INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 13, Issue 4, (2024) E-ISSN: 2226-6348

Analysis Corelation of Technology on Instruction in Virtual Classrooms: A Case Study at the Tertiary Level

Malathy A/P Nadarajan, Noorhuda Abdul Karim, Noraini Saro, Nor Sa'adah Syaiful Anuar

Faculty of Education, UNITAR International University,47301 Petaling Jaya, Selangor, Malaysia

Corresponding Author Email: noorhuda@unitar.my

To Link this Article: http://dx.doi.org/10.6007/IJARPED/v13-i4/23519 DOI:10.6007/IJARPED/v13-i4/23519

Published Online: 23 November 2024

Abstract

This study investigates the influence of technology on instructional practices in virtual classrooms at the university level using a quantitative approach. Survey questionnaires were administered to students, professors, and administrators to collect data on technology types, usage frequency, efficacy, challenges, and instructional delivery preferences. The application of descriptive and inferential statistics using SPSS 23.0 allows for a much deeper understanding of technological accessibility and flexibility components whilst uncovering the implications of digital literacy and infrastructural constraints. Also, the observance of platforms' user-friendliness, trainers' skills, and learners' access to resources in the remote educational scenario is connected with the success of the learning activities. The current study responds to and contributes to the discussions of the digital education field, and it offers practical suggestions for the improvement of virtual learning environments targeting educators, the government, and technology creators.

Keywords: Virtual Classrooms, Technology Integration, Instructional Practices, Digital Literacy, Educational Technology

Introduction

This study investigates the role of technology in the teaching and learning process in online tertiary education settings, focusing on its effects on achievement of objectives, involvement of learners, and pedagogical techniques. The changing face of education the world over now includes new methods of teaching and learning and as indicated, relates more and more to the Internet and other virtual dimensions. Virtual and other online dimensions have greatly enhanced the tertiary institutions which are creative and educational centers. With the increasing integration of educational technologies, the focus on student learning effectiveness and differentiated instruction can be addressed with tablets, laptops, and smartphones, which are now essential components in a virtual classroom. The purpose of this research is to explore the influence of technology on the provision of virtual education at the

level of philosophy, interaction level of students, and overall educational methodology. Aiming to provide practical examples and ideas, the study intends to address the problem of how to support efficient digital education techniques in HEIs.

This research is important because it responds to challenges posed by the need of the digital generation, where technology becomes a medium of education. Educators like Gopalan et al. (2020), and Okoye et al. (2021), focus on how educational technology encourages creativity and participation in higher education. Means et al. (2010), believe that technology makes it possible to be more involved, therefore educators are capable of integrating multimedia, blended learning and flipping classrooms in order to accomplish lesson objectives and keep track of learners' progress and activities. Such methods not only enhance the effectiveness of content delivery methods but also promote extensive engagement and active learning (Johnson et al., 2016).

These advantages notwithstanding, there are challenges that virtual classrooms present which include a digital divide, security and privacy issues, and varied levels of technological infrastructure or access among the population (Bates et al, 2015). Such challenges call for a deeper understanding of the impact of technology in shaping fair and just learning environments. In examining these dynamics, this study seeks to remedy the inefficiencies in the integration of technology in virtual classrooms and the current state of virtual classrooms. This will be of significance to the educators, the administrators, and the policymakers of higher education.

This research will bring several benefits to certain groups in the context of tertiary education level. For teachers, it will offer effective ways of using technology to their advantage in improving the learning experience of the students. For learners, it pursues the provision of fair education opportunities that promote students' diversity within the learning environment. And the administrators and politicians will understand how best to harness technology in virtual classrooms and the best practices for technology usage in virtual classroom that would assist in enhancing the achievement of institutional objectives

On a larger scale, the investigation complements the current discourse on educational reforms where reforms that can be implemented in the context of technology are urgently required in the modern world. This research further emphasizes the importance of technology in online education by showing its applicability and productivity, which is key if it is to be accepted as the future of education.

Problem Statement

Technology's quick adoption in online university classes has brought about big changes in how we teach and learn. But even with its promise, we still face problems in using digital tools well and seeing how they affect teaching and learning results. These issues include differences in tech setup how well people can use digital tools, and what resources students and teachers can access. While tech offers to make learning better through more involvement new ideas, and lessons tailored to each person putting it into action often runs into roadblocks. These include the gap between those who have tech and those who don't, teachers not getting enough training, and some tech tools working better than others.

It is fair to say that students enrolled in today's higher education programs expect from their learning activities some elements of technology having been integrated in reality, or in this case – in virtual classrooms. Admittedly, there are many advantages for employing technology in teaching, improvement of virtually any pedagogy in a physical classroom is not strictly comparable to its virtual version. This research aims to fill the gap by analyzing the role of technology in teaching within an online environment, specifically at certain postsecondary institutions (Kavanagh, 2019). The present study seeks to address the gap in knowledge about the nuanced function of innovation in digital classrooms, especially its effects on teaching methods, student involvement, and overall effectiveness of training.

This research tackles a key knowledge gap in how tech shapes teaching methods in online college classrooms. Past studies point out how tech can boost student engagement and make things run smoother, but they often miss the tricky parts of putting it into action. These include making sure everyone has fair access, keeping data safe, and dealing with the fact that students and teachers have different levels of tech know-how (Tuiloma et al. 2022). What's more, as educational tech keeps changing fast, we need to keep looking at how it affects teaching and what students learn (Gray & DiLoreto, 2016). This study seeks to fill the said knowledge gap. It aims to explore the impact of technology on online students including engagement, equity, and the effectiveness and efficiency of online teaching experiences (Stoltenkamp et al., 2014). The gap between advanced access and use of modern tools is pressing need to analyze and not only the rewards and limitations of electronic tolls but also the interaction between technology, teaching methods, and student engagement.

The problem statement of this study brings out key issues faced regarding technology application, particularly in the context of virtual classrooms of higher institutions. It outlines a thorough investigation of technology dependencies or technology dependence, upgrading pace of development in modern teaching, pedagogical, and institution-related challenges (Johnson et al., 2016). It also mentions another in-depth research which will not just discuss technology in teaching but its implications in higher education circles (Shen & Ho, 2020). Also, it is necessary to be nearby to examine how such variables contribute to the achievement of educational intentions and how they shape the future of the virtual learning environment in higher education.

Again, the research focus is consistent with the problem statement as the objectives of the research are focused on exploring virtual classrooms' technologies and their potential and limitations and developing guidelines for their implementation in higher education (Ertmer et al., 2012). This problem focuses on a very narrow part of the problem into its isolated objectives in order to maintain coherence across the entire statement. Therefore, the current study provides attractive prospects for the integration of technology into tertiary education and provides recommendations for the enhancement of virtual classroom knowledge for both teachers and learners. Finally, the frame of reference of the study suggests further research that focuses on the problems of technology in online classrooms and how these affect the quality of teaching and consequent outcomes in colleges (Wright, 2018).

Study Purpose and Objectives

The purpose of the study is to investigate the impact of Technology on instruction in virtual classrooms at tertiary level. The benefits and drawbacks of the use of technology in virtual classrooms, and particularly the impact on both instructor and learner in teaching and learning. This study was intended to help instructors, students, administration and policymakers with best practices on how technology can conduct in virtual classrooms and how its importance for tertiary education teaching and learning method. The study aims to determine the impact of technology on teaching strategies in virtual learning environment at tertiary level, to identify the challenges of integrating technology into virtual classroom and to investigate how various tools of technology impact participation in virtual learning environment at tertiary level.

Research Question

What are the impacts of various tools of technology on participating in Virtual learning environment at the tertiary level?

Literature Review

Challenges in Integrating Technology into Virtual Classroom

Virtual classrooms at the tertiary level bring with many challenges to educators and institutions. One challenge that has been articulated is the digital divide that develops a chasm in digital inequalities between students. Even though most of the students easily access high-speed connectivity and recent hardware, many others, especially those from marginalized or underserved communities, remain without quality connection and in times lacking hardware. This digital divide may have an impact of impeding results of learning and may thus lead to student lack of participation and failure to contribute to online activities.

There are technological glitches entailing software, system, and cybersecurity issues, which are persistent challenges to instructors and IT personnel. These issues cannot only derail the flow of instructions but also lead to frustration and disengagement on the students' and instructors' side. The high rate of technological change necessitates continuous training and professional development provided to faculty to make full use of the new tools and to adjust instructional strategies (Greenhow et al., 2020). Sometimes, without appropriate support and resources, educators may not be able to integrate technology into instructional practice effectively; instead, opportunities for improving learning will be lost. These challenges can be eliminated through collaboration between educators, administration, and policymakers on addressing infrastructure gaps, issues of equitable access to technology resources, and comprehensive training and support to empower the educators to navigate the complexities of virtual instruction.

From the viewpoint of the instructor and the student, the difficulties in a virtual learning environment might be internal and subjective as well as external and objective. As educators, it would be wiser to look at the internal issues first so that we can reflect on them and improve the learning environment for everyone. A few of the difficulties or barriers whereas many teachers show reluctance toward learning and using new ICT-based methods, often viewing them as relevant only for science students, which hinders their adaptation to digital learning environments (Huang et al., 2020). Even when ICT skills are acquired, there's a hesitance to apply them in the classroom, as teachers often feel uncomfortable presenting

these methods. Additionally, the belief that traditional "chalk-and-talk" methods remain effectively contributes to this resistance (Joshi et al., 2020). Preparing digital lecture materials is also seen as time-consuming, especially during the initial stages, leading some teachers to consider it a misuse of time.

Each university and vocational school must plan and govern the use of technology in accordance with its own objectives and goals, as unclear planning and implementation presents one of the biggest obstacles putting it into practice Educational Technologies in Higher Education and Planning like this should be concentrated on creating technology-use motivation through methods that make virtual classrooms an alternate learning environment (Gumport & Chun, 2007). As noted by several authors recently, the challenges facing education today necessitate the integration of new pedagogical technologies in a more flexible and open formal education. Similar to this, universities encounter infrastructure-related challenges that restrict students' access to computers (Lee et al., 2016). One of the difficulties is that, given that investing in technology necessitates a long-term and expensive infrastructure. To implement stable ICTs systems, institutions must first have a reliable source of energy and infrastructure.

Impact of Technology on Teaching Strategies

Technology has transformed teaching in tertiary virtual learning by enhancing accessibility, flexibility, and engagement. Virtual environments allow students to access educational content anytime, accommodating diverse learning styles. Teachers can also personalize lessons, fostering self-directed learning with multimedia and asynchronous modules (Kaden, 2020).

Engaging tools like virtual labs, multimedia, and VR make classrooms interactive, turning passive learning into hands-on experiences. Social media and collaborative platforms further enrich peer communication, enhancing community and cooperation (Purwanto, 2021). Adaptive learning systems, powered by algorithms, customize learning paths to meet individual student needs. Automated assessments provide real-time feedback, helping students monitor progress (Toshkov et al., 2021).

Active learning is supported by flipped classroom models and inquiry-based learning, where technology enables independent exploration of topics and critical thinking using digital resources. Gamification and educational games boost motivation and reinforce skills, fostering digital fluency, literacy, and critical thinking (Rahiem, 2020). Virtual group projects develop essential communication, problem-solving, and teamwork abilities for modern careers. E-portfolios allow students to reflect on achievements and set goals for future growth. Overall, technology empowers educators to deliver more dynamic, accessible, and customized learning experiences that equip students for success in a digital world (Joshi et al., 2020).

Technological Tools and Participation in Virtual Learning

Technology plays a critical role in enhancing student engagement in tertiary virtual learning environments through various digital tools, including Learning Management Systems (LMS) that house course materials, assignments, and assessments in a single platform (Börner et al., 2018). Synchronous and asynchronous communication via chat, discussion board or video

calls all lend to a collaborative learning experience on an LMS platform (Ewing & Cooper, 2021). Interactive multimedia resources and content creation tools heighten engagement by catering to a range of learning styles and preferences, while gamified elements as well as virtual reality simulations deliver immersive learning experiences Deep Dive (Toshkov et al., 2021).

Some online classrooms also provide peer-to-peer collaboration via Microsoft Teams or Google Workspace support where students can collaborate on projects and learn from their friends in real time. Purwanto (2021), states that virtual assessments and feedback systems, e.g., tests, surveys can give prompt information for whether students are improving or still have holes in understanding the materials. Accessible design, through things like close captioning and screenreaders allows us to support a wider range of students including greater abilities with accessibility (Kaden, 2020).

Instructors face the challenge of integrating a growing array of educational technologies effectively. Research highlights the impact of LMS and social networking on student engagement, particularly in emotional involvement, while tools like multimedia technology enhance interactivity, comprehension, and retention of instructional content (Simelane-Mnisi, 2023; Alqurashi, 2022).

Theoretical Support for Virtual Classroom

Figure 1

Theoretical framework on use of Technology on Instruction in Virtual Classrooms

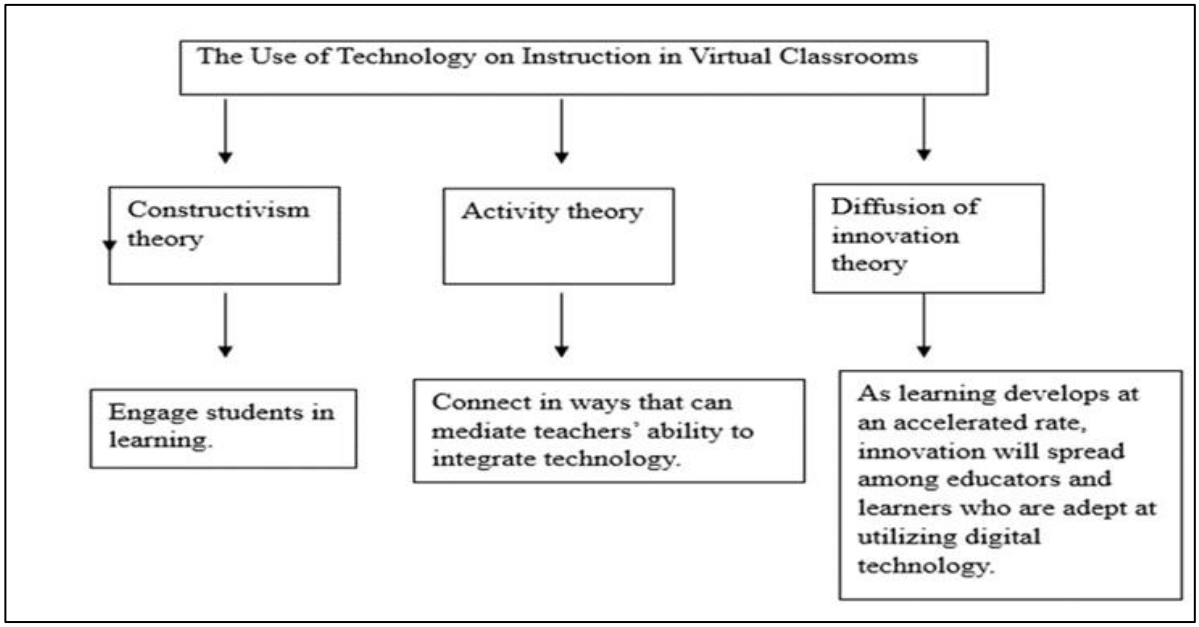

Figure 1 depicts the theoretical structure for incorporating technology into on Instruction in Virtual Classrooms. Figure 2 illustrates the theoretical framework for integrating technology into teaching within online classrooms at post-secondary educational institutions. This framework draws upon three foundational theories: Constructivism, Activity Theory, and Diffusion of Innovation Theory. Three foundational theories have been used to frame the discussion of the subject.

Methodology

Research design employs a quantitative method that allows for the precise measurement and analysis of variables. This approach is particularly suited for assessing the degree to which technology impacts instructional practices, as it enables the collection of empirical data that can be statistically analyzed. Furthermore, the questionnaire encompasses a variety of question formats, such as Likert scale items, multiple-choice questions, and open-ended prompts. The instruments of the questionnaire used are divided into four sections which consist of Demographics, Type of Technological Tool Used, which consists of 10 questions administered to a sample of 32 participants, Instructor's Technological Proficiency 10 questions, Student Access to Technology comprises 14 questions and Student Participation and Engagement includes 20 questions.

The research population consists of individuals involved in virtual higher education, including students, professors, and administrators across various academic fields and institutions. A representative sample is selected to capture diverse perspectives, with random sampling used to ensure everyone has an equal chance of selection, reducing bias and enhancing generalizability. The sample size is determined based on statistical power to detect meaningful effects. Invitations to participate are distributed through institutional channels like email, learning management systems, and virtual classroom platforms.

Result

Table 1

Demographics table of Participants

Variables/characteristics	Categories	Frequency	Percent
Age	20-25 year	14	43.8
	26-30 year	18	56.3
Gender	Female	9	28.1
	Male	23	71.9
Educational Level	Undergraduate	1	3.1
	Postgraduate	9	28.1
	Doctorate	22	68.8
Experience with Virtual Learning (in years)	Less than 1 year	7	21.9
	1-2 years	25	78.1
Access to Technology	High	1	3.1
	Medium	15	46.9
	Low	16	50.0
Primary Device Used for Virtual Learning	Laptop/Desktop	21	65.6
	Tablet	1	3.1
	Smartphone	10	31.3
Frequency of Virtual Classes Attended	Weekly	1	3.1
	Monthly	1	3.1
	Rarely	30	93.8

The study's demographic profile reveals key trends in participants' backgrounds and virtual learning experiences. Most participants are young adults, with 56.3% aged 26–30 and 43.8% aged 20–25, likely a mix of advanced undergraduate and early postgraduate students. Gender distribution shows a male majority at 71.9%, possibly reflecting field-specific or institutional demographics that may influence virtual classroom dynamics and technology use.

Educational levels are primarily advanced, with 68.8% pursuing doctorates, 28.1% in postgraduate studies, and only 3.1% in undergraduate programs. This focus on higher education levels suggests participants' familiarity with research and academic rigor, possibly enhancing their adaptability to virtual learning tools.

Experience with virtual learning is mostly in the 1–2-year range for 78.1% of participants, while 21.9% have less than a year. This indicates substantial exposure, likely due to the recent shift toward online education, equipping participants to evaluate technology's effectiveness in their studies.

Technology access varies, with 50% reporting low access, 46.9% medium, and only 3.1% high access, highlighting potential barriers to full engagement in virtual learning. Most participants (65.6%) use laptops or desktops, suitable for academic tasks, while 31.3% rely on smartphones and only 3.1% on tablets. The preference for laptops/desktops underscores the need for devices that support the comprehensive demands of higher education.

The frequency of virtual classes attended reveals that a striking 93.8% of participants attend classes rarely, with only 3.1% attending weekly and another 3.1% monthly. This infrequent attendance could be indicative of asynchronous learning models or potential challenges in maintaining regular virtual class schedules, raising questions about the effectiveness of current virtual classroom structures and student engagement strategies.

In conclusion, the demographic profile of the study participants provides a detailed overview of their backgrounds and experiences with virtual learning. The insights gained from this analysis are crucial for understanding the context in which technology impacts instruction and for identifying areas that require targeted improvements to enhance the overall educational experience in virtual classrooms.

Correlation

Table 2

Correlation Analysis

		Type of Technological Tool Used	Instructor's Technological Proficiency	Student Access to Technology	Student Participation and Engagement
Type of Technological Tool Used	Pearson Correlation	1	.857**	.843**	.609**
	Sig. (2-tailed)		.000	.000	.000
	N	32	32	32	32
Instructor's Technological Proficiency	Pearson Correlation	.857**	1	.919**	.440*
	Sig. (2-tailed)	.000		.000	.012
	N	32	32	32	32
Student Access to Technology	Pearson Correlation	.843**	.919**	1	.508**
	Sig. (2-tailed)	.000	.000		.003
	N	32	32	32	32
Student Participation and Engagement	Pearson Correlation	.609**	.440*	.508**	1
	Sig. (2-tailed)	.000	.012	.003	
	N	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In particular, the correlation analysis will more effectively explore how tech-related variables are related to levels of student participation and engagement in online classrooms. From this, the Pearson correlation coefficients tell us about the strength and direction of these relationships with other levels representing that we can trust the findings to be reliable. Correlation Coefficient R (Pearson correlation) — This is the Pearson Correlation between the “Type of Technological Tool Used” and “Instructor Technical Proficiency”, which was. 857***, showing a large positive correlation and very significant relationship (p =. 000). Lastly, this implies that how effectively and in what ways technology's tools are used within a virtual classroom corresponds to the level of technical skill amongst instructors. Educators that are more skilled in technology can be assumed to leverage a wider variety of efficient tools, which should improve the educational experiences as well. As far as "Type of Technological Tool Used" and what the students have access is concerned, its correlation using Pearson r=. The new model has a chi-square = 843**(also very significant (p <.0001). 000). This suggests that the more access to technology students have, the better tools they will use in their virtual classrooms. Doing more with technology increases the number and sophistication of digital tools that can potentially drive better learning outcomes while making it easier for students to access them.

The correlation between "Type of Technological Tool Used" and "Student Participation & Engagement". (See Table 2 for more details.) Moreover, the Spearman correlation was r

=.609** Indicating a moderate positive relationship significant (p = <. 000). This means that multiple and better technological tools make the students participate more, according to these results. More tools in use and better (more effective) they are, the more engaged students will be.

Valuable Insights the Pearson Correlation between "Instructor's Technological Proficiency" and "Student Access to Technology is. 919**, reveals a highly significant (p =. 000). The finding carries implications for how instructors who are tech-savvy might be helping their students to have greater access to it. This proficiency makes it possible for instructors to assist and provide students with effective ways of using these resources when helping them harness the technology.

This relationship was positively weak (.242) between "Instructor's Technological Proficiency" and an increase in "Student Participation-Engagement". 440*, which implies between PAC and pledge is moderate positive relationship that indicates a significant (p =. 012). The findings suggest that more tech-savvy instructors may do a better job of engaging and reaching students in an online classroom. The capacity to successfully employ technology makes it possible for teachers to develop more interactive and engaging learning experiences which improves student involvement. The Pearson correlation for "Student Access to Technology" and Student Participation & Engagement is. 508**, suggesting that the correlation is significant (p <. 003).

This suggests that instructors with greater technological skills can more effectively promote student engagement and connectedness in online learning environments. In summary, the proper use of technology allows instructors to develop learning experiences that stimulate student participation. The Pearson correlation between "Student Access to Technology" and "Student Participation and Engagement" is .508**, indicating a moderate, positive relationship that is significant (p = .003).

Recommendation

The current study has laid a robust foundation for understanding the impact of technological factors on instructional effectiveness and student engagement in virtual classrooms at the tertiary level. However, the rapidly evolving landscape of digital education necessitates further exploration to address emerging challenges and opportunities. Future research should aim to deepen and broaden the understanding of the complex interplay between technology and education, focusing on several key areas.

Where further study should focus is on different pedagogic approaches and how they combine this with technology in the Virtual Classroom. The study focused on the types of technological tools in this research although it would be a future forte to look at how different pedagogy like flipped classrooms, blended learning and gamification work with these things for maximizing the outcomes. Discovering the synergy between pedagogy and technology may yield results that can help inform a better model of instruction. For example, studies can be done to study the teaching approaches of popular interactive simulations and virtual labs versus what are proven traditional methods in STEM education as per Al-Rahmi et al. [32]. Second, research could also investigate adaptive learning technologies that adjust and personalize the instruction according to individual students' needs on an ongoing basis.

Reviewing these methods will enable educators to establish more subtle techniques, through which they can provide technology-based support and meet the varying learning systems and predilections.

Future studies could examine the student-level impact of technological factors across demographic distinctions, that is among students by socio-economic status, race/ethnicity and region. The current study emphasized a technology equity issue, but further investigations are warranted to examine how these discrepancies influence student learning outcomes. For instance, researchers could examine the struggles unique to students in rural or low-income regions where support for high-speed internet and cutting-edge technology tools may fall short. Future studies could focus on an evaluation study of targeting strategies and their effectiveness in reducing the digital divide (Alqurashi, 2022). Research may also delve into the virtual classroom experiences of students with disabilities; this potential study might assess how accessible digital tools and resources are.

Also, looking at how support from institutions helps build good virtual learning setups is very important for future studies. This research mentioned how tech systems matter, but it needs a closer look at institutional rules and actions. Researchers might check how different kinds of support, like tech help, training for teachers, and financial aid for students, affect how well online education works. Additionally, studies could investigate how national and regional education policies influence the use of tech in higher education. Comparing different countries and educational systems could give useful information on the best ways to create effective virtual learning environments (Barbour et al., 2020).

The pace of technology is fast and both challenges to opportunities go hand in hand for virtual education. We need continued research into the possibilities represented by new technologies and their capacity to raise higher engagement levels in students, whether we are talking about artificial intelligence (AI), virtual reality (VR) or augmented reality set-ups. Examples include AI-powered tools to personalize learning experiences, automate administrative tasks and provide real-time feedback on a student's performance. Possible Research: Adaptive-Education Platform and Its Application for AI-based adaptive learning Platforms to understand better the overall improvement in Student Outcome, Engagement. In the same way, VR and AR technologies can make it much easier for students to engage themselves in learning a diverse number of subjects while still staying interested.HTML5 allows developers to create interactive content that makes teaching & learning more fun. Research could investigate the effect of these applications on student motivation to learn, comprehension of subjects, and retention in memory (Boldureanu et al., 2020)

Conclusion

To explore how technological factors influence educational outcomes, we conducted a detailed correlation analysis. The demographic profile: young, predominantly male; many who have pursued postgraduate and doctoral studies with considerable experience in virtual learning are even more stark. Correlation analysis supports this, showing strong positive relationships between the types of technical tools used as well greater technological proficiency in instructors and students with access to technology at their disposal that translate into higher levels of participation and involvement. Under the most conservative

analysis in our study, we observe that technological factors explain a large proportion of variance in instructional effectiveness.

This research demonstrates the necessary importance of utilizing technology to strengthen instructional effectiveness in virtual classrooms. With the help of powerful technology solutions, developed instructor capabilities and full exposure to learning tools by students we can ensure high-quality virtual experiences for education institutions. And they provide useful information to help educators and policymakers fine-tune virtual instruction to improve the educational prospects for postsecondary students.

Co-Author Contributions

The authors declare no conflicts of interest regarding this article. Author1 conducted the handling of data entry and performing statistical analysis of the article. Author2 was responsible for drafting the research methodology, interpreting the results and responsible for communicating with the journal throughout the paper's submission, peer review, and publication process. Author3 was responsible for overseeing the writing process, and proofreading the entire article. Author4 was responsible template and supervised the overall writing

References

Ahmad, J., Noor, S. M., & Ismail, N. (2015). Investigating students' environmental knowledge, attitude, practice and communication. *Asian Social Science*, 11(16). https://doi.org/10.5539/ass.v11n16p284

Alammary, A., Sheard, J., & Carbone, A. (2014). Blended learning in higher education: Three different design approaches. *Australasian Journal of Educational Technology*, *30*(4). https://doi.org/10.14742/ajet.693

Amerstorfer, C. M., & Von Münster-Kistner, C. F. (2021). Student Perceptions of Academic Engagement and Student-Teacher Relationships in Problem-Based Learning. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.713057

Alqurashi, F. (2022). ESP writing teachers' beliefs and practices on WCF: Do they really meet?. *Journal of Language and Linguistic Studies*, *18*.

Al-Rahmi, A. M., Al-Rahmi, W. M., Alturki, U., Aldraiweesh, A., Almutairy, S., & Al-Adwan, A. S. (2022). Acceptance of mobile technologies and M-learning by university students: An empirical investigation in higher education. *Education and Information Technologies*, *27*(6), 7805-7826.

Barbour, M. K., LaBonte, R., Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., ... & Kelly, K. (2020). Understanding pandemic pedagogy: Differences between emergency remote, remote, and online teaching. *State of the Nation: K-12 e-Learning in Canada*.

Bates, A. (2015). *Teaching in a Digital Age: Guidelines for Designing Teaching and learning*. https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/276/14/Teaching-in-a-Digital-Age-1429535678-Vi-15092015.odt

Boldureanu, G., Ionescu, A. M., Bercu, A. M., Bedrule-Grigoruță, M. V., & Boldureanu, D. (2020). Entrepreneurship education through successful entrepreneurial models in higher education institutions. *Sustainability*, *12*(3), 1267.

Börner, K., Scrivner, O., Gallant, M., Ma, S., Liu, X., Chewning, K., Wu, L., & Evans, J. A. (2018). Skill discrepancies between research, education, and jobs reveal the critical need to

supply soft skills for the data economy. *Proceedings of the National Academy of Sciences*, *115*(50), 12630–12637. https://doi.org/10.1073/pnas.1804247115

Chen, H., & Tseng, H. (2011). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, *35*(3), 398–406. https://doi.org/10.1016/j.evalprogplan.2011.11.007

Ewing, L., & Cooper, H. B. (2021). Technology-enabled remote learning during Covid-19: perspectives of Australian teachers, students and parents. *Technology Pedagogy and Education*, *30*(1), 41–57. https://doi.org/10.1080/1475939x.2020.1868562

Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of Quasi-Experimental Research Designs in Education Research: Growth, promise, and Challenges. *Review of Research in Education*, 44(1), 218–243. https://doi.org/10.3102/0091732x20903302

Greenhow, C., Lewin, C., & Willet, K. B. S. (2020). The educational response to Covid-19 across two countries: a critical examination of initial digital pedagogy adoption. *Technology Pedagogy and Education*, *30*(1), 7–25. https://doi.org/10.1080/1475939x.2020.1866654

Huang, R. H., Liu, D. J., Tlili, A., Yang, J., Wang, H., & Zhang, M. (2020). Handbook on facilitating flexible learning during educational disruption: The Chinese experience in maintaining undisrupted learning in COVID-19 outbreak. *Beijing: Smart Learning Institute of Beijing Normal University*, *46*.

Johnson, A. M., Jacovina, M. E., Russell, D. G., & Soto, C. (2016a). Challenges and Solutions when Using Technologies in the Classroom. In *Routledge eBooks* (pp. 13–30). https://doi.org/10.4324/9781315647500-2

Joshi, A., Vinay, M., & Bhaskar, P. (2020). Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. *Interactive Technology and Smart Education*, *18*(2), 205–226. https://doi.org/10.1108/itse-06-2020-0087

Kaden, U. (2020). COVID-19 School Closure-Related changes to the professional life of a K–12 teacher. *Education Sciences*, *10*(6), 165. https://doi.org/10.3390/educsci10060165

Kavanagh, C. (2019, August 28). New tech, new threats, and new governance challenges: an opportunity to craft smarter responses? *Carnegie Endowment for International Peace*. https://carnegieendowment.org/2019/08/28/new-tech-new-threats-and-new-governance-challenges-opportunity-to-craft-smarter-responses-pub-79736

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of Evidence-Based Practices in Online Learning: A Meta-analysis and Review of Online Learning Studies*. US Department of Education. https://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf

Okoye, K., Rodriguez-Tort, J. A., Escamilla, J., & Hosseini, S. (2021). Technology-mediated teaching and learning process: A conceptual study of educators' response amidst the Covid-19 pandemic. *Education and Information Technologies*, *26*(6), 7225–7257. https://doi.org/10.1007/s10639-021-10527-x.

Purwanto, A., Santoso, P. B., Siswanto, E., Hartuti, H., Setiana, Y. N., Sudargini, Y., & Fahmi, K. (2021). Effect of Hard Skills, Soft Skills, Organizational Learning and Innovation Capability on Islamic University Lecturers' Performance. *International Journal of Social and Management Studies*, *2*(1), 14–40. https://doi.org/10.5555/ijosmas.v2i1.5

Rahiem, M. D. H. (2020). Technological Barriers and Challenges in the Use of ICT during the COVID-19 Emergency Remote Learning. *Universal Journal of Educational Research*, *8*(11B), 6124–6133. https://doi.org/10.13189/ujer.2020.082248

Shen, C., & Ho, J. (2020). Technology-enhanced learning in higher education: A bibliometric analysis with latent semantic approach. *Computers in Human Behavior*, 104, 106177. https://doi.org/10.1016/j.chb.2019.106177

Simelane-Mnisi, S. (2023). Effectiveness of LMS digital tools used by the academics to foster students' engagement. *Education Sciences*, *13*(10), 980. https://doi.org/10.3390/educsci13100980

Stoltenkamp, J., Kabaka, M., & Braaf, N. (2014). Lessons Learnt: Support Interventions during a Blended Course for Teacher-Educators from Urban and Rural Settings. *Creative Education*, 05(11), 924–935. https://doi.org/10.4236/ce.2014.511105

Toshkov, D., Carroll, B., & Yesilkagit, K. (2021). Government capacity, societal trust or party preferences: what accounts for the variety of national policy responses to the COVID-19 pandemic in Europe? *Journal of European Public Policy*, *29*(7), 1009–1028. https://doi.org/10.1080/13501763.2021.1928270

Tuiloma, S., Graham, C. R., Arias, A. M. M., & Caicedo, D. M. P. (2022). Providing institutional support for academic engagement in online and blended learning programs. *Education Sciences*, *12*(10), 641. https://doi.org/10.3390/educsci12100641

Wright, D. B. (2018). A framework for research on education with technology. *Frontiers in Education*, *3*. https://doi.org/10.3389/feduc.2018.00021