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PAPER

Using Artificial Intelligence to Influence Student Engagement in Media Content Creation

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ABSTRACT

Integrating artificial intelligence (AI) into educational environments transforms how students learn and engage in creative activities. The main purpose of this study is to examine how AI-enhanced learning experiences influence students' engagement in media content creation (MCC). The study identifies key factors that drive or hinder students' involvement in media-related activities and explores how AI-based tools and technologies can enhance learning outcomes and foster creativity in content creation. The results indicate a positive impact resulting from linking AI application factors to content creation. This study employs a quantitative methodology by distributing a questionnaire to university students. An application was developed as part of the study to help students enhance their media creation skills using AI techniques. The study highlights how AI factors influence and attract students to engage in content creation.

KEYWORDS

technology learning application, virtual reality (VR), behavior intention (BI), artificial intelligence (AI), media content creation (MCC)

1 INTRODUCTION

Integrating artificial intelligence (AI) into educational settings transforms how students learn and engage in creative activities. AI offers personalized learning pathways, real-time feedback, and adaptive tools that can enhance student creativity in media production. However, there is a gap in understanding how these AI-driven learning environments impact student behavior and motivation in media content creation (MCC). This study aims to bridge that gap by exploring the factors influencing student engagement, such as usability, personalization, and collaboration in AI-enhanced educational environments [1] [6] [10] [19].

Virtual reality (VR) is AI technology combined with MCC. VR is a long-standing abbreviation, but its meaning has evolved through time. Before the 1900s, VR was simply a

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means to make things appear genuine. VR took off at the close of the twentieth century when the first VR headsets with computer-generated graphics were created [1] [2]. Early technological advances in MCC technology, such as the first contemporary head-mounted displays (HMD) and VR gloves, were made throughout the 1990s. Existing technology, however, was unable to match the growing demands of what VR required to accomplish at the time [3]. Objectives, questions, existence models, and theories appeared related to formative issues that impact technology acceptance. The following questions resulted in a legend that this study aims to identify factors affecting UTAUT2 paradigm factors on VR system use and intention behavior. Focusing on the availability of students to obtain virtual education technology and support students [2] [6].

The current study answers two primary research questions:

- What are the key factors that influence students' engagement in MCC when using AI-based learning tools?
- How does the integration of AI in learning environments impact students' motivation and creativity in MCC-related activities?

Media content creation has recently regained popularity with the output advancement of the HMD and the widespread use of smartphones. This has made VR more accessible to everyone. Because of new technologies and price reductions, VR has become even more accessible and significant [3]. The most frequent way to watch VR is using a HMD. There are also numerous simulators and full-room VR environments.

The main challenge identified in this study: The rapid integration demonstrated by AI into MCC has revolutionized the industry, enabling more efficient scientific technology, enhanced creativity, and personalized user experiences. Despite the growing demand, there is a gap in understanding how to effectively incorporate design elements to improve AI-powered content creation tools [4]. The challenge is to know the elements and mechanisms for implementing software design principles and patterns that not only support AI functionality but also address the ever-expanding development and maintenance of MCC that supports and creates more engaging and effective learning tools. Besides that, some of the most restricting characteristics of VR need to be solved [5].

The purpose of the study is to provide a comprehensive overview of the research paper's focus and objectives. It outlines the integration of AI into MCC and its impact on traditional methods, emphasizing how AI-driven processes enhance creativity and enable personalized content delivery. The study further highlights the paper's analysis of the intersection between AI-based media generation and software architectural design. Specifically, it emphasizes the exploration of key design paradigms such as microservices, modular design, and event-driven systems, which are crucial for developing scalable, flexible, and efficient AI-powered content creation systems [5].

2 LITERATURE REVIEW

The integration of AI into MCC requires a strong program design plan to handle complex forms, versatility, and real-time execution. This writing survey looks at existing investigations on the merging of AI in media substance creation, highlighting the key engineering standards, designs, and challenges in actualizing AI-driven arrangements. The survey is organized into four primary segments: (1) AI in MCC, (2) Computer program building plan standards and designs using VR, (3) AI and program design integration, and (4) Challenges and future headings.

2.1 Media content creation

There are, of course, challenges when considering the benefits of incorporating MCC into the curriculum. The substance of MCC technology should no longer be the primary concern, but rather its expense and scarcity, which are also some of the most restricting characteristics of VR [32]. However, this is not the only difficulty that VR will face in the sphere of education. Economic and technological constraints are also major impediments [20]. The entire cost of all required MCC hardware and software is prohibitively expensive. Furthermore, smaller purchases, such as VR implementations, can be difficult because school financing is typically quite limited and is already earmarked for specific traditional instructional facilities.

Artificial intelligence and MCC technology must frequently function smoothly and properly for learning resources to be effectively utilized [10] [16]. This is, of course, a well-known concern for both old computers in schools, and the recent increase in new technology is bound to pose challenges, particularly at an early stage. Computers, unlike electronics, provide their own set of problems. VR doesn't has a lot of learning tools, and those that do exist are largely for self-learning rather than classroom learning [18]. According to [19], a person's behavioral purpose is how strongly they desire to do something and can thus anticipate its actual use; concerns can also be problematic, especially if VR is intended to be employed in the instruction of younger kids. Because most programs employ English as their primary language, this is owing to a shortage of material. This can be a significant challenge for both young and older students [2] [3] [7]. Mistranslations are frequently impediments to learning. Furthermore, spelling errors have an impact on the learning process [8] [33].

2.2 Virtual reality

To analyze learner attitudes regarding VR learning environments, a theory-based technique might be utilized [7]. The first learning challenges are also linked to new technology. It will take time for students and teachers to grasp the concept of VR and become acquainted with the various VR technologies [16].

Virtual reality equipment and implementations can differ greatly, making switching between them challenging [30]. Mainstream VR systems are primarily intended for entertainment and hence necessitate a high level of [18]. The utilization of VR technology will also necessitate the teacher having the appropriate technical skills to even utilize the computer, let alone use it for educational purposes [32]. Fellow teachers will need technological support and time to learn about VR tools and facilities before they can be used in the classroom.

There are other organizational issues associated with the usage of VRs in primary education. These issues are related to the functional aspect of how to use a small number of VR instruments in courses of varying sizes. Because it is doubtful that the entire classroom will be supplied with HMDs soon, other alternatives are constantly being researched. This opens up the possibility of using VR-powered mobile systems; however, even this has drawbacks. It is not assured that every student will have a smart computer with VR capabilities, which will determine whether they will have the same kind of experience. Other alternatives could include the sharing of HMDs or other VR learning centers.

While other models impact the effects of VR on teachers' perspectives, some research was conducted on students' learning through the usage of VR in education [7] [8]. These studies concentrate on students' learning and instructional decisions when utilizing VR technologies in the classroom, but they do not reveal what variables influence students' initial decisions to adopt and employ developing technology [12]. Given the benefits that VR can offer to classrooms, it is critical to encourage students to adopt developing technology in their classes [12] [34].

Some people experience physical discomfort when using VR gadgets, particularly impressive HMDs. The severity and frequency of this so-called "cybersickness" vary from person to person but ultimately result in a pessimistic attitude toward VR and worse learning outcomes [18]. The most common cause of cybersickness is a sensory mismatch, which happens when a virtual world character travels while one's body remains in the physical world. Long-term usage of a HMD causes eye strain, especially in younger students [33]. There is very limited literature on VR in education, particularly for young pupils, and interactive VR has the potential to influence the cognitive and physical development of such students [5] [31]. Cognitive overload is a circumstance in which so much information is presented at once that the target is unable to comprehend any of it. VR can cause cognitive overload in some scenarios, which can be detrimental to learning and motivated by its incorporation into the educational system [15] [38] [39].

2.3 Artificial intelligence technology

As a result, VR must be effectively incorporated into AI learning so that it is not just a separate activity but is directly linked to courses and their learning outcomes [16]. This will necessitate careful planning to ensure that AI is not used solely for entertainment purposes and MCC. As a result, measuring the additional benefits of AI and determining if they correlate with learning outcomes would be more difficult. This study focused on primary education; however, many aspects of teaching apply to all levels of education. It is necessary to recognize points of view in both teaching and learning to explain how VR applies in surroundings and new forms of educational reforms and technology [16] [17] [32] [38].

There are various learning hypotheses from the standpoint of instructional psychology. Recent modifications of the technology acceptance model (TAM) resulted in the creation of a new variation known as the TAM3. According to [33], subjective standards, image, importance of function, quality of performance, demonstrability of outcomes, and perceived ease of use (PEOU) all influence perceived usefulness (PU). On the other side, believed that PEOU was determined by anchors and modifications [4] [25]. Meanwhile, [33] claimed that anchors are associated with computers, and their use influences an individual's preliminary knowledge of the device's ease of use. Machine self-efficacy, external power expectations, machine fear, and computer fun are the four anchors that determine PEOU. However, the user's understanding will change after becoming acquainted with the system, but they will continue to rely on the initial anchors.

3 USES AND GRATIFICATION THEORY

Uses and Gratification Theory (U & GT), which has its roots in information psychology, was originally used to explain how and why individuals who utilize various media platforms may have gained appeal in the IS industry, including AI and MCC [38] [7] [13]. In actuality, U & GT is a cognitive motivational model [36] in which viewers are specifically targeted and purposefully chosen media to meet their psychological and social demands [33] [5].

According to [39], communication media differ in their quantity of social presence, which is defined by social cues such as being friendly, warm, and personable. To put it another way, social presence is “the extent to which other creatures (living or synthetic) are also present in the virtual environment” [11] [12]. A study [25] used VR in the setting of museums. They discovered that the social presence offered by realty technology improves visitors’ experiences (educational, aesthetic, entertainment, and escape) and, ultimately, their intention to return [25] [32] [40] [41].

Furthermore, there are three fundamental cognitive structures in which learning might theoretically occur: behaviorism, cognitivism, and constructivism [40], [34]. All learning theories will technically fall into one of these three groups. Stimuli cause behavioralism, which results in a shift in goal behavior toward one that often reinforces positive traits [42]. Repetitive learning occurs when particular conditions drive the subject to behave in the desired manner with adequate repetition [32]. MCC can help with this type of education since it provides an environment that allows for easy repetition. Of course, learning will continue to take place in the real world, but VR may provide an environment even when physical or other impairments make instruction difficult [17]. This means that colleague educators may continue to use MCC, for example, in distance learning through AI courses.

4 METHODOLOGY

The study employs a method approach and uses quantitative research techniques. The research used an application developed to help students enhance their media creation skills using AI technologies. AI-powered substance creation frameworks. Besides, the paper examines real-world applications, challenges, and future patterns within the space [24]. The discoveries highlight the significance of vigorous computer program design in guaranteeing consistent AI integration, permitting for upgraded development, and moving forward client encounters in media substance generation. All proposal points were determined based on data analysis. The study surveyed 500 students from different universities and examined the output using the PLS-SEM application.

4.1 Participant information

The survey was distributed among 160 participants from AlBuraimi University College in Oman. The survey link was shared through social media networks among the researchers’ students. The age is divided into four categories (18–24, 25–30, and above 30), where the highest number of participants belong to the first category (18–24) with 76.2%. Table 1 shows the demographical analysis of participant personal information.

Table 1. Demographical information

Item	Category	Percentage 100%
Total Participants	160	100%
Age	18–24	76.2%
	27–30	8.5%
	Above 30	15.3%
Nationality	Omani	100%
Gender	Male	54.9%
	Female	45.07%

4.2 Research model

This study used the original TAM to test if these factors can enhance the effectiveness of using AI in learning and the power of using MCC to be an extra channel for supporting students in their educational process within different fields actively with social media and online learning.

Technology acceptance model is developed in multiple stages and different versions. This study targeted the original work developed by [33]. This model consists of the main factors of PU, PEOU, attitude towards intention to use (ATT), behavior intention to use (BI), and actual use (AU). Figure 1 shows the TAM model used for this study.

The TAM by [33] is the most punctual demonstration examining the acknowledgement and deliberate of utilizing innovations. TAM was built from the hypothesis of contemplated activity (TRA), which has four interrelated developments, specifically conviction, state of mind, deliberate, and conduct, as this model's concern is to legitimize the conduct of people that relate to the deliberate framework utilized.

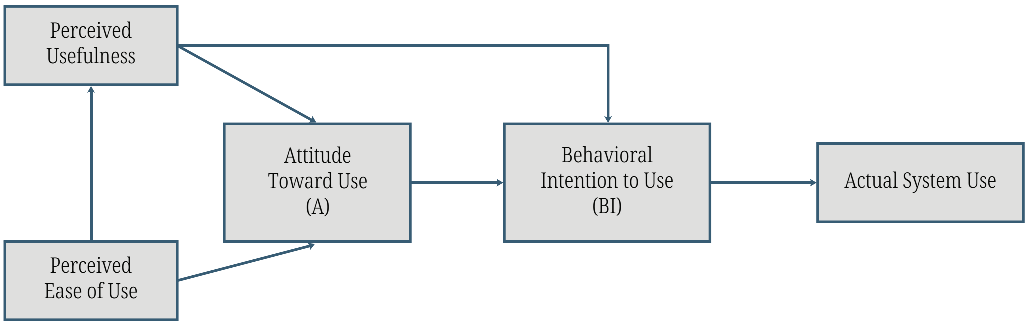

Fig. 1. Technology acceptance model

Figure 1 shows that unique TAM comprises four striking components, specifically 1) PU, 2) PEOU. 3) ATT, and 4) behavioral intention which is all indicating towards framework utilization [16]. Besides, TAM legitimizes the relationship of innovation deliberately to utilize for behavioral purposes. These variables are profoundly acknowledged to approve the deliberate to utilize the e-learning framework and media substance creation [11] [18]. PEOU alludes to "the degree to which an individual accepts that employing a specific framework would be a free effort" [9]. Within the e-learning setting, PEOU alludes to what clients anticipate as the least demanding to decide e-learning acknowledgement [15] [20].

Alluding to [34], seen convenience (PU) can be characterized as the "extent where a client sees that an innovation helps in making strides in capability and adequacy to total a task." In the media setting, PU alludes to users' convictions that e-learning can improve their execution and their capacity to total a movement [15] [29]. These past considerations uncovered that innovation acknowledgment utilizing PU and PEOU can affect understudy conduct and be purposeful to acknowledge or dismiss the framework. The state of mind figure is troublesome to actualize because it depends on the user's state of mind towards utilizing innovation. Subsequently, this calculation was not considered with numerous other things that used TAM as the most show to test its acknowledgement and legitimacy [37] [41]. This impassive state of mind demotivates the understudies to embrace e-learning to legitimize the students' needs where no useful capacities serve the genuine utilization the MCC framework.

The main objective of these adopted versions of the TAM model was to enhance the acceptance of e-learning in an organizational product and the engagement level of the students with the organization of each job or university. Besides, these types of combinations to present an adopted TAM were mostly used to enhance the use of social media and serve the internet network or for company requirements of quality [41] [35].

Perceived usefulness. [33] mentioned the definition of PU as a learner's beliefs according to the mechanism of adding new technology that can enhance the learner's performance. PU stands for the arbitrary process by which the system determines how much a student has advanced in a course and how much their work performance has improved. According to the TAM's PU, students' perceptions of the application system's potential as a tool for achieving learning objectives and their ongoing intention to use it are revealed. It directly predicts information systems (IS) behavioral intention, and PU is significantly associated with the model's continuous use [19].

Perceived ease of use. The degree to which students believe using e-learning models doesn't take effort is known as PEOU. The PEOU looks at how students perceive the e-learning system to determine whether it requires little effort and whether learning how to use e-learning 2.0 platforms is simple. This indirectly leads to the development of a continual intention to use [33] [27]. In the research by [31] and [10], the PEOU factor alluded to how students perceived e-learning as a way to improve their task completion performance. In research by [16], the student's use of the system through PU was referred to as the PEOU factor. Additionally, to encourage the students to use the PEOU, [19] mentioned the strong correlation between BI and the system and indirectly supported the actual intention to use MCC and VR systems [25].

Behavior intention. The PU of direct online access to the entire course material and all forms of contact between students and the course instructor, which improves the student's performance, determines the behavioral intention of the students. According to [33], students' BI is defined as their intention to use AI or embrace the MCC system. PU and PEOU were found by TAM to have a substantial correlation with the utilization of e-learning systems. In addition, behavioral intention considerations about the real use of AI and MCC systems have an impact on these aspects [40]. The e-learning system in this study will have a high behavioral intention to use the VR system and pleasant engagement [21] [28].

Actual use. The aim of students to utilize VR and MCC systems to enhance their learning skills is the definition of the actual use of these tools [13]. The TAM's behavioral aim. In order to maximize the best aim to continually use systems with student satisfaction at universities, [23] investigated the use of video blogs. [26] made additional efforts to look at the ways that in-person engagement and video instruction could improve university students' learning outcomes while maintaining the real use of MCC and VR apps. To assist the process of strengthening the continuing intention to use the system, the author's strategy relied on the deployment of Web 2.0 technology [15]. The author's findings showed that the utilization of video blogs improved the SLO ascertained using the TAM to get system use [27].

4.3 Research causal findings

The deployment of different AI systems currently used in universities could directly or indirectly relate to the actual use of VR and MCC systems through factors of TAM. Therefore, this factor is recommended to be used for contributing factors of actual intention to use AI systems. Table 2 shows the causal relationships according to the literature review studies.

Table 2. Causal relationships from literature

Factors	Causal Link	Recent Studies
Perceived usefulness	PU→BI	[15] [17] [27] [33]
Perceived ease of use	PEOU→PU	[9] [14] [17] [22] [33]
	PEOU→BI	[9] [14] [17] [33]
Behavioral intention	BI→AU	[1] [10] [15] [23] [33]

5 RESULTS AND DISCUSSION

This research contributes to the field of AI in education by highlighting how AI-based learning environments can positively impact student engagement in MCC. It identifies practical factors, such as user interface design, personalized learning features, and feedback mechanisms, that educators and developers can use to create more engaging and effective learning tools. Additionally, the study offers insights into student behavior and motivation in AI-enhanced creative activities. The research finds that AI-driven learning tools significantly enhance student engagement by offering personalized experiences, adaptive feedback, and intuitive MCC environments. Students who used AI-supported tools demonstrated higher creativity, motivation, and persistence in completing tasks [43]. However, the study also reveals challenges such as students' initial reluctance to adopt AI tools, concerns over loss of creativity due to automation, and the need for better alignment between AI features and educational goals.

All the results show the satisfaction and the positive effect of the BI of the students, and they are highly motivated by its incorporation into the educational system. This study uses a case study to focus on understanding the foundation and structures of VR applications using MCC being adopted in several universities in Oman [44].

The proposed research model is a factor construction that follows the path taken in IT and IS technology adoption research. The results of this study suggest that both factors positively affect the BI of students, and they are highly motivated by its incorporation into the educational system.

5.1 Data analysis

All Tables from Tables 3–6 explain the results and their positive impact on the model proposed. Where in these tables an alpha Cronbach value is calculated to be accepted only if it is above 0.7, the CR also checked whether it is above 0.7 to be accepted. The AVE value should be greater than or equal to 0.5 to be accepted. Table 3 shows the path coefficients of all factors as the impact of each factor on the others. Table 4, shows the R square results where it's highly accepted in some factors while weak acceptance in others. Table 6 shows the reliability and validity of all factors [34].

Table 3. Path coefficients

	ATT	BI	PEOU	PU	Actual System Use
Attitude towards Behavior (ATT)		0.340		0.378	
Behavioral Intention (BI)					0.238
Perceived Ease of Use (PEOU)	0.014	0.279		0.448	
Perceived Usefulness (PU)	0.452				

Table 3 shows the accepted path coefficient used in the study of the TAM model to test the acceptance of using AI technology with the MCC tool to enhance student learning. As shown in Table 3, (0.448) is the highest path coefficient between PEOU and PU. Table 4 shows the R square validity where PU and attitude towards behavior remarks with highly accepted value because its results are greater than 0.5 [43] [44].

Table 4. R^2 values

	R^2	Remarks
Perceived Usefulness	0.530	Highly Accepted
Perceived Ease of Use	0.394	Accepted
Attitude towards Behavior	0.551	Highly Accepted
Behavioral Intention	0.218	Weak Accepted
Actual System Use	0.310	Accepted

Table 5 shows the discriminant validity results where the diagonal results are equal to or greater than 0.7 for all variables. Furthermore, the lower triangle values should not exceed 0.5 or the value of the diagonal results.

Table 5. Discriminant validity

	ATT	BI	PEOU	PU	AU
ATT	0.819				
BI	0.173	0.838			
PEOU	0.230	0.439	0.782		
PU	0.102	0.127	0.341	0.800	
AU	0.073	0.207	0.373	0.154	0.853

Table 6 shows the final stage of testing the model's impact on AI and MCC use to enhance student education and learning. Table 6 explains that Cronbach's alpha is accepted and valid, it should be above 0.7. The second value used is composite reliability (CR); also, this indicator should be graded with results equal to or greater than 0.7. An additional test result used for the average variance rollability (AVR) used to show that all items used in the model should have a value greater than 0.5 to be in the right and significant results.

Table 6. Construct reliability and validity

	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Rollability (AVR)
ATT	0.751	0.839	0.717
BI	0.709	0.802	0.670
PEOU	0.772	0.819	0.601
PU	0.808	0.756	0.617
AU	0.739	0.821	0.684

6 CONCLUSION

This study is a case where VR technology was introduced to higher education institutions in Oman and the potential for using VR as an educational tool was revealed. Intended for studies. Although this study had interesting results, it has some weaknesses. This study mentions limitations regarding results, which may be restricted to the techniques evaluated and demographics. The practical and economic benefits of this methodology make it an indispensable practice for industries seeking to optimize their software development processes and deliver high-quality, reliable products. The intersection of AI and MCC requires advanced software architectural solutions that address the unique demands of AI-driven processes. The literature reveals that microservices, modular designs, and cloud-native architectures are pivotal in managing the complexity and scalability of these systems. However, challenges related to performance optimization, resource management, and the evolving nature of AI technologies remain areas for ongoing exploration. As AI continues to redefine content creation, further research will be needed to develop architectural patterns that ensure robustness and efficiency while maintaining the flexibility required for creative innovation. By adopting component-level design, organizations can achieve greater efficiency, flexibility, and cost-effectiveness in their software development efforts, ultimately driving innovation and success in their respective fields.

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8 REFERENCES

[1] R. M. Tawafak, R. Mathew, S. I. Malik, A. Al Sideiri, and G. Alfarsi, “Learning and entertainment technology review: The fusion of artificial intelligence and escape room technology,” in *ITM Web of Conferences*, 2024, vol. 64. https://doi.org/10.1051/itmconf/20246401014

[2] G. Al Farsi, R. M. Tawafak, I. Y. Alyoussef, and W. M. Al-Rahmi, “Systematic literature review for smart mobile learning in programming courses,” *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 18, no. 12, pp. 129–142, 2024. https://doi.org/10.3991/ijim.v18i12.46299

[3] G. Alfarsi, R. M. Tawafak, S. I. Malik, and B. H. Khudayer, “Facilitation for undergraduate college students to learn java language using e-learning model,” *Int. J. Interact. Mob. Technol. (iJIM)*, vol. 16, no. 8, pp. 4–17, 2022. https://doi.org/10.3991/ijim.v16i08.28689

[4] C. Wen Shen, J. Tsung Ho, P. T. Minh Ly, and T. Chang Kuo, “Behavioural intentions of using virtual reality in learning: Perspectives of acceptance of information technology and learning style,” *Virtual Reality*, vol. 23, pp. 313–324, 2018. https://doi.org/10.1007/s10055-018-0348-1

[5] A. Marougkas, C. Troussas, A. Krouska, and C. Sgouropoulou, “Virtual reality in education: A review of learning theories, approaches and methodologies for the last decade,” *Electronics*, vol. 12, no. 13, p. 2832, 2023. https://doi.org/10.3390/electronics12132832

[6] G. Alfarsi, H. Sulaiman, R. M. Tawafak, S. Malik, J. Jabbar, and A. Alsidiri, “A study of learning management system with e-learning,” *Learning*, 2019.

[7] G. Alfarsi, A. B. M. Yusof, R. M. Tawafak, S. I. Malik, R. Mathew, and M. W. Ashfaque, "Instructional use of virtual reality in e-learning environments," in *2020 IEEE International Conference on Advent Trends in Multidisciplinary Research and Innovation (ICATMRI)*, 2020, pp. 1–5. https://doi.org/10.1109/ICATMRI51801.2020.9398478

[8] B. Baby *et al.*, "A review of virtual reality simulators for neuroendoscopy," *Neurosurgical Review*, vol. 43, pp. 1255–1272, 2020. https://doi.org/10.1007/s10143-019-01164-7

[9] A. El Gourari, M. Skouri, M. Raoufi, and F. Ouatik, "The future of the transition to e-learning and distance learning using artificial intelligence," in *2020 Sixth International Conference on e-Learning (econf)*, 2020, pp. 279–284. https://doi.org/10.1109/econf51404.2020.9385464

[10] G. AlFarsi, R. M. Tawafak, A. ElDow, S. I. Malik, J. Jabbar, and A. Al Sideiri, "Smart classroom technology in artificial intelligence: A review paper," in *International Conference on Culture Heritage, Education, Sustainable Tourism, and Innovation Technologies (CESIT)*, 2021, vol. 1, pp. 229–235. https://doi.org/10.5220/0010306502290235

[11] M. Fernandez, "Augmented virtual reality: How to improve education systems," *Higher Learning Research Communications*, vol. 7, no. 1, pp. 1–15, 2017. https://doi.org/10.18870/hlrc.v7i1.373

[12] G. Fransson, J. Holmberg, and C. Westelius, "The challenges of using head mounted virtual reality in K-12 schools from a teacher perspective," *Education and Information Technologies*, vol. 25, pp. 3383–3404, 2020. https://doi.org/10.1007/s10639-020-10119-1

[13] A. Haarala-Muhonen, M. Ruohoniemi, A. Parpala, E. Komulainen, and S. Lindblom-Ylänne, "How do the different study profiles of first-year students predict their study success, study progress and the completion of degrees?" *Higher Education*, 74, pp. 949–962, 2017. https://doi.org/10.1007/s10734-016-0087-8

[14] L. Jensen and F. Konradsen, "A review of the use of virtual reality head-mounted displays in education and training," *Education and Information Technologies*, vol. 23, pp. 1515–1529, 2018. https://doi.org/10.1007/s10639-017-9676-0

[15] S. Papadakis *et al.*, "Unlocking the power of synergy: The joint force of cloud technologies and augmented reality in education," in *Proceedings of the 10th Workshop on Cloud Technologies in Education (CTE 2021) and 5th International Workshop on Augmented Reality in Education (AREdu 2022)*, Kryvyi Rih, Ukraine, 2023, vol. 3364, pp. 1–23. https://doi.org/10.31812/123456789/7399

[16] S. Papadakis *et al.*, "Revolutionizing education: Using computer simulation and cloud-based smart technology to facilitate successful open learning," in *Proceedings of two workshops: Cloud-based Smart Technologies for Open Education Workshop (CSTOE 2022) and Illia O. Teplytskyi Workshop on Computer Simulation in Education (CoSinE 2022)*, Kyiv, Ukraine, 2023, vol. 3359, pp. 1–18. https://doi.org/10.31812/123456789/7375

[17] K. Lavidas *et al.*, "Determinants of humanities and social sciences students' intentions to use artificial intelligence applications for academic purposes," *Information*, vol. 15, no. 6, p. 314, 2024. https://doi.org/10.3390/info15060314

[18] M. Khairudin, A. K. Triatmaja, W. J. Istanto, and M. N. A. Azman, "Mobile virtual reality to develop a virtual laboratorium for the subject of digital engineering," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 13, no. 4, pp. 80–95, 2019. https://doi.org/10.3991/ijim.v13i04.10522

[19] S. Malik, R. Tawafak, G. Alfarsi, M. Al-Emran, and R. Mathew, "Comparison of e-learning, m-learning and game-based learning in programming education – A gendered analysis," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 15, no. 15, pp. 133–146, 2020. https://doi.org/10.3991/ijet.v15i15.14503

[20] J. Martín-Gutiérrez, C. E. Mora, B. Añorbe-Díaz, and A. González-Marrero, "Virtual technologies trends in education," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 13, no. 2, pp. 469–486, 2017. https://doi.org/10.12973/eurasia.2017.00626a

[21] M. Pikhart and L. H. Al-Obaydi, “Potential pitfalls of online foreign language teaching from the perspective of the university teachers,” *Heliyon*, vol. 9, no. 2, 2023. https://doi.org/10.1016/j.heliyon.2023.e13732
[22] A. Pregowska, K. Masztalerz, M. Garlińska, and M. Osial, “A worldwide journey through distance education—From the post office to virtual, augmented and mixed realities, and education during the COVID-19 pandemic,” *Education Sciences*, vol. 11, no. 3, p. 118, 2021. https://doi.org/10.3390/educsci11030118
[23] J. B. Soto, D. T. Ocampo, L. B. Colon, and A. V. Oropesa, “Perceptions of immerseme virtual reality platform to improve English communicative skills in higher education,” *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 14, no. 7, pp. 4–19, 2020. https://doi.org/10.3991/ijim.v14i07.12181
[24] T. Alhussain, W. M. Al-Rahmi, and M. S. Othman, “Students' perceptions of social networks platforms use in higher education: A qualitative research,” *Int. J. Adv. Trends Comput. Sci. Eng.*, vol. 9, no. 3, pp. 2589–2603, 2020. https://doi.org/10.30534/ijatcse/2020/16932020
[25] A. M. Al-Rahmi, A. Shamsuddin, E. Wahab, W. M. Al-Rahmi, I. Y. Alyoussef, and J. Crawford, “Social media use in higher education: Building a structural equation model for student satisfaction and performance,” *Frontiers in Public Health*, vol. 10, 2022. https://doi.org/10.3389/fpubh.2022.1003007
[26] C. H. H. Tsay, A. Kofinas, and J. Luo, “Enhancing student learning experience with technology-mediated gamification: An empirical study,” *Computers & Education*, vol. 121, pp. 1–17, 2018. https://doi.org/10.1016/j.compedu.2018.01.009
[27] P. K. Tulsi, M. P. Poonia, and A. Priya, “Learning styles of engineering students,” *Journal of Engineering Education Transformations*, vol. 30, no. 2, pp. 44–49, 2016. https://doi.org/10.16920/jeet/2016/v30i2/105438
[28] E. Ucar, H. Ustunel, T. Civelek, and I. Umut, “Effects of using a force feedback haptic augmented simulation on the attitudes of the gifted students towards studying chemical bonds in virtual reality environment,” *Behaviour & Information Technology*, vol. 36, no. 5, pp. 540–547, 2017. https://doi.org/10.1080/0144929X.2016.1264483
[29] B. Urien, A. Erro-Garces, and A. Osca, “WhatsApp usefulness as a communicational tool in an educational context,” *Edu. Inf. Technol.*, vol. 24, pp. 2585–2602, 2019. https://doi.org/10.1007/s10639-019-09876-5
[30] J. Valverde-Berrocoso, M. D. C. Garrido-Arroyo, C. Burgos-Videla, and M. B. Morales-Cevallos, “Trends in educational research about e-learning: A systematic literature review (2009–2018),” *Sustainability*, vol. 12, no. 12, p. 5153, 2020. https://doi.org/10.3390/su12125153
[31] V. Venkatesh, S. A. Brown, L. M. Maruping, and H. Bala, “Predicting different conceptualizations of system use: The competing roles of behavioral intention, facilitating conditions, and behavioral expectation,” *MIS Quarterly*, vol. 32, no. 3, pp. 483–502, 2008. https://doi.org/10.2307/25148853
[32] N. Ullah, W. S. Alnumay, W. M. Al-Rahmi, A. I. Alzahrani, and H. Al-Samarraie, “Modeling cost saving and innovativeness for blockchain technology adoption by energy management,” *Energies*, vol. 13, no. 18, p. 4783, 2020. https://doi.org/10.3390/en13184783
[33] V. Venkatesh and F. D. Davis, “A theoretical extension of the technology acceptance model: Four longitudinal field studies,” *Management Science*, vol. 46, no. 2, pp. 186–204, 2000. https://doi.org/10.1287/mnsc.46.2.186.11926
[34] T. Wani and S. Ali, “Innovation diffusion theory,” *Journal of General Management Research*, pp. 101–118, 2015.
[35] P. Wang, P. Wu, J. Wang, H. L. Chi, and X. Wang, “A critical review of the use of virtual reality in construction engineering education and training,” *International Journal of Environmental Research and Public Health*, vol. 15, no. 6, p. 1204, 2018. https://doi.org/10.3390/ijerph15061204

[36] Y. Y. Wentao Shang, "Challenges in IoT networking via TCP/IP architecture," NDN Technical Report NDN, 2016.

[37] X. Yang, L. Lin, P. Yu Cheng, X. Yang, Y. Ren, and Y. Min Huang, "Examining creativity through a virtual reality support system," *Education Tech. Research Dev*., vol. 66, pp. 1231–1254, 2018. https://doi.org/10.1007/s11423-018-9604-z

[38] S. Aravantinos, K. Lavidas, I. Voulgari, S. Papadakis, T. Karalis, and V. Komis, "Educational approaches with AI in primary school settings: A systematic review of the literature available in scopus," *Education Sciences*, vol. 14, no. 7, p. 744, 2024. https://doi.org/10.3390/educsci14070744

[39] A. Al Sideiri, N. Alzeidi, M. Al Hammoshi, M. S. Chauhan, and G. AlFarsi, "CUDA implementation of fractal image compression," *Journal of Real-Time Image Processing*, vol. 17, pp. 1375–1387, 2020. https://doi.org/10.1007/s11554-019-00894-7

[40] Y. Al-dheleai, Z. Tasir, W. Al-Rahmi, M. Al-Sharafi, and A. Mydin, "Modeling of students online social presence on social networking sites and academic performance," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 15, no. 12, pp. 56–71, 2020. https://doi.org/10.3991/ijet.v15i12.12599

[41] H. Abuhassna, A. Megat, N. Yahaya, M. Azlina, and W. M. Al-Rahmi, "Examining students' satisfaction and learning autonomy through web-based courses," *International Journal of Advanced Trends in Computer Science and Engineering*, vol. 1, no. 9, pp. 356–370, 2020. https://doi.org/10.30534/ijatcse/2020/53912020

[42] G. Alfarsi, R. M. Tawafak, A. ElDow, S. I. Malik, J. Jabbar, A. Al Sideiri, and R. Mathew, "General view about an artificial intelligence technology in education domain," in *Proceedings of the International Conference on Culture Heritage, Education, Sustainable Tourism, and Innovation Technologies*, 2021, vol. 1, pp. 120–127. https://doi.org/10.5220/0010304501200127

[43] A. Tatnall, "Editorial for EAIT issue 2, 2020," *Education and Information Technologies*, vol. 25, pp. 647–657, 2020. https://doi.org/10.1007/s10639-020-10135-1

[44] A. Tatnall, "Correction to: Editorial for EAIT issue 2, 2020," *Education and Information Technologies*, vol. 25, pp. 5901–5910, 2020. https://doi.org/10.1007/s10639-020-10180-w

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