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Examining the role of virtual learning in enhancing teacher education: teacher students' perspectives on effectiveness, challenges, and future prospects in Sri Lanka's National Colleges of Education

Dr. Bhagya Kankanamge[1], Jasar Jawfer[2]
Department of Teacher Education, National Institute of Education, Sri Lanka
Department of Religions and Value Education, National Institute of Education, Sri Lanka
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Abstract
The increasing integration of digital technologies into education has transformed teaching and learning practices worldwide, making virtual learning an essential component of contemporary teacher education. This study examined the role of virtual learning in enhancing teacher education from the perspectives of teacher students in Sri Lanka's National Colleges of Education. Specifically, the study investigated the effectiveness of virtual learning, the challenges encountered by teacher students, and their perceptions regarding its future prospects in teacher education programmes. A quantitative descriptive survey design was employed, and data were collected from 44 teacher students using a structured questionnaire. The collected data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores. The findings revealed that teacher students generally perceived virtual learning positively, with an overall mean score of 4.05 for effectiveness. Virtual learning was particularly valued for promoting independent learning, improving communication and collaboration, and enhancing digital literacy skills. However, respondents also identified several challenges, including difficulties associated with online assessments, reduced interaction, motivation issues, and technological limitations. Despite these challenges, students expressed strong support for the continued integration of virtual learning within teacher education programmes, particularly through blended learning approaches. The findings further indicated that respondents believed virtual learning contributes significantly to preparing future teachers for technology-enhanced educational environments. The study concludes that virtual learning plays a significant role in enhancing teacher education and recommends strengthening digital infrastructure, improving online assessment practices, promoting blended learning, and enhancing digital competency development within National Colleges of Education. These measures can contribute to the preparation of technologically competent and professionally capable future teachers.

Keywords: Virtual learning, teacher education, educational technology, teacher students, National Colleges of Education, Sri Lanka, blended learning

Introduction

The rapid advancement of Information and Communication Technology (ICT) has significantly transformed educational practices across the globe. Digital technologies have expanded access to educational resources, facilitated flexible learning opportunities, and introduced innovative approaches to teaching and learning. Among these developments, virtual learning has emerged as a prominent educational strategy that enables learners and educators to interact through digital platforms regardless of geographical and temporal constraints (Moore & Kearsley, 2019) [15]. As educational institutions increasingly adopt technology-enhanced learning environments, virtual learning has become an essential component of contemporary education.

The significance of virtual learning became particularly evident during the COVID-19 pandemic, when educational institutions worldwide were required to transition rapidly from traditional face-to-face instruction to online learning modalities. This shift accelerated the integration of digital technologies into education and highlighted the potential of virtual learning to support educational continuity during periods of disruption (UNESCO, 2021). Consequently, educational institutions have continued to explore ways of integrating virtual learning into their programmes to improve accessibility, flexibility, and learning outcomes.

Teacher education has been profoundly influenced by these developments. In addition to acquiring subject knowledge and pedagogical competencies, future teachers are increasingly expected to develop digital skills that enable them to effectively integrate technology into classroom instruction. Modern educational environments require teachers to utilize digital tools, facilitate online learning experiences, and support students in technology-rich learning contexts (Redecker, 2017) [17]. Therefore, teacher education institutions have a responsibility to prepare teacher students for these emerging professional demands.

Virtual learning offers several benefits within teacher education programmes. Previous studies have demonstrated that virtual learning enhances access to educational resources, promotes learner autonomy, supports collaboration, and contributes to the development of digital literacy skills (Garrison, 2017; Moore & Kearsley, 2019) [8, 15]. Through engagement with virtual learning environments, teacher students gain practical experience with educational technologies and develop competencies necessary for technology-enhanced teaching. These experiences are particularly valuable as educational systems continue to embrace digital transformation.

Despite its potential advantages, virtual learning also presents several challenges. Issues such as inadequate

internet connectivity, limited access to technological devices, technical difficulties, reduced social interaction, and constraints in practical teaching experiences can affect the quality of learning outcomes (Hayashi *et al*., 2020[10]; UNESCO, 2023). These challenges are especially important in teacher education, where practical teaching experiences and direct interaction play a critical role in professional development.

In Sri Lanka, the adoption of virtual learning increased substantially following the COVID-19 pandemic. National Colleges of Education (NCOEs), which are responsible for preparing teachers for the national education system, incorporated various online learning platforms and digital tools into their educational programmes. While these initiatives expanded learning opportunities, they also revealed challenges related to technological infrastructure, digital readiness, and educational accessibility. Understanding teacher students' experiences and perceptions regarding virtual learning is therefore essential for improving teacher education programmes and supporting future educational reforms.

Although a growing body of research has examined virtual learning in higher education, limited studies have focused specifically on teacher students in Sri Lanka's National Colleges of Education. This gap highlights the need for empirical research that examines how virtual learning influences teacher preparation within this unique educational context. Accordingly, this study investigates teacher students' perspectives on the effectiveness, challenges, and future prospects of virtual learning in teacher education. The findings are expected to contribute to the improvement of teacher education practices and provide evidence-based recommendations for enhancing virtual learning initiatives within National Colleges of Education in Sri Lanka.

Literature Review and Conceptual Framework

Virtual learning has become an important component of contemporary education due to the rapid advancement of digital technologies and the increasing demand for flexible learning opportunities. Virtual learning refers to the use of digital platforms, internet-based technologies, and online communication tools to facilitate teaching and learning beyond the traditional classroom environment (Moore & Kearsley, 2019) [15]. It encompasses various forms of technology-enhanced learning, including synchronous and asynchronous learning, blended learning, and fully online educational programmes. The growing adoption of virtual learning has transformed educational practices by expanding access to learning resources, enhancing learner flexibility, and promoting technology-supported instructional approaches.

The theoretical foundation of virtual learning is largely informed by Constructivist Learning Theory and the Technology Acceptance Model (TAM). Constructivist Learning Theory, developed through the works of Piaget (1970) and Vygotsky (1978) [16, 21], suggests that learners actively construct knowledge through interaction, collaboration, and meaningful learning experiences. Virtual learning environments support these principles by providing opportunities for discussion, problem-solving, collaboration, and self-directed learning. Through digital platforms, learners engage with educational content and interact with peers and instructors, thereby facilitating active knowledge construction and critical thinking.

The Technology Acceptance Model, proposed by Davis (1989) [5], explains how individuals accept and use technological systems. According to TAM, perceived usefulness and perceived ease of use significantly influence technology adoption. In educational settings, students are more likely to engage with virtual learning platforms when they perceive them as beneficial for academic achievement and easy to use. Research has demonstrated that positive perceptions of educational technologies contribute to increased engagement, satisfaction, and learning effectiveness (Al-Rahmi *et al*., 2022) [1]. This framework is particularly relevant for understanding teacher students' attitudes toward virtual learning and their willingness to integrate technology into future teaching practice.

Previous studies have identified numerous benefits associated with virtual learning. One of the most significant advantages is improved access to educational resources. Virtual learning environments provide learners with continuous access to lecture materials, digital libraries, multimedia content, and online learning resources, enabling learning beyond classroom boundaries (UNESCO, 2021). Additionally, virtual learning promotes flexibility by allowing students to engage with educational content at convenient times and locations, thereby accommodating diverse learning needs and circumstances (Bozkurt *et al*., 2020) [3].

Research has also shown that virtual learning contributes to the development of independent learning skills and digital literacy. Online learning environments encourage students to manage their learning activities, access information independently, and develop self-regulated learning behaviours (Garrison, 2017) [8]. These competencies are particularly important in teacher education, where future educators are expected to engage in continuous professional development and effectively utilize technology within teaching and learning processes. Furthermore, virtual learning facilitates communication and collaboration through discussion forums, virtual classrooms, and collaborative digital tools, enabling meaningful interaction among learners and educators (Anderson, 2017) [2].

Despite these benefits, virtual learning presents several challenges that may affect learning effectiveness. Limited internet connectivity, inadequate technological infrastructure, and lack of access to suitable digital devices remain major barriers, particularly in developing countries (World Bank, 2022) [22]. Technical difficulties, software issues, and digital literacy gaps can further impede student participation and engagement in virtual learning environments. Additionally, studies have reported that online learning may reduce opportunities for direct interaction, negatively affecting student motivation, engagement, and sense of belonging (Martin & Bolliger, 2018) [14].

Within teacher education programmes, challenges associated with practical teaching experiences are particularly significant. Teacher preparation requires opportunities for classroom observation, teaching practice, and professional interaction, which may be difficult to replicate fully within virtual environments. Consequently, many scholars advocate blended learning approaches that combine online learning with face-to-face instruction to

maximize educational effectiveness while maintaining practical learning opportunities (Graham, 2021) [9].

In Sri Lanka, the adoption of virtual learning increased considerably following the COVID-19 pandemic. National Colleges of Education implemented online learning platforms to ensure educational continuity during institutional closures. While these initiatives enabled uninterrupted learning, they also exposed challenges related to internet accessibility, digital infrastructure, technological readiness, and educational equity (Hayashi *et al*., 2020) [10]. Nevertheless, the experience accelerated digital transformation within teacher education and increased awareness of the importance of educational technology integration.

The future of virtual learning is expected to be characterized by greater technological integration, increased adoption of blended learning models, and the utilization of emerging technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and learning analytics (Luckin *et al*., 2022) [13]. These innovations have the potential to enhance personalized learning, improve learner engagement, and provide new opportunities for teacher preparation and professional development. As educational systems continue to evolve, virtual learning is likely to remain a critical component of teacher education and educational reform initiatives.

Conceptual Framework

The conceptual framework of this study is based on three dimensions of virtual learning identified in the literature: effectiveness, challenges, and future prospects. These dimensions represent the independent variables influencing the enhancement of teacher education among teacher students.

- **Effectiveness of Virtual Learning**
  - Access to learning resources
  - Independent learning
  - Communication and collaboration
  - Digital literacy development

- **Challenges of Virtual Learning**
  - Internet connectivity issues
  - Lack of technological resources
  - Technical difficulties
  - Motivation and engagement issues
  - Practical teaching limitations

- **Future Prospects of Virtual Learning**
  - Continuation of virtual learning
  - Blended learning adoption
  - Educational technology integration
  - Investment in digital infrastructure

These dimensions collectively influence the enhancement of teacher education by shaping teacher students' learning experiences, professional competencies, and readiness for technology-enhanced teaching environments.

Methodology

This study employed a quantitative descriptive survey design to examine the role of virtual learning in enhancing teacher education among teacher students in Sri Lanka's National Colleges of Education. A survey approach was considered appropriate because it enables the collection of data regarding participants' perceptions, experiences, and attitudes toward a specific phenomenon and facilitates the analysis of trends within a target population (Creswell & Creswell, 2018) [4].

The target population of the study consisted of teacher students enrolled in National Colleges of Education in Sri Lanka. A sample of 44 teacher students participated in the study. Respondents were selected using convenience sampling, a non-probability sampling technique that allows participants to be chosen based on accessibility and willingness to participate in the research (Etikan *et al*., 2016) [7]. The sample included students from different years of study, gender categories, and residential backgrounds, thereby providing diverse perspectives on virtual learning experiences.

Data were collected using a structured questionnaire developed based on the literature related to virtual learning, educational technology, and teacher education. The questionnaire consisted of five sections. The first section collected demographic information, including gender, age, year of study, and area of residence. The second section examined the effectiveness of virtual learning through items related to access to learning materials, communication, collaboration, digital literacy, and independent learning. The third section focused on challenges associated with virtual learning, including internet connectivity, technological resources, motivation, interaction, and assessment issues. The fourth section examined respondents' perceptions regarding the future prospects of virtual learning, while the final section included an open-ended question that invited participants to provide suggestions for improving virtual learning in teacher education.

A five-point Likert scale was used to measure respondents' level of agreement with each statement, where 1 represented "Strongly Disagree," 2 represented "Disagree," 3 represented "Neutral," 4 represented "Agree," and 5 represented "Strongly Agree." The use of a Likert scale enabled the quantitative measurement of perceptions and facilitated statistical analysis.

Data collection was conducted through Google Forms. The questionnaire link was distributed electronically to teacher students, and participation was entirely voluntary. Respondents were informed about the purpose of the study and assured that the information provided would be used solely for academic purposes. Upon completion of the data collection process, responses were exported to Microsoft Excel for analysis.

The collected data were analyzed using descriptive statistical techniques. Frequencies and percentages were used to summarize demographic information, while mean scores were calculated to assess respondents' perceptions regarding the effectiveness, challenges, and future prospects of virtual learning. The findings were presented using tables and descriptive interpretations to facilitate understanding and comparison of results.

Ethical considerations were observed throughout the study. Participation was voluntary, respondents' anonymity was maintained, and no personally identifiable information was collected. All data were treated confidentially and used

exclusively for research purposes. The study adhered to accepted ethical principles of educational research, including respect for participants, confidentiality, and responsible reporting of findings.

Results and Discussion

1. Demographic Characteristics of Respondents

A total of 44 teacher students participated in the study. Among the respondents, 72.7% were female, 22.7% were male, and 4.5% preferred not to disclose their gender. The majority of participants (77.3%) were between 20 and 24 years of age, while 20.5% were below 20 years. Regarding the year of study, 59.1% of respondents were second-year students, followed by 34.1% first-year students. In terms of residence, 61.4% of respondents were from rural areas and 36.4% were from urban areas. The demographic profile indicates that the study captured perspectives from a diverse group of teacher students representing different educational and geographical backgrounds.

2. Effectiveness of Virtual Learning

Table 1 presents respondents' perceptions regarding the effectiveness of virtual learning in teacher education.

Table 1: Effectiveness of Virtual Learning

Statement	Mean
Virtual learning improves access to learning materials	3.98
Virtual learning helps me manage my studies effectively	3.93
Online learning enhances my digital literacy skills	3.95
Virtual learning promotes independent learning	4.22
Virtual learning improves communication with lecturers	4.11
Virtual learning supports collaboration with classmates	4.11
Virtual learning contributes positively to academic performance	4.05

Overall Mean = 4.05

The findings indicate that respondents generally perceived virtual learning as effective in supporting teacher education. The overall mean score of 4.05 demonstrates a high level of agreement regarding its benefits. Among the effectiveness indicators, the highest-rated statement was that virtual learning promotes independent learning (M = 4.22). This finding suggests that virtual learning encourages students to take responsibility for their learning, manage educational activities independently, and develop self-directed learning skills.

The results support Constructivist Learning Theory, which emphasizes active learner participation and knowledge construction through independent engagement (Piaget, 1970; Vygotsky, 1978) [16, 21]. The findings are also consistent with Garrison (2017) [8], who reported that online learning environments promote learner autonomy and self-regulated learning. Additionally, respondents agreed that virtual learning improves communication with lecturers and collaboration with classmates (M = 4.11), supporting Anderson's (2017) [2] argument that virtual learning environments facilitate meaningful interaction and collaborative learning.

3. Challenges of Virtual Learning

Table 2 presents respondents' perceptions regarding challenges associated with virtual learning.

Table 2: Challenges of Virtual Learning

Statement	Mean
Poor internet connectivity affects learning	3.64
Lack of suitable devices creates difficulties	3.77
Technical problems interrupt online classes	3.95
Difficulty staying motivated during online learning	4.07
Virtual learning reduces interaction with lecturers	4.07
Virtual learning limits practical teaching experiences	4.02
Online assessments create challenges	4.19

Overall Mean = 3.96

The findings reveal that respondents experienced several challenges while participating in virtual learning environments. The highest-rated challenge was difficulties associated with online assessments (M = 4.19), indicating concerns regarding assessment procedures, technological reliability, and evaluation methods. This finding supports Dawson (2021) [6], who highlighted online assessment as a major challenge in digital learning environments.

Respondents also reported difficulties maintaining motivation during online learning (M = 4.07) and perceived a reduction in interaction with lecturers (M = 4.07). These findings are consistent with Martin and Bolliger (2018) [14], who found that limited social interaction may negatively affect learner engagement and satisfaction. Furthermore, practical teaching limitations (M = 4.02) were identified as a significant concern, reflecting the unique requirements of teacher education programmes where classroom-based experiences remain essential.

The findings also indicate that internet connectivity and access to technological resources continue to affect virtual learning experiences. Similar challenges were reported by Hayashi *et al.* (2020) [10], who identified technological inequalities and infrastructure limitations as major barriers to online learning in Sri Lanka.

4. Future Prospects of Virtual Learning

Table 3 presents respondents' perceptions regarding the future prospects of virtual learning in teacher education.

Table 3: Future Prospects of Virtual Learning

Statement	Mean
Virtual learning should continue in teacher education programmes	3.81
Blended learning is more effective than traditional learning alone	3.89
Educational technology should be integrated into teacher education courses	3.93
Virtual learning prepares future teachers for digital classrooms	4.20
National Colleges of Education should invest more in online learning facilities	4.21

Overall Mean = 4.01

The findings demonstrate strong support for the continued integration of virtual learning within teacher education programmes. The highest-rated statement was the need for greater investment in online learning facilities (M = 4.21), indicating that students recognize the importance of strengthening technological infrastructure to improve learning experiences.

Respondents also agreed that virtual learning prepares future teachers for digital classrooms (M = 4.20). This finding highlights the growing importance of digital competence in the teaching profession and supports Redecker's (2017) [17]

assertion that educators must develop technological skills to function effectively in contemporary educational environments.

The positive perceptions regarding future integration of virtual learning are consistent with the Technology Acceptance Model (Davis, 1989) [5], which suggests that individuals are more likely to adopt technologies they perceive as useful and beneficial. The findings indicate that teacher students recognize the educational value of virtual learning and support its continued implementation within teacher education programmes.

Overall, the results suggest that while challenges remain, teacher students perceive virtual learning as an effective educational approach that contributes to professional development and prepares future teachers for technology-enhanced educational environments. The findings further indicate that blended learning approaches may provide the most appropriate model for integrating virtual learning into teacher education in Sri Lanka.

Conclusion and Recommendations

This study examined the role of virtual learning in enhancing teacher education from the perspectives of teacher students in Sri Lanka's National Colleges of Education. The study focused on three key dimensions: the effectiveness of virtual learning, the challenges associated with its implementation, and its future prospects within teacher education programmes. Using a quantitative descriptive survey design, data were collected from 44 teacher students and analyzed using descriptive statistical techniques.

The findings revealed that virtual learning is generally perceived as an effective approach to supporting teacher education. The overall mean score for effectiveness (M = 4.05) indicated that respondents recognized the positive contribution of virtual learning to their educational experiences. Among the various benefits identified, virtual learning was particularly valued for promoting independent learning, enhancing communication and collaboration, improving access to learning resources, and supporting the development of digital literacy skills. These findings suggest that virtual learning contributes significantly to the development of competencies that are essential for future educators in increasingly technology-driven educational environments.

Despite these positive perceptions, the study also identified several challenges that affect the effectiveness of virtual learning. Respondents reported difficulties related to online assessments, learner motivation, reduced interaction, technological limitations, and practical teaching experiences. These challenges highlight the need for continuous improvements in technological infrastructure, instructional design, student support systems, and assessment practices. Addressing these barriers is essential to ensure that virtual learning provides meaningful and equitable learning opportunities for all teacher students.

The findings further demonstrated positive attitudes toward the future integration of virtual learning within teacher education. Respondents strongly supported increased investment in online learning facilities and recognized the importance of virtual learning in preparing future teachers for digital classrooms. The results suggest that teacher students view educational technology as an essential component of contemporary teacher preparation and support the continued use of virtual learning within National Colleges of Education.

Based on the findings, several recommendations are proposed. First, National Colleges of Education should strengthen digital infrastructure by improving internet connectivity, expanding access to technological resources, and enhancing online learning platforms. Second, institutions should improve online assessment practices by incorporating diverse and authentic assessment methods that promote fairness and academic integrity. Third, blended learning approaches should be adopted to combine the flexibility of virtual learning with the practical experiences and interpersonal interactions provided through face-to-face instruction. Fourth, teacher education programmes should place greater emphasis on developing digital competencies among both teacher students and teacher educators. Finally, educational policymakers should continue investing in educational technology and supporting initiatives that promote effective technology integration within teacher education.

In conclusion, virtual learning has become an important component of teacher education in Sri Lanka. While challenges remain, the findings indicate that virtual learning offers significant opportunities for enhancing learning experiences, developing digital competencies, and preparing future teachers for technology-enhanced educational environments. The successful integration of virtual learning, particularly through blended learning approaches, has the potential to strengthen teacher education programmes and contribute to the development of competent, adaptable, and technologically skilled educators capable of meeting the demands of twenty-first-century education.

References

1. Al-Rahmi WM, Yahaya N, Alturki U, Alrobai A, Aldraiweesh A, Alsayed AO, *et al*. The role of technology acceptance model factors, perceived enjoyment, and social media use in educational performance among students. Education and Information Technologies,2022:27(3):2895–2917. https://doi.org/10.1007/s10639-021-10755-1
2. Anderson T. The theory and practice of online learning (3rd ed.). Athabasca University Press, 2017.
3. Bozkurt A, Sharma RC, Malik A, Moreno CC, Kurucay M, Altinpulluk H, *et al*. A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. Asian Journal of Distance Education,2020:15(1):1–126.
4. Creswell JW, Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications, 2018.
5. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly,1989:13(3):319–340. https://doi.org/10.2307/249008
6. Dawson P. Defending assessment security in a digital world: Preventing e-cheating and supporting academic integrity in higher education. Routledge, 2021.
7. Etikan I, Musa SA, Alkassim RS. Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics,2016:5(1):1–4. https://doi.org/10.11648/j.ajtas.20160501.11

8. Garrison DR. E-learning in the 21st century: A community of inquiry framework for research and practice (3rd ed.). Routledge, 2017.
9. Graham CR. Current research in blended learning. In M. G. Moore & W. C. Diehl (Eds.), Handbook of distance education (4th ed., pp. 173–188). Routledge, 2021.
10. Hayashi R, Garcia M, Maddawin A, Hewagamage K. Online learning in Sri Lanka's higher education institutions during the COVID-19 pandemic. Asian Development Bank, 2020.
11. Hodges C, Moore S, Lockee B, Trust T, Bond A. The difference between emergency remote teaching and online learning. Educause Review, 2020. https://er.educause.edu
12. Koehler MJ, Mishra P. What is technological pedagogical content knowledge (TPACK)? Contemporary Issues in Technology and Teacher Education,2009:9(1):60–70.
13. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence unleashed: An argument for AI in education. Pearson Education, 2022.
14. Martin F, Bolliger DU. Engagement matters: Student perceptions on the importance of engagement strategies in online learning. Online Learning Journal,2018:22(1):205–222. https://doi.org/10.24059/olj.v22i1.1092
15. Moore MG, Kearsley G. Distance education: A systems view of online learning (4th ed.). Cengage Learning, 2019.
16. Piaget J. Science of education and the psychology of the child. Orion Press, 1970.
17. Redecker C. European framework for the digital competence of educators: DigCompEdu. Publications Office of the European Union, 2017.
18. Siemens G. Learning analytics: The emergence of a discipline. American Behavioral Scientist,2013:57(10):1380–1400. https://doi.org/10.1177/0002764213498851
19. UNESCO. Reimagining our futures together: A new social contract for education. UNESCO Publishing, 2021.
20. UNESCO. Global education monitoring report 2023: Technology in education. UNESCO Publishing, 2023.
21. Vygotsky LS. Mind in society: The development of higher psychological processes. Harvard University Press, 1978.
22. World Bank. Digital transformation in education systems. World Bank Publications, 2022.