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The Rotation Model in Blended Learning

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Abstract: The COVID-19 pandemic has led to an increase in the use of blended learning globally, but there is a lack of understanding of the various types of blended learning models. This literature review study focuses on the blended learning models and the rotation blended learning model. The study gathered data through document analysis and used content analysis to analyze it. The findings suggest that blended learning can be delivered through different models, including the models based on class instruction. Therefore, when developing a blended learning activity, course, or program, it is important to consider all available models. This study emphasizes the importance of the rotation model and its sub-models in blended learning and offers suggestions for future research and practitioners. The results of this study can be used to create effective blended learning environments.

Keywords: blended learning models, blended learning, mixing modalities, the rotation model, K-12 education.

Highlights

What is already known about this topic:
- There is a wide range of blended learning models.
- BL models have gained popularity due to their flexibility and ability to cater to individual learning needs. However, the success of these models depends on the availability and accessibility of technology.

What this paper contributes:
- This contributes to the understanding of blended learning models, specifically focusing on the rotation blended learning model.
- This paper highlights the importance of the rotation model based on classroom instruction can be a solution for students who are unable to access the internet at home.

Implications for theory, practice, and/or policy:
- It is important to think physical and pedagogical dimensions of blended learning.
- Much research is needed to better understand how the blended learning models work in practice.

Introduction

Blended learning (BL) has been around since the late 1990s when the Internet and World Wide Web became popular, and its meaning has evolved (Friesen, 2012). Definitional issues related to BL were particularly complex, as each institution seemed to have a slightly different model of what they considered important for their context and environment. This made it difficult for researchers attempting to study this emerging phenomenon, as they were interested in reducing ambiguity and establishing clear definitions and boundaries for blended learning. However, many researchers were left feeling frustrated by the lack of consistency in how blended learning was defined and described (Oliver & Trigwell, 2005).

The Clayton Christensen Institute provides a widely accepted definition of BL, particularly in K-12 education. According to their definition, BL is "a formal education program at the K-12 level that involves online learning with some control over time, place, path, and/or pace, as well as supervised brick-and-mortar learning away from home. The modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience" (Staker &Horn, 2012, p.3).

BL can improve student engagement and learning outcomes, as well as provide access and flexibility to student learning, while also potentially reducing costs. However, to achieve these benefits, it is crucial to design high-quality blended teaching that includes seven essential elements: the teacher, pacing, preparation, participation, personal interaction, personalization, and place. By incorporating these elements, blended teaching can help students develop vital knowledge and skills, including communication, collaboration, critical thinking, and creativity, that will be necessary for their future success. Thus, blended classrooms can be a key factor in achieving this goal (Graham, 2019).

During the COVID-19 pandemic, various organizations and institutions emphasized the significance of BL. The importance of BL is expected to continue even after the pandemic (UNESCO, 2022), as it can better prepare learners for unpredictable situations and enable a workforce and economy driven by knowledge. To achieve universal anytime, anywhere learning, restructuring the education system is essential, as stated by AURORA (2022). According to Educause (2021), blended and hybrid course models will significantly impact postsecondary teaching and learning. The European Commission's document (2020) supporting the recommendation for BL for primary and secondary education recognized BL as a flexible approach that can be adjusted based on the learners' age, capacity, and learning outcomes, giving them more control over the learning process's time, place, path, and pace.

Traditional schools have been the primary mode of education for centuries. However, the recent COVID-19 pandemic has forced educators and policymakers to reevaluate the efficacy of traditional schooling models. As a result, BL models have gained increased attention as a potential solution to this situation. However, the effectiveness of BL largely depends on technology. Without the use of technology, BL may face several challenges. For example, students may lack access to online learning materials, which can limit their ability to learn and engage with the course content.

A report published by UNICEF Romania and the International Telecommunication Union in 2020 revealed that almost two-thirds of the world's school-age children, which amounts to 1.3 billion youngsters aged between 3 and 17, do not have access to the Internet at home. This absence of internet connectivity has implications that go beyond a mere lack of technology, as it restricts children's ability to participate in the global economy, contributes to their social isolation, and deprives them of educational opportunities, especially during school closures. Moreover, the report emphasizes that the digital divide reinforces existing inequalities and exacerbates the educational gap between children from disadvantaged backgrounds, such as those living in poverty, and rural areas, and their more privileged counterparts.

The lack of internet access for such a large number of children between the ages of 3 to 17 in other words children at K-12 levels has serious implications for their education, socialization, and future economic opportunities. In today's world, the internet has become a crucial tool for learning, communication, and accessing information. Children who are unable to access the internet at home may not be able to keep up with their peers, as they are not able to access online learning resources, social media, and other digital platforms that have become an integral part of modern life.

The implementation of BL models has the potential to address issues of inequity, inequality, and injustice that arise from limited accessibility (Bozkurt & Sharma, 2021). In this sense, implementing the rotation BL model or models based on class instruction in brick-and-mortar schools could provide several benefits for both teachers and students in need to develop digital skills and competencies. In conclusion, brick-and-mortar schools can be a solution to the challenges if they implement at least BL models based on class instruction.

By integrating online learning stations into a physical classroom setting, students with a more personalized learning experience that takes into account their individual needs and interests may be provided to address issues of accessibility and equity in education. For students in K-12 education who lack internet access at home, BL models are particularly useful. By providing online resources and materials in a classroom setting, all students have access to the same educational opportunities, regardless of their home situation. However, it is also important to investigate the full potential of BL environments and tools, which, if sustained, can offer the youth an education that equips them to a world that is quickly evolving and complex (Vegas & Winthrop, 2020).

This study is to review the BL models and the rotation model in the BL literature. This study aims to answer the questions below:

1. What are the BL models?
2. What is the rotation model based on class instruction in the literature?

Methodology

The present study is a literature review study. Literature reviews can be beneficial for providing a comprehensive overview of a particular research problem or issue. "Typically, this type of literature review is conducted to evaluate the state of knowledge on a particular topic" (Torraco, 2005, p.334).

The document analysis method was used to gather the data. The data were analyzed using content analysis. It is important to note that this study has limitations. The literature review was carried out using online databases, specifically the Education Resources Information Center and Scopus. The time frame of the data was limited to the period from 2010 to 2022. The search was conducted using the keywords "blended learning" and "blended learning models". 188 articles were found, 64 of which were related to the rotation model.

Findings and Discussions

The findings of the current study were analyzed and given below.

Blended Learning Models

Different institutions have created various BL models to cater to their learning requirements (Alam & Agarwal, 2020). This study provides some examples of these models. Hannon and Macken (2014) proposed three BL models, namely: the flipped classroom, the blended block model (also known as the

program flow model), and the fully online model, which can still be considered blended if it includes both synchronous and asynchronous learning activities (e.g., online tutorials and discussion forums).

TeachThought (2021) identifies twelve different models for BL, including traditional classroom instruction supplemented with online activities, rotating between face-to-face and online learning, online activities as the primary mode of instruction with occasional face-to-face sessions, and various other approaches such as self-blend, flipped classroom, station rotation, lab rotation, individual rotation, enriched virtual, and outside-in. On the other hand, the National Institute of Technology, Tiruchirappalli (NIIT) has classified BL into three different models, which are skill-driven, attitude-driven, and competency-driven. The skill-driven model combines self-paced learning with support from an instructor or facilitator to develop specific skills and knowledge. The attitude-driven model uses different events and media to develop specific behaviors. Finally, the competency-driven model blends performance support tools, knowledge management resources, and mentoring to develop workplace competencies (Valiathan, 2022).

Some classification models focus on physical features rather than pedagogical features. However, recent models provide design guidance related to relevant pedagogical practices. The 2019 global pandemic led to an increase in a unique form of BL known as blended synchronous instruction or HyFlex. There is a wide range of blended models that varies in physical and pedagogical dimensions, and researchers need to specify both elements. Pedagogy (method) is considered more influential than modality or media in terms of student learning (Graham & Halverson, 2023).

The blended MOOC model has become increasingly popular in recent years, combining the benefits of both online learning and face-to-face instruction. In this model, students are required to complete online course materials, which are typically in the form of a MOOC, outside of class time. During class meetings, instructors facilitate discussions, activities, and problem-solving exercises that supplement the online materials. One of the primary advantages of blended MOOCs is that they allow students to access high-quality content from top universities and instructors, regardless of their location or enrollment status. In addition, the in-person meetings provide opportunities for students to ask questions, receive feedback, and engage with their peers and instructors in a more personalized way.

The Blended online learning model is a form of instruction that combines synchronous and asynchronous activities using video conferencing and desktop applications instead of the traditional classroom. The model involves a regular weekly shift between synchronous activities, such as discussions or lectures, and asynchronous activities, such as individual or team assignments (Power, 2008). In addition, the model has evolved to include the blended MOOC, which is a flipped classroom approach that supplements a massive open online course (MOOC) with in-person class meetings. In this approach, students access the MOOC materials outside of class and then attend class meetings for discussions or activities. An example of this approach is San Jose State University's pilot of MIT's Circuits and Electronics course, where students took the MOOC outside of class while face-to-face time was used for additional problem-solving (LaMartina, 2012).

According to Norberg, Dziuban, and Moskal (2011), incorporating time-based BL can serve as an effective BL model. Additionally, the multimodal conceptual model emphasizes that since learners come from diverse backgrounds, and have distinct personalities and learning styles, educators and instructional designers should utilize various techniques, such as face-to-face and online technologies, to cater to the needs of a broad range of students (Picciano, 2019).

BL models have become essential for providing quality education to students especially, with the rise of remote and hybrid learning due to the pandemic. Bozkurt (2022) found the increasing interest in BL, which doubled during the Covid-19 pandemic, and the interdisciplinary connections between education and technology-related fields. After the year 2020, many institutions have adopted a hybrid or BL model, which combines in-person and online learning.

The HyFlex model, also known as hybrid flexible learning, is a type of BL that empowers students with the choice to attend classes either in person or remotely. This approach prioritizes flexibility, enabling students to customize their learning journey based on their unique requirements (Beatty, 2019). The HyFlex model can offer many benefits to students. For example, students who prefer a more traditional in-person classroom experience can continue to attend class as usual, while those who prefer a more flexible and remote approach can participate from anywhere. This can lead to increased student engagement and satisfaction, as well as improved learning outcomes.

The Rotation Model

In 2013, a paper was published by the Clayton Christensen Institute, previously known as the Innosight Institute, which examined BL from the perspective of disruptive innovation theory. They introduced a taxonomy that combines the key elements of traditional classroom and online learning and identified hybrid innovations that are sustaining. This taxonomy, as shown in Figure 1, is a useful starting point for distinguishing between sustaining and disruptive BL models. According to the new BL classification, the Station Rotation, Lab Rotation, and Flipped Classroom approaches are categorized as hybrid innovations that maintain a balance between traditional classroom methods and online learning. On the other hand, the Flex, A La Carte, Enriched Virtual, and Individual Rotation models are considered more disruptive in comparison to the traditional system as they deviate from the traditional teaching methods (Christensen, Horn, & Staker, 2013)

Figure 1. Hybrid zone of blended learning (Christensen, Horn& Staker, 2013, p.27)
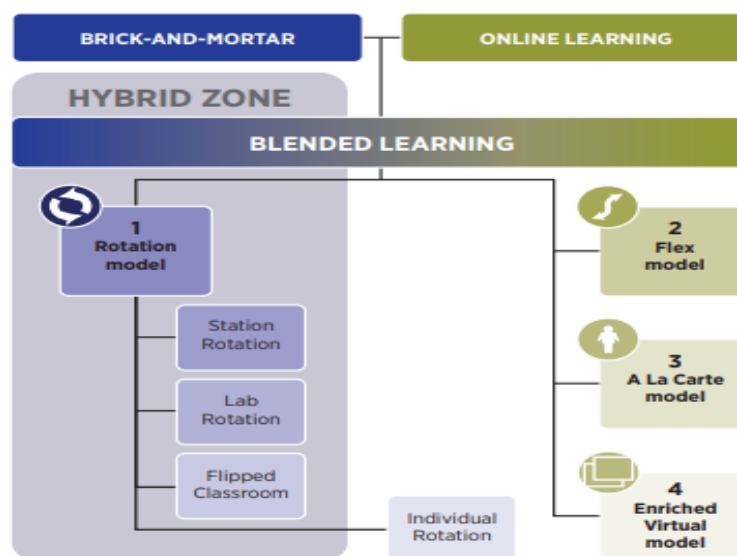
The Rotation model involves students rotating between various learning methods, including online learning, within a particular subject or course, such as mathematics. The rotation can be either scheduled or decided by the teacher and may include activities like small-group or full-class instruction, group projects, individual tutoring, and traditional pencil-and-paper assignments. There are four sub-models of the Rotation model, which are Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation.

In the rotation model, students can receive instruction and complete assignments in the classroom, while also having the opportunity to work independently or remotely using offline materials. This

approach can help bridge the digital divide and ensure that all students have access to quality education regardless of their access to technology at home.

The Flex approach involves using online education as the main form of student learning, while still incorporating offline activities as necessary. Students can progress through various modes of learning on a flexible, personalized schedule. The teacher who is responsible for the student's academic progress is present in person at the learning location.

The A La Carte approach allows students to complete one or multiple courses entirely over the Internet with a designated online teacher while still participating in traditional in-person educational activities. These online courses can be taken on the physical school premises or from a remote location

The Enriched Virtual approach offers a comprehensive educational approach where students divide their time between physical attendance in a traditional school setting and remote learning through online delivery of course materials and instruction, applied to each subject such as math(Staker & Horn, 2012; Christensen, Horn, & Staker, 2013).

According to Govindaraj & Silverajah (2017), the rotation model has been extensively utilized and demonstrated to be a successful approach to learning. Divayana (2019) suggests that the popularity of the blended learning rotation model is due to its ability to support classroom learning that is convenient, straightforward, adaptable, and self-directed. In the rotation model, students follow a predetermined schedule that alternates between online learning and on-site instruction.

To sum up, the Rotation Model consists of students switching between in-person and online instruction. The Flex Model enables students to learn online independently and on their own time, receiving in-person assistance when required. The A La Carte Model allows students to take online courses alongside their usual in-person classes. The Enriched Virtual Model blends in-person and online teaching, with a greater emphasis on online learning.

Sub-models of the Rotation Model

The rotation BL models are significant because they offer a structured approach to integrating onsite and online learning activities. In a rotation BL model, students move through a series of learning activities in a predetermined sequence, which can include online modules, group work, and one-on-one teacher instruction. As shown in Figure 2, there are four distinct sub-models within the rotation model, including station rotation, lab rotation, flipped classroom, and individual rotation.

Figure 2. Sub-models of the Rotation Model
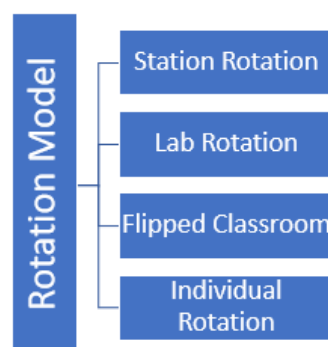
1. Station Rotation: The Station Rotation model, also known as the Classroom Rotation or In-Class Rotation model, involves students rotating within a contained classroom.For example, one station might be an independent work station where students work on an online lesson or activity; another station might be a small-group collaboration station where students work together on a project; and another station might be a whole-class lesson led by the teacher (Staker &Horn, 2012)

Station rotation allows instructors to differentiate instruction based on students' needs and interests. Students who need more time to complete an online lesson can do so at their own pace, while those who are ready for more challenging material can move ahead. And because students are engaged in different activities at different stations, they are less likely to get bored or feel like they're just sitting there.

The station rotation model for teaching brings changes to both the learning experience of students and the teaching methods of educators. This model allows students to have more opportunities to engage in various activities, receive instruction from teachers, work together with classmates, and utilize computers with internet access (Akinoso, Agoro, & Alabi, 2021). The station-rotation BL model has the benefit of allowing teachers to work with smaller groups of students. This is particularly helpful for teachers who are dealing with larger class sizes. With this model, students can complete their learning activities at the same time and pace, as directed by their teacher or schedule.

The individual rotation model is distinct from the other rotation models as each student has a personalized playlist and may not necessarily rotate to every available station or modality (Staker & Horn, 2012; Christensen, Horn, & Staker, 2013).

2. Lab Rotation: It refers to a model in which students, in a particular course or subject, move to different locations on the physical campus either on a fixed schedule or as determined by the teacher. Among these locations, one is a learning lab for online learning, while the others are classrooms for different types of learning. Unlike the station rotation model, where students remain in a single classroom for a blended course or subject, lab rotation involves moving among various locations on the campus. The lab rotation model involves rotating between a classroom and a learning lab for online learning. (Staker & Horn, 2012).

3. Flipped Classroom: The main method of providing educational material and teaching is through the internet, which sets apart a Flipped Classroom from students who simply complete their homework online in the evenings. The Flipped-Classroom approach aligns with the concept of BL, which involves some level of student autonomy over factors such as when, where, and how they learn, as this model permits students to select the location where they access educational content and instruction online and determine their own pace while engaging with online resources. The Flipped Classroom model, on the other hand, involves rotating between face-to-face teacher-guided practice (or projects) at school and online content and instruction at home or off-site (Staker & Horn, 2012).

The flipped classroom model is one of the rotation model's most well-known sub-models. Flipped learning is also referred to as inverted learning, the reverse classroom, or inverted class in the literature. Teachers can use class time for projects or practice in a flipped classroom. More opportunities for individualized learning are provided by the model. The literature has shown that the flipped classroom model is the most widely used blended learning strategy (Lage & Platt, 2000).

Flipped classroom relies heavily on technology which requires self-motivation and discipline from students and may be difficult to implement without adequate resources. In this context, Gonzalez (2014) offers in-class flip as a solution to the challenges associated with homework, such as the unavailability of a functional device, an unstable internet connection, and an unsuitable study environment. The in-

class flip is a model of flipped learning that involves providing direct instruction through station rotation work within the classroom, rather than assigning it as homework. This approach allows students to access the content without facing obstacles such as a lack of access to technology or a conducive learning environment at home. The model involves organizing stations within the classroom, with at least one station containing direct instruction and others containing practice or application activities. The in-class flip can be structured as either a mixed or simple sequence, with the former letting students work at their own pace and the latter requiring a pre-established work rate. The model is different from the station rotation model proposed by Horn and Staker (2012), which includes teacher-led instruction and is not synonymous with in-class flip (Velandia & Maldonado, 2018).

Flipped learning model requires variations for successful implementation such as Internet connectivity, technological devices, homework support, and so on. But in-class flip becomes an ideal alternative to flipped learning under these circumstances. In-class flip differentiates the classroom, transforms learning, and helps students stay focused. Loop input for teacher training is a technique that allows teachers to authentically experience new teaching methods from the student's perspective.

4. Individual Rotation – a model implementation in which within a given course or subject (e.g., math), students rotate on an individually customized, fixed schedule among learning modalities, at least one of which is online learning. An algorithm or teacher(s) sets individual student schedules. The individual rotation model differs from the other Rotation models because students do not necessarily rotate to each available station or modality (Staker & Horn, 2012, p.11).

Friesen (2012) suggested that a combination of BL (blended learning) models could be implemented in both K-12 and higher education settings. These models range from classroom-intensive to those that rely more heavily on online mediation. For instance, the "rotation model" involves incorporating online engagement into various forms of face-to-face instruction in a cyclical manner. The "flex model" primarily involves multiple students engaging online but with a teacher present to supervise. In the "self-blending model," students independently choose different courses but still attend class with a supervising teacher and other students. Lastly, the "enriched-virtual model" involves online, virtual experiences that are periodically enriched through arrangements of physical co-presence.

The International Association for K-12 Online Learning (iNACOL) has released a "roadmap for Implementation of BL at the school level," offering detailed guidance on how to successfully introduce a BL program. The study examines the case of the e iLearnNYC Lab Schools and identifies six essential elements for planning and implementing BL: leadership, professional development, teaching, operations, content, and technology (Darrow, Friend, & Powell, 2013). The study found that most schools began their BL journey with the rotation model before transitioning to the flex model.

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Conclusion and Suggestions

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This study examined the various BL models, particularly the rotation model, and its four sub-models, which are used in both K-12 and higher education settings. The rotation model, which is among these models, differs from other models in one aspect. It is a promising model to address the challenges faced by students who lack access to technology or the Internet. It may be particularly effective for developing digital skills because it allows students to work with technology and digital tools in a structured and supported way at brick-and-mortar schools. However, while the rotation model can be a useful starting point for addressing the digital divide, it is not a comprehensive solution. To fully address the digital divide and support the development of digital skills for all students, it is important to take a holistic approach that addresses these broader challenges as well.

To enhance the quality of learning in the classroom and make sure that students are given the proper support for their learning, it is crucial to understand how to effectively combine in-person and online

instruction. Understanding how to effectively blend in-person and online instruction is crucial for improving the quality of learning in the classroom and providing students with adequate support. However, it is important to recognize that every BL model comes with its own set of advantages and disadvantages. With careful planning and execution, BL can be a successful addition to any curriculum.

BL models have gained popularity due to their flexibility and ability to cater to individual learning needs. However, the success of these models depends on the availability and accessibility of technology, which can pose a challenge for students. In addition to rotation BL and in-flip class models, schools and educators can also consider incorporating low-tech solutions to support student learning. School leaders, stakeholders, and policymakers play crucial roles in shaping educational policies and ensuring that they are implemented effectively. Without their participation and support, even the most comprehensive professional development programs may fail to achieve the desired outcomes.

Further investigation is needed to better understand the use of BL models. More insights can be gained through research papers that examine the implementation of BL models, including the integration of online and in-person instruction. Challenges can arise both in and outside of the classroom, particularly in K-12 settings, and guidance on overcoming these obstacles would be valuable. Action research can be conducted to explore BL models more deeply. To ensure the widespread adoption of BL models, institutional support is recommended when limitations arise due to the teacher's efficiency in the classroom.

As a final remark, BL has the potential to increase access to education for students who may not otherwise have access to traditional classroom settings, such as those in rural or remote areas. However, there are also concerns that the cost of technology and internet access may create barriers. As a result, it is essential to ensure that all students have equal opportunities to take part in BL to promote equity in education.

References

Akinoso, S. O., Agoro, A. A., & Alabi, O. M. (2021). Effect of station rotation mode of instructional delivery for mathematics in the era of advancing technology. *International Journal of Emerging Technologies in Learning (iJET)*, 16(6), 212-225.

Alam, M. S., & Agarwal, J. (2020). Adopting a blended learning model in education: Opportunities and challenges. *International Journal of Early Childhood Special Education*, *12*(2), 1–7. https://doi.org/10.9756/INT-JECSE/V12I2.201050

Aurora Institute. (2022). *Aurora Institute Federal Policy Priorities and Recommendations 2022*. https://aurora-institute.org/wp-content/uploads/Aurora-Institute-Federal-Policy-Priorities-and-Recommendations-2022.pdf

Beatty, B. J. (2019). Hybrid-Flexible Course Design: Implementing student-directed hybrid classes. *Educause review, 54*(5), 38-48. https://doi.org/10.59668/33

Bozkurt, A., & Sharma, R. C. (2021). In Pursuit of the Right Mix: Blended Learning for Augmenting, Enhancing, and Enriching Flexibility. *Asian Journal of Distance Education, 16*(2), 1-22. https://doi.org/10.5281/zenodo.5628986

Bozkurt, A. (2022). A retro perspective on blended/hybrid learning: Systematic review, mapping, and visualization of the scholarly landscape. *Journal of Interactive Media in Education, 2022*(1), 1-15. https://doi.org/10.5334/jime.751

Christensen, C. M., Horn, M. B., & Staker, H. (2013). Is K–12 blended learning disruptive? An introduction of the theory of hybrids. *Clayton Christensen Institute for Disruptive Innovation*. https://files.eric.ed.gov/fulltext/ED541472.pdf

Divayana, D. (2019). The implementation of blended learning with Kelase platform in the learning of assessment and evaluation course*. International Journal of Emerging Technologies in Learning (iJET), 14*(17), 114-132. https://doi.org/10.3991/ijet.v14i17.8308

Darrow, R., Friend, B., & Powell, A. (2013). A Roadmap for Implementation of Blended Learning at the School Level: A Case Study of the iLearnNYC Lab Schools. *International Association for K-12 Online Learning.* https://files.eric.ed.gov/fulltext/ED561320.pdf

Educause. (2021). *2021 EDUCAUSE horizon report, Teaching and learning edition*. https://library.educause.edu/resources/2021/4/2021-educause-horizon-report-teaching-and-learning-edition

European Commission. (2020). *Blended learning in school education_European Commission_June 2020.* https://education.ec.europa.eu/.

Friesen, N. (2012). *Defining blended learning, Learning Spaces*. Retrieved from https://www.normfriesen.info/papers/Defining_Blended_Learning_NF.pdf

Gonzalez, J. (2014). *Modifying the flipped classroom: The "in-class" version.* Edutopia. https://www.edutopia.org/blog/flipped-classroom-in-class-version-jennifer-gonzalez

Govindaraj, A., & Silverajah, V. S. G. (2017). Blending flipped classroom and station rotation models in enhancing students' learning of physics. *ACM International Conference Proceeding Series*, 73–78. [New York, NY]. https://doi.org/10.1145/3175536.3175543

Graham, C.R., & Halverson, L.R. (2023). Blended Learning Research and Practice. In O. Zawacki-Richter & I. Jung (Eds.), Handbook of Open, Distance and Digital Education (pp. 1-17). Springer. https://doi.org/10.1007/978-981-19-2080-6_68

Graham, C. R. (2019). Current research in blended learning. In Moore, M. G. & Diehl, W. C. (Eds.), *The Handbook of distance education* (4th ed., pp. 173-188). Routledge. https://doi.org/10.4324/9781315296135-15

Hannon, J., & Macken, C. (2014). Blended and online curriculum design toolkit. *La Trobe University*. https://openbooks.col.org/blendedlearning/chapter/chapter-1-blended-learning/

Lage, M. J., & Platt, G. (2000). The internet and the inverted classroom. *The Journal of Economic Education,* 31(19), 11-11. https://doi.org/10.1080/00220480009596756

LaMartina, D. (2012). *Blended MOOCs: The best of both worlds*? https://campustechnology.com/articles/2013/08/21/blended-moocs-the-best-of-both-worlds.aspx?=CT21.

Norberg, A., Dziuban, C. D., & Moskal, P. D. (2011). A time-based blended learning model. *On the Horizon, 19*(3), 207–216. https://doi.org/10.1108/10748121111163913

Oliver, R., & Trigwell, K. (2005). Can 'blended learning' be redeemed? *E-Learning, 2(1),* 17-26. https://doi.org/10.2304/elea.2005.2.1.17

Picciano, A. G. (2019). Blending with purpose: The multimodal model. *Journal of asynchronous learning networks, 13*(1), 7-18. https://doi.org/10.24059/olj.v13i1.1673

Power, M. T. (2008). The emergence of a blended online learning environment. *MERLOT Journal of Online Learning and Teaching, 4*(4), 503-514.

Staker, H., & Horn, M. B. (2012). Classifying K–12 blended learning. *Innosight Institute*. https://www.christenseninstitute.org/wp-content/uploads/2013/04/Classifying-K-12-blended-learning.pdf

TeachThought. (2022). The definition of blended learning. https://www.teachthought.com/learning/the-definition-of-blended-learning/

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review, 4*(3), 356–367. https://doi.org/10.1177/1534484305278283

UNESCO. (2022). *Transforming education through innovation: The Global Education Coalition leading in action*. https://en.unesco.org/themes/education-emergencies/global-coalition

UNICEF Romania. (2020). Two-thirds of the world's school-age children have no internet access at home, a new UNICEF-ITU report says. *UNICEF*. https://www.unicef.org/romania/press-releases/two-thirds-worlds-school-age-children-have-no-internet-access-home-new-unicef-itu

Vegas, E., & Winthrop, R. (2020) Beyond reopening schools: How education can emerge stronger than before COVID-19. *Brookings Institution*. https://www.brookings.edu/research/beyond-reopening-schools-how-education-can-emerge-stronger-thanbefore-covid-19/

Valiathan, P. (2002). *Blended learning models*. http://purnima-valiathan.com/wp-content/uploads/2015/09/Blended-Learning-Models-2002-ASTD.pdf

Velandia, D., & Maldonado, D. (2018). In-class flip in teacher education through loop input. *Educational Research and Reviews, 13*(3), 131-148. https://doi.org/10.5897/ERR2017.3416

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Conflict of Interest

The authors do not declare any conflict of interest.

Data Availability Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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