ISSN: 2583-7354

International Journal of Emerging Knowledge Studies

Publisher's Home Page: https://www.ijeks.com/

Fully Open Access Research Paper

Effectiveness of online learning as an alternative to traditional classrooms by students' and lecturers' perceptions

E.M.Y. Sachith[1*] R.B.N. Chinthani[2] H.K.D.K.S. Perera[3] H.K.C. Darshana[4]

[1]Lecturer, Department of Planning & Evaluation, National Institute of Education, Sri Lanka.

[2]Senior Lecturer, Department of Examination, National Institute of Education, Sri Lanka.

[3]Educationist, Department of Planning & Evaluation, National Institute of Education, Sri Lanka.

[4]Teacher, MR/Radampola Sri Sumanagala MV, Dikwella, Sri Lanka.

DOI: https://doi.org/10.70333/ijeks-05-02-024

*Corresponding Author: sachith253@gmail.com

Article Info: - Received : 07 January 2026 **Accepted** : 25 February 2026 **Published** : 28 February 2026

Abstract

The rapid expansion of online learning during the COVID-19 pandemic and subsequent socio-economic disruptions positioned digital education as a critical alternative to traditional classroom instruction in Sri Lanka. Yet, limited empirical evidence exists regarding the perceptions of students and lecturers engaged in professional development programmes offered by the National Institute of Education (NIE). This study evaluates the effectiveness of online learning as an alternative mode of instruction across BEd, PGDE, and MEd programmes using a mixed-method convergent parallel design. Quantitative data were collected from 420 students and qualitative data from 30 lecturers, triangulated through thematic analysis. Findings identify significant tensions between accessibility, flexibility, and learner autonomy on one hand, and interaction, assessment quality, and technological constraints on the other. The study draws on the Community of Inquiry Framework, Transactional Distance Theory, and self-regulated learning perspectives to interpret stakeholder experiences. Results demonstrate that online learning offers substantial advantages for working and adult learners yet requires improved instructional design, robust technological infrastructure, and enhanced student support to achieve parity with face-to-face instruction. Recommendations include adopting blended learning strategies, strengthening institutional preparedness, redesigning assessment practices, and enhancing teacher professional development to ensure sustained online learning effectiveness within the Sri Lankan higher education context.

Keywords: online learning, perceptions, teacher education, blended learning, mixed methods.

ISSN: 2583-7354

1. Introduction

The rapid growth of online learning has brought a major transformation to educational practices across the world. Higher education institutions, in particular, have increasingly adopted digital technologies to ensure continuity of teaching and learning **(Adedoyin &Soykan, 2020; Dhawan, 2020)**.Higher education institutions, in particular, have increasingly adopted digital technologies to ensure continuity of teaching and learning. In Sri Lanka, the National Institute of Education (NIE), which is the main institution responsible for the professional development of educators, shifted its BEd, PGDE, and MEd programmes to online delivery during the COVID-19 pandemic and the national disruptions that followed. This shift had important implications for instructional quality, learner engagement, access to resources, and the overall effectiveness of these programmes **(Hayashi et al., 2020; Hettiarachchi et al., 2021).**

Although international literature has widely discussed the challenges of emergency remote teaching, including unequal access to technology, limited digital competence, and concerns regarding assessment integrity, the Sri Lankan context adds further complexity **(Adedoyin &Soykan, 2020; Pokhrel & Chhetri, 2021).**These complexities arise from infrastructural limitations as well as from the diverse professional and personal backgrounds of the learners. A large proportion of students in NIE programmes are in-service teachers who must balance academic work with employment, family responsibilities, and other personal commitments. For this reason, understanding their experiences and perceptions of online learning is essential for designing more effective programme models **(Hayashi et al., 2020; Hettiarachchi et al., 2021)**.

The background of the study also points to the need to evaluate the usefulness of online learning and its practical significance for educators, policymakers, and educational administrators in Sri Lanka. At the same time, the study addresses an important gap in the literature by contributing to the limited body of research on online learning perceptions in developing countries and by extending current discussions on challenges and quality assurance in digital learning environments. Against this background, the present study investigates how students and lecturers in NIE programmes perceive the effectiveness, challenges, and pedagogical value of online learning. Through a mixed-method approach, the study analyses demographic patterns, lived experiences, and statistical associations in order to examine whether online learning can function as a viable and sustainable alternative to face-to-face instruction.

The study is guided by the following overarching aim: to evaluate the effectiveness of online learning as an alternative to traditional classroom instruction across selected professional development programmes at the NIE. This aim is consistent with the methodological position that both quantitative and qualitative evidence are necessary to develop a fuller understanding of stakeholder perceptions and experiences **(Creswell & Creswell, 2018).**

2. Objectives of the study

The study's primary aim is to evaluate the effectiveness of online learning as an alternative to traditional classrooms in NIE courses in Sri Lanka. The specific objectives are:

- Toassess the perceptions of students and lecturers towards online learning.
- To identify factors that affect the challenges and concern encountered during online teaching and learning
- To propose actionable strategies to enhance the effectiveness of online education

3. Literature Review

The use of online learning is becoming an important form of instruction. Its effectiveness, however, is highly dependent on how far it can facilitate interaction, engagement, autonomy, and access. Several theoretical approaches can be used to describe how learners perceive online space and why certain issues are more prominent in online classes than in regular classes.

4. Community of Inquiry (CoI) Framework

Community of Inquiry (CoI) framework can be used as an effective framework of comprehending learning experiences in online contexts. It provides that an effective educational experience is based on three connected types of presence, including cognitive presence, social presence, and teaching presence **(Garrison et al.,**

2000). Cognitive presence is the capacity of the learner to build and validate meaning by reflecting and discussing. Social presence is the level at which learners perceive that they are part of others in the learning community. Teaching presence encompasses design, facilitation and direct instruction that lead to the learning process. These dimensions play a vital role as they influence the satisfaction of the students, their participation, and engagement in online learning environments.

The applicability of this framework is supported by empirical studies. **Peacock and Cowan (2019)** discovered that good teaching presence leads to better understanding and a sense of confidence among learners, whereas **Kilis and Yildirim (2019)** have highlighted that social presence is the key to maintaining motivation and eliminating feelings of isolation **(Peacock & Cowan, 2019; Kilis & Yildirim, 2019)**. The lack of such types of presence during the pandemic often led to reduced levels of engagement, especially when students did not have many chances to be actively **(Rapanta et al., 2020).**

CoI framework is especially applicable to NIE programmes due to the fact that the learners have varying technological, social, and professional backgrounds. This diversity has a bearing on how they engage in online learning. The challenges mentioned in sustaining discussion, tracking engagement, and facilitating collaboration are expected in the context of weakened social and teaching presence, as the CoI framework would suggest.

5. Transactional Distance Theory

The theory of transactional Distance Theory (TDT) is concerned with the psychological and communicative distance that may arise between the learners and the instructors in online learning environments **(Moore, 1993).** The distance is affected by dialogue, structure, and autonomy among the learners. In situations where there is little opportunity to dialogue and the learning system is too fixed; the transactional distance is high and consequently the satisfaction and learning results become reduced.

The literature points out that transactional distance was particularly evident in the case of emergency online learning where communication was frequently delayed and the learners lacked the chance to pursue clarification. **Martin et al. (2020)** demonstrated that minimal conversation and less instructor engagement made students uncertain, whereas **Huang et al. (2022)** demonstrated that performance and transactional distance might be reduced with the help of interactive course design **(Martin et al., 2020; Chen, 2023)**. High transactional distance was also commonly perceived by NIE students, particularly those who are teaching full-time, as a sense of uncertainty, lack of motivation, and the inability to access instant support. This theoretical orientation can be used to explain why learners have occasionally appreciated the flexibility of online learning and at the same time complained about communication and feedback.

6. Self-Regulated Learning (SRL)

In online education, self-regulated learning plays a significant role particularly due to the fact that the learner is supposed to be more autonomous in terms of time, motivation, and studying habits. According to **Zimmerman (2000),** self-regulated learning is a cyclic process that entails planning, monitoring and reflection. Research has consistently shown that students with stronger self-regulation skills are better able to handle the demands of online learning **(Zimmerman, 2000; Broadbent & Poon, 2015).** Self-regulated learning is also identified in the literature as an important factor influencing learner satisfaction and effectiveness in digital settings. **Broadbent and Poon (2015)** found that planning and organizational skills were strongly associated with academic success in online learning. During the pandemic, many students struggled to remain motivated and to manage workload effectively, as shown by **Pelikan et al. (2021) and Wong et al. (2021) (Pelikan et al., 2021; Wong et al., 2021)**. NIE students, many of whom are working teachers, often appreciated the flexibility of online learning, although competing demands affected their participation. In this context, self-regulated learning provides a useful lens for understanding procrastination, cognitive overload, and reduced engagement.

7. Student and Lecturer Perceptions of Online Learning

7.1. Student Perceptions

Past studies indicate that students tend to appreciate online learning due to convenience and flexibility of access, yet, concurrently, they are

concerned about interaction, feedback, and evaluation. According to the studies carried out by **Allen and Seaman (2017) and Castro and Tumibay (2021)**, online learning is usually perceived as helpful and sometimes isolating. **Aguilera-Hermida (2020)** noted that the adaptability of students in the context of the pandemic highly depended on their emotional preparedness and access to digital tools, whereas **Hayashi et al. (2020)** discovered that the satisfaction of learners in Sri Lanka strongly depended on internet stability and digital literacy **(Aguilera-Hermida, 2020; Castro &Tumibay, 2021; Hayashi et al., 2020).**

These general tendencies also corresponded to NIE students, who valued the flexibility of online education, yet they still were worried about the lack of interaction, bad connectivity, and the inability to coordinate academic and professional and personal life.

7.2. Lecturer Perceptions

Another set of problems that lecturers had to face was also critical. Though most of them acknowledged that they needed to teach online, they also said that they had a challenge in terms of monitoring their student engagement, redesigning their lessons to be delivered online, and assessing the integrity of the work. Research indicates that the experiences of lecturers vary according to the level of institutional support that they get and their previous experiences in digital pedagogy **(Kebritchi et al., 2017; Gamage et al., 2020)**.

The literature also indicates the concerns of lecturers who include the issue of growing workload, delays in feedback, and the inability to provide the practical teaching skills in the online setting. The current research also included these concerns since lecturers frequently mentioned that online teaching was only necessary but challenging and constraining pedagogically.

7.3. Institutional Preparedness and Infrastructure

The move toward online learning revealed major differences in institutional preparedness across the world. **Johnson et al. (2020)** found that institutions with established digital infrastructure and staff training mechanisms were better able to adapt to sudden transitions **(Baran & Correia, 2014; Hayashi et al., 2020)**. In the case of the NIE, readiness varied depending on internet access, device availability, and familiarity with online platforms.

The literature emphasizes the need for continuous professional development for lecturers, particularly in digital pedagogy **(Baran & Correia, 2014),** At the same time, evidence highlights that stable internet access and user-friendly learning platforms are central to successful online education **(Hayashi et al., 2020; Widger et al., 2023)**. These findings suggest that online learning effectiveness cannot be separated from institutional preparedness and broader infrastructural support.

7.4. Enhancing Online Learning: Blended Learning and Assessment Reform

Blended learning has been widely recognized as an effective way of combining the strengths of online and face-to-face instruction. Studies by **Atmacasoy and Aksu (2018)** and **Heinonen et al. (2019)** show that blended learning can improve engagement, skill development, and overall satisfaction **(Atmacasoy& Aksu, 2018; Salta et al., 2022).** In teacher education programmes, where both flexibility and interaction are important, blended learning appears particularly relevant.

Assessment has also emerged as an area in need of reform. Online assessment often raises concerns regarding fairness, academic integrity, and technological disruption. The literature increasingly supports the use of authentic, continuous, and competency-based assessment methods in digital and blended environments **(Boud & Soler, 2021; Rapanta et al., 2020).** This suggests the need to redesign assessment strategies so that they better align with the realities of online teaching and learning.

8. METHODOLOGY

8.1. Research Design

This study adopted a convergent parallel mixed-method design, which is widely recognized as an appropriate approach for examining complex educational issues that require both numerical analysis and qualitative interpretation. The rationale for selecting a mixed-method design lies in the understanding that combining quantitative and qualitative evidence provides a more comprehensive and trustworthy explanation of stakeholder perceptions and challenges.

In this design, both forms of data were collected during the same phase, analysed independently, and then brought together at the interpretation stage. This integration of findings strengthens the credibility of the study and allows deeper insights to emerge, especially where quantitative patterns require explanation through qualitative evidence.

The quantitative component helped identify broader patterns in student perceptions, such as levels of satisfaction, barriers encountered, and general responses to online learning. The qualitative component, based on semi-structured interviews with lecturers, offered detailed insights into pedagogical experiences, institutional constraints, and contextual realities that could not be captured fully through numerical data alone. In this way, the research design allowed for a balanced and comprehensive examination of the research problem.

8.2. Target Population and Sample

The study population consisted of students enrolled in the B.Ed, PGDE, and M.Ed programmes conducted by the NIE, with a total enrolment of 10,200 learners. This population included 4,600 B.Ed students, 5,100 PGDE students, and 500 M.Ed students. Because of the size of the population, a sample was selected in order to make the study manageable while still ensuring adequate representation. Using Solvin's formula, a final sample of 420 students was determined. Stratified sampling was then applied to ensure proportional representation from each programme, thereby reflecting the diversity of the student body.

The lecturer population was drawn from different faculties and subject areas, and the study included a sample of 30 lecturers selected using probability sampling. This made it possible to include lecturers with different levels of experience in online teaching, varying subject backgrounds, and diverse levels of technological competence. Together, the student and lecturer samples provided a sufficiently broad basis for examining both learner and instructor perspectives.

8.3. Data Collection Instruments

Three types of instruments were used to collect data: a student questionnaire, a lecturer interview guide, and documentary analysis.

8.4. Student Questionnaire

A structured questionnaire was designed on the basis of themes identified from the literature review and institutional context. The questionnaire included Likert-scale items measuring perceptions of accessibility, interaction, engagement, clarity of instruction, assessment, and overall satisfaction. It also included open-ended questions that allowed students to describe their experiences in their own words. The instrument was reviewed for clarity and relevance and was pilot tested before administration to improve validity and usability.

8.5. Lecturer Interviews

Semi-structured interviews were conducted with lecturers in order to gather deeper qualitative insights into their experiences with online teaching. The interview protocol included questions related to instructional strategies, challenges, student engagement, communication, and assessment concerns. These interviews were useful in uncovering issues that could not be adequately captured through structured survey responses alone.

8.6. Documentary Analysis

Documentary analysis involved reviewing NIE circulars, programme-related documents, learning management system reports, student feedback forms, and internal evaluations. These documents provided valuable contextual information on institutional expectations, policies, and operational challenges associated with digital learning. The combination of these three instruments ensured triangulation and strengthened the validity of the findings.The combination of instruments ensured triangulation and enhanced the validity of the study.

8.7. Data Analysis

The selection of research methodology is guided by the research objectives, necessitating careful so consideration of whether the research is exploratory or confirmatory in nature. It is crucial to choose appropriate methods, such as qualitative data collection and analytical techniques, accordingly.

8.8. Quantitative Analysis

Quantitative data were analysed using descriptive statistics such as frequencies,

percentages, and cross-tabulations. These analyses helped identify patterns in student perceptions related to satisfaction, interaction, technological barriers, and assessment concerns. In addition, chi-square tests were used to examine associations between demographic variables and perceptions of online learning. These analyses revealed significant patterns, especially in relation to digital confidence and perceived workload.

8.9. Qualitative Analysis

Qualitative data from lecturer interviews and open-ended questionnaire responses were analysed thematically. An inductive coding process was used to identify recurring categories and patterns in the data. Themes such as technological difficulties, limited interaction, assessment concerns, and emotional fatigue emerged consistently across responses. This approach made it possible to identify deeper meanings and contextual influences shaping participant perceptions.

After conducting the separate analyses, quantitative and qualitative findings were integrated in order to generate a more comprehensive interpretation. Areas where the two datasets converged—such as concerns about interaction, assessment validity, and the preference for blended learning—were regarded as especially strong findings. Areas of divergence were also examined to better understand variation across different participant groups. This integrated interpretation improved the reliability of the study and supported the development of grounded recommendations.

8.10. Ethical Considerations

Ethical guidelines were followed throughout the study to ensure the protection of participants and the integrity of the research process. Ethical approval was obtained from the NIE Research Management Committee prior to data collection. All participants were informed about the purpose of the study, the procedures involved, the voluntary nature of their participation, and their right to withdraw at any stage without negative consequences.

Data were handled carefully to prevent unauthorized access. Digital files were stored securely, identifying details were removed, and pseudonyms were used when reporting qualitative evidence. The study was guided by the ethical principles of respect, beneficence, and justice, ensuring fair treatment of participants and responsible reporting of findings.

9. Results

This section presents the empirical findings of the study based on the quantitative and qualitative data collected from lecturers and students enrolled in the Bachelor of Education (B.Ed), Postgraduate Diploma in Education (PGDE), and Master of Education (M.Ed) programmes conducted by the National Institute of Education (NIE), Sri Lanka. The findings are organized according to the research objectives in order to provide a systematic explanation of the effectiveness of online learning within the institutional context. Both descriptive interpretations and statistical analyses were used to understand the perceptions, challenges, and demographic variations associated with online teaching and learning.

9.1. Perceptions of Students and Lecturers Towards Online Learning

The first objective of the study was to examine the perceptions of lecturers and students toward online learning implemented in the NIE programmes. The findings indicate that both lecturers and students held mixed perceptions regarding the effectiveness of online learning, recognizing both its advantages and limitations within the context of teacher education.

9.2. Lecturer Perceptions of Online Learning

From the lecturers' perspective, online learning was widely recognized as a practical and necessary alternative mode of instruction, particularly during periods when traditional face-to-face classroom teaching was disrupted. Lecturers acknowledged that online platforms enabled the continuation of academic programmes without major interruptions, allowing them to maintain the scheduled delivery of course content. Digital learning environments also enabled lecturers to distribute materials such as lecture slides, reading resources, recorded lessons, and supplementary instructional content efficiently.
Several lecturers emphasized that online teaching offered greater flexibility in terms of scheduling and accessibility. In particular, the possibility of uploading recorded lectures and digital resources allowed students to revisit difficult concepts

independently. From an instructional point of view, this flexibility also enabled lecturers to integrate multimedia resources and digital tools that supported theoretical teaching.

At the same time, lecturers identified several major limitations associated with online teaching. One of the most frequently mentioned concerns was the absence of meaningful interaction between lecturers and students. In conventional classroom settings, lecturers depend heavily on facial expressions, body language, and spontaneous questions to assess understanding and engagement. In the online setting, however, many students kept their cameras and microphones switched off, which reduced these opportunities. As a result, lecturers often found it difficult to determine whether students were actively following the lesson or struggling with the content.

Lecturers also noted that online teaching required additional preparation and instructional planning. Lessons had to be redesigned to fit digital delivery, and extra time was often required to prepare teaching materials and manage online platforms. In addition, lecturers explained that the effectiveness of online learning varied according to the nature of the subject matter. While theoretical and lecture-based topics could be delivered relatively effectively through online platforms, subjects requiring practical demonstrations, collaborative activities, or extensive discussion were more difficult to handle.

Another important concern raised by lecturers was the credibility and reliability of online assessment practices. Many expressed uncertainty about whether students completed examinations independently in online settings. The absence of direct supervision raised concerns about fairness and academic integrity, leading some lecturers to view online assessment as less dependable than traditional classroom-based evaluation.

Lecturers recognized the importance of online learning as an alternative instructional strategy, but they generally emphasized that it should complement rather than replace face-to-face teaching.

9.3. Student Perceptions of Online Learning

Students also expressed both positive and negative perceptions of online learning. One of the most frequently mentioned advantages was the flexibility and convenience provided by online classes. Many students indicated that online learning removed the need for long-distance travel to attend lectures at the NIE, thereby saving both time and transportation costs. This benefit was particularly important for students who were already working as teachers or education professionals.

For many in-service teachers enrolled in postgraduate programmes, online learning made it possible to continue their studies while managing professional duties. Students explained that the online mode gave them an opportunity to remain engaged in higher education without interrupting their teaching responsibilities. Within the context of teacher professional development, this flexibility emerged as one of the most valuable strengths of online learning.

Another major benefit identified by students was the availability of recorded lectures. Students noted that recorded sessions allowed them to revisit difficult topics, review lecture content, and clarify concepts at their own pace. This supported independent learning and became particularly valuable during examination preparation, when students could rewatch important sections whenever necessary.

Despite these advantages, students also reported several challenges. A major concern was the lack of interaction and engagement during online classes. Many indicated that online lectures often felt less interactive than classroom-based sessions. Opportunities for discussion, group work, and collaborative learning were limited, which at times resulted in passive learning experiences.

Students also reported reduced motivation and engagement during prolonged online sessions. Some participants explained that long hours of screen exposure caused fatigue and made it difficult to maintain concentration. In addition, the absence of face-to-face communication with lecturers and peers contributed to feelings of isolation among some students.

10. Factors Affecting Challenges Encountered During Online Teaching and Learning

The second objective of the study was to identify the factors contributing to the challenges encountered during online teaching and learning. The analysis showed that these challenges were shaped by several interconnected dimensions, including technological, pedagogical, environmental, and psychological factors.

10.1. Technological Limitations

Technological limitations emerged as the most significant barrier affecting the effectiveness of online learning. A large proportion of students reported unstable internet connectivity and frequent network interruptions during online classes. These disruptions often caused them to miss important explanations and prevented active participation in real-time discussions.

In addition to connectivity problems, power interruptions also affected students' ability to attend classes consistently. These difficulties were particularly serious for students living in rural areas, where digital infrastructure and electricity supply were often less stable.

10.2. Device Accessibility

Device accessibility also played a major role in shaping students' learning experiences. Many students relied primarily on smartphones rather than laptops or desktop computers to attend online classes. Although smartphones enabled access to online platforms, they often limited full engagement with digital learning materials. Presentation slides were harder to view, typing responses was more difficult, and participation in online discussions was less convenient on smaller screens.

Students using smartphones also reported difficulties in completing assignments and accessing digital platforms that were designed mainly for computer-based use. As a result, device limitations created additional barriers to effective participation.

10.3. Interaction and Communication Barriers

Another major challenge identified in the study was the limited interaction between lecturers and students in online learning environments. Students reported that it was often difficult to ask questions or contribute to discussions during online sessions. Similarly, lecturers indicated that limited student responses made it difficult to assess whether the lesson content had been understood.

In traditional classroom settings, interaction occurs more naturally through spontaneous discussions, group activities, and immediate feedback. In contrast, online classes often became lecture-centered, which reduced opportunities for collaborative learning and sometimes left students feeling disconnected from the learning process.

10.4. Environmental Factors

Environmental conditions also influenced students' learning experiences. Many attended classes from home settings that were not always suitable for study. Noise, household duties, and limited study space created distractions that reduced concentration during online lectures.

These findings show that online learning cannot be understood only in terms of technology and pedagogy; students' home learning conditions also play an important role in shaping their experiences.

10.5. Psychological and Motivational Factors

The study also identified psychological and motivational challenges associated with prolonged online learning. Several students reported fatigue due to extended screen time, while others indicated that online environments reduced their motivation to participate actively in class.

Feelings of isolation were also mentioned, particularly because online classes lacked the social interaction typically experienced in traditional classroom settings. These findings suggest that online learning affects not only technological participation but also students' emotional and motivational engagement.

10.6. Impact of Demographic Variations on Perceptions of Online Learning

The third objective of the study was to examine whether demographic variables influenced perceptions and experiences of online learning. To address this objective, chi-square tests of independence were conducted to examine relationships between selected demographic variables and key indicators related to online learning.

10.7. Teaching Experience and Lecturer Confidence

The results revealed a statistically significant relationship between teaching experience and lecturers' confidence in using online teaching platforms ($\chi^2 = 33.04$, $p < 0.05$). Interestingly, lecturers with three to five years of teaching experience demonstrated lower levels of confidence compared with both early-career lecturers and those with longer teaching experience.

Table-1: teaching experience and lecturers' confidence in using online teaching platforms

Teaching Experience	Low Confidence (Disagree)		Neutral		Agree		Strongly Agree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
1–2 years	0	0.0%	0	0.0%	4	44.4%	5	62.5%	9	28.1%
3–5 years	8	100.0%	7	100.0%	0	0.0%	0	0.0%	15	46.9%
6–10 years	0	0.0%	0	0.0%	5	55.6%	3	37.5%	8	25.0%
Total	**8**		**7**		**9**		**8**		**32**	

$\chi^2 = 33.04$, $p = 0.001 < 0.05$
Source: Survey data

One possible explanation for this finding is that early-career lecturers may be more familiar with digital technologies due to their recent exposure to technology-enhanced learning environments during their academic training. Meanwhile, more experienced lecturers may have developed greater confidence through accumulated teaching experience and repeated exposure to different instructional methods.

10.8. Gender Differences in Perceived Workload

Another Chi-square analysis examined the relationship between student gender and perceptions of workload stress associated with online learning. The results indicated a statistically significant association between gender and perceived workload overload ($\chi^2 = 59.91$, $p < 0.05$). Male students were more likely to report feeling overwhelmed by the volume of online coursework compared with female students.

Table-2: Gender and Overwhelmed by Online Workload

Gender	Agree		Neutral		Disagree		Strongly Agree		Strongly Disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Female	79	36.4 %	105	66.9 %	39	83.0 %	4	28.6 %	4	100.0 %	231	52.6 %
Male	138	63.6 %	52	33.1 %	8	17.0 %	10	71.4 %	0	0.0%	208	47.4 %
Total	217	100 %	157	100 %	47	100 %	14	100 %	4	100%	439	100 %

$\chi^2 = 59.91$, $p = 0.001 < 0.05$
Source: Survey data

This finding suggests that perceptions of academic workload and stress may vary across demographic groups. Differences in coping strategies, learning habits, and time-management skills may influence how students respond to the demands of online learning environments.

Finally, these findings highlight the importance of considering demographic diversity when designing and implementing online learning programmes. Educational institutions should therefore develop inclusive teaching strategies and support mechanisms that respond to the diverse needs of both lecturers and students.

11. Discussion

This study examined the effectiveness of online learning implemented in teacher education programmes conducted by the National Institute of Education (NIE), Sri Lanka. The discussion interprets the empirical findings in relation to the research objectives and places them within wider scholarly debates on online and digital learning in higher education. The findings provide important insights into how lecturers and students experience online learning environments, the challenges that shape teaching and learning processes, and the role of demographic variables in influencing these experiences.

11.1. Perceptions of Lecturers and Students toward Online Learning

The findings related to the first objective indicate that lecturers and students held mixed perceptions regarding the effectiveness of online learning. While participants acknowledged the benefits of digital learning environments, several limitations were also identified, particularly in relation to interaction, engagement, and pedagogical effectiveness.

One of the most significant advantages identified in the study was the flexibility offered by online learning. Students reported that online classes reduced travel time and enabled them to balance academic responsibilities with professional and personal commitments. This finding is especially relevant to NIE programmes, where many students are practising teachers pursuing postgraduate qualifications while maintaining full-time employment. In this context, online learning enabled working professionals to continue their education without stepping away from their professional duties. Previous research has consistently identified flexibility as one of the major strengths of online learning, particularly for adult learners engaged in professional development **(Adedoyin &Soykan, 2020; Dhawan, 2020)**.

Another positive aspect emphasized by students was the availability of recorded lectures. Recorded sessions allowed students to revisit difficult topics, review lecture materials, and engage in self-paced learning. This feature also supports the development of self-regulated learning strategies, which are particularly important in online environments **(Broadbent & Poon, 2015; Pelikan et al., 2021)**. The ability to revisit lecture content multiple times may contribute to deeper understanding and improved performance.

Despite these advantages, the findings also revealed significant concerns regarding limited interaction and reduced engagement in online learning environments. Lecturers reported difficulty in assessing student understanding because non-verbal cues such as facial expressions and body language were largely absent in online classes. In traditional classroom settings, these cues provide immediate feedback that helps lecturers adapt teaching strategies in real time. In online learning environments, however, opportunities for spontaneous interaction and instant feedback are reduced.

Students expressed similar concerns about the lack of discussion and collaborative learning. Several participants indicated that online classes often became lecture-centered and lacked the interactive qualities of face-to-face classrooms. These findings are consistent with the Community of Inquiry (CoI) framework, which emphasizes the importance of social presence, cognitive presence, and teaching presence in effective online learning **(Garrison et al., 2000; Peacock & Cowan, 2019; Rapanta et al., 2020)**. When interaction is limited, social presence weakens, which in turn may reduce engagement and learning effectiveness.

Another important finding is that the effectiveness of online learning appears to vary depending on the nature of course content. Lecturers indicated that theoretical subjects could be delivered relatively effectively through online platforms, whereas courses that required practical demonstrations, group discussion, or collaborative activity were more difficult to conduct in virtual

environments. This supports earlier studies suggesting that online learning is often more effective for knowledge-based instruction than for learning tasks that rely heavily on hands-on practice or intensive interpersonal communication **(Kebritchi et al., 2017; Rapanta et al., 2020)**.

Overall, the findings suggest that while online learning provides important benefits in terms of accessibility and flexibility, it cannot fully reproduce the interactive and collaborative strengths of traditional classroom teaching. For this reason, many lecturers appeared to view online learning as a complementary approach rather than a full substitute for face-to-face instruction.

11.2. Factors Affecting Challenges Encountered During Online Teaching and Learning

The findings related to the second objective demonstrate that the challenges associated with online learning are multidimensional and interconnected. These challenges involve technological, pedagogical, environmental, and psychological factors, all of which influence the effectiveness of online teaching and learning.

Technological limitations emerged as the most significant barrier affecting online learning in this study. Many students reported unstable internet connections and repeated interruptions during online classes. These disruptions prevented them from fully following lecture content and participating actively in discussions. These findings are in line with previous studies from developing countries, where limited digital infrastructure continues to constrain the successful implementation of online education **(Adedoyin &Soykan, 2020; Pokhrel & Chhetri, 2021; Hayashi et al., 2020)**.

Device accessibility also played an important role in shaping students' online learning experiences. A considerable number of students relied primarily on smartphones rather than laptops or desktop computers. Although smartphones provide convenient access to online platforms, they often limit students' ability to interact effectively with course materials, participate in discussions, and complete academic tasks. This finding highlights the need to ensure equitable access to suitable digital devices.

Another major challenge identified was the reduction of interaction and communication opportunities in online environments. Students frequently reported difficulty asking questions during lectures, while lecturers indicated that limited student responses made it difficult to assess understanding. In traditional classrooms, interaction often happens naturally through dialogue, collaborative tasks, and immediate feedback. In online environments, however, interaction may become restricted, especially when teaching is organized in a lecture-based format **(Garrison et al., 2000; Salta et al., 2022)**.

Environmental conditions also significantly influenced students' learning experiences. Many students attended classes from home environments that were not always suitable for study due to noise, limited study space, and household responsibilities. These distractions reduced concentration and participation during online sessions. This finding highlights the fact that online learning is shaped not only by the digital platform itself but also by the social and domestic environments in which students learn.

In addition to these external barriers, the study also identified psychological and motivational factors affecting online learning. Students reported fatigue, reduced motivation, and difficulty maintaining concentration during long online sessions. Extended screen time and limited social interaction also contributed to feelings of isolation among some participants. Such psychological challenges can negatively influence engagement and academic performance **(Aguilera-Hermida, 2020; Pelikan et al., 2021)**.

Taken together, these findings suggest that improving online learning effectiveness requires more than technological investment alone. It also requires attention to pedagogical design, students' home learning conditions, and learner well-being.

11.3. Impact of Demographic Variations on Perceptions of Online Learning

The findings related to the third objective indicate that demographic variables influenced participants' experiences and perceptions of online learning. Statistical analysis revealed significant associations between certain demographic characteristics and attitudes toward online teaching and learning.

One important finding was the relationship between teaching experience and lecturers' confidence in using online teaching platforms. Interestingly, lecturers with three to five years of teaching experience demonstrated lower

confidence than both early-career and more experienced lecturers. One possible explanation is that younger lecturers may be more familiar with digital technologies due to their recent exposure to technology-enhanced learning during academic training. Conversely, more experienced lecturers may have developed confidence gradually through longer exposure to varied instructional methods. Another significant finding was the association between student gender and perceptions of workload stress in online learning environments. Male students were more likely than female students to report feeling overwhelmed by the volume of online coursework. This suggests that academic stress and workload may be experienced differently across demographic groups, possibly due to differences in learning strategies, time management, or coping mechanisms **(Pelikan et al., 2021)**.

These findings highlight the importance of considering demographic diversity when planning and implementing online learning programmes. Educational institutions should ensure that professional development initiatives, student support services, and instructional strategies are responsive to the varied needs and experiences of both lecturers and students.

The discussion as a whole shows that online learning has created valuable opportunities for expanding access to higher education and supporting flexible participation. However, the findings also make it clear that technological, pedagogical, and contextual barriers must be addressed if online learning is to become more effective.

While online learning appears to function well for theoretical instruction and flexible participation, it is less effective in promoting interaction, engagement, and collaborative learning. Consequently, the findings of this study support the adoption of blended learning approaches, which combine the accessibility and flexibility of online learning with the interactive strengths of traditional classroom teaching **(Atmacasoy& Aksu, 2018; Salta et al., 2022)**.

Blended learning may therefore provide a more balanced and sustainable instructional model for teacher education programmes, allowing institutions to preserve flexibility while maintaining opportunities for direct interaction, discussion, and practical learning activities.

12. Conclusion

This study examined the effectiveness of online learning implemented in teacher education programmes conducted by the National Institute of Education (NIE), Sri Lanka. By exploring the perceptions of lecturers and students, identifying the major challenges encountered during online teaching and learning, and examining the influence of demographic variables, the study provides a comprehensive understanding of both the opportunities and limitations associated with online learning in the context of teacher professional development.

The findings indicate that online learning played a crucial role in maintaining continuity of education during periods when traditional classroom instruction was disrupted. Both lecturers and students acknowledged the flexibility and accessibility provided by online learning platforms. In particular, the ability to access recorded lectures and participate remotely enabled many in-service teachers to continue their studies while managing professional responsibilities.

At the same time, the study identified several limitations affecting the overall effectiveness of online learning. Reduced interaction between lecturers and students, technological barriers such as unstable internet connectivity, and environmental distractions within home learning settings were identified as major obstacles. In addition, psychological issues such as reduced motivation and feelings of isolation affected some students during prolonged online learning experiences.

The findings also demonstrate that demographic factors influence perceptions of online learning. Differences in lecturers' confidence and students' perceptions of workload underline the importance of recognizing the diverse characteristics of participants when designing online learning environments. Overall, the study suggests that while online learning provides valuable opportunities for flexible education delivery, it cannot fully replace the interactive and collaborative strengths of face-to-face instruction. For this reason, the integration of online and traditional teaching approaches through blended learning models appears to offer a more effective and sustainable way forward for teacher education programmes.

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Cite this article as: E.M.Y. Sachith and et al (2026). Effectiveness of online learning as an alternative to traditional classrooms by students' and lecturers' perceptions. International Journal of Emerging Knowledge Studies. 5(2), pp. 222–236. https://doi.org/10.70333/ijeks-05-02-024