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Article Review

Innovative Teaching and Learning Beyond Crisis: Systematic Literature Review of Blended Learning Model in Higher Education Institutions Post COVID-19

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Abstract

This systematic review focuses on the effectiveness, students' satisfaction, advantages, and challenges of blended teaching and learning in Higher Education Institutions (HEIs) post-pandemic. We were interested in conducting the review as the outbreak of COVID-19 has triggered the application of blended teaching and learning, which scholars research. However, the available systematic review papers are limited, and the present review topic of focus differs from those available. Four questions guided the review: how effective is Blended Teaching and Learning in higher education institutions (HEIs)? How satisfied are the students with the blended teaching and learning in HEIs? What are the purposes of embracing the model in HEIs teaching and learning? What are the challenges HEIs face during the application of the model? The PRISMA protocol was followed to identify and screen the articles. Research articles were collected from Scopus, ERIC, ProQuest, and Google Scholar. A total of 20 articles were included in the analysis. The result revealed that the Blended teaching and learning model was effective post-pandemic. Even though few researchers have shown students' dissatisfaction, most of them described that students are motivated and satisfied with the model. The main purposes of integrating the model are accessibility, self-directed learning, collaboration, self-paced learning, flexibility, cost-effectiveness, and improved performance. Challenges experienced encompass lack of knowledge and skills, lack of devices, internet connectivity, anxiety, and the problem of distance assessment. Overall, the model is fruitful and can be applied in a crisis or beyond that in Higher Education Institutions.

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1. Introduction

The COVID-19 pandemic was an unforgettable memory for us due to the huge loss and crisis it has caused. The globe has experienced unprecedented problems in managing social, health, economic, and educational affairs as the outbreak was sudden and no one had planned for it. It brought intriguing opportunities as well. The lit-

erature presents various issues related to managing the pandemic, innovations, and challenges in higher education institutions. Kara (2021) found that the closure of higher education institutions (HEIs) was seen as a strategy to manage the spread of the virus. During the first outbreak, most of the higher education institutions' immediate action was "lockdown" as it was also a statewide emergency in most countries around the globe. State of emergency, segmenting the society, and communication strategies (Zikargae, 2020), using social media as a source of information, and applying precautious measures (Girma et al., 2020), online mental health counseling services (Szlamka et al., 2021), having a special plan to respond to the crises (Rumbley, 2020), measures ranging from no response through social isolation to curriculum development for fully online (Crawford et al., 2020) were some measures.

On the other hand, universities have experienced various challenges, particularly in developing countries, which lack the pre-existing infrastructure (Khamis et al., 2021) that would assist them in responding to the crisis. The poor access to the internet and power interruption especially in the African continent (Tamrat & Teferra, 2020) presented serious problems that led to the closure of significant higher education institutions during the lockdown. Disparities among students in terms of digital tools accessibility like smartphones (Reinders, 2020), teachers' and students' Information Communication Technology (ICT) competence (Ferede et al., 2022), banning international students' mobility (Martel 2020), and depression and anxiety among college students (Tadesse et al., 2020) were some of the challenges.

Despite the crises, the situation brought opportunities as well. Work-based learning among psychologists (Lourens & Uren, 2023), the creation of optimistic and innovative higher education institutions that adopt new technologies (Aruleba et al., 2022), the move to online teaching and learning, and the application of digital tools (Krajka, 2022; van der Merwe & Levigne-Lang, 2023) can be named. Applying innovative pedagogies to sustain the teaching and learning activities in higher education institutions was one of the measures. Online and blended models are among the responses adopted for teaching and learning during and after the lockdown. According to the OCDE (2016), Innovative pedagogies bring ideas, materials, tools, and techniques to solve problems and meet the needs and interests in teaching and learning when the old pedagogy no longer fits the situation. Innovative pedagogies are essential to realize powerful learning; They are pedagogical forms that bring renewal or change to what is being practiced in the classroom and can meet the needs of the learners thereby overcoming the challenges (Major et al., 2020). In this sense, the Blended model is an innovative pedagogical model. However, the institutional framework that enables the implementation of a high-quality Blended teaching and learning model (Cobo-Rendón et al., 2022), is highly recommended.

After the lockdown was eased, there seemed to be a paradigm shift to embrace Blended teaching and learning. There is an increased interest in online and blended teaching and learning. The blended model as its name implies combines traditional face-to-face with online learning thereby allowing for flexible learning (Cosmina MIRONOV; Anca BORZEA; Lucian CIOLAN, 2012). There are recommendations raised by teachers regarding teachers' education curriculum revision to incorporate blended learning as a pedagogical strategy for the future (KARATAŞ AYDIN, 2023). In addition, as higher education equity is the most challenging (Sepúlveda-Parrini et al., 2024); only online method is not inclusive of students without internet connectivity (Sharma & Shree, 2023). Hence, A blended learning model can assist universities in meeting the diverse needs of students (Vlachopoulos, 2022). Embracing the blended model could assist higher education teaching and learning through its potential to offer inquiry-based and constructive learning (Ntim et al., 2021). We can see how academics foresee the strong growth of blended learning in the post-pandemic era (Guppy et al.,

2022). Therefore, this systematic literature review focuses on the effectiveness of the model, the student's satisfaction, advantages, and challenges associated with its application. We are interested in doing this review since much research has been conducted on the topic, as seen in the literature. Reviewing the general knowledge researchers convey would benefit others in getting an overview of knowledge related to the topic. In doing so, the following questions were set as guidance.

- How satisfied are the students with the blended teaching and learning in HEIs?
- What are the benefits/purposes of embracing the model in HEIs teaching and learning?
- What are the challenges HEIs face during the application of the model?
- How effective is the blended teaching and learning model overall?

2. Rational for the Review

This systematic literature review would contribute to the teaching and learning in Higher education institutions. This is because it examines how the existing literature presents the BTL model's effectiveness in higher education institutions' settings. We were interested in doing the review in cognizance of the availability of plenty of research done on the topic, but limited review papers. In searching the review papers, we have found a few of them.

One of the review papers (Sala et al., 2024), which focuses on BL, is a good example of the increased use from 2007 to 2022. This study undertook a robust analysis to assess peer-reviewed research articles on the bibliographic history and Bloom's taxonomy level of achievement of place-based and online learning. However, it focused only on Engineering fields of study and one database (Scopus).

Another review article (Otto et al., 2024), focuses on emerging digital practices from the pandemic onset and links with their previously done case study. The review integrated the two data to see how emerging digital practices support the student-centered approach. Blended learning was also included in addition to the other digital practices by the time the world was experiencing the pandemic situation. However, the time frame was mainly when higher education institutions were in and out of the pandemic between 2020 and 2022. In addition to this, the data was collected from the Scopus database only. Hence it is different from the current review we have conducted.

The third review paper (Balakrishnan et al., 2021), focuses on how Blended Teaching and Learning improves knowledge and skills in Pharmacy education. The research articles were collected from PubMed, Scopus, and Cochrane Library. They specifically focused on research dealing with the Pharmacy student population. The review was not associated with the pandemic. Therefore, this review differs from our current paper in its content, perspectives of focus of BL, as our review includes the benefits, students' satisfaction, challenges, and overall effectiveness, databases, as our database includes Google Scholar, Scopus, Eric, and ProQuest, and time frame as ours focuses on studies conducted from 2021 to 2024.

The fourth review article, which differs from the current review paper, was written by (Maarop & Embi, 2016). This paper focuses on the challenges of implementing BTL in higher education institutions which they found mainly on teachers' workload and competence in applying the approach. The time frame was between 2010 and 2023. The research articles were collected from the EBSCO, JSTOR, and Science Direct databases. It differs in its thematic focus, as our review includes the benefits, students' satisfaction, and overall effectiveness in addition to the challenges, and time frame, as ours focuses on studies conducted from 2021 to 2024, and databases, as our database includes Google Scholar, Scopus, Eric, and ProQuest.

To summarize, reviewing the systematic literature review, there is scarce evidence. In addition,

the available review papers on the topic focused on different themes, time frames, and databases. Therefore, we believe that the present review would provide a synthesized understanding of the use of the BTL model in higher education institutions so that one can make the best use of it.

3. Research Methodlogy

The PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) protocol was followed in doing this systematic literature review**.** The keywords for collecting the previously published research articles include the 'effectiveness', 'students' motivation', 'challenges', and 'benefits' of Blended Teaching and Learning in combination with 'higher education institutions or 'Universities' and 'post-pandemic' or Post COVID-19' interchangeably. The articles were collected from the Google Scholar, Scopus, ProQuest, and Eric databases. The keywords were combined with the Blended Teaching and Learning Model and higher education or university and post-pandemic, in a full phrase, for instance, 'the challenges of blended teaching and learning in higher education institutions post-pandemic' and inserted into a database to search for related articles.

Criteria were set for inclusion and exclusion to collect the required articles.

The inclusion criteria were:

- Publication year from 2021 to 2024 as studies published before this period would less likely focus on the post-pandemic application of the Blended teaching and learning model.
- The inclusion of the keyword, at least one, the 'blended teaching and learning model and the post-pandemic',
- The full accessibility of the research article, and
- Peer-reviewed journals

The exclusion criteria include:

- Research articles title that does not focus on the Blended Teaching and Learning model,
- The publication year of the articles before 2021,
- Inaccessible material, only abstract articles, that are difficult to read the full length, and
- Those articles that were published in non-peer-reviewed journals

The articles were then organized in the Mendeley reference manager and screened. The final 20 articles were read and analyzed based on the themes of the analysis set. The Prisma flow chart depicting the collection and analysis process is presented in chart 1 below.

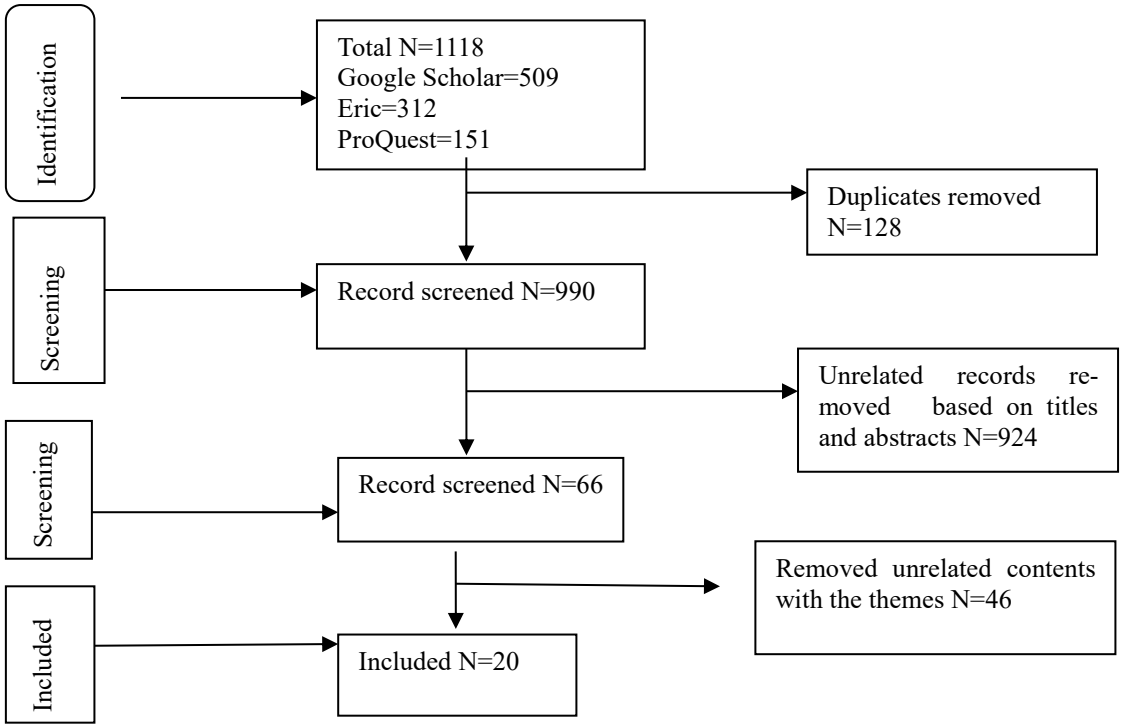

Figure 1: The PRISMA Flow Chart

A table (**Appendix**) that highlights the analyzed articles is attached at the end. The contents are organized based on the topics of analysis set in the introduction part of this systematic review. Hence, the main concepts of the articles were arranged under each topic before they were analyzed and written as a main body of the review. It is attached as an appendix to this review on top of the references.

4. Results and Discussions

This section presents the results of the analyzed articles. Twenty (20) research articles were included in the analysis and discussed based on the themes set at the beginning of the paper.

4.1 The Advantages of Blended Teaching and Learning

The purposes of Blended Teaching and learning in higher education institutions are multifaceted.

We organized them into two main categories: flexibility and cost-effectiveness and Learning opportunity. Each category is discussed hereunder according to the researchers' findings.

4.1.1 Learning Opportunity

In the analyzed articles researchers have presented various learning opportunities related to accessibility, collaborations, self-paced learning, self-directed learning, creativity, problem-solving, digital technology learning, and student-centered learning.

He et al., (2024) found out that Blended teaching and learning (BTL) improves clinical skill proficiency as it creates personalized teaching & timely feedback since it allows for the flexibility of instruction in time and space. As they described, the model helps students with deficiencies after studying in synchronous and asynchronous forms. It is a model that develops students' lifelong learning and 21st-century skills through the application of Heutagogy, which focuses on bottom-up, student-dominated, nonlinear learning (Chamo et al., 2023). According to these authors, BTL can create a learning environment where students can create and lead their learning. As a result, students would develop the capacity to evaluate, solve problems, and create. Duan et al., (2024) pinpointed the model increased students' self-directed learning

(SDL) and academic grades. It assists in diversified teaching activities and student-centered pedagogy. In addition, Adarkwah & Huang (2023) states that BL ensures cognitive and social presence. It promotes self-paced learning and ensures the availability of plenty of educational materials. Of course, we cannot underestimate the varieties of materials like recorded presentations and discussions, videos, digital books, articles, and printed materials altogether which makes students experience varieties based on their choices. Similarly, Y. Zhang et al., (2023) claim that this model enhances interest in the course, initiates learning, promotes repeatability, and real-time monitoring. It also been found to improve academic achievement, self-study skills, and learning attitude, and increase student interactions (Tong et al., 2022). The interactive communicational tool improves teachers' perceptions of presence, student satisfaction, and engagement (Roque-Hernández et al., 2024) and Balanced modes of teachers-led and students-led content (Qamar et al., 2024). The increased self-directed learning ability of the experimental group in BL modes applying virtual simulation for CPR nursing courses, repeated practice, and clear internal structure (Li et al., 2024) was another advantage of the model for medical students. Go et al., (2024) identified it promotes satisfaction, self-efficacy, and work readiness of nursing students. It also promotes interdisciplinary and transnationality, and students are aware of the importance of their work in the framework of the general health approach (Duś-Ilnicka et al., 2024). This promotes collaboration between students and teachers at national and departmental levels.

On the other hand, Hossain et al., (2024) argue that teachers would adopt BL pedagogy without relying on others' saying or thinking if they are supported. It is believed to increase the learning opportunity for teachers and students and can be considered an alternative pedagogical method in non-pandemic or crises. Similarly, Yuan et al., (2022) claim the interest in considering BL as a future of pedagogy as it combines the shortcomings of online-only and in-person teaching and a good mix of different materials. Generally, the model has many advantages we might have to consider in our pedagogy.

4.1.2 Cost-effectiveness and Flexibility

Researchers have shown that the BTL model is flexible in time and place. It was found to be cost-effective as it reduces costs incurred for frequent travel, especially if teachers and students must travel long distances. Some learning contents and materials are digital and do not require a print version which might be an additional cost.

For instance, Obada et al., (2023) argue how the BTL model assisted teaching and learning in overcoming laboratory closure. The pandemic had affected the regular meetings of teachers and students, this model assisted them in sustaining the traditional pedagogy through the application of already available platforms like Zoom and Google Meet without the additional cost incurred. It assisted the teaching and learning to be flexible and sustain online when they cannot meet in person. Building on this, the other researchers describe its flexibility and cost-effectiveness (Crew & Märtins, 2023) due to less travel to attend classes and the possibility of online and on-site. Y. Zhang et al., (2023) have added flexibility in applying the BTL model. According to Van der Westhuizen & Hlatshwayo, (2023), it allows for flexibility, accommodates students' socioeconomic, and availability of various learning resources. As Qamar et al., (2024) asserted it overcomes travel costs incurred by face-to-face and access to online sources.

4.2 Students Satisfactions

In most of the analyzed articles, it is possible to understand that students are satisfied with the model. For instance, Banihashem et al., (2023) explain the positive influences of BTL on teachers' and students' workload, well-being, and motivation as a new teaching and learning model post-pandemic in Russian higher education. Many researchers have mentioned the favorableness of the model even though they haven't mentioned the students' satisfaction vividly. Students are satisfied with the BTL as it helped them students achieve the learning outcome (Obada et al., 2023), satisfied and considered it superior to the traditional model (He et al., 2024), students are satisfied and are active players (Chamo et al., 2023);

students preferred BL over full online learning (Adarkwah & Huang, 2023); teachers and students have high intentions for using BTL if they are supported and have skills (Hossain et al., 2024); 90% of the students are satisfied (Duan et al., 2024); students are supportive of BTL for its flexibility (Crew & Märtins, 2023); students are more satisfied with BL than online-only and face-to-face-only (Zhang et al., 2023); most of the students and teachers are satisfied with the model (Tong et al., 2022; Yuan et al., 2022); students prefer BTL over face-to-face (Qamar et al., 2024); students are satisfied with the model as it improves their analytic ability and ruth-seeking (Li et al., 2024); high satisfaction of students with self-efficacy improvement (Go et al., 2024); and increases performance and satisfaction (Sun, 2024).

Some of the researchers reported less satisfaction. Duś-Ilnicka et al., (2024) claim the students' dissatisfaction due to limited assistance and the problem of sharing patients' data online in a medical setting. Similarly, Al-Amin et al., (2021) sate that students are not satisfied with the BTL model of online assessment methods.
Generally, the BTL in HEIs is found to satisfy the students. The results show that students consider the opportunities the model has created for them, like the availability of varied learning materials, accessibility of online materials from anywhere in the world, self-paced learning, and the possibility of meeting in person and solving problems where difficulties arise.

4.3 Challenges of Blended Teaching and Learning

Despite the many advantages of the BTL model mentioned in the research articles, they were not achieved without challenges. Proper assessment strategies and lack of devices (Jahan et al., 2021), the cost of internet data and connectivity, devices, skills, and know-how of online platforms, and expertise in designing blended courses (Banihashem, Brok, et al., 2023; Obada et al., 2023; Van der Westhuizen & Hlatshwayo, 2023), Limited clinical skills and learning needs(Cheng et al., 2024; He et al., 2024), and Lack of self-confidence, low assertiveness, anxiety (Adarkwah & Huang, 2023; Go et al., 2024), the difficulty of monitoring the learning process at a distant (Chamo et al., 2023), participants' differences (Duś-Ilnicka et al., 2024) were the main. Of course, these challenges are expected. If there is a problem with the internet connection it might be difficult for the participants to attend the online classes and access some digital learning materials. The same is true if they don't have computers or smartphones. Similarly, the skills and expertise for teachers and students to use the tools and platforms would be challenging if they are lacking.

4.4 The Overall Effectiveness of BTL

It was noted that the BTL model was considered effective in most of the analyzed articles. Obada et al., (2023) confirmed that the model was successful in making 80% of the students achieve their learning outcomes. It was effective in surgery and emergency medicine (He et al., 2024). Chamo et al., (2023) described its effectiveness in developing students' 21st-century skills. Adding to this point, Adarkwah & Huang (2023) described the model as the best, pot-pandemic. On the other hand (Hossain et al., 2024) explained that users have high intentions to implement this model even beyond the crisis. Crew & Märtins, (2023) raised its effectiveness for its affordability. It is also considered effective for combining face-to-face and online teaching and learning modes (Tong et al., 2022; Yuan et al., 2022). In addition, as Roque-Hernández et al., (2024) argue the interactive tool of BTL is a good fit that gained popularity post-pandemic. It promotes effective teaching strategies and broadens the learning spectrum (Duś-Ilnicka et al., 2024; Sun, 2024). By and large, it is considered effective teaching and learning pedagogy that addresses the diverse learning needs of students (Sun, 2024). Others recommend it as a future model of pedagogy (Keshavarz, 2020; van der Merwe & Levigne-Lang, 2023).

Some of the researchers have raised concerns about high teachers' stress and workload (Banihashem, Brok, et al., 2023) and difficulty in understanding and assessing technical courses (Al-Amin et al., 2021). Hence the model was not as effective as required. Overall, the model can be considered effective for many reasons overcoming the disadvantages of online-only and onsite-only

models, the availability of various learning and teaching materials, promoting student-centeredness, collaboration, self-paced learning, and developing digital technology skills.

5. Conclusions and Practical Implications

5.1 Conclusions

In conclusion, the BTL model can be considered effective for its flexibility, innovativeness, inclusiveness, responsiveness to diverse individual needs, cost-effectiveness, accessibility, and availability of diverse learning resources. However, the advantages need to be considered with caution due to contextual differences. There could be challenges like a lack of skills and expertise in digital tools, online platforms and resources, and facilities like computers and internet access. It would be difficult for the implementers to be successful with the model if they lack internet and connectivity. In the same way, the individuals' competence in applying digital tools and platforms matters for the successful implementation of the model.

5.2 Practical Implication

The analysis of the review result shows the effectiveness of the Blended teaching and learning model, particularly post-pandemic. Therefore, it would be beneficial for higher education institutions to consider this innovative pedagogy when facing a crisis or in a normal teaching and learning situation. The government (the Ministry of Education) needs to consider the laws, regulations, and policies to support the sector in planning and implementing this model since the use of digital technologies and platforms has become inescapable in this era. However, to implement the model, one needs to tailor it to its institutional situation. It might not work as well as it does in another institution. Hence, looking at one's capacity in terms of resources, knowledge, and skills is essential.

Higher education institutions might need to focus on teachers' TPACK (Technological Pedagogical Content knowledge), content knowledge, and technological knowledge to apply the model in their teaching and learning. In addition, institutions might need to work with different governments, NGOs, national, and international institutions to share knowledge and resources. They could also create resource centers so that they can innovatively share them. Students should not be left behind as they need assistance to be motivated, and ready enough to attend the hybrid courses. As we all know, students are from diverse backgrounds including culture, language, socioeconomics, and digital competence. Therefore, institutions should look for an inclusive way of implementing the model.

6. Limitations

In this systematic review, we have tried to collect previously published research articles from four databases, ERIC, Scopus, ProQuest, and Google Scholar. However, there could be other research articles related to the topic, in other databases, that have not been included in the analysis. In addition to this, only accessible research articles have been collected. Research that was inaccessible but had good relevance to the topic might be left. The time frame was focused on post-pandemic. Therefore, it would be great if a comparative study, of pre- and post-pandemic or widening the time frame, could be conducted. The analysis dimensions could also be focused from varied and widened perspectives so that its success could be seen from multiple perspectives.

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Conflict of Interest

There is no conflict of interest in this work.

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Appendix

Table 1 : The overview of the analyzed articles

Article	Effectiveness	Purposes	Satisfaction	Challenges
Obada, David O. et al (2023) Teaching bioengineering using a blended online teaching and learning strategy: a new pedagogy for adapting classrooms in developing countries	80% of students reported that blended learning was successful in achieving their learning outcomes, using already available platforms like Zoom and Google without additional cost	Overcome the problem of laboratory closure Adaptive economies	Satisfied	Technical know-how, data subscription, internet connectivity Computers
He, Zhicheng et al (2024) The application of blended teaching in a medical practical course of clinical skills training	Effective pedagogy in medical courses, especially in emergency medicine & surgery, but ss prefer offline to online teaching (Face-to-face communication)	To improve clinical skill proficiency compared to the traditional model Create a personalized teaching environment & timely feedback for t/r, accessible and flexible (time and location)	Students believed the blended model is superior to the traditional pedagogy	Limited clinical skills
Chamo, Nurit, et al (2023) 'Nice to Meet You Again': When Heutagogy Met Blended Learning in Teacher Education, Post-Pandemic Era	Bottom-up growth of Heutagogy in blended learning, meet structural change in curriculum post-corona	Nonlinear learning, capacity development, lifelong learning Develop 21st-century skills (self-directed, communicative, and collaborative)	Students are highly satisfied, active players, self-directed learners, increased motivation	Difficulty in monitoring the learning process at a distance
Adarkwah, Michael (2023) Blended learning for the "multi-track" undergraduate students in Ghana in an adverse era	Self-paced learning reduced overcrowding, and the presence of plenty of materials online	BL ensures the cognitive and social presence Considered the best post-pandemic	preferred BL over fully online learning and recommended it for the future	Problem of e-learning anxiety
Hossain, Mohammad, et al (2023) Behavioral Intentions of University Teachers and Students toward the Adoption of the hybrid-blended learning method: Evidence from Bangladesh	Users' intention to adopt BL	Teachers would adopt BL pedagogy without relying on other says or thinking, and beyond the crisis, Increases the opportunity for teaching and learning	Students will use the BL if they receive support from the university, and friends and have the resources and skills to use it	Proposed

Duan, Anyan (2024) Design and practice of blended teaching of internal medicine nursing based on O-AMAS effective teaching model	Integrating BL with O-AMAS and SS self-directed learning	Increased students' Self-Directed Learning SDL increased academic grades, effective	Student satisfaction increased 96%	-
Nikolopoulou, (2023) Blended Learning in a Higher Education Context: Exploring University Students' Learning Behavior	Effective in raising students' positive perception of BL independent learning, motivation	Explore students learning behaviors in BL situation as there is a general shift to online teaching and learning due to covid which gave rise to BL	Positive perception of the Bl (audio-visual resources to enhance their independent learning	-
Crew, Teresa et al, (2023) Students' views and experiences of blended learning and employability in a post-pandemic context	It is effective because of its affordability in terms of financial concerns and the cost of living	Flexibility, cost-effective	Students are supportive of BL for its flexibility	-
Zhang, et al (2023) Online education isn't the best choice: evidence-based medical education in the post-epidemic era—a cross-sectional study	Perception and Learning Outcome of students in a BL model as it is widely used post-pandemic compared to the face-to-face and online-only model	Enhance interest in the course initiative of learning, flexibility, repeatability, real-time monitoring	Students were more satisfied with BL than online only and face-to-face only	-
Yuan, et al (2022) The Exploration of the Future Teaching Mode in Post-pandemic Higher Education	BL compared with the online and face-to-face models to define the future of pedagogy post-pandemic	BL is considered as the future of pedagogy as it is effective in combining the shortcomings of online-only and in-person teaching, a good mix of different materials, videos	Most of the teachers and students are satisfied with the BL model	-
Tong, et al (2022) The effectiveness of blended learning on students' academic achievement, self-study skills, and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane	Combining the advantages of online and face-to-face in a blended form as BL and teaching is triggered by online learning which was induced by the pandemic	Improved academic achievement, self-study skills, and learning attitude, increased student interactions	Students were satisfied with the BL model	-

Van der et al (2023) Towards flexible learning and Teaching: Lessons learned for blended learning and teaching post COVID-19 pandemic	Recommendation of BL post-pandemic as there have been lessons learned from the online learning during the Covid	Flexible, accommodates students socioeconomic-wise, availability of learning resources	Recommend BL for post-pandemic based on their experiences of OL during the COVID	Data cost (internet) and devices, skills in using online platforms
Roque-Hernández (2024) Roque-Hernández Perceived instructor presence, interactive tools, student engagement, and satisfaction in hybrid education post-COVID-19 lockdown in Mexico	The interactive technology for BL is a good fit model that got popularity post-pandemic	The interactive communicational tool improves teachers' perceptions of presence, student satisfaction, and engagement	Improved students' satisfaction	-
Qamar, et al (2024) Incorporating face-to-face and online learning features to propose a blended learning framework for post-COVID classrooms in India	BL is effective over f2f and universities must tailor the model to their specific institutional and student needs.	Balanced modes of teachers-led and students-led, overcome travel costs incurred by the f2f, access to online sources	Increases satisfaction of students with the BL over f2f	-
Li, Yan (2024) Integrative virtual nursing simulation in teaching cardiopulmonary resuscitation: A blended learning approach	BL is effective in comparing two groups in a medical course/virtual nursing simulation	The increased self-directed learning ability of the experimental group in BL modes applying virtual simulation for CPR nursing course, repeated practice, clear structure of the internal structure	Improved ss self-directed learning, self-confidence, truth-seeking and analyticity	Complex change and learning needs in clinical nursing
Go, Cheyenne Franchesca M. (2024) Nursing students' blended learning satisfaction, self-efficacy, and work readiness: A structural equation modeling study	Effective	Identify if blended learning promotes satisfaction, self-efficacy, and work readiness of nursing students	High ss satisfaction self-efficacy and work readiness	Lack of self-confidence, low assertiveness, anxiety
Bani Hashem, et al (2023) Modeling teachers' and students' attitudes, emotions, and perceptions in blended education: Towards post-pandemic education	Teachers perceive high stress and workload but students' low stress	Identify if BL influences teachers and ss workload, well-being, and motivation as a new teaching and learning model post-pandemic in Russian higher education	High teachers and students' motivation with BTL,	Lack of expertise in designing blended courses

Sun, Yanting (2024) Evaluating the Learning Effectiveness of A Blended Teaching Model of College English Using A Decision Tree Algorithm	BL to promote personalized learning experiences and promote effective teaching strategies	Effective teaching strategies address the diverse learning needs of students	Increased students' performance,	-
Duś-Ilnicka, et al (2024) Blended intensive program's implementation in dental education: post-pandemic evolution of learning	Effective in broadening the learning spectrum	Promote international cooperation, Promote interdisciplinary and transnational, ss aware of the importance of their work in the framework of the general health approach	Dissatisfied with the opportunity to provide limited assistance to their patients and, the lack of sharing patients' data online	Participants differences
Jahan, I., Rabbi, F., & Islam, U. N. (2021). Can blended learning be the new normal in higher education in Bangladesh? International Journal of Educational Research Review, June, 306-317.	Useful to help slow learners, Develop digital literacy Decrease the hours of traditional classes	The scopes and challenges of implementing blended learning	Most of the students were not satisfied with the assessment processes of online courses, difficulty in understanding technical courses	Unstable network connection, lack of devices lack of motivation for self-regulated learning poor interaction between facilitators and students, and proper assessment strategies