Journal of Education and e-Learning Research
Vol. 13, No. 1, 38-47, 2026
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/jeelr.v13i1.8202

Post-pandemic blended learning: How learners utilise technology for academic success

Conny Khosa[1]✉
Abueng Molotsi[2]

[1,2]*University of South Africa, South Africa.*
[1]*Email: connyekhosa@gmail.com*
[2]*Email: molotar@unisa.ac.za*


(✉ Corresponding Author)

Abstract

The COVID-19 pandemic's disruption forced secondary schools to adopt blended learning strategies. After the outbreak, learners used various online tools to learn both synchronously and asynchronously outside the classroom. This research aimed to analyze how secondary school learners utilize technology for learning in a blended environment following the COVID-19 epidemic. A random sample of 334 learners, who received instruction through a blended approach, was drawn from five secondary schools in the Tshwane West District of Gauteng province to provide data for this quantitative study. The study was guided by the Complex Adaptive Blended Learning System framework, and the mean and standard deviation were used for data analysis. The findings showed that learners used blended learning to communicate with classmates and teachers, learn independently using internet resources, and schedule their time to complete assignments. However, the findings also revealed the digital divide issue. Learners lacked the necessary technological skills and devices to complete online tests. These challenges made it difficult for learners to participate in online assessments outside the classroom. The study recommends providing learners with training on how to use various Learning Management Systems for online tests. Schools should create an ICT policy to guide the use of blended learning.

Keywords: Blended learning, Digital divide, Learner, Online learning resources, Real-time learning, Technology.

Citation | Khosa, C., & Molotsi, A. (2026). Post-pandemic blended learning: How learners utilise technology for academic success. *Journal of Education and E-Learning Research, 13*(1), 38–47. 10.20448/jeelr.v13i1.8202
History:
Received: 5 May 2025
Revised: 15 December 2025
Accepted: 22 January 2026
Published: 20 February 2026

Publisher: Asian Online Journal Publishing Group

Funding: The authors received no financial support for the research. The APC for this article was funded by the University of South Africa.
Institutional Review Board Statement: The Ethical Committee of the University of South Africa has granted approval for this study on 07 September 2022 (2022/09/07/61951412/01/AM).
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

Contents

Contribution of this paper to the literature
The present study made significant contributions to the body of knowledge about blended learning use by learners in secondary schools. It significantly advanced the understanding of how to enhance learners' blended learning experiences by incorporating real-time synchronous learning with downloaded online educational resources.

1. Introduction

Technology in education encompasses a broad spectrum of tools and methods aimed at enhancing communication, instructional delivery, and knowledge acquisition. This includes various online learning systems, digital platforms, virtual environments, and interactive applications that facilitate learning experiences for both real-time (synchronous) and online (asynchronous) learning (Cahyani, Romadin, Irfan, & Nurmalasari, 2025; Roa González, Sánchez Sánchez, Seoane Pujol, & Díaz Palencia, 2025). The use of various technologies in schools has grown significantly, especially in response to the disruption caused by the COVID-19 pandemic. The pandemic dramatically remodeled teaching and learning, compelling educational institutions to adopt digital solutions to preserve academic progress (Bordoloi, Das, & Das, 2021).

This situation led to an increased use of online learning technologies to continue instruction when learners could not attend school physically (Almahasees, Mohsen, & Omer, 2021; Daniel, 2020; Durgungoz & Durgungoz, 2022; Loukomies & Juuti, 2021; Yi, 2021). Schools had to cease contact lessons due to the restrictions imposed by the enactment of the lockdown (Mhlanga & Moloi, 2020). During this period, meetings in physical classrooms were impossible, causing interruptions in teaching and learning activities (Bordoloi et al., 2021; Pustika, 2020). As a result, there was a shift towards blended learning, which uses technology to integrate asynchronous and synchronous learning materials (Fadde & Vu, 2014).

Blended learning, as defined by Fadde and Vu (2014), is a combination of simulated live collaborations using video conferencing tools, including online meetings managed through different Learning Management Systems (LMSs). Cahyani et al. (2025) and Saboowala and Manghirmalani-Mishra (2020) also explained blended learning as an approach that involves various educational tools to integrate both synchronous and asynchronous lessons to meet educational objectives. It involves the use of virtual learning platforms to access educational resources and participation in real-time discussions using LMSs (Günes & Alagözlü, 2021). Blended learning enables learners to operate various online tools to meet personal learning needs, increase learner contribution, and broaden learning adaptability.

Common technological platforms in a blended learning environment include Google Classroom, Moodle LMS, and social media platforms such as WhatsApp, which facilitate learner-teacher interaction, online evaluation, and instructional delivery (Kristanto, Mustaji, & Mariono, 2017; Monareng, Ramraj, & Mashau, 2020).

Audio-visual conferencing tools like Google Meet, Microsoft Teams, and Zoom are also employed to promote real-time peer discussions and provide practical experiences that broaden learners' knowledge (Cleveland-Innes & Wilton, 2018; Fadde & Vu, 2014). The learning experiences offered through virtual modalities support differentiated instruction, which improves learners' learning paths (Adnan & Anwar, 2020). The impact of COVID-19 and the changes it brought to the educational sector demonstrated that blended learning has notable advantages compared to face-to-face learning that occurs in a physical classroom (Bordoloi et al., 2021).

Blended learning combines synchronous and asynchronous methods, balancing structured online lessons with flexible, student-led learning. This approach promotes self-guided learning, allowing learners to independently explore online resources, engage in interactive activities with peers, and participate in virtual interactions (Cahyani et al., 2025). Blended learning can align teaching and learning goals that are realistic and can lead to transformative, constructive, and collaborative educational practices through the use of flexible and affordable technologies (Bordoloi et al., 2021; Tayebinik & Puteh, 2013). Such learning practices can be beneficial during emergencies and disruptions caused by natural disasters and pandemics (Bordoloi et al., 2021).

Although most countries have made significant progress in expanding technological infrastructure, only a few schools equipped with the necessary technology were able to shift to a blended learning environment when COVID-19 emerged (Khan, 2022). Challenges such as unstable internet connections, digital literacy gaps, lack of clear blended learning policies, and low learner motivation continue to cause inconsistencies in learners' experiences and the quality of education they receive (Mchunu, Ngcobo, & Bhengu, 2021).

While blended learning has the potential to increase learner engagement and academic performance, there is limited empirical evidence on how learners interact with digital tools in post-pandemic blended environments. Although it has become a mainstream educational approach, its long-term effectiveness, learner adaptability, and technology usage by learners remain uncertain. This raises concerns whether the current incorporation of technology in a blended learning environment is truly beneficial for learners or if learners experience learning gaps during blended learning.

This article examined learners' utilization of technology in a blended environment after the outbreak of COVID-19. It evaluated how the use of technological devices in a blended environment influences learners' performance, experiences, and involvement in learning activities.

2. Literature Review

Various online educational technologies were used during the COVID-19 pandemic in schools to ensure continued education through a blended learning system. The implementation of blended learning during the COVID-19 lockdown played a key role in maintaining teaching and learning when learners could not physically attend school. Affordable and accessible educational technologies were employed by many institutions so that learners from all socio-economic backgrounds were accommodated (Bordoloi et al., 2021). This review examined literature on how learners utilized blended learning after the COVID-19 pandemic. Understanding learners' use of different learning technologies is crucial for the successful integration of blended learning.

A study by Pregoner and Baguio (2024) investigated the readiness and learning styles of senior high school learners in the Philippines who learned English using the blended learning model after COVID-19. The study found

that these learners demonstrated high proficiency in peer collaboration, analytical, and critical thinking skills during blended lessons. They were able to follow lessons while applying problem-solving practices to deal with English-related challenges, which made them favor blended learning methods. Pregoner and Baguio (2024) also noted that these learners were ready to learn English through blended approaches because of their good computer literacy and ability to learn autonomously. They recommended that schools develop motivation strategies to encourage learners to utilize various blended learning methods for learning English.

Another study by Jasmin and Ongcoy (2024) explored the experiences and perceptions of learners who used blended learning to learn mathematics after its implementation post-COVID-19. The researchers asserted that blended teaching methods can improve learner performance, communication skills, participation, and personal learning. Through blended learning, learners can develop the skills required for the 21st century, including teamwork and self-directed learning. However, schools must build strong relationships with families to ensure the benefits of blended learning are sustainable and that learners receive the necessary support from home (Baloran, 2020; Jasmin & Ongcoy, 2024; Olugbade & Olurinola, 2021).

Jasmin and Ongcoy (2024) suggested that teachers incorporate instructional methods that promote learner-driven knowledge sharing and peer collaboration within a blended learning environment. Learners should develop a sense of belonging through knowledge sharing and receiving support from teachers and classmates. The authors emphasised the importance of fostering genuine relationships between teachers and learners to ensure effective blended learning implementation.

A study by Dei (2024) on higher education institutions in Ghana during and after the pandemic, it was found that the crisis significantly affected the country's education system. Despite this, higher education institutions successfully integrated digital systems and created training programmes for students and lecturers to continue teaching and learning. When lockdown was imposed, learners and teachers used blended learning to maintain communication and instruction regardless of physical location (Almahasees et al., 2021; Laili & Nashir, 2020; Rifiyanti, 2020). However, many scholars pointed out challenges such as unreliable internet, limited digital literacy, and a lack of digital resources, which hindered the successful deployment of blended learning (Adnan & Anwar, 2020; Al-Alami, Adwan, & Alsous, 2022; Maphalala, Khumalo, & Khumalo, 2021; Mpungose, 2021; Naidoo, 2020).

Dei (2024) suggested that policymakers, institutions, and stakeholders in education should collaborate to develop and implement blended learning systems that supplement traditional teaching methods, enhancing overall teaching and learning practices. Teachers and learners need training on using LMS platforms like Moodle and Blackboard, as well as applications like Google Meet and Zoom (Dei, 2024; Ni, 2020; Sobaih, Salem, Hasanein, & Elnasr, 2021).

Ratten (2023) studied how educational approaches in management courses changed after COVID-19. The research found that learners used virtual applications such as Google Classroom to learn through videos and simulations. They also relied on social networks and platforms like YouTube for additional learning. These online education platforms allowed them to communicate in a virtual environment by posting videos, queries, and comments (De Jager, Rwodzi, & Mpofu, 2020; Okebukola et al., 2020). After the pandemic, learners also used games to make learning more exciting while studying at home. The use of games enabled them to gain knowledge in an entertaining and instructive manner while fostering peer learning (Ratten, 2023). The study recommended that variations caused by COVID-19 to management courses be closely examined, considering before, during, and after the pandemic, to gain an understanding of how these courses have been influenced by COVID-19.

Matsiliza (2024) investigated learners' adaptability to blended learning in South Africa since COVID-19 and revealed that learners rely significantly on remote learning and Artificial Intelligence to complete their academic tasks. They occasionally use electronic mail and their smartphones to contact their teachers and peers (Matsiliza, 2024; Okebukola et al., 2020). Learners can take an online test given by their teachers at a specified time to complete within a certain time frame. This is made possible by the participatory nature of synchronous learning, which allows for quick interactions between learners and teachers, establishing a sense of community and reducing the perceived distance between them (He & Zhao, 2020; Matsiliza, 2024; Tinungki & Nurwahyu, 2020). Synchronous learning enables learners to respond to their teachers' recommendations remotely through LMSs. Matsiliza's (2024) study recommended that learners receive training on a blended learning approach to address learning challenges and, as a result, develop ways to improve their grasp of content and their skills in using various LMSs (Matsiliza, 2024).

Research by Mali and Lim (2021) on learners' perceptions of blended learning after COVID-19, the study showed that learners found blended learning convenient, as it allowed them to rewatch recorded lessons to improve their understanding of the subject. However, results also revealed that learner motivation decreased due to limited contact with teachers and a lack of learner support during blended learning. Participants in Mali and Lim (2021) study also indicated that blended learning offered minimal opportunities for group work, which made them prefer traditional face-to-face learning over blended methods. Learners also noted that they missed the social aspects of blended learning, like learner-learner engagement, learner-teacher connection, and the limited opportunities to probe for additional information (Mali & Lim, 2021; Mpungose, 2021). The study recommended that educational institutions reconsider resource allocation by investing in blended learning infrastructure to improve learners' experiences and optimize the utilization of learning technologies even outside the classroom (Mali & Lim, 2021).

Bordoloi et al. (2021) explored how students in Indian colleges and universities perceived blended learning during the COVID-19 epidemic. The study showed that after the onset of COVID-19, higher education lecturers began to use educational tools such as Facebook Live classes, Skype seminars, personal blogs, audiovisual programs, and Zoom meetings, which provided significant relief to students. Most respondents believed that blended learning would be the optimal approach for future Indian education (Bordoloi et al., 2021; Saboowala & Manghirmalani-Mishra, 2020). The study found that not all learners could reliably access fully online or synchronous resources due to poor internet connectivity; therefore, asynchronous learning methods could offer learners flexible and suitable learning prospects (Bordoloi et al., 2021). Additionally, electricity shortages were reported as another barrier to effective blended learning. The study recommended that the central government of India implement major policy changes to address the issues and ensure that education reaches underprivileged learners despite the obstacles (Bordoloi et al., 2021).

Similar results were reported by Quansah and Essıam (2021), who investigated the acceptance of Moodle LMS as an e-learning platform by students at the University of Education in Winneba. These researchers noted that poor internet access caused delays in teachers' feedback. Evaluating learners using Moodle was also difficult because learners' true performance could be masked by cheating, which Moodle could not prevent (Aliyyah et al., 2020; Quansah & Essıam, 2021). Despite these challenges, students found Moodle convenient and easy to use, as it allowed them to repeatedly review lessons, study at their own pace, easily find educational resources, and submit assignments (Quansah & Essıam, 2021). The study suggested that the Ministry of Education establish agreements with telecom companies to improve internet speed, capacity, and affordability, to enable students across Ghana to access Moodle from anywhere. Teachers should also focus on providing prompt feedback on learner progress (Quansah & Essıam, 2021).

A study by Sobaih et al. (2021) investigated learners' educational experiences with Microsoft Teams compared to social networking sites (SNSs) in Egyptian public institutions. Results revealed that both MS Teams and SNSs helped learners access information and educational resources, positively impacting their analytical skills and knowledge development. However, learners reported limited teacher and peer support, as well as low engagement in MS Teams-based activities (Sobaih et al., 2021). They also complained about inadequate evaluation and feedback when SNSs were used. The study recommended that educational officials develop plans for online and blended learning. Since many educational institutions in developing countries face infrastructure challenges and lack digital LMSs, adopting low-cost communication platforms is crucial. Adequate training and seminars should be provided for teachers and learners on how to effectively use LMSs like MS Teams to maximize support and participation.

From the literature review, it is evident that secondary school learners value the use of technology for blended learning. They continue to use technology to learn through both synchronous and asynchronous methods. The literature revealed that blended learning improves learner-teacher and peer communication. However, challenges such as load shedding, digital divide, unreliable internet, and lack of technical skills make it difficult for learners to adopt blended learning. The review emphasised the importance of providing learner support during the implementation of blended learning.

3. Methodology

This quantitative research gathered data from 334 secondary school learners selected through simple random sampling. The sample was drawn from five selected secondary schools in the Tshwane West district in Gauteng province, South Africa. Only learners who were in grades 11 and 12 during data collection, who learned using blended systems after the inception of COVID-19, met the inclusion criteria and were sampled as study participants. These learners were already in secondary schools at the start of COVID-19 and have since adopted a blended learning approach.

Learners from grade 10 and below were not considered for this study because they witnessed the effects of COVID-19 at a primary school level and may not have provided valuable insights on secondary school-level blended learning in the post-COVID-19 era. The total sample for each school was calculated based on the number of grades 11 and 12 learners. The margin of error method was applied to determine the sample size for each school (Kotrlik & Higgins, 2001; Van Haute, 2021).

The use of the simple random sampling technique minimized the researcher's bias, giving all eligible learners an equal opportunity of being sampled (Adeoye, 2023; Sharma, 2017). It also allowed for generalisability of findings by ensuring that the sample size represents the population (Adeoye, 2023).

Data collection was carried out using a structured questionnaire, which facilitated easy access and collection of responses from the 334 learners (Aithal & Aithal, 2020; Schrepp & Thomaschewski, 2019; Taherdoost, 2022). Participants responded to the questionnaire independently, encouraging honest responses (Taherdoost, 2022). The standardised questionnaire allowed for comparison across responses and ensured high accuracy in data capturing (Gulnoza & Niginabonu, 2022).

A 5-point Likert scale was used in the questionnaire, ranging from 1 (strongly disagree) to 5 (strongly agree), to assess learners' agreement levels regarding the use of technology for blended learning since the start of COVID-19. A one-sample t-test was employed to determine whether there was significant disagreement, agreement, or neither on the components listed in the questionnaire.

A statistical analysis was performed to analyze the collected data. Data analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 28. The database generated output tables and graphs that assisted in creating the reporting table (Table 1).

The analysis followed a subjective grouping approach where related questionnaire elements were grouped to present the findings. Statistical analysis enabled the researcher to draw meaningful conclusions, guided by the CABLS framework, which considered two elements (learner & technology) among others.

4. Theoretical Framework

This study employed the Complex Adaptive Blended Learning Systems (CABLS) theoretical framework (Wang, Han, & Yang, 2015) to gain profound insight into the dynamic, adaptive, and complex nature of blended learning. The CABLS framework contains six elements: learner, teacher, learning support, technology, institution, and content (Wang et al., 2015). These elements continuously interact with one another to sustain an effective blended learning environment (Belghmi, Habiballah, & Belfakir, 2024; Wang et al., 2015).

Figure 1 presents the CABLS ecosystem and its six elements, which also depend on their respective subsystems.

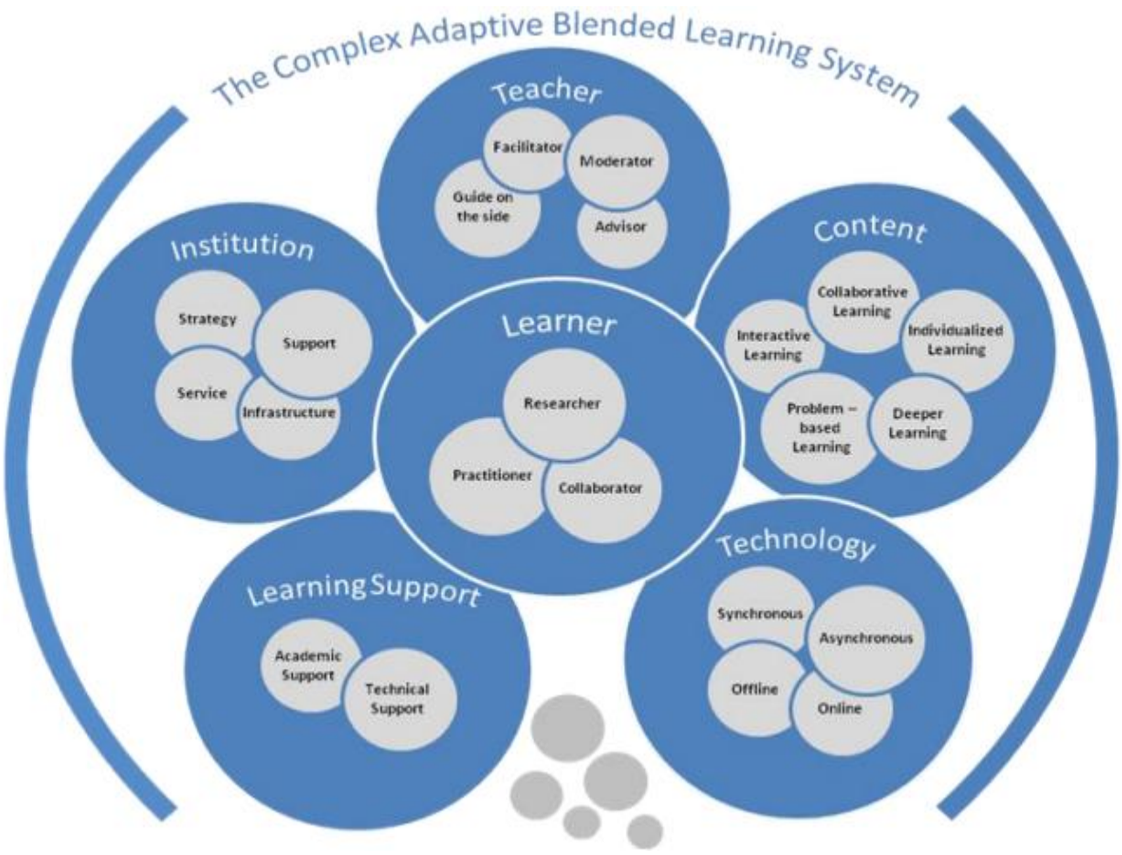

Figure 1. CABLS framework.
Source: The CABLS Framework by Wang et al. (2015).

In a blended learning atmosphere, learners transition from being passive to active participants through interaction with various elements (Kömür, Şahin, & Okur, 2023; Yan, Feng, & Leong, 2023). Likewise, teachers' roles shift from being narrators to becoming advisors, moderators, and facilitators as they adjust to different teaching styles suited for blended learning (Bordoloi et al., 2021; Paudel, 2021; Yan et al., 2023). Technology also transforms how education is delivered by enabling both synchronous and asynchronous learning (Yan et al., 2023). Additionally, blended learning provides learners with extensive and engaging content (Kömür et al., 2023; Ntim, Opoku-Manu, & Kwarteng, 2021).

Learners also require support systems to help them develop essential skills such as time management and technology use for operating various technologies and online platforms within a blended space (Katsaris, Logothetis, Katsios, & Vidakis, 2022; Khan, 2022). Institutions must support both teachers and learners by developing policies, providing resources, and implementing a comprehensive blended learning plan (Yan et al., 2023).

The "learner" is the central element of the CABLS framework, indicating the crucial role learners play in blended learning (Ntim et al., 2021). This learner element is encircled by five components that facilitate learning in a blended environment (Ntim et al., 2021). Although the CABLS framework presents six elements, this study focused only on two: the learner and technology, to meet the research aim. The study took into account that successful blended learning primarily depends on learners' willingness and ability to adopt the technology-guided instruction.

In this study, the CABLS framework focuses on learners' social collaboration, real-world engagement, technological adaptability, motivation, and participation in practical blended activities. In a blended learning setting, learners assume new roles, evolving into researchers, practitioners, and collaborators (Becher, 2023). They are encouraged to integrate technology to make learning more interesting, collaborate with peers on learning materials, and develop creative thinking skills (Yan et al., 2023).

The CABLS framework is distinct because of the active interaction and interdependence among its elements (Kömür et al., 2023). A study by McGee and Poojary (2020) explored how the elements dynamically relate, highlighting that the framework provides a guide for a complex, co-evolving, and learner-centred teaching and learning process. This framework presents learners with optimistic learning experiences through its adaptable structure that accommodates changes within a blended environment (McGee & Poojary, 2020). It can also direct stakeholders in educational settings towards a positive adoption of a solid blended learning approach (McGee & Poojary, 2020).

For schools planning to implement blended learning courses, the CABLS framework is significant because it displays the interconnectedness of various blended learning elements (Manaig, Yazon, Tesoro, Buama, & Sapin, 2024). Therefore, following the CABLS framework in this study was necessary to understand how learners work with technology to learn effectively in a dynamic blended environment.

5. Results

The analysis of learners' technology use during blended learning was based on fourteen questionnaire items. Overall, learners' usage of technology was high for most components (12), with a mean score exceeding 3.91. However, one item had the lowest mean score of 2.26, indicating significant disagreement, while another item scored

3.39, revealing neither significant agreement nor disagreement. A subjective grouping strategy was used to present the results, grouping related questionnaire components. The findings are presented in Figure 2 and Table 1.

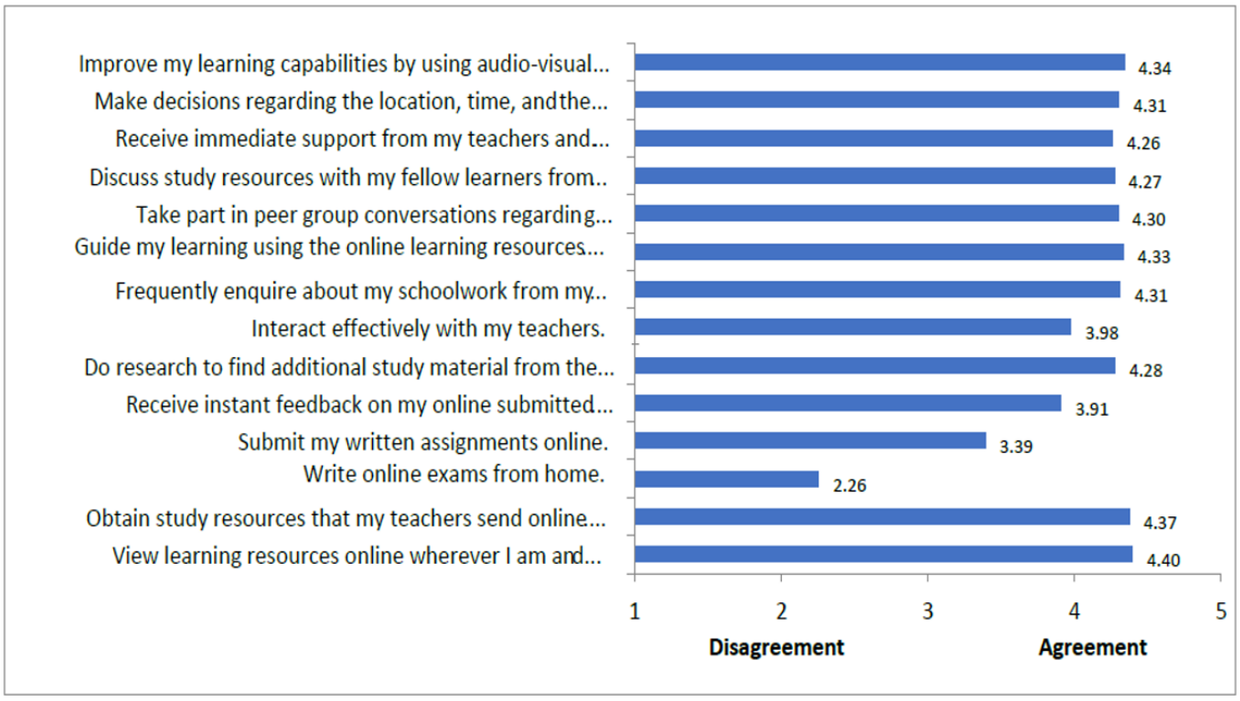

Figure 2. Learners' agreement levels on the use of blended learning.

Table 1 presents the mean scores and standard deviations for the questionnaire items.

Table 1. Learners' use of technology for blended learning.

Through technology, I can...	n	Mean	Standard deviation	t	df	p-value
1 View learning resources online wherever I am and whenever I desire to.	334	4.40	0.747	34.133	333	<0.001
2 Obtain study resources that my teachers send online to prepare for synchronous lessons in advance.	334	4.37	0.654	38.431	333	<0.001
3 Write online exams from home	334	2.26	1.215	-11.166	333	<0.001
4 Submit my written assignments online	334	3.39	1.344	5.333	333	<0.001
5 Receive instant feedback on my online-submitted assignments from my teachers.	334	3.91	1.149	14.482	333	<0.001
6 Do research to find additional study materials from the internet to add to the learning resources that my teachers provide to me.	334	4.28	0.788	29.589	333	<0.001
7 Interact effectively with my teachers	334	3.98	0.995	17.924	333	<0.001
8 Frequently enquire about my schoolwork from my teachers	334	4.31	0.766	31.269	333	<0.001
9 Guide my learning using the online learning resources provided by my teachers.	334	4.33	0.698	34.898	333	<0.001
10 Take part in peer group conversations regarding schoolwork	334	4.30	0.793	29.860	333	<0.001
11 Discuss study resources with my fellow learners from various physical spaces	334	4.27	0.752	30.933	333	<0.001
12 Receive immediate support from my teachers and peers without having to wait for lessons.	334	4.26	0.795	28.985	333	<0.001
13 Make decisions regarding the location, time, and the method in which I will complete my schoolwork.	334	4.31	0.673	35.446	333	<0.001
14 Improve my learning capabilities by using audio-visual study resources	334	4.34	0.780	31.344	333	<0.001

As previously mentioned, subjective groups were used to display the results. Five subjective groups have been identified: peer interaction, access to online learning resources, instructor access, and the use of technology to guide learning. These subcategories were considered to understand how learners practice with technology in a blended learning setting. The next section discusses these subgroups.

5.1. Learners' Interaction with Peers

The findings indicate that the three questionnaire items grouped under this characteristic have a high level of agreement. Eighty-six percent (86%) of respondents concurred that they discuss coursework with other learners in small groups using technology. Most respondents (85.4%) agreed that they exchange study materials with their peers even when they are not in the same geographic location. Additionally, other respondents (85.2%) agreed that they receive prompt feedback from instructors and peers rather than waiting for the lesson. The findings show that in a blended learning setting, learners connect with each other through technology. Technology helps them communicate more effectively. Using various online platforms, learners collaborate in a virtual classroom to work on learning resources provided by teachers. Technology also enables peers to provide quick feedback on information they need support with.

5.2. Learners' Communication with Teachers

To determine learners' access to teachers during blended learning, two questionnaire components were combined and discussed. The analysis indicates significant agreement that learners use technology to communicate effectively with their teachers and frequently inquire about their schoolwork from teachers by asking content-related questions when needed. The participants (79.5%) stated that technology improves their interaction with teachers. These results highlight that learner-teacher collaboration has improved since learners often reach out to teachers for assistance. Learners needing clarification on online material can contact their teachers anytime and schedule private after-class sessions to discuss unclear topics. This eliminates the need to wait for live lessons to engage with teachers.

5.3. Learners' Exposure to Online Study Resources

The results indicate significant agreement that learners use technology to access online learning resources at any time and place; obtain learning resources sent by teachers to prepare for synchronous lessons; improve their learning capabilities with audio-visual resources; and search for additional online resources to supplement what teachers provide. Most participants (88%) acknowledged that using technology enables them to access and work asynchronously with online materials regardless of location and without being constrained by a fixed schedule. According to the results, 87.4% of the participants confirmed that their instructors used technology to send them learning materials to prepare for virtual lessons. Other respondents (86.8%) indicated that they used audio-visual content to enhance their blended learning experience. The findings suggest that learners can access and complete their schoolwork from any location with an internet connection and a compatible device.

5.4. Learners' Use of Technology for Online Assessment

The results show significant agreement that technology helps learners receive instant feedback on online assignments submitted to their teachers. However, there is significant disagreement that learners can take online exams from home. The results also indicate neither significant agreement nor disagreement that learners use technology to submit written assignments online from home. Although 74.2% of participants reported that technology helped them receive immediate feedback on their online submissions, 54.8% disagreed that they wrote online assessments outside a physical school environment. The findings indicate that learners appreciate technology for providing convenient feedback on written work. However, they also reported ongoing challenges with online assessments. Some learners lack the necessary technology skills to take online tests, which forces them to rely on in-person examinations administered in a classroom setting.

5.5. Learners' Technology Use to Drive Learning

The results highlight significant agreement that technology helps learners make decisions regarding the location, time, and methods used to complete schoolwork, and that they use online materials to direct their learning. Most participants (86.2%) agree that technology use influences their choice of place and learning schedules that they set to complete their schoolwork. Some participants (86.6%) agree that they use online materials received through technology to drive their learning. The analysis reveals that learners successfully manage their learning in a blended environment using technology. Online learning materials are downloaded and viewed at any time. Learners make use of various learning technologies to develop convenient learning schedules that enable them to meet deadlines. With the blended learning strategy, learners learn from anywhere and do not need to travel to classes frequently.

6. Discussion of Findings

The findings demonstrate that, following the Covid-19 outbreak, secondary school learners engage with their peers through technology during blended learning. The use of technology results in an improvement in their communication levels with other learners. These results are corroborated by the results of Prihandoko (2022), who discovered that amid the COVID-19 pandemic, learners' usage of technology contributed to increased levels of peer collaboration, which in turn promotes effective learning. Phutela and Dwivedi (2019) discovered that during blended learning, learners shared their knowledge and experiences with their classmates while interacting with technology.

Research by Leung, Hui, Luk, Chiu, and Ho (2023) revealed that learners used multiple educational technologies to connect and share ideas continuously with other learners during the COVID-19 crisis. Learners interacted with one another through asynchronous internet meetings and discussion boards (Tu & Luong, 2021). Similar findings were recorded by Latif, Hussain, Saeed, Qureshi, and Maqsood (2019), who noted that after the introduction of COVID-19, most social networking platforms were used by learners to share notes and other learning resources across various subjects.

A study by Ratten (2023) also exposed that learners adopted new learning methods and formulated learning groups on social networks to support peer education. In another study, Bouklikha (2023) reported that learners connected with friends via Facebook group chats where they discussed study material. Another research by Cahyani et al. (2025) found that technology in a blended environment inspires learners to exchange ideas and debate educational topics, which helps them develop teamwork skills. This demonstrates that learners in a blended setting embrace the role of collaborators as they interact with various factors.

The current study's results indicate that technology use in a blended environment increased learners' opportunities to access their teachers. These findings are supported by Adnan and Anwar (2020) study, which found that learners frequently used technology to contact their teachers even outside the classroom. Dei (2024) and Khan (2022) also found that technology enables learners to reach their teachers from different locations when they need additional assistance on specific topics. Learners seek support with study materials and receive timely advice while maintaining contact with their teachers (Adnan & Anwar, 2020; Quansah & Essiam, 2021; Tinungki & Nurwahyu, 2020).

Technology has helped facilitate regular communication between learners and teachers, reducing the reliance on live lessons for assistance. In a study by Almahasees et al. (2021), participants reported being satisfied with the enhanced learner-teacher contact during blended learning. Naidoo (2020) uncovered that learners received prompt intervention on challenging topics from their teachers. Similarly, Sobaih et al. (2021) observed that learners and teachers created simulated classrooms where learners interacted with teachers as they would in a traditional classroom.

Another study by Yuhanna, Alexander, and Kachik (2020) found that learners requested support materials from teachers and communicated through various LMS platforms. Other studies reported that learners used LMSs like MS Teams and Moodle to foster collaborative environments with their teachers (Bsharat & Behak, 2020; Poston, Apostel, & Richardson, 2020; Quansah & Essıam, 2021). However, Adnan and Anwar (2020) study highlighted that unreliable internet connections during the COVID-19 crisis led to ineffective learner-teacher interaction.

The current findings indicate that learners access online resources from anywhere through technology. Online learning materials are uploaded for asynchronous learning, and learners use technology to prepare beforehand for virtual lessons, helping them master content more quickly during real-time sessions. This assisted learners in grasping the content more rapidly during real-time instruction.

Learners also search for additional educational resources online, aligning with Cummings (2022), who found that learners seek helpful internet materials to augment what their teachers provide. They save these materials on electronic devices to access them during revision. Several studies support these findings, highlighting that learners appreciate the opportunity to learn through asynchronous methods using various online resources (Sobaih et al., 2021; Stein & Graham, 2019; Syauqie, 2021; Yates, Starkey, Egerton, & Flueggen, 2021).

In a study by Laili and Nashir (2020), participants reported using technology to access online resources, which saved them time from regular visits to schools. Similarly, Almahasees et al. (2021) revealed that electronic devices provided learners with unrestricted access to learning resources during asynchronous learning. Other researchers also found that, after Covid-19, learners downloaded recordings of missed live lessons and engaged with them, despite the challenges related to the digital divide (Bordoloi et al., 2021; Tu & Luong, 2021; Yani, 2021).

Learners also received academic support from teachers, who shared different links to a variety of learning resources via group chats (Quansah & Essıam, 2021). The results of the current research are supported by studies showing that after COVID-19, learners used a variety of digital platforms like Google Classrooms, YouTube, and Zoom to obtain online learning resources (Mohd Tahir et al., 2022; Ratten, 2023; Tarteer, Badah, & Khlaif, 2022; Yates et al., 2021). Learners then developed ways to work independently on these resources through self-paced learning.

However, the findings of the current study also show that learners face challenges with online assessments. They find it difficult to participate in real-time online examinations despite having the skills to use online platforms for submitting work. These findings support those of Aliyyah et al. (2020), who found that after the introduction of COVID-19, learners experienced difficulties with online assessments.

Sobaih et al. (2021) revealed that learners often lacked experience and skills in online real-time evaluation and grading. According to their study, the most challenging aspect of blended learning was completing formal online tests and assignments from home, as learners were accustomed to physical examinations administered in face-to-face classrooms. Mirza (2021) also found that learners taking online assessments during blended learning were sometimes interrupted by unreliable internet connections and power cuts, which prevented them from finishing the examinations before the stipulated time ended. Similarly, Yi (2021) discovered that online assessment portals sometimes shut down unexpectedly during examinations, which left learners with no alternative testing options.

The current study further highlights that learners navigate their learning paths using technology. They complete their schoolwork while managing other duties. Learners develop study plans and submission targets aligned with deadlines set by their teachers. They have control over their learning, which allows them to decide where, when, and how to learn. These findings support other researchers' results, who also reported that during blended learning, learners interact with educational resources at their convenience and organise their learning schedules to fit their daily routines. They also attend real-time lessons from any location using various LMSs (Kristanto, Mustaji, & Mariono, 2017; Stein & Graham, 2019).

A study conducted by Yates et al. (2021) similarly reported that learners valued the adaptability of blended learning because they could use technology to complete their schoolwork at times and places that suited them. Laili and Nashir (2020) noted that during the Covid-19 pandemic, when traveling to schools was prohibited, learners relied on their mobile devices and the internet to learn from anywhere. Additionally, Rifiyanti (2020) observed that learners used technology to learn and discussed online resources with teachers and peers according to their plans.

7. Conclusion and Recommendations

This study concludes that secondary school learners utilized technology for blended learning following the outbreak of Covid-19. They used technology for various purposes, such as staying in touch with peers, reaching out to teachers at any time, even outside scheduled class hours, seeking help, and receiving prompt feedback. Learners also used technology to research and access online resources from any place. Through technology, learners select their learning times, which improves their ability to learn independently.

However, secondary school learners also experience challenges related to the implementation of blended learning. These include unreliable internet connections, limited technological skills, and inadequate technology infrastructure. Due to erratic connections, unavailability of necessary devices, and unfamiliarity with various learning management systems and online assessment platforms, learners find it challenging to manage online tests. They struggle particularly with online evaluation outside the classroom. The following recommendations are proposed:

- Secondary schools should develop an ICT strategy to support blended learning.
- Learners should receive coaching on how to use various learning management systems for online assessments.
- The Gauteng Department of Education should revise its budget to invest in technological infrastructure to address resource shortages.

References

Adeoye, M. A. (2023). Review of sampling techniques for education. *ASEAN Journal for Science Education, 2*(2), 87-94.

Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology, 2*(1), 45-51. https://doi.org/10.33902/JPSP.2020261309

Aithal, A., & Aithal, P. (2020). Development and validation of survey questionnaire & experimental data–a systematical review-based statistical approach. *International Journal of Management, Technology, and Social Sciences, 5*(2), 233-251. http://doi.org/10.5281/zenodo.4179499

Al-Alami, Z. M., Adwan, S. W., & Alsous, M. (2022). Remote learning during COVID-19 lockdown: A study on anatomy and histology education for pharmacy students in Jordan. *Anatomical Sciences Education, 15*(2), 249-260. https://doi.org/10.1002/ase.2165

Aliyyah, R. R., Rasmitadila, R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The perceptions of primary school teachers of online learning during the COVID-19 pandemic period. *Journal of Ethnic and Cultural Studies, 7*(2), 90-109. http://doi.org/10.29333/ejecs/388

Almahasees, Z., Mohsen, K., & Omer, M. A. (2021). Faculty's and students' perceptions of online learning during COVID-19. *Frontiers in Education, 6*, 638470. http://doi.org/10.3389/feduc.2021.638470

Baloran, E. T. (2020). Knowledge, attitudes, anxiety, and coping strategies of students during the COVID-19 pandemic. *Journal of Loss and Trauma, 25*(8), 635–642. https://doi.org/10.1080/15325024.2020.1769300

Becher, A. M. S. (2023). Blended learning in higher education: An approach, a model, and two theoretical frameworks. *Journal of Teaching and Learning in Higher Education, 4*(1), 4–6.

Belghmi, M., Habiballah, S., & Belfakir, L. (2024). Enhancing students' satisfaction through asynchronous blended learning in higher education: PhD students at the University of Sidi Mohamed Ben Abdellah as a case study. *International Journal of English Language Studies, 6*(3), 70-82. https://doi.org/10.32996/ijels.2024.6.3.10

Bordoloi, R., Das, P., & Das, K. (2021). Perception towards online/blended learning at the time of COVID-19 pandemic: An academic analytics in the Indian context. *Asian Association of Open Universities Journal, 16*(1), 41-60. https://doi.org/10.1108/AAOUJ-09-2020-0079

Bouklikha, W. (2023). Students' English language usage of Facebook during the COVID-19 pandemic. *Arab World English Journal (AWEJ) Special Issue on Communication and Language in Virtual Spaces*, 208-212. https://doi.org/10.24093/awej/comm1.16

Bsharat, T. R. K., & Behak, F. P. (2020). The impact of microsoft teams' app in enhancing teaching–learning English during the Coronavirus (COVID-19) from the English teachers' perspectives in Jenin city. *Malaysian Journal of Science, Health & Technology, 7*, 102–109.

Cahyani, V. P., Romadin, A., Irfan, A. M., & Nurmalasari, R. (2025). The impact of blended learning on student motivation and engagement: A literature review analysis. *Formosa Journal of Sustainable Research, 4*(2), 175-188. https://doi.org/10.55927/fjsr.v4i2.15

Cleveland-Innes, M., & Wilton, D. (2018). *Guide to blended learning*. Burnaby: Commonwealth of Learning.

Cummings, S. (2022). Elementary teacher perceptions of blended learning in the digital classroom. Doctoral Dissertation, Walden University.

Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects, 49*(1), 91-96. https://doi.org/10.1007/s11125-020-09464-3

De Jager, L., Rwodzi, C., & Mpofu, N. (2020). The innovative use of social media for teaching English as a second language. *TD: The Journal for Transdisciplinary Research in Southern Africa, 16*(1), 1-7. https://doi.org/10.4102/td.v16i1.702

Dei, D.-G. J. (2024). Promoting quality education through blended learning during and post COVID-19 pandemic. *Quality Education for All, 1*(1), 256-276. https://doi.org/10.1108/QEA-10-2023-0011

Durgungoz, A., & Durgungoz, F. C. (2022). "We are much closer here": Exploring the use of WhatsApp as a learning environment in a secondary school mathematics class. *Learning Environments Research, 25*(2), 423-444. https://doi.org/10.1007/s10984-021-09371-0

Fadde, P. J., & Vu, P. (2014). Blended online learning: Benefits, challenges, and misconceptions. *Online Learning: Common Misconceptions, Benefits and Challenges, 9*(4), 33-48.

Gulnoza, K., & Niginabonu, K. (2022). Questionnaire and its application. *Research Focus, 1*(3), 78-82. https://doi.org/10.5281/zenodo.7428151

Günes, S., & Alagözlü, N. (2021). Asynchronous distance learning and blended learning in terms of learner autonomy, motivation and academic success. *Turkish Online Journal of Educational Technology, 20*(3), 54-65.

He, W., & Zhao, L. (2020). Exploring undergraduates' learning engagement via BYOD in the blended learning classroom (Eulebyodblc). *International Journal of Information and Education Technology, 10*(2), 159-164. https://doi.org/10.18178/ijiet.2020.10.2.1356

Jasmin, D. R., & Ongcoy, P. J. (2024). Study on school students' blended learning experiences and Mathematical self-concept during Covid-19. *Journal of Learning for Development, 11*(3), 492-501. https://doi.org/10.56059/jl4d.v11i3.1136

Katsaris, I., Logothetis, I., Katsios, K., & Vidakis, N. (2022). *Adaptive blended learning platform based on the 4Cs Architecture*. Paper presented at the Proceedings of the 14th International Conference on Computer Supported Education. (CSEDU 2022), https://doi.org/10.5220/0010998700003182.

Khan, A. S. (2022). Blended learning is the new normal for current education scenarios. *Webology, 19*(3), 2992-2994.

Kömür, İ. A., Şahin, Y. L., & Okur, M. R. (2023). The complex adaptive blended learning system: A systematic review. *Digital Security and Media, 1*(1), 18-29.

Kotrlik, J., & Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal, 19*(1), 43-49.

Kristanto, A., Mustaji, M. & Mariono, A. (2017). The development of instructional materials E-learning based on blended learning. *International Education Studies, 10*(7), 10-17. https://doi.org/10.5539/ies.v10n7p10

Laili, R. N., & Nashir, M. (2020). *The use of Zoom meeting for distance learning in teaching English to nursing students during Covid-19 pandemic*. Paper presented at the UHAMKA International Conference on ELT and CALL (UICELL) Proceedings (2020).

Latif, M. Z., Hussain, I., Saeed, R., Qureshi, M. A., & Maqsood, U. (2019). Use of smart phones and social media in medical education: Trends, advantages, challenges and barriers. *Acta Informatica Medica, 27*(2), 1-6. https://doi.org/10.5455/aim.2019.27.133-138

Leung, T. N., Hui, Y. M., Luk, C. K., Chiu, D. K., & Ho, K. K. (2023). Evaluating Facebook as aids for learning Japanese: Learners' perspectives. *Library Hi Tech, 41*(5), 1456-1475. https://doi.org/10.1108/LHT-11-2021-0400

Loukomies, A., & Juuti, K. (2021). Primary students' experiences of remote learning during COVID-19 school closures: A case study of Finland. *Education Sciences, 11*(9), 560. https://doi.org/10.3390/educsci11090560

Mali, D., & Lim, H. (2021). How do students perceive face-to-face/blended learning as a result of the Covid-19 pandemic? *The International Journal of Management Education, 19*(3), 100552. https://doi.org/10.1016/j.ijme.2021.100552

Manaig, K. A., Yazon, A. D., Tesoro, J. F. B., Buama, C. A. C., & Sapin, S. B. (2024). Unraveling the Connections: Exploring the Relationship between Teaching Effectiveness and Academic Achievement in Blended Learning Environments. *Advanced Journal of STEM Education, 2*(2), 80–94. https://doi.org/10.31098/ajosed.v2i2.2718

Maphalala, M. C., Khumalo, N. P., & Khumalo, N. P. (2021). Student teachers' experiences of the emergency transition to online learning during the COVID-19 lockdown at a South African university. *Perspectives in Education, 39*(3), 30-43. http://doi.org/10.18820/2519593X/pie.v39.i3.4

Matsiliza, N. S. (2024). *Learners' adaptation to blended learning in the post-Covid 19 era in South Africa: A systematic literature review*. Paper presented at the University of Fort Hare Teaching and Learning Conference (UFHTL 2023), Atlantis Press.

McGee, E., & Poojary, P. (2020). Exploring blended learning relationships in higher education using a systems-based framework. *Turkish Online Journal of Distance Education, 21*(4), 1-13. https://doi.org/10.17718/tojde.803343

Mchunu, B. S., Ngcobo, A. Z., & Bhengu, T. T. (2021). Managing the impact of COVID-19 on the education plans and activities of South African schools. In COVID-19: Paving the Way for a More Sustainable World. In (pp. 372-379). Cham: Springer. https://doi.org/10.1007/978-3-030-69284-1_19

Mhlanga, D., & Moloi, T. (2020). COVID-19 and the digital transformation of education: What are we learning on 4IR in South Africa? *Education Sciences, 10*(7), 180. http://doi.org/10.3390/educsci10070180

Mirza, H. S. (2021). University teachers' perceptions of online assessment during the Covid-19 pandemic in Lebanon. *American Academic & Scholarly Research Journal, 11*(10), 11-15.

Mohd Tahir, H. M., Shak, M. S. Y., Adnan, A. H. M., Shah, D. S. M., Zaini, M. F., Ling, L. Y., & Piaralal, S. D. (2022). Factors influencing the use of Google Classroom for lessons during COVID-19 pandemic among secondary ESL instructors. *Arab World English Journal, 13*(2), 17-36. https://doi.org/10.24093/awej/vol13no2.2

Monareng, J., Ramraj, A. B., & Mashau, P. (2020). The rise in online learning in South African schools due to the Coronavirus pandemic. *Gender & Behaviour, 18*(4), 16753-16762.
Mpungose, C. B. (2021). Students' reflections on the use of the Zoom video conferencing technology for online learning at a South African University. *International Journal of African Higher Education, 8*(1), 159-178. https://doi.org/10.6017/ijahe.v8i1.13371
Naidoo, J. (2020). Postgraduate mathematics education students' experiences of using digital platforms for learning within the COVID-19 pandemic era. *Pythagoras, 41*(1), a568. https://doi.org/10.4102/pythagoras.v41i1.568
Ni, L. B. (2020). Blended learning through google classroom. *International Journal of Educational and Pedagogical Sciences, 14*(4), 215-221.
Ntim, S., Opoku-Manu, M., & Kwarteng, A. A.-A. (2021). Post COVID-19 and the potential of blended learning in higher institutions: Exploring students and lecturers perspectives on learning outcomes in blended learning. *European Journal of Education and Pedagogy, 2*(6), 49-59. http://doi.org/10.24018/ejedu.2021.2.6.162
Okebukola, P. A., Suwadu, B., Oladejo, A., Nyandwi, R., Ademola, I., Okorie, H., & Awaah, F. (2020). Delivering high school Chemistry during COVID-19 lockdown: Voices from Africa. *Journal of Chemical Education, 97*(9), 3285-3289. https://doi.org/10.1021/acs.jchemed.0c00725
Olugbade, D., & Olurinola, O. (2021). Teachers' perception of the use of Microsoft Teams for remote learning in Southwestern Nigerian schools. *African Journal of Teacher Education, 10*(1), 265-281. https://doi.org/10.21083/ajote.v10i1.6645
Paudel, P. (2021). Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *International Journal on Studies in Education, 3*(2), 70-85. https://doi.org/10.46328/ijonse.32
Phutela, N., & Dwivedi, S. (2019). *Impact of ICT in education: Students' perspective.* Paper presented at the Proceedings of International Conference on Digital Pedagogies (ICDP).
Poston, J., Apostel, S., & Richardson, K. (2020). *Using Microsoft Teams to enhance engagement and learning with any class: It's fun and easy.* Paper presented at the Pedagogicon Conference Proceedings. Eastern Kentucky University.
Pregoner, J. D. M., & Baguio, J. B. (2024). Learning strategies and readiness towards blended learning in english subjects as predictors of students' satisfaction during the COVID-19 pandemic. *Asian Journal of Education and Social Studies, 50*(4), 170-184. https://doi.org/10.9734/ajess/2024/v50i41321
Prihandoko, L. A. (2022). Schoology-based blended learning in academic writing class during the COVID-19 pandemic. *Jurnal Pendidikan Indonesia, 11*(1), 51-61. https://doi.org/10.23887/jpi-undiksha.v11i1.33739
Pustika, R. (2020). Future English teachers' perspective towards the implementation of e-learning in Covid-19 pandemic era. *Journal of English Language Teaching and Linguistics, 5*(3), 383-391.
Quansah, R., & Essıam, C. (2021). The use of learning management system (LMS) moodle in the midst of covid-19 pandemic: Students' perspective. *Journal of Educational Technology and Online Learning, 4*(3), 418-431. https://doi.org/10.31681/jetol.934730
Ratten, V. (2023). The post COVID-19 pandemic era: Changes in teaching and learning methods for management educators. *The International Journal of Management Education, 21*(2), 100777. https://doi.org/10.1016/j.ijme.2023.100777
Rifiyanti, H. (2020). Learners' perceptions of online English learning during COVID-19 pandemic. *Scope: Journal of English Language Teaching, 5*(1), 31-35.
Roa González, J., Sánchez Sánchez, N., Seoane Pujol, I., & Díaz Palencia, J. L. (2025). Challenges and perspectives in the evolution of distance and online education towards higher technological environments. *Cogent Education, 12*(1), 2447168. https://doi.org/10.1080/2331186X.2024.2447168
Saboowala, R., & Manghirmalani-Mishra, P. (2020). Perception of in-service teachers towards blended learning as the new normal in teaching-learning process post COVID-19 pandemic. *Educreator Research Journal, 8*(3), 2–9.
Schrepp, M., & Thomaschewski, J. (2019). Design and validation of a framework for the creation of user experience questionnaires. *International Journal of Interactive Multimedia and Artificial Intelligence, 5*(7), 88-95.
Sharma, G. (2017). Pros and cons of different sampling techniques. *International Journal of Applied Research, 3*(7), 749-752.
Sobaih, A. E. E., Salem, A. E., Hasanein, A. M., & Elnasr, A. E. A. (2021). Responses to COVID-19 in higher education: Students' learning experience using microsoft teams versus social network sites. *Sustainability, 13*(18), 10036. https://doi.org/10.3390/su131810036
Stein, J., & Graham, C. R. (2019). Essentials for blended learning. In (pp. 14-17). New York: Routledge
Syauqie, H. M. (2021). *Medical learners' perception about of video-assisted blended learning in Ophthalmology Clinical Clerkship during COVID-19 pandemic period.* Paper presented at the 3rd International Conference on Educational Development and Quality Assurance (ICED-QA 2020). Atlantis Press.
Taherdoost, H. (2022). What are different research approaches? Comprehensive review of qualitative, quantitative, and mixed method research, their applications, types, and limitations. *Journal of Management Science & Engineering Research, 5*(1), 53-63.
Tarteer, S., Badah, A., & Khlaif, Z. N. (2022). Employing Google classroom to teach female students during the COVID-19 pandemic. *Computers in the Schools, 38*(4), 300–321. https://doi.org/10.1080/07380569.2021.1988318
Tayebinik, M., & Puteh, M. (2013). *Blended learning or e-learning? CoRR, abs/1306.4085.* Retrieved from https://arxiv.org/abs/1306.4085
Tinungki, G. M., & Nurwahyu, B. (2020). The implementation of Google Classroom as the e-learning platform for teaching Non-Parametric Statistics during COVID-19 pandemic in Indonesia. *International Journal of Advanced Science and Technology, 29*(4), 5793-5803.
Tu, N. P., & Luong, T. K. P. (2021). *Online language learning via Moodle and Microsoft Teams: Students' challenges and suggestions for improvement.* Paper presented at the Proceedings of the AsiaCALL International Conference. Atlantis Press. https://doi.org/10.2991/assehr.k.210226.013.
Van Haute, E. (2021). Sampling techniques. In M. Gilbert & M. Hardt (Eds.), Research methods in the social sciences: An A–Z of key concepts. In (pp. 247–250). Oxford, UK: Oxford University Press
Wang, Y., Han, X., & Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework. *Educational technology & society, 18*(2), 380-393.
Yan, Y., Feng, C. C., & Leong, L. K. B. (2023). Complex adaptive blended learning for higher GIS education: A theory-driven pedagogy moving forward after the pandemic. *Transactions in GIS, 27*(5), 1479-1502. https://doi.org/10.1111/tgis.13084
Yani, A. (2021). English teachers' perception on the quality of online learning during COVID-19. *Journal of English Language Teaching and Linguistics, 6*(2), 471-486. https://doi.org/10.21462/jeltl.v6i2.600
Yates, A., Starkey, L., Egerton, B., & Flueggen, F. (2021). High school students' experience of online learning during Covid-19: The influence of technology and pedagogy. *Technology, Pedagogy and education, 30*(1), 59-73. https://doi.org/10.1080/1475939X.2020.1854337
Yi, C. (2021). Most common types of online English teaching during COVID-19 pandemic in China—An introduction to Fanya and Chaoxing platform. *Sino-US English Teaching, 18*(4), 79-85.
Yuhanna, I., Alexander, A., & Kachik, A. (2020). Advantages and disadvantages of online learning. *Journal Educational Verkenning, 1*(2), 13-19. https://doi.org/10.48173/jev.v1i2.54