KANCHIOLI
(Journal of Humanities and Social Sciences)
ISSN : 2583-0740 (online)
Volume- I, Issue – 2, DECEMBER-2021

Critical Analysis on the definition of Blended learning within the digital teaching learning environment

[1]**Author** Hemanta Kumar Baruah

ARTICLE INFO

RECEIVED 27 AUGUST 2021
ACCEPTED 19 NOVEMBER 2021
PUBLISHED 09 DECEMBER 2021

ABSTRACT

The rapid advancement of technology has ushered in complex changes that impact the transmission and dispersal of knowledge across various stages of education. In tandem with these developments, blended learning emerges as a promising approach, not only enhancing classroom learning but also revitalizing the learning environment to offer students heightened levels of flexibility and opportunity (Smith & Hill, 2019). This paper aims to delve into existing literature on blended learning, conducting a critical analysis to re-conceptualize and familiarize this model within the public education system.

A notable challenge in discussing blended learning lies in the ambiguity associated with the term itself, as studies point out potential criticisms related to 'Blended pedagogies' or 'Blended Teaching.' The investigation reveals that while the Blended Learning approach, combining technology with face-to-face learning, has gained familiarity, its conceptual clarity remains elusive. To address this, the paper suggests alternative terminologies such as 'Blended Mode of Learning' or 'Blended Instructional Model.' In this proposed model, a fusion of face-to-face interaction and technology-mediated learning takes place, necessitating teachers to employ skillful strategies to sustain student motivation and provide a diverse learning experience.

By re-evaluating and refining the terminology, educators and policymakers can better navigate its implementation.

Keywords:

Blended Learning, Mixed Learning, E-learning, Digital Learning, Instructional Model.

[1] Corresponding Author : Assistant Professor, Deptt. of Education, Lakhimpur Girls' College
Email - hemantabaruah1@gmail.com , Contact No. 8486389550

INTRODUCTION

The ever-evolving landscape of education has witnessed a profound transformation with the advent of advanced instructional technologies. The complexity of learning environments and the delivery of information has given rise to various models and platforms globally, among which the prominent one is Blended Learning. The term 'Blended' inherently suggests a combination or mixture, and when applied to learning, it signifies a fusion of physical presence or individual work with the delivery of learning experiences aided by advanced tools and preset learning resources.

Blended learning leverages the capabilities of computers and technology to create interactive and engaging learning environments, significantly impacting the acquisition of knowledge, skill development, and student engagement (Chen et al., 2018; Müller & Mildenberger, 2021). This approach goes beyond merely enhancing classroom instruction; it strives to elevate the overall learning environment, providing students with increased opportunities for exploration and interaction (Smith & Hill, 2019).

Despite the prevalence and the additional flexibility offered to adult learners, purely online courses often face challenges in terms of retention (Bawa, 2016). The comparison between attending classes in person and virtual courses reveals that physical attendance can provide adult learners with valuable connections to both their peers and instructors (James & Seary, 2019). However, a meta-analysis of over 1,000 empirical studies conducted from 1996 to 2008 concluded that blended learning, rather than being attributed to the medium itself, proves to be more effective than either face-to-face instruction or online learning alone (Means et al., 2009).

The success of blended learning lies in its ability to blend the strengths of traditional classroom settings with the benefits of technology-mediated instruction. This

integration allows for a dynamic and personalized learning experience that caters to diverse learning styles and preferences. The combination of face-to-face interactions and technology-driven resources creates a synergy that addresses the limitations of both traditional and online learning.

Blended learning not only facilitates the delivery of content but also nurtures collaborative learning environments. The physical presence in traditional classrooms fosters interpersonal relationships, while technology enables collaborative tools, virtual discussions, and real-time feedback. This combination contributes to a holistic educational experience that goes beyond the confines of a traditional classroom.

CONCEPTUAL FRAMEWORK AND BACKGROUND

The implementation of a Blended Learning approach involves several components and intentional activities, including in-person meetings, the delivery of learning resources through digital media, the development of digital literacy, stimulation of students' interest, and the provision of an individualized grading plan based on students' pace and time. This approach not only facilitates learning experiences but also consciously advocates for the integration of e-learning materials with in-person activities. Traditional instructional programs often fail to address the unique needs and life circumstances of adult learners (Illeris, 2018).

Bliuc et al. (2007) define Blended Learning as learning activities that deliberately combine both face-to-face and technologically mediated interactions among instructors, students, and learning resources.

According to Allen et al., (2007), Blended Learning combines face-to-face learning with an online learning style, where 30-79% of the content is delivered online. This model is also referred to as a blended teaching-learning strategy or a mix of instructional

methods and activity styles (Al-Busaidi, 2013). It incorporates various types of media, such as text, audio, and video, at different time scales (synchronous, asynchronous), within a similar educational context (Roseth et al., 2013).

Driscoll (2002) conceptualization of Blended Learning introduces four key concepts: the blending of online activities, the integration of pedagogical approaches, the incorporation of instructional technology with instructor-led training, and the blending of instructional innovations with real work tasks to create a collaborative impact on teaching and learning.

Akkoyunlu & Soylu (2006) emphasize that the integration of online and face-to-face learning optimally combines the flexibility and efficiency of online learning with the social interaction provided by in-person classes, where students require guidance for learning.

Moreover, the concept of sustained electronic learning systems to complement traditional instruction is gaining significance (McClelland, 2001). The synergy created by Blended Learning aligns with contemporary perspectives on learning environments, recognizing the importance of combining traditional and technologically mediated approaches. The dynamic combination of these elements addresses the limitations of each mode and offers a comprehensive and effective educational experience. As the educational landscape continues to evolve, the exploration and implementation of Blended Learning approaches become increasingly valuable for catering to the diverse needs of learners and enhancing the overall quality of education.

OBJECTIVES

The researcher pursues the following two primary objectives, both of which are thorough and hold greater significance in the evolving landscape of educational

settings:

1) To conduct a comprehensive review of the current literature on the Blended Learning approach.
2) To undertake a critical analysis aimed at re-conceptualizing the Blended Learning approach or model and fostering its integration within the public education system.

EMERGENCE OF BLENDED LEARNING IN TECHNOLOGY MEDIATED LEARNING ENVIRONMENT

The rapid pace of advancements brought about by new technologies has significantly impacted the global way of life, work dynamics, and recreational activities (Cervenanská, 2013). The role of educational technology in teaching is pivotal due to the extensive use of information, communication, and data technologies (Lazar, 2015). A plethora of studies and literature corroborate the profound influence of information and communication technology on students in remote areas, providing access to both formal and non-formal education. Moreover, numerous studies emphasize heightened motivation and interest when utilizing technology-based or digital learning environments. The widespread adoption of web technologies, coupled with structured learning, has enabled the design and implementation of new-generation learning environments that are authentic, legitimate and secure (Caner, 2012).

Multimedia learning has become a prevalent method in both formal and informal settings, such as institutions of higher education, full-time occupations, and business enterprises (Li et al., 2020). The design of multimedia education and the transformation of learning materials bring richer resources and display formats to teaching and learning, profoundly impacting students' cognitive processes and academic performance (Mayer, 2019; Mutlu-Bayraktar et al., 2019).

Nevertheless, there is a recognized need to shift from a teacher-centered to a student-focused model by integrating information and communication technology in all aspects of instruction and learning (Jani et al., 2018). Higher education institutions (HEIs) have consequently shifted their focus from entirely online distance learning to Blended learning, as an evolution of the face-to-face instruction model (Johnson et al., 2016).

The Blended learning model offers students greater time flexibility and improved learning outcomes. However, students initially face challenges in managing their time efficiently, assuming greater responsibility for their own learning, and adapting to modern technologies. Blended courses present enhanced opportunities for teacher-student interaction, increased student engagement in learning, greater flexibility in the teaching and learning environment, and avenues for continuous improvement. Challenges include resource constraints, lack of time, support, and resources for course revision, acquiring new instruction and technology skills, alongside risks associated with delivering a course in the blended learning mode.

From a strategic standpoint, Blended learning provides an opportunity to enhance an institution's reputation, broaden access to educational offerings, and reduce operating costs. Challenges, however, involve aligning the blended model with institutional goals, resistance to organizational change, and a lack of organizational structure and experience in collaboration and partnerships (Vaughan, 2007).

The integration of special electronics with inverse correspondence contributes to a more advanced educational process and easier access to information (Bonk & Graham, 2004). Despite challenges regarding the feasibility of implementing blended learning in higher education, a body of research supports the integration of face-to-face instruction with an online mode, leading to improved learning outcomes (Garrison & Kanuka, 2004).

The contemporary era is equipped with a digital infrastructure, indicating a growing need to incorporate technology into face-to-face language classes. This creates new avenues for exploration. A blended learning model with face-to-face instruction can invigorate learning and provide more community-oriented learning experiences (Okaz, 2015).

Several years of experience in designing blended learning, coupled with multiple iterations of traditional course delivery, are crucial for the successful implementation of this approach. Open and distance education, which involves the integration of technology, is not only cost-effective for students but also offers them the opportunity to learn collaboratively (Baruah, 2014). Instructors must possess a comprehensive understanding of students' needs and be familiar with a range of tools that can be employed to efficiently achieve course objectives (Alammary et al., 2014).

Blended learning is gaining momentum in institutions due to its positive impact on student motivation and performance (Lu et al., 2018). It enables teachers to engage students in active learning, fostering skills such as communication, information literacy, creativity, and collaborative effort that translate into the ability to leverage digital technologies for various purposes. Embracing blended learning can make Higher Education Institutions (HEIs) more adaptable and responsive to rapid changes, provided it is appropriately adopted (Oakley, 2016).

ADAPTIVE BLENDED LEARNING MODELS

The application of blended learning methods capitalizes on a variety of learning experiences achievable through a blend of learning environments, encompassing independent study, lectures, collaborative online activities, studios, communication networks, simulations, and the utilization of multimedia (Reid-Young, 2003; Draffan & Rainger, 2006).

Instructors encounter challenges primarily in the effective integration of technology for teaching. Difficulties in providing appropriate educational technology, resources, and effective training for supporting teachers constitute the central challenges faced by educational institutions (Rasheed et al., 2020).

The blended learning model serves as a framework for assessing and integrating various components to create an educationally robust learning environment. These components include the learning environment itself, instructional components, and media components (Kaur, 2013). The successful integration of e-learning into instructional practices necessitates ongoing planning, development, and experimentation. Additionally, a theoretical framework is essential for the precise examination of technology in technology-rich environments like e-learning settings (Karasavvidis, 2009).

Blended learning typically incorporates a diverse range of media, materials, teaching methods, and assessment tools (Sharma & Barrett, 2008). While traditional classrooms have limitations in covering a specific amount of material, blended learning emerges as an opportunity to manage course content through online resources. Consequently, blended learning offers more choices in learning, a quicker delivery of information, and students are expected to be motivated, ultimately achieving their learning goals (Ting, 2014).

Staker & Horn, (2012) and their subsequent book 'Blended: Using Disruptive Innovation to Improve Schools' (2017) present **four effective blended learning models** that have proven successful in transforming educational practices:

1. Rotation Model:

Station Rotation: Students rotate through learning modalities on a fixed schedule, with at least one modality being online. Teachers create individualized study plans.

Lab Rotation: Similar to Station Rotation, but students move to a computer lab for the online learning component.

Flipped Classroom: Students independently consume online lessons, utilizing class time for homework or assignments with teacher assistance as needed.

Individual Rotation: Students rotate through learning modalities on a customized schedule set by an algorithm or teacher.

2. Flex Model:

Courses or subjects where electronic learning forms the basis of student learning, allowing for differentiated practices. Instructors are present to provide assistance, and students' progress through the Flex course based on individual needs. Instructors may initiate tasks and discussions to enhance learning.

3. A La Carte Model:

Any course taken entirely online while attending a physical school. Students have the option to enroll in additional online courses beyond their regular school hours, supplementing their traditional classes.

4. Enriched Virtual Model:

Courses that involve scheduled face-to-face learning sessions but allow students to complete the majority of work online from any location. Some courses may meet in person and permit students to work independently online, whether on or off-campus.

These models offer a diverse range of approaches, catering to different educational needs and preferences. The Rotation Model provides structured flexibility, the Flex Model focuses on individualized learning, the A La Carte Model allows for additional online courses, and the Enriched Virtual Model combines face-to-face interactions with online flexibility. The implementation of these models has the potential to revolutionize traditional education by leveraging the benefits of technology and meeting the diverse learning styles of students.

CRITICAL ANALYSIS

Blended learning represents more than a mere replacement for traditional classrooms and online instruction. It demands a nuanced understanding of the progress made by students in the online environment (Graham et al., 2013).

This approach necessitates intricate instructional strategies that, in addition to supporting face-to-face interactions, continuously monitor students' engagement and various activities within an e-course. To effectively leverage blended learning in higher education, one must assess how well e-learning facilitates direct communication, the appropriateness of e-content quality, and whether an e-course has been designed with its effectiveness in mind (Keržič et al., 2019).

Despite the positive outcomes observed in research and practical applications, the adoption of blended learning remains slow, primarily due to human resistance to adapting to technological changes. The prevailing belief that the physical classroom is the superior teaching method persists, rooted in the direct contact between instructors and students (Ramakrisnan et al., 2012).

Recognizing the importance of emotions in learning, studies highlight that human instructors spend significantly more time addressing emotional and motivational aspects than academic challenges (Lepper et al., 1993). While human instructors excel at managing emotional engagement, it does not negate the effectiveness of technology-mediated resources, which can be equally or more efficient in specific contexts. In blended learning environments, where decisions to blend human and technology-based instruction must consider the impact on student engagement, educational designers need to discern when interpersonal interaction is critical and when technology-mediated resources are compelling, remaining mindful of emotional

involvement. (Halverson & Graham, 2019).

Assessing the effectiveness of self-directed studies supported by distance learning resources, adapting to evolving instructional models, and gaining more experience in blended and e-learning environments are emphasized as crucial aspects (Rolfe & Gray, 2011; Sheffield et al., 2015).

Any instructional model developed from an instructor's perspective needs to consider various contextual levels and challenges to learning (Draffan & Rainger, 2006). Challenges in designing blended learning include incorporating flexibility, fostering interaction, supporting students' learning processes, and creating a conducive learning environment (Boelens et al., 2017).

The transition to a blended learning environment necessitates a robust technical foundation. Simultaneously, factors such as students' readiness, commitment, geographical and biological diversity, as well as practical considerations like privacy and copyrights, impact the creation and effective implementation of a comprehensive learning environment. Leaders need to carefully assess their institution's readiness for blended learning, considering these perspectives and developments (Adekola et al., 2017).

Blended learning offers flexibility in learning for both students and teachers, enabling a symbiotic relationship where both parties become learners. However, institutional support, provision of professional development opportunities, and the ability to adapt courses to the most suitable blended model are essential for optimal implementation (Bliuc et al., 2007).

The positive impact of blended learning on instructors can be hindered by negative perceptions and a lack of institutional support, potentially impeding the willingness of

instructors to embrace the necessary changes (Tshabalala et al., 2014; Lim & Wang, 2016).

This is undeniable that there exists significant uncertainty regarding its precise definition. Despite its growing acceptance, the lack of clear conceptual boundaries has sparked discussions about its terminology. The blending aspect doesn't inherently pertain to the learning process itself, prompting the suggestion of terms like 'blended or mixed pedagogics,' 'blended or mixed instruction,' or the more student-centric 'learning with blended educational methods' as potentially more precise alternatives. Rather than using "Blended Learning," it might be worthwhile to consider alternatives such as "Blended Mode of Learning."

DISCUSSION AND CONCLUSION

The term 'blended learning' often discussed in research literature primarily emphasizes the integration of e-learning with traditional forms of learning. However, there is a significant ambiguity and inconsistency in its definition, as noted by Oliver & Trigwell, (2005). While the popularity of blended learning is on the rise, its conceptual clarity is lacking, leading to a debate over terminology. The blending in question is not inherently about learning; thus, terms like 'blended or mixed pedagogics,' 'blended or mixed instruction,' or the more student-centered 'learning with blended educational methods' may be more accurate. Rather than 'Blended Learning,' alternative expressions such as 'Blended Mode of Learning' could be adopted.

The term 'blended learning' is most commonly used in the educational domain rather than public schooling, where its significance emerges from the failure of purely online learning to meet the instructional needs of institutions (e.g. Driscoll, 2002). Approaching blended learning requires an understanding of flexible design possibilities and the challenge of doing things differently. Its redesign aims to re-conceptualize and

restructure teaching and learning interactions fundamentally, assuming that opening the educational mind to a full range of possibilities is crucial. Blended learning considers various options that demand a reevaluation of how students learn in profound and meaningful ways (Garrison & Vaughan, 2008).

In the current educational landscape, information and technology advancements play a crucial role. Teachers leverage modern technology to shape students' learning experiences in more dynamic and engaging ways, contributing to student motivation (Arkhipova et al., 2017). However, it's essential to acknowledge that teachers expect comprehensive technical support and training from institutions regarding professional development, technology integration, and educational forums. This significantly influences teachers' motivation to utilize technology for teaching (Nicolle & Lou, 2008).

Technology alone does not guarantee effective learning. The key lies in how teachers and students utilize available technologies to determine whether transformative learning occurs. Teachers can either rise to the challenge or explore the potential of technology to help students achieve meaningful outcomes. Understanding learning principles such as learning in context, learning being dynamic, social, and interactive provides teachers with a framework to think about how technology can support their education (Marcy Driscoll, 2002). In essence, technology in education should be viewed not as a standalone solution but as a tool that, when used thoughtfully, can enhance the learning experience for both teachers and students.

In conclusion, the ongoing advancements and innovations in education underscore the significance of models like blended learning. The term 'blended' encapsulates the harmonious integration of traditional and technological elements in the learning process. This approach has proven to be effective in enhancing classroom instruction, creating a conducive learning environment, and offering flexibility to learners. By

acknowledging the strengths of both face-to-face interactions and technology-mediated instruction, the so called 'Blended learning', suggested to be the 'Blended mode of Learning' emerges as a transformative force in education, catering to the diverse needs of learners in the ever-evolving educational landscape.

REFERENCES

1. Adekola, J., Dale, V. H. M., & Gardiner, K. (2017). Development of an institutional framework to guide transitions into enhanced blended learning in higher education. Research in Learning Technology, 25.
2. Akkoyunlu, B., & Soylu, M. Y. (2006). A study on students' views on blended learning environment. Turkish Online Journal of Distance Education, 7(3), 43–56.
3. Al-Busaidi, K. A. (2013). An empirical investigation linking learners' adoption of blended learning to their intention of full e-learning. Behaviour \& Information Technology, 32(11), 1168–1176.
4. Alammary, A., Sheard, J., & Carbone, A. (2014). Blended learning in higher education: Three different design approaches. Australasian Journal of Educational Technology, 30(4).
5. Allen, I. E., Seaman, J., & Garrett, R. (2007). Blending in: The extent and promise of blended education in the United States. ERIC.
6. Arkhipova, M. V, Belova, E. E., Gavrikova, Y. A., Lyulyaeva, N. A., & Shapiro, E. D. (2017). Blended learning in teaching EFL to different age groups. International Conference on Humans as an Object of Study by Modern Science, 380–386.
7. Baruah, H. K. (2014). Open and Distance Learning System as a Mean for Catering Learners' Need. International Journal of Research, 1(8), 384–389.
8. Bawa, P. (2016). Retention in online courses: Exploring issues and solutions—A literature review. Sage Open, 6(1), 2158244015621777.
9. Bliuc, A.-M., Goodyear, P., & Ellis, R. A. (2007). Research focus and methodological choices in studies into students' experiences of blended learning in higher education.

The Internet and Higher Education, 10(4), 231–244.

10. Boelens, R., De Wever, B., & Voet, M. (2017). Four key challenges to the design of blended learning: A systematic literature review. Educational Research Review, 22, 1–18.
11. Bonk, C. J., & Graham, C. R. (Eds. . (2004). Handbook of blended learning: Global Perspectives, Local Designs. CA: Pfeiffer Publishing.
12. Caner, M. (2012). The definition of blended learning in higher education. Blended Learning Environments for Adults: Evaluations and Frameworks, 19–34.
13. Chen, J., Wang, M., Kirschner, P. A., & Tsai, C.-C. (2018). The role of collaboration, computer use, learning environments, and supporting strategies in CSCL: A meta-analysis. Review of Educational Research, 88(6), 799–843.
14. Draffan, E. A., & Rainger, P. (2006). A model for the identification of challenges to blended learning. ALT-J, 14(1), 55–67.
15. Driscoll, Marcy. (2002). How people learn (and what technology might have to do with it). TITLE CyberBytes: Highlighting Compelling Uses of Technology in Counseling. INSTITUTION ERIC Clearinghouse on Counseling and Student Services (2002), 144.
16. Driscoll, Margaret. (2002). Blended learning: Let's get beyond the hype. E-Learning, 1(4), 1–4.
17. Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. The Internet and Higher Education, 7(2), 95–105.
18. Garrison, D. R., & Vaughan, N. D. (2008). Blended learning in higher education: Framework, principles, and guidelines. John Wiley \& Sons.
19. Graham, C. R., Woodfield, W., & Harrison, J. B. (2013). A framework for institutional adoption and implementation of blended learning in higher education. The Internet and Higher Education, 18, 4–14.
20. Halverson, L. R., & Graham, C. R. (2019). Learner engagement in blended learning environments: A conceptual framework. Online Learning, 23(2), 145–178.
21. Horn, M. B., & Staker, H. (2017). Blended: Using disruptive innovation to improve

schools. John Wiley \& Sons.

22. Illeris, K. (2018). A comprehensive understanding of human learning. In Contemporary theories of learning (pp. 1–14). Routledge.

23. James, T., & Seary, K. (2019). Why aren't they attending class like they are supposed to? A review into students' perception of the value of class attendance. Student Success, 10(1), 115–130.

24. Jani, J., Muszali, R., Nathan, S., & Abdullah, M. S. (2018). Blended learning approach using frog vle platform towards students' achievement in teaching games for understanding. Journal of Fundamental and Applied Sciences, 10(5S), 1130–1141.

25. Johnson, L., Becker, S. A., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2016). NMC horizon report: 2016 higher education edition. The New Media Consortium.

26. Karasavvidis, I. (2009). Activity Theory as a theoretical framework for the study of blended learning: a case study. Proceedings of the 6th International Conference on Networked Learning, 195–202.

27. Kaur, M. (2013). Blended learning-its challenges and future. Procedia-Social and Behavioral Sciences, 93, 612–617.

28. Keržič, D., Tomaževič, N., Aristovnik, A., & Umek, L. (2019). Exploring critical factors of the perceived usefulness of blended learning for higher education students. PloS One, 14(11), e0223767.

29. Lepper, M. R., Woolverton, M., Mumme, D. L., & Gurtner, J. (1993). Motivational techniques of expert human tutors: Lessons for the design of computer-based tutors. Computers as Cognitive Tools, 1993, 75–105.

30. Li, J., Luo, C., Zhang, Q., & Shadiev, R. (2020). Can emotional design really evoke emotion in multimedia learning? International Journal of Educational Technology in Higher Education, 17, 1–18.

31. Lim, C. P., & Wang, T. (2016). A framework and self-assessment tool for building the capacity of higher education institutions for blended learning. Blended Learning for Quality Higher Education: Selected Case Studies on Implementation from Asia-Pacific,

1–38.

32. Lu, O. H. T., Huang, A. Y. Q., Huang, J. C. H., Lin, A. J. Q., Ogata, H., & Yang, S. J. H. (2018). Applying learning analytics for the early prediction of Students' academic performance in blended learning. Journal of Educational Technology \& Society, 21(2), 220–232.

33. Mayer, R. E. (2019). What Do Teachers and Administrators Need to Know about Multimedia Learning Theory. Multimedia Learning Theory: Preparing for the New Generation of Students, 85.

34. McClelland, B. (2001). Digital learning and teaching: Evaluation of developments for students in higher education. European Journal of Engineering Education, 26(2), 107–115.

35. Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies.

36. Müller, C., & Mildenberger, T. (2021). Facilitating Flexible Learning by Replacing Classroom Time With an Online Learning Environment: A Systematic Review of Blended Learning in Higher Education. Educational Research Review, 100394.

37. Mutlu-Bayraktar, D., Cosgun, V., & Altan, T. (2019). Cognitive load in multimedia learning environments: A systematic review. Computers \& Education, 141, 103618.

38. Nicolle, P. S., & Lou, Y. (2008). Technology adoption into teaching and learning by mainstream university faculty: A mixed methodology study revealing the "how, when, why, and why not." Journal of Educational Computing Research, 39(3), 235–265.

39. Oakley, G. (2016). From diffusion to explosion: Accelerating blended learning at the University of Western Australia. Blended, 67.

40. Okaz, A. A. (2015). Integrating blended learning in higher education. Procedia-Social and Behavioral Sciences, 186, 600–603.

41. Oliver, M., & Trigwell, K. (2005). Can 'blended learning'be redeemed? E-Learning and Digital Media, 2(1), 17–26.

42. Paul, A. M. (2014). Computer tutors that can read students' emotions.

43. Ramakrisnan, P., Yahya, Y. B., Hasrol, M. N. H., & Aziz, A. A. (2012). Blended Learning: A Suitable Framework For E-Learning In Higher Education. Procedia - Social and Behavioral Sciences, 67, 513–526.

https://doi.org/https://doi.org/10.1016/j.sbspro.2012.11.356

44. Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. Computers \& Education, 144, 103701.

45. Reid-Young, A. (2003). The key to e-learning is b-learning. HCi Journal of Information Development.

46. Rolfe, V. E., & Gray, D. (2011). Are multimedia resources effective in life science education? A meta-analysis. Bioscience Education, 18(1), 1–14.

47. Roseth, C., Akcaoglu, M., & Zellner, A. (2013). Blending synchronous face-to-face and computer-supported cooperative learning in a hybrid doctoral seminar. TechTrends, 57(3), 54–59.

48. Sharma, P., & Barrett, B. (2008). Blended learning: Using technology in and beyond the language classroom. Macmillan.

49. Sheffield, S. L.-M., McSweeney, J. M., & Panych, A. (2015). Exploring Future Teachers' Awareness, Competence, Confidence, and Attitudes Regarding Teaching Online: Incorporating Blended/Online Experience into the" Teaching and Learning in Higher Education" Course for Graduate Students. Canadian Journal of Higher Education, 45(3), 1–14.

50. Smith, K., & Hill, J. (2019). Defining the nature of blended learning through its depiction in current research. Higher Education Research \& Development, 38(2), 383–397.

51. Staker, H., & Horn, M. B. (2012). Classifying K--12 blended learning.

52. Ting, K. (2014). Blended Learning as a Theoretical Framework for the Application of Podcasting. English Language Teaching, 7(5), 128–135.

53. Tshabalala, M., Ndeya-Ndereya, C., & van der Merwe, T. (2014). Implementing Blended Learning at a Developing University: Obstacles in the Way. Electronic Journal of E-Learning, 12(1), 101–110.

54. Vaughan, N. (2007). Perspectives on blended learning in higher education. International Journal on E-Learning, 6(1), 81–94.