology in both online and traditional classroom settings.
Frazier et al. (2018)	"Potential for Virtual Reality: As a Tool for 2nd Language Learning Distance Education in Japan"	Qualitative	It has been discovered that high-end VR and widely available VR are two different sorts of media. High-end (headset connected to a robust computer) and the second one includes mass-distributed VR (consists Smartphone). Others such as Google Expeditions, Google Earth VR, and programmes are available for taking students on tours of well-known modern or historical places
Hua (2015)	"Virtual Reality Technology and Application in Distance Education Presentation"	Experimental	Findings revealed that the usage of VR technology has impacted remote education demonstrations and can enhance image quality.
Abidi, El-Tamimi, & Al-Ahmari (2012)	"The next-generation virtual reality technology for distance education"	Qualitative	Interactivity is a key to learning, immersion are advantages and the main drawbacks include cost, usability, fear, maintainability, security, and secrecy.
Johnson et al. (2011)	"Assessing the Feasibility of Using Virtual Environments in Distance Education"	Mixed method	Found technical difficulties and students are preferring synchronous web-based learning.
Buha et al. (2011)	"Virtual Reality in Distance Education and Marketing Communications"	Quantitative	Revealed that by improving one's cognitive attitude toward virtual reality, one can master cognitive abilities like problem-solving, planning and decision-making, report creation, data analysis, project planning, and developing marketing strategies

Findings

The findings of the study has been analysed in terms of uses and impact of VR in open and distance higher education from the sixteen research articles. The impact of Virtual reality in open and distance education is analysed in terms of its benefits and challenges faced by teacher and students while using in teaching-learning process.

Uses of VR in Open and Distance Higher Education

Above related literature reports some of the uses of VR in open and distance higher education in terms of using various digital devices of VR technology. It is found from the literature that, mostly two types of VR devices are being used in distance higher education i.e., high end VR and mass-distributed VR. In high end VR, there is headset linked to a computer and the second consists the smart phone. Other includes Google Expeditions, which takes students on tours of well-known modern or historical locales, and Google Earth VR, which is being used to demonstrate geography lectures. Mindshow is employed for role play activities & Google Cardboard is being used as VR viewer device. Head-mounted displays (HMD), which are utilised in place of desktop VR and cave automated virtual environments (CAVE) VR, provide distant participants the impression that they are in the same room. Studies also reveal some applications modes of VR in distance higher education like self-directed learning, simulation learning & group discussions.

Impact of VR in Open and Distance Higher Education

The above reports of the literature reveal the impact of the uses of VR technologies in distance higher education in terms of experimental effect as well as benefits with some challenges encountered by both teacher and students. Most of the experimental study's result shows positive results in terms of its effect (Coban & Goksu, 2022; Li, Fang & Jiang, 2022). Use of teleportation technique is also effective (Keil et al., 2021). Students have willingness to use VR (Valenti et al., 2020), and VR also have positive effect on remote education and clarity of images are high (Hua, 2015).

The study show various advantages of VR technology in open and distance learning, like, VR has a positive impact on students' imagination and the interactive experience, demonstrating that technology has a significant role in helping students to perceive the VR environment in a multidimensional manner. It facilitates real-time interactions to encourage student participation. Avatars and voice interactions with other distant players increase the sensation of immersion more than pre-recorded information. Academic achievement of students has increased and low level of anxiety among students has found in courses as compared to those who taught the same course by standard text-materials.

Challenges in Using VR in Distance Higher Education

The literature also reveals various challenges faced by teacher and students of distance higher education while using in their teaching and learning. The first challenges in using VR in distance higher education are lack of access, lack of collaboration and policies. It is found that dizziness affected the students' experience, which showed negative effect on their learning. Biggest challenge is the lack of educational resources, technical needs for the design of VR lessons, cost of development of teaching resources is too high, and teachers find it challenging to keep an eye on the teaching process, there is a lack of systematic and ideal virtual instructional theory. Cost of implementation of VR is high in classes. Issues & challenges in terms of usability, fear, maintainability, security and confidentiality are there in relation to VR.

Conclusion

The related literature considered for analysis deals with uses and impact of VR in open and distance higher education i.e., what type of techniques, digital devices they are using in VR and what are the benefits and challenges in terms of its effect. VR headset, Avatars, Google earth etc. found to being used by the teacher & students of distance higher education. Overall, it is found from the literature that most of the studies show a positive effect of virtual reality in open and distance higher education. Engagement in learning activity and achievement of students has increased with the use of VR technologies (Mystakidis, 2020; Ntaba & Jantjies, 2019 and Valenti et al., 2020). The challenges in using VR such as high cost, weight, technological problems etc. have been found from the literature. The use of VR in open and distance higher education may take more time as digital divide is there in many corners of the world. From the findings of this review, researchers may get new insights, and educators may receive useful data about the problems, challenges, benefits and how can they apply in distance higher education. However, further research is required for better understanding of this aspect of VR usability in open and distance higher education by taking various regions of the world like in developing countries and study can also be conducted by taking secondary stage students of open schooling.

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Effectiveness of Connection Technique of Memory Model in Achievemnet in Engilish of Class IX Student

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Abstract: Many students complain that they can't remember necessary material. They assert they understand the content once they read it, but can't remember it later. There's a difference between understanding and remembering. Fortunately there are memory techniques and methods for you to use. Some are going to be more useful for a few subjects and content than others. Memory is the ability to recollect past experiences, and a record of the training process. The human brain has the power, referred to as neuroplasticity, which permits it to make new neural pathways, alter existing connections, and adapt and react in ever-changing ways as we learn. Information must enter our Long term memory, so that we can retrieve it from our memory in future. There are three steps involved in establishing an extended memory: encoding, storage, and retrieval. The present study is intended to study the effectiveness of Connection Technique in achievement in English of students of class IX. To compare the adjusted mean scores of achievements in English of experimental and control group by considering pre achievement as covariate. There is no significant difference in the adjusted mean scores of achievements in English of experimental and control group by considering pre achievement as covariate. Method adopted in this study was experimental method and the design adopted was pre-test, post-test. The study was conducted on the sample of 90 students of ninth standard. Achievement in English test was prepared by researcher herself. At first pre test without any treatment was conducted on both the groups of students and achievement scores were recorded. Then students belonging to experimental group were taught through Connection Techniques technique belonging to Memory Model and students belonging to control group were continued to be taught through traditional method and then again same achievement test was administered on both the groups and scores of both the groups were recorded. The achievement scores obtained by the students in the pre achievement and post achievement by both the groups were statistically analyzed with respect to pre achievement in English as covariate with the help of One Way ANCOVA and all the conditions of Normality and Homogeneity were tested before proceeding to ANCOVA. The detailed analysis of pre test and post scores of achievement in English shows that effect of Connection Techniques on, achievement in English of students is there as compared to lecture method of teaching. It also helps to reduce the difficulty of students in learning English Vocabulary. Hence this strategy can be effectively used in our present classroom set up. The study showed that Connection Technique Instruction is superior to the lecture method in students achievement in English and help to develop and sustain interest of students in learning .

Keywords: Connection Technique, Short term Memory, Long term Memory, Achievement in English.

Introduction

Many students complain that they can't remember necessary material. They assert they understand the content once they read it, but can't remember it later. There's a difference between understanding and remembering. Fortunately there are memory techniques and methods for you to use. Some are going to be more useful for a few subjects and content than others. As we identify the content we are working upon. We often discover things that we simply will feed in our memory. There are numerous strategies which will assist us to recollect important information effectively in order that we remember it on tests, apply it to subsequent courses, and use it throughout our life and career.

Connection Technique

When it comes to memory, visualisation is a crucial skill. Because names and numbers are abstract, our brains have a difficult time latching onto them. Our brains, on the other hand, have a far easier time storing and recalling images. Here are some effective visual tricks: Turn the sound of a stranger's name into an image: "Hi, I'm Mike," and you say, "Hi Mike"—poof! You forget this person's name since you haven't associated that word with anything about them (it could be in your short-term memory, but it's unlikely). You must link "Mike" to something else. The best strategy is to use the memory palace technique and other memorization techniques that deal with symbols (such as letters and numbers). The sound of rain falling on the roof makes me feel cozy and warm. In the case of "Mike," you can think of a picture of a microphone. To create an image for each syllable in a multi-syllable name,

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create a picture for each letter of the name. For "Melanie," you might think of a melon and someone crushing it with their knee. Then, the second step is to fixate on a location you will remember it.
If your new friend Mike has unusually big eyes, you might imagine microphones bulging out of each of his eyes. The memory palace technique is similar to the way we remember things, but instead of using a physical location to anchor new information, we use a physical feature of whatever we're trying to remember. Make your images as lively as possible to help embed the word or number in your memory more effectively. Use as many of your senses as possible when encoding information. Remember how the brain begins encoding information through your senses? If you can remember abstract concepts like names and numbers, you will remember them better. When it comes to numbers, the same techniques apply. You can associate numbers 0-9 with images to help you better remember long strings of numbers. For example, 0 might be a doughnut; 1 might be a flagpole; 2 might be a swan. To remember the number 210, picture a swan swimming past a flagpole to pick at a doughnut.

Figure 1: Features of Memory

Memory

Memory is the ability to recollect past experiences, and a record of the training process. The human brain has the power, referred to as neuroplasticity, which permits it to make new neural pathways, alter existing connections, and adapt and react in ever-changing ways as we learn. Information must enter our Long term memory, so that we can retrieve it from our memory in future. There are three steps involved in establishing an extended memory: encoding, storage, and retrieval.

1. To encode, you assign useful meaning to the knowledge.
2. To store information, you review it and its meanings (study), as repetition is important to remembering.
3. To retrieve it, you follow the trail you created through encoding. This might include variety of memory triggers that you simply used once you were encoding.

STEP 1: Encoding
Memory encoding allows an item of interest to be converted into a construct that's stored within the brain, which may later be recalled. Memory encoding allows information to be converted into a construct that's stored within the brain indefinitely. Once it's encoded, it is often recalled from either STM or LTM.

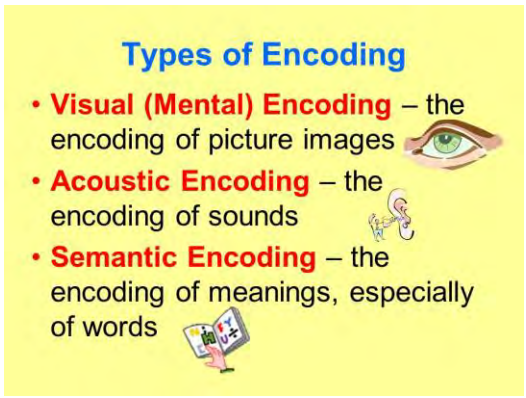

Figure 2: Types of Encoding

STEP 2: Storage of Information or Optimization of Encoding
Our brains take the encoded information and place it in storage. Storage means creation of a permanent record of data. In order for a memory to enter into

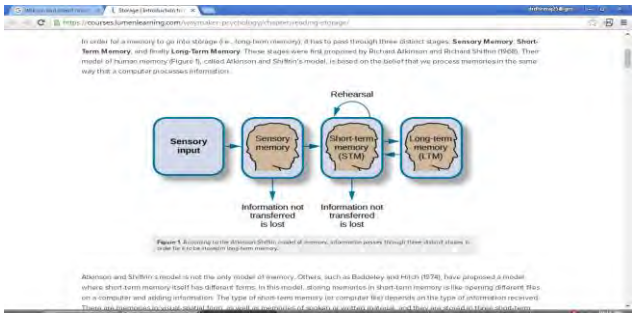

Figure 3: Process of memorization

Storage (i.e. long-term memory), it is supposed to undergo three distinct stages: Sensory Memory, STM, and eventually LTM.

Step 3: Retrieval of Information

Memory retrieval is that the process of remembering information stored in LTM. Some theorists suggest that there are three stores of memory: sensory memory, LTM, and STM. Only data that's processed through STM and encoded into LTM can later be retrieved.

Retrieval Failure

Sometimes an individual isn't ready to retrieve a memory that they need previously encoded. This will flow from to decay, natural action that happens when neural connections decline, like an unused muscle.

Statement of the Problem

The present study is intended to study the effectiveness of Connection Technique in achievement in English of students of class IX.

Objectives

To compare the adjusted mean scores of achievement in English of experimental and control group by considering pre achievement in English as covariate.

Hypothesis

There is no significant difference in the adjusted mean scores of achievement in English of experimental and control group by considering pre achievement in English as covariate

Sample

The sample of 45 students in each section of experimental and control group for the study were selected from Agrawal Public School randomly. Equal numbers of participants in each condition (pre and post test) and equal numbers of males and females to decrease gender biases.

Limitations

- The study is delimited to students of Chameli Devi Public School, Indore (M.P.).
- Sample is delimited to only 90 students. It is an experimental study.
- However an attempt was made to get a representative sample.
- As the study was confined to only in IX standard students the result cannot be generalized.
- The study was limited to only some matter selected from the syllabus of IX standard.
- With all these limitations researcher tries her level best in finding the effectiveness of Connection Techniques.

Methodology

Method adopted in this study was experimental method and the design adopted was pre-test, post-test single group design. The study was conducted on a sample of 90 students of ninth standard. Achievement in English test was prepared by researcher herself. At first pre test without any treatment was conducted on both the groups of students and achievement scores were recorded. Then students belonging to experimental group were taught through Connection Techniques technique belonging to Memory Model and students belonging to control group were continued to taught through traditional method and then again same achievement in English test was administered on both the groups and scores of both the groups were recorded.

The achievement scores obtained by the students in the pre achievement test and post achievement by both the groups were statistically analyzed with respect to pre achievement as covariate with the help of One Way ANCOVA and all the conditions of Normality and Homogeneity were tested before proceeding to ANCOVA.

Data analysis

Scores obtained were analysed in detail as given below. Comparison of adjusted mean scores of achievement in English of pre achievement scores and post achievement scores of students taught through Memory model using Connection Techniques method in memorizing and recalling of information with pre achievement as covariate

Table 1: Summary of test of normality of pre-test and post test scores in Achievement in English of students.

Achievement scores	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
pretest	.067	45	.057*
posttest	.182	45	.054

Interpretation

From the table 1 it is clear that Kolmogorov- Smirnov statistics of pre test group is. 067 for which significant value is .057 with df 45 which is greater than .05 level of significance therefore it is not significant at .05 level of significance. Hence the null hypothesis "the pre test score of students in the group does not significantly deviate from normality" is not rejected. Therefore it can be concluded that pre test score of the group are distributed normally. From the table 1 it is clear that Kolmogorov- Smirnov statistics of post test group is .182 for which significant value is .054 with df 45 which is greater than .05 level of significance therefore it is not significant at .05 level of significance. Hence the null hypothesis "the post test scores of students in the group does not significantly deviate from normality" is not rejected. Therefore it can be concluded that post test score of the group are distributed normally.

Table 2: Summary of test of Homogeneity of Variances of pre-test and post test scores in Achievement in English in English of students.

Achievement in English scores	Equality of Variance Assumed	F	df1	df2	Sig.
		.113	1	49	.739

Interpretation

From the table 2, it is clear that F value at df (1, 49) is .113, whose significance value is .739, which is greater than .05 level of significance, hence it is not significant. Therefore the null hypothesis "There is no significant difference in variance scores of pre test scores and post test scores of students in a group" is not rejected. Therefore it can be concluded that achievement in English scores have same variances.

Table 3: Summary of One Way ANCOVA of achievement scores by taking Pre achievement as covariate.

Source of variation	df	SSy.x	MSSy.x	f	Exact Sig.	Si Sig. Level
Treatment	1	110.404	110.404	104.462	0.00	< 0.01
Error	87	145.674	1.015			
Total	88					

Interpretation

From Table 3, above it is evident that the adjusted F-value for Treatment is 104.462 whose significance value with df= (1,87) is 0.00. This value is lesser than 0.01 and hence is significant at 0.01 level of significance. It indicate that the adjusted mean score of achievment of students taught through Connection Technique of Memory Model and traditional method differ significantly when Pre achievment was taken as covariate. In the light of this statement the null hypothesis "There is no significant difference in adjusted mean scores of achievment of students belonging to Experimental group and traditional group while Pre achievment was taken as covariate" is rejected.

Table 4: Adjusted mean score of experimental and control Groups

Groups	Mean
Experimental	38.550
Control group	35.044

Interpretation

Referring from the above table 4 , it is evident that the adjusted mean score of achievement of experimental group is 38.550 which is higher than the corresponding mean score of 35.044 of students belonging to traditional group. It may therefore be concluded that Connection Technique technique under Memory Model was found to be significantly effective than the traditional method in enhancing achievement in English of students of class IX.

Findings and Conclusions

The detailed analysis of pre test and post scores of achievement in English shows that effectivness of Connection Techniques on achievement in English of students is there as compared to lecture method of teaching. It also helps to reduce the difficulty of students in learning English Vocabulary. Hence this strategy can be effectively used in our present classroom set up.

Recommendations and Suggestions

To remember specific pieces of information, try creating a Connection Technique that associates the information with an mnemonic or acrostic, a rhyme or a jingle. There are numerous memory strategies listed and it's wise to try them and see which ones work best for you.

Conclusion:

The study showed that Connection Technique Instruction is superior to the lecture method in student's achievement in English and help to develop and sustain interest of students in learning. The present study is a limited one due to the lack of time and other facilities there are various other areas where this strategy is possible for all types of students such a gifted, average, below average. Actually, this type of study should be extended to large samples involving more number of units in order to examine the reliability of the results and ensure general applicability of findings.

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Artificial Intelligence and Virtual Reality Supported Classrooms

Dursun Akaslan[1] and Yusuf Elmuhammed[2]

Abstract: Various modes such e-mail, website, forums, chat rooms and internet conferencing are used in open and distance education for establishing communication between teachers and students. However, communication is still perceived by many researchers as one of the biggest challenges in open and distance education. On the other hand, virtual environments might help to overcome the lack of communication in distance education because teachers and students in a virtual classroom can meet, communicate, approach each other, ask for advice, act naturally and perform reality-reflective actions such as shaking hands, holding and dropping objects. The purpose of this study is to design and implement artificial intelligence and virtual reality supported classrooms for the autonomous teaching and learning. First, realistic 3D virtual teachers are constructed by using the photogrammetry method. Second, humanoid virtual teachers are animated naturally with machine learning models coming with Tensorflow. Third, humanoid teachers are trained for answering the questions of students with NLP models. Our study might help increase the level of communication and interactions between the teacher and student in a classroom.

Keywords: artificial intelligence, virtual reality, autonomous teaching, classrooms, 3D teacher.

Introduction

Distance education studies, which started three centuries ago in the world with "Shortcut Lessons" in the Boston Newspaper in 1728, came to the fore almost two centuries later in Türkiye and became a part of the mainstream in education in a very short time (Korkut, 2017). Due to the COVID-19 epidemic that affected the world in 2020, distance education has been made compulsory in order to ensure the continuity of education and training in both secondary and higher education (Genç, Engin, & Yardim, 2020).

Distance education, which started with correspondence, continued with radio and television, and became widespread with the Internet/Web, develops itself in parallel with the developments in the field of information and communication technologies (Demir, 2014). Today, virtual worlds are accepted as one of the technologies used in distance education (Yıldırım & Şahin, 2016). This issue remains on the agenda of both local and national newspapers (Hurriyet, 2021; Habertürk, 2021).

It is highly important to develop artificial intelligence and virtual reality supported worlds with Turkish speaking and synthesis applications because one of the biggest challenges in virtual worlds is communication. A lecturer at the University of Tampere emphasizes that asynchronous tools such as text (WhatsApp, Chat, etc.) and synchronous tools such as video conferencing (Zoom, Microsoft Team, etc.) are great at conveying large amounts of information and at discussing ideas formally (Torro, Holopainen, Jalo, Pirkkalainen, & Lahtevanoja, 2022).

However, they cannot replace the effectiveness, enjoyment, interaction or sharing of common understanding that face-to-face meetings have (Torro, Holopainen, Jalo, Pirkkalainen, & Lahtevanoja, 2022). In another study, Yılmaz and Horzum (2005) emphasize that communication between students and teachers must be implemented by utilizing the right method and appropriate technology in order for distance education applications with the Internet to be as successful as formal education applications (Yılmaz and Horzum, 2005).

Likewise, in another study conducted by Ekici (2003) it was emphasized that the communication and interaction deficiency most frequently encountered by the students who benefit from the distance education system can be improved by arranging their learning styles appropriately.In another study conducted by Metin, Karaman, and Şaştım (2017), it was observed that the English course being taught via distance education affects the efficiency, attractiveness and success of the students, and emphasized that the success can be increased by establishing interaction between the student and the teacher, as is done in face-to-face teaching.

In a study by Okkay and Bal (2021), although facial expressions are one of the most important advantages of face-to-face communication, due to the necessity of masks that come with the COVID-19 epidemic, it prevents people from seeing the facial expressions in the middle and lower parts of the face in face-to-face communication and can create noise in face-to-face communication. elements began to emerge.

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The purpose of this study is to design and implement artificial intelligence and virtual reality supported classrooms for the autonomous teaching and learning. In order to achieve our aim, the following objectives will be achieved, respectively.

- Firstly, we will create a full three-dimensional model of a real person using photogrammetry. This method will help us to create a realistic character for the use in virtual reality.
- Secondly, the 3D model created with photogrometry will be cleaned up with Blender.
- Thirdly, a bone structure will be attached to the realistic model for artificial intelligence control. For realizing this objective, Blender and Adobe Mixamo will be used together. These bones will be used to animate the realistic model naturally.
- Fourthly, the realiziation of realistic characters will be enabled with the models such as facialmarks, pose and hand detection used with TensowFlow.
- Fifthly, the characteristic models will be trained with natural language models for answering the questions of students.

Literature Review

Various modes such e-mail, website, forums, chat roomts and Internet conferencing are used in open and distance education for establishing communication between teachers and students. However, communication is still perceived by many researchers as one of the biggest challenges in open and distance education. A professor at Kaunas University of Technology, Thomas Balazauskas, states that virtual environments might help to overcome the lack of communication in distance education (Balazauskas, 2021).

Teachers and students in virtual environment can not only communicate but also meet, approach each other, ask for advice, act naturally and perform reality-reflective actions (ECIU, 2021). In 2021, a digital human was introduced by Doug Robble (2022) in TED Talks, which is a real human replica as illustrated in Figure 1. As illustrated in Figure 1, Doug Robble has a motion-sensing suit that understands body movements and a camera that monitors his facial expressions. Dough can control its three-dimensional digital character in real-time with his facial expressions by using the algorithms used in machine learning.

Figure 1. Digital Human | Doug Robble

Robble (2022) states that the main purpose of controlling a 3D character in real time with the facial expressions of a real person is to ensure that face-to-face communication in virtual worlds is realistic and believable. The acceleration of computers and graphics cards in the last 5 years and the emergence of machine and deep learning algorithms can transfer people's emotions and facial expressions. Moreover, the facial expressions of people might be analysed to find out whether they are lying or not to 3D characters.

In a study by Sun, Li, Huang, and Li (2018) found that distance learning is becoming more and more popular among students. However, they emphasize that the emotional state of the students is often overlooked in the distance education process. For this negative situation, Sun, Li, Huang and Li (2018) recommends three respective solutions: recognizing students' facial expressions with artificial intelligence (i), understanding students' real-time

emotional states (ii), and changing teaching teaching strategşies instantly by the instructors according to the students' emotional states.

In another study conducted by Theonas Hobbs, and Rigas (2007), the relationship between the facial expressions (e.g., smiles, laughter, opening of eyes, raising and lowering of eyebrows) of teachers and students' reactions to these facial expressions were examined. Theonas, Hobbs and Rigas (2007) suggested that the same situation can be reflected in the facial expressions of virtual teachers, which will be designed by computer, and that it may positively affect students' performance. In order to prove their thesis, Theonas, Hobbs and Rigas (2007) designed a 3D animated head as illustrated in Figure 2 and placed facial expressions on the face of it such as happy, sad, scared, surprised, angry and disgusted.

Figure 2. Facial Expressions

Methodology

The stages used in our stud are illustrated in Figure 3. As illustrated, our study inloves constructing, animating and training parts. First, realistic 3D virtual teachers are constructed by using the photogrammetry method. Second, humanoid virtual teachers are animated naturally with machine learning models coming with Tensorflow. Third, humanoid teachers are trained for answering the questions of students with NLP models.

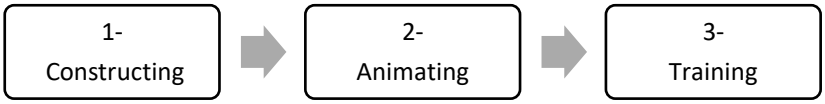

Figure 3. Methods

TensowFlow was developed by Google Brain Theme for Google internal uses and was later released as an open-source software in 2015. In 2019, the JavaScript implementation of TensowFlow was published by Google developers in 2019. The TensorFlow is originally writin in Python as a popular library for machine learning. Today, the Tensowflow.js have he same features as the original library. The models namely Face Landmark Detection, Natural Language Question Answering, Hand Posture Detection and Posture Detection are used in our study.

Findings and Discussions

Constructing 3D Virtual Teachers

3D virtual teachers are constructed by using the photogrammetry method and improved by using the Blender. A machine with a 25.5-megapixel resolution was used to construct the face of the realistic model. The photographs of the model were captured from the various angles as illustrated in as illustrated in Figure 4. As illustrated, several images were captured from the various angles of the model.

Figure 4. Capturing Images

The Mehsroom software was used to reconstruct the realistic model of the real human. Moreover, the model was cleaned up with the Blender. Since the face of the model was not clear enough for the use in virtual reality, an add-on (e.g., FaceBuilder) was used to reconstruct the face of the model by matching the keypoints of the faces with one of the captured images as illustrated in Figure 5.

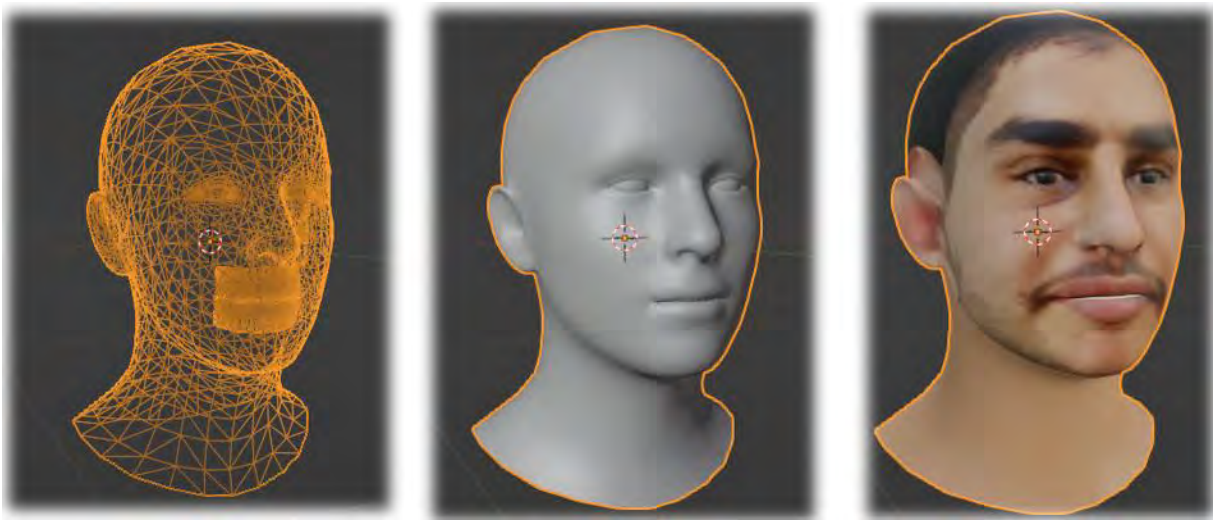

Figure 5. FaceBuilder Use

Animating 3D Virtual Teachers

A bone structure is highly important for animating the the realistic model. It was easy to create a bone structure for detecting finger, hand, wrist and pose movements of the realistic model from basic to advanced in Blender as illustrated in Figure 6.

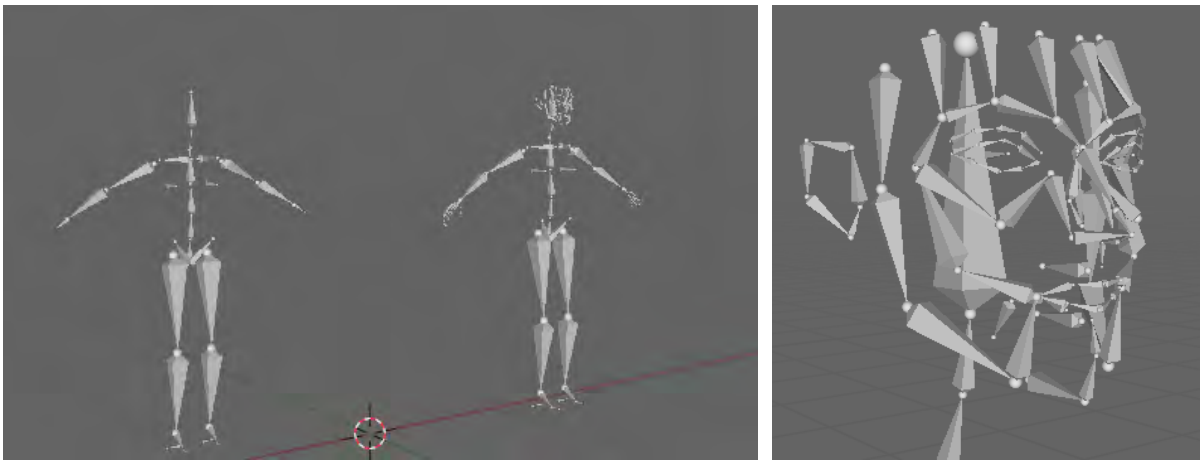

Figure 7. Human Body and Face Bone Structure in Blender

For the facial expressions and natural lib synchronization, a bone stracture was designed separately for lips, plate and tongue for maching the keypoints used in TensowFlow with the keypoints of the realistic characters by using the React.js Library as illustrated in Figure 8.

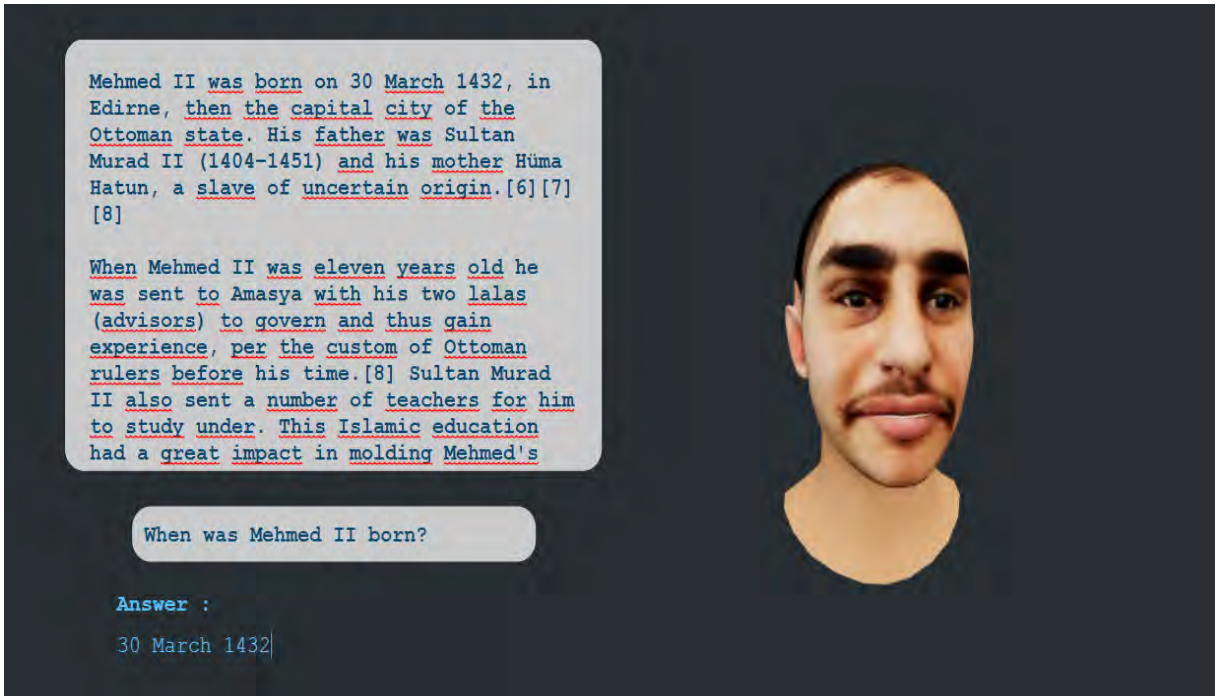

Figure 8. Face Bone Structure and NLP

As illustrated in Figure 8**,** the lips, plate and tongue of the realistic model were animated by using the nodes used in React.js. Moreover, the NLP model was used in our study to train the model with a standard text and answer the questions of the students related to the text given to the model. The lips of the model were synchronized naturally based on the prononunciation of the letters in English and Turkish languages by creating a phonetic database. Finally, a classroom with 24 desks were designed and implemented as illustrated in Figure 9.

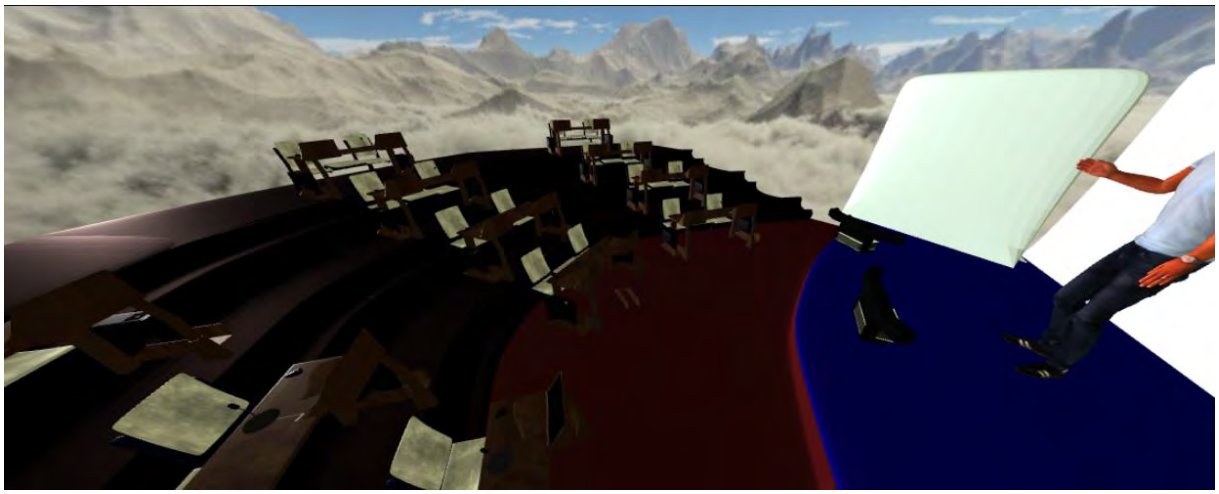

Figure 9. Virtual Reality Supported Classroom

Conslusion

An artificial intelligence and virtual reality supported classroom will play a critical role in the future. Our findings indicate that a 3D virtual teacher should have a natural mimic, lips and faces in artificial intelligence and virtual reality supported classrooms. A 3D virtual teacher might answer any questions directed by students if it is trained well. A text-voice library might be also used to translate voice into text. This might increase the interaction of students with AI-supported teacher. Moreover, 3D virtual teachers might be improved by using the models coming with Tensorflow such as Pose and Hand Detection.

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The Comparative Perception of Quality of Artificial Intelligence for Imaging

Luis Cesar Molina Almanza[1], Julieta Flores Michel[2], Margarita Emilia González Treviño[3] and Ramesh Chander Sharma[4]

Abstract: The general objective of the research is to identify possible differences in the perception of the quality of AI (Craiyon and Latent Diffusion LAION), to create images using semantic text that serve as a basis to generate illustrations for marketing processes; The study was carried out among students of the Business Administration and Marketing Area of the IES Simón Bolívar (Peru) and the Autonomous University of Nueva León (Mexico), the variables of age, sex, employment status and geographic location were analyzed to associate it with the perception about the artificial intelligence that they applied. The cross-sectional observational design was used, the quantitative method. The subjects of the study were 45 students from Mexico and 23 students from Peru, randomly selected regarding the distribution by sex in the case of Mexico, 69% of the participants were female and 31% male; in Peru the proportion was 61% female and 39% male. Regarding the research findings, the following is appreciated: There is a tendency to value the artificial intelligence application Craiyon more positively than that of Latent Diffusion LAION, both by participants from Peru and Mexico. In the different questions to assess the perception of student satisfaction with artificial intelligence applications, a higher level of satisfaction is observed in the participants from Peru compared to those from Mexico. There is a significant difference in the percentage of students from Peru compared to those from Mexico; In the selected students there is a higher level of employment in Peru than in Mexico. The age range of the students from Mexico who participated in the research is more homogeneous and is in the age range of 16 to 25 years, while in the case of the students from Peru there is great heterogeneity in the age range. finding participants between the range of 16 to over 51 years of age

Keywords: Artificial Intelligence, Perception, Quality, Age Groups

Introduction

For centuries, intelligence was considered the distinctive and unique feature of the human being, understood as the ability to perceive or infer information, and retain it as knowledge to apply it to adaptive behaviors within an environment or context. With the advances in computer technology, the concept of artificial intelligence was coined, which is the ability of systems to think like humans, although exclusively in a rational and logical way, without the emotional or sentimental components that distinguish human beings. Artificial intelligence as defined by Fabio Morandín "is the ability of a machine or computer system to simulate and perform tasks that require human intelligence, such as logical reasoning, learning, and problem solving" (Morandín-Ahuerma, 2022). To put it in context, we can see in the Figure 1, 2 and 3, the images generated by artificial intelligence from semantic text. The images generated in some cases are confused with real images (photos) or images that have been created by human beings.

Artificial intelligence is impacting society faster than we think. We have a series of devices and services that already include some element of artificial intelligence, banks are replacing their call center operators with artificial intelligence systems, telephone companies use calls -made by artificial intelligence- to remind their clients of pending debts , This is just the tip of the iceberg. Now, when we think about the ethical aspects associated with the use and application of artificial intelligence, we remember Franganillo's reflections and concerns regarding the practice of " some digital newspapers already use DALL E mini and Craiyon to illustrate their headlines with false images. " (Franganillo, 2022). However, when we think about the possibility of using artificial intelligence to create illustrations that are useful for marketing processes, there is still divergence about the practical utility in the business sector; These obey the perception they have about the real advantages that can be obtained with their application. Another ethical aspect is related to copyright, since artificial intelligence creates images from a semantic text given by the user, collecting information from different images found on the Internet. It is worth considering, whether or not the use of these images constitutes an infringement of intellectual property rights, the authors of the images used as a base by artificial intelligence do not receive any type of royalty or compensation for their use. (Tenas Alós, 2022)

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It is also necessary to analyze how the variables of sex, age and geographic location could influence the behavior and perception of people. In its interaction with artificial intelligence, in this regard, a previous study detected that there are differences at the level of interaction; the interaction between men and women, as well as the existence of differences in employability levels(Molina Almanza, 2014)

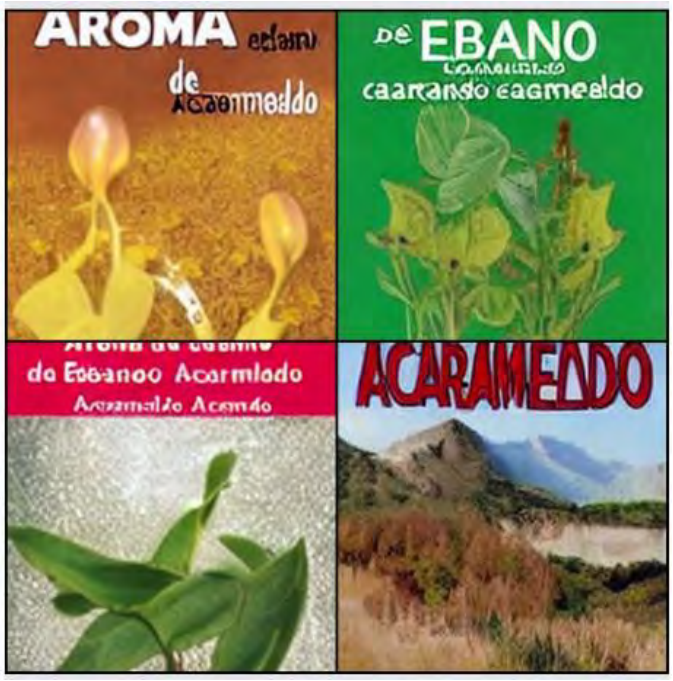

Figure 1. Image created by the Artificial Intelligence of Latent Diffusion LAION based on the semantic text: "Caramelized ebony scent"

Figure 2 Image created by Craiyon's Artificial Intelligence based on the semantic text: "Lower prices, within people's reach".

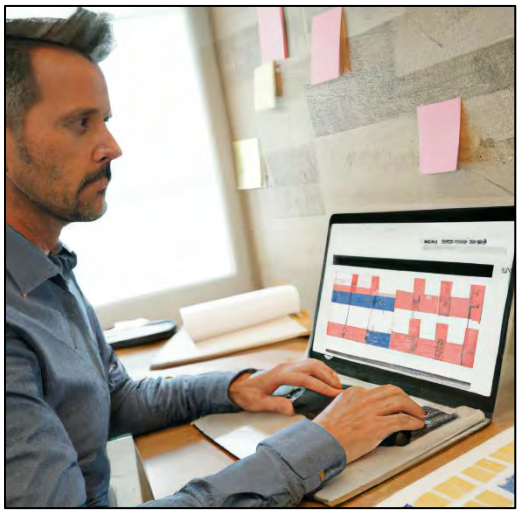

Figure 3. Image created by Dall-E-2 Intelligence based on the semantic text: "man typing on laptop gantt".

Methodology

For the present investigation, the quantitative case study method was used, seeking to identify the similarities or differences in the perception of the quality of Artificial Intelligence, in the creation of basic images for marketing processes from semantic text; among Spanish-speaking students from the School of Marketing of the Autonomous University of Nuevo León (Mexico) and the Business Administration program of the Simón Bolívar Institute of Higher Education (Peru).

Of the participants subject to the study

The study involved 45 students from Mexico and 23 students from Peru, randomly selected based on the convenience of the research team and the voluntary participation of the students; The research seeks to discriminate whether the variables of age, sex, geographical area and study program influence the perception of the quality of Artificial Intelligence. Selected study subjects met all of the following criteria:

1. Being a student or graduate of the Marketing School of the Autonomous University of Nuevo León (Mexico) or the Business Administration program of the Simón Bolívar Institute of Higher Education (Peru).
2. Participate voluntarily in the tests with the Artificial Intelligence applications of Craiyon and Latent Diffusion LAION
3. Register the results of your experimentation and perception in the electronic form created for this purpose.

Of the instruments and resources

For this research the following instruments were used:

1. Application : Craiyon (Craiyon Artificial Intelligence App URL : https://www.craiyon.com/)
2. Artificial Intelligence Application: Latent Diffusion LAION (Latent Diffusion Artificial Intelligence Application LAION URL : https://huggingface.co/spaces/multimodalart/latentdiffusion)
3. Electronic form for collecting the results of your experimentation and perception

Design

The research is of the cross-sectional observational type and the method was quantitative, no manipulations or interventions were made on the variables.

From the procedure

The research was planned by the main team of researchers made up of: Luis Cesar MOLINA ALMANZA (Peru), Julieta FLORES MICHEL (Mexico), Margarita Emilia GONZÁLEZ TREVIÑO (Mexico), and Ramesh Chander SHARMA (India), establishing the guidelines for execution and designing the instruments to collect the results of the experience of use and perception of the participants; as well as guidance instructions for support teachers and students.

The information collection form was designed to allow anonymous responses only with the email identifier. The form has three sections: 1) The one corresponding to data such as Age, Sex, Country, Institution, Study Program, employment status and self-rating on knowledge of Artificial Intelligence Technology. 2) Data from the experience of use and perception of the quality of the Artificial Intelligence Application: Craiyon, as well as evidence of use. 3) Data on the experience of use and perception of the quality of the Artificial Intelligence Application: Latent Diffusion LAION, as well as evidence of use. The form was designed to allow only one entry per person identified through the institutional email account.

From statistical processing

The Statistical Processing was carried out with the PSPP software version 1.5.3-g797d4 c . In addition, dynamic data analysis was used using Microsoft Excel Pivot Tables

Findings

The results obtained according to the information entered by the participants through the electronic form are according to the following detail:

Study subjects

The study involved 45 students from Mexico and 23 students from Peru, randomly selected based on the convenience of the research team and the voluntary participation of the students. Regarding the participation by gender of each country, in the case of Mexico, 69% of the participants were female and 31% male; in Peru the proportion was 61% female and 39% male; as can be seen in the following table:

Table 1 Sex of the participants according to country

gender	**Mexico(1)**	**Peru(2)**	**Grand Total**
female	31	14	Four. Five
Male	14	9	23
Grand Total	Four. Five	23	68

Selected study subjects met all of the following criteria

1. Being a student or graduate of the Marketing School of the Autonomous University of Nuevo León (Mexico) or the Business Administration program of the Simón Bolívar Institute of Higher Education (Peru).
2. Participate voluntarily in the tests with the Artificial Intelligence applications of Craiyon and Latent Diffusion LAION
3. Register the results of your experimentation and perception in the electronic form created for this purpose.

Regarding the semester of studies of the participants, in the case of Mexico students from 5, 6 and 7 semesters of studies participated, while in Peru students from 2, 4 and 6 semesters and graduates participated, as can be seen in the following table:

Table1 Student study semester

Country							**Grand Total**
	2	4	5	6	7	Egressed	
Mexico			26	12	7		Four. Five
Peru	one	2		18		2	23
Grand Total	one	2	26	30	7	2	68

Analyzing the percentage distribution of participants for each semester of studies and country, it is observed that in Mexico participation is centralized in 5th semester students, who represent 58% of the Mexican participants, while in Peru it is centralized in 5th semester students. 6th semester that represent 78% of the Peruvian participants. Although in both cases we have leptokurtic kurtosis, regarding the participants and the semester of study; However, in the case of Peru, the level of concentration in the measure of central tendency is much higher than that of Mexico, as can be seen in the following graph.

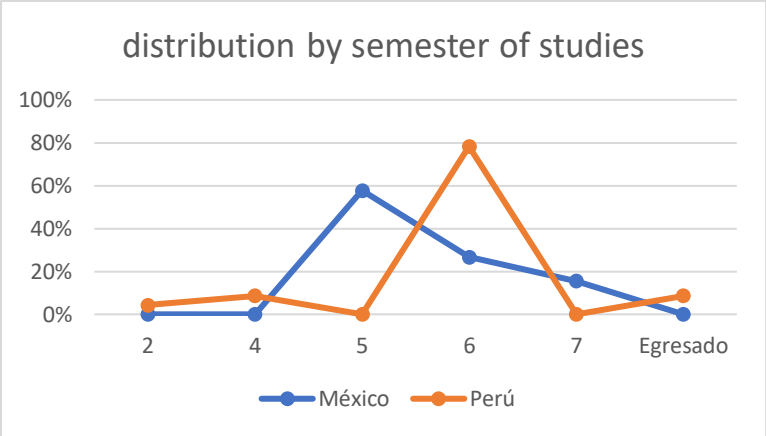

Figure 3 Percentage distribution of participations by semester of study

Regarding the age range of the participants in Mexico, it is centralized in two age ranges, thus 53% of the participants correspond to the age range of 16 to 20 years and 47% to the age range of 21 to 25 years; On the contrary, in Peru there is a great dispersion of data regarding age, only 26% are located in the age range of between 26 and 30 years; as can be seen in the attached table.

Table 2 Distribution by age range and country

Country	**from 16 to 20**	**From 21 to 25**	**from 26 to 30**	**from 31 to 35**	**from 36 to 40**	**from 41 to 45**	**51 to +**	**Grand Total**
Mexico	24	twenty-one						Four. Five
Peru	2	5	6	3	2	2	2	23
Grand Total	26	26	6	3	2	2	2	68

Regarding the percentage of subjects participating in the study and whether they are working or not, the results obtained are: in the case of Peru, 17% do not work and 83% do work; in the case of Mexico, 60% do not works and 40 % if they work; a significant difference is observed between the employability of the study subjects from Peru and Mexico, the results are shown in the attached table

Table 3 Percentage of students who work by institution

Institution Of Studies		
Simón Bolívar Public Higher Education Institute	17%	83%
Autonomous University of Nuevo Leon	60%	40%
	100%	100%

We can clearly identify that the distribution of participants by age is highly centralized in Mexico compared to that of Peru, which shows greater dispersion by age range, as can be seen in the following graph:

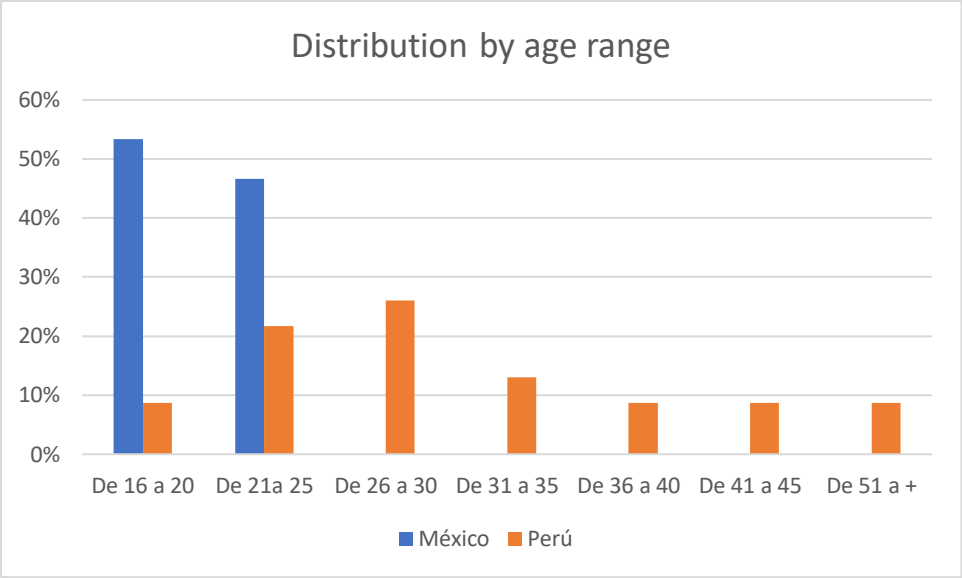

Figure 4 Distribution of participants by age range in percentage form by country

Regarding the self-definition of the level of knowledge of artificial intelligence by the participants from Mexico and Peru, both are centralized at the level of very basic Knowledge, with 36% in the case of Mexico and 52% in the case of Peru, as seen in the following table.

Table 4 Self-definition of knowledge of AI by the participants

Country	I don't know at all	very little knowledge	very basic knowledge	regular knowledge	I know advanced	Grand Total
Mexico	3	13	16	eleven	2	Four. Five
Peru	**one**	**5**	**12**	**5**		**23**
Grand Total	**28**	**16**	**2**	**18**	**4**	**68**

When you carry out the percentage analysis of the level of knowledge, it can be seen that Mexico has slightly higher percentage values towards the tails (I don't know at all, very little knowledge –tail to the left- and Regular knowledge and advanced knowledge – Right tail), instead Peru shows higher percentages towards the measure of central tendency "Very basic knowledge"; as can be seen in the following graph:

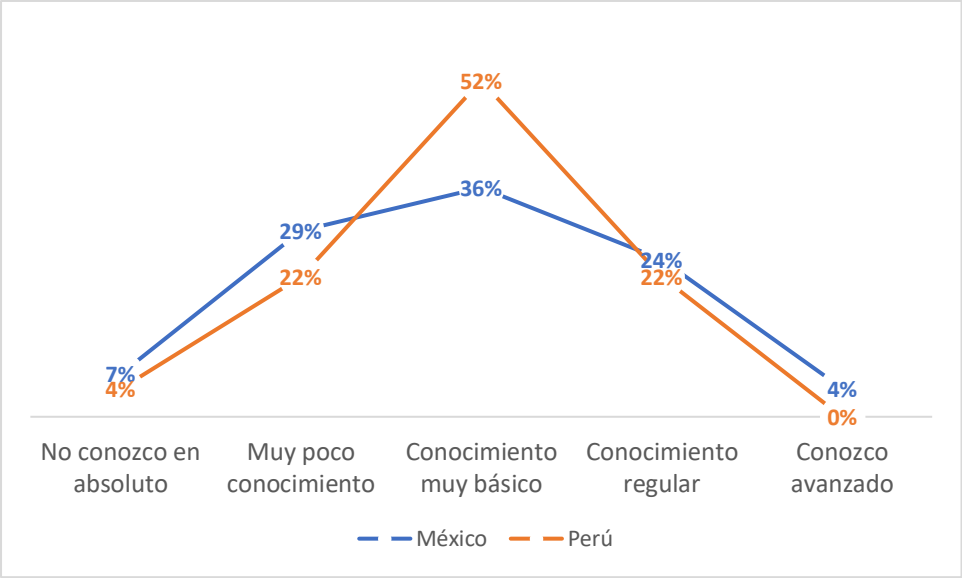

Figure 6. Percentage of self-definition of knowledge of AI by the participants

Regarding the level of satisfaction with the use of the quality of Artificial Intelligence, in the creation of basic images for marketing processes from semantic text; The participants, after using the applications, responded according to the following criteria:

Level of satisfaction regarding whether the image created corresponds to the idea of a product: In this case, it can be seen that students from Peru show higher levels of satisfaction in this criterion than students from Mexico; in both countries Craiyon receives better marks than Latent Diffusion LAION.

Table 5 Level of satisfaction on whether the image created corresponds to the idea of a product

	Crayon		**Latent Diffusion LAION**	
Satisfaction level	Mexico	Peru	Mexico	Peru
totally dissatisfied	17.78%	0.00%	29%	4%
Dissatisfied	24.44%	4.35%	24%	30%
indifferent	17.78%	34.78%	eleven%	13%
Satisfied	33.33%	43.48%	24%	43%
Totally satisfied	6.67%	17.39%	eleven%	9%
Grand Total	100.00%	100.00%	100%	100%

The levels of satisfaction regarding whether the image created by means of semantic text corresponds to the idea of a product, in the case of IA Craiyon, is markedly higher in students from Peru than in those from Mexico, as can be seen in the results of the graph. Next.

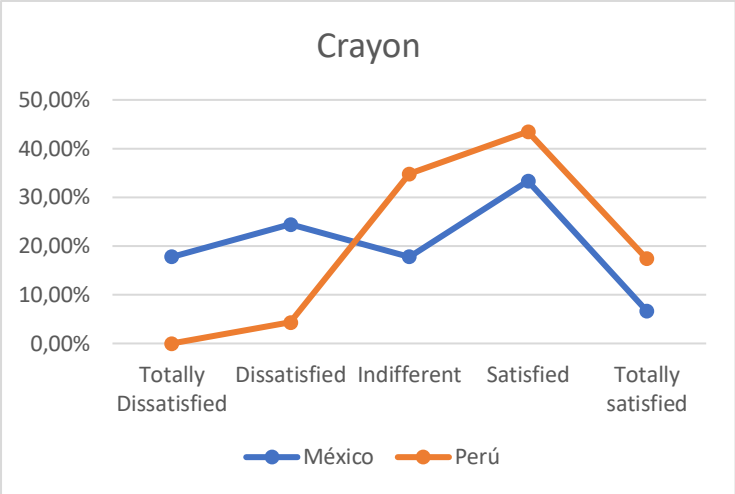

Figure 5 Levels of satisfaction about whether the image created by means of semantic text corresponds to the idea of a product - IA Craiyon

The levels of satisfaction about whether the image created by means of semantic text corresponds to the idea of a product, in the case of IA Laion is relatively higher in students from Peru than in those from Mexico, as can be seen in the results of the graph Next.

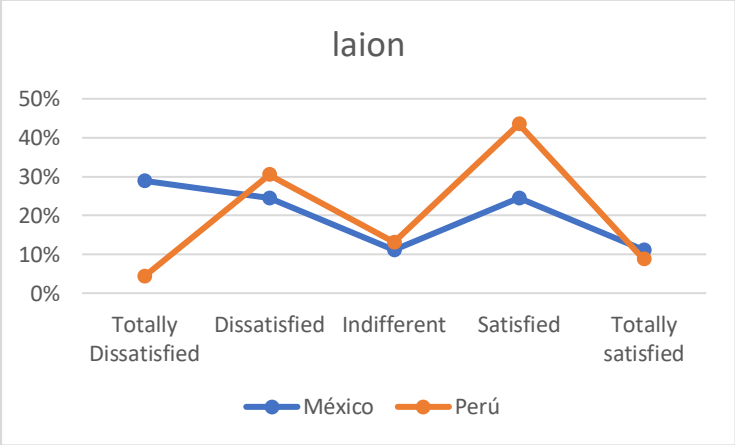

Figure 8. Levels of satisfaction regarding whether the image created by means of semantic text corresponds to the idea of a product - IA Laion

Satisfaction level of the sharpness and clarity of the image created by Artificial Intelligence: According to the results, it can be seen that students in Peru (65% are satisfied or totally satisfied with Craiyon and 48% with LAION) show higher levels of satisfaction in this criterion than the students from Mexico (40% are satisfied or totally satisfied with Craiyon and 25% with LAION); in both countries Craiyon receives better marks than Latent Diffusion LAION.

Table 6 Level of Satisfaction of the sharpness and clarity of the image created by Artificial Intelligence

	Crayon		Latent Diffusion LAION	
Satisfaction level	Mexico	Peru	Mexico	Peru
totally dissatisfied	13%	4%	24%	4%
Dissatisfied	24%	22%	36%	39%
indifferent	22%	9%	16%	9%
Satisfied	22%	61%	18%	48%
Totally satisfied	18%	4%	7%	0%
Grand Total	100%	100%	100%	100%

Level of satisfaction regarding the speed in the generation of the image by means of Artificial Intelligence: In this case, the level of satisfaction of the participants with respect to the speed or rapidity with which the artificial intelligence applications create or generate the images was analyzed, obtaining that students from Peru have lower levels of dissatisfaction compared to students from Mexico. Thus, in the case of Peru, 43% are totally dissatisfied or dissatisfied with the time spent with Craiyon and 21% with LAION, unlike what happens in Mexico where 64% are totally dissatisfied or dissatisfied with the time spent with Craiyon and 47% with LAION

Table 7 Level of satisfaction about the speed in generating the image through Artificial Intelligence

	Crayon		Latent Diffusion LAION	
Satisfaction level	Mexico	Peru	Mexico	Peru
totally dissatisfied	24%	0%	twenty%	4%
Dissatisfied	40%	43%	27%	17%
indifferent	18%	22%	24%	17%
Satisfied	eleven%	35%	eleven%	57%
Totally satisfied	7%	0%	18%	4%
Grand Total	100%	100%	100%	100%

Level of satisfaction regarding the image generated by Artificial Intelligence serves as the basis for the design of promotional elements: Once again, the levels of satisfaction with artificial intelligence applications are higher among students in Peru (61% are satisfied or totally satisfied with Craiyon and 48% with LAION) unlike the students from Mexico (38% are satisfied or totally satisfied with Craiyon and 31% with LAION); in both countries Craiyon receives better marks than Latent Diffusion LAION.

Table 8 Level of satisfaction regarding the image generated by Artificial Intelligence serves as a basis for the design of promotional elements

	Crayon		**Latent Diffusion LAION**	
Satisfaction level	Mexico	Peru	Mexico	Peru
totally dissatisfied	twenty%	0%	29%	9%
Dissatisfied	twenty%	17%	27%	22%
indifferent	22%	22%	13%	22%
Satisfied	29%	57%	18%	48%
Totally satisfied	9%	4%	13%	0%
Grand Total	100%	100%	100%	100%

Conclusion

Craiyon has a better evaluation, both in the students of Mexico and in Peru, with respect to Latent Diffusion LAION By carrying out this research, we have been able to determine that the age range of the students in Mexico who participated in the research is more homogeneous and is in the age range of 16 to 25 years, while in the case of students from Peru there is a great heterogeneity in the age range, finding participants between the range of 16 to more than 51 years of age There is a higher percentage of students from Peru who are working compared to the percentage of participants who work from Mexico. In the different questions to assess the perception of student satisfaction with artificial intelligence applications, a higher level of satisfaction is observed in the participants from Peru compared to those from Mexico. There is a tendency to value the artificial intelligence application Craiyon more positively than that of Latent Diffusion LAION, both by participants from Peru and Mexico

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