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A Systematic Review of Blended Learning Strategies and Outcomes in Music Education

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Abstract

Educational technology has altered conceptions of effective learning. The combination of virtual and physical instruction is constantly developing and growing, making blended learning a growing trend. While blended learning has been extensively reviewed in various fields, there is a lack of research on its application in music education. This study aims to understand the current development of blended learning in the field of music education; this paper will collect literature on blended learning from the past ten years. Following the PRISMA guidelines, we have systematically analysed the blended learning strategies and outcomes in music education. This study examined Web of Science, Scopus, and ERIC for pertinent strings. Thirteen publications passed the strict screening procedure and were included in the analysis of blended learning in music education. This study found that the flipped classroom blended learning model has emerged as the prevailing method in music education, enhancing learners' musical perception, performance, and overall experience. The findings reveal a need for more research on blended learning in music education.

Keywords: blended learning; music education; PRISMA; systematic review

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INTRODUCTION

Recent advancements and adoption of online learning in education have revealed considerable challenges, such as insufficient knowledge supervision, obstacles for instructors in providing guidance, student struggles with self-motivation, and suboptimal learning outcomes (Valverde-Berrocoso et al., 2020; Dakhi & Irfan, 2020; Halverson & Graham, 2019; Ustun & Tracey, 2020). Blended learning has become famous for fully using the benefits of online learning and eliminating the contrast between it and face-to-face instruction (Pappas, 2015). Given these challenges, educational institutions increasingly adopt blended learning approaches that integrate traditional face-to-face instruction with online learning methods. At the start of the 21st century, a period of accumulating technological advancement and quickening global economic expansion gave birth to blended learning. It emerged as a solution to the issue of the unsatisfactory results of online and distance learning, which was first proposed in the field of corporate training, then introduced into school education, and went through a process from face-to-face to online learning, and then

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from online learning to blended learning (Ashraf et al., 2022; Dziuban et al., 2018).

Nowadays, blended learning is generally acknowledged to meet the demands of students' learning and the need for educational institutions to provide more space for learning. With the growth of Open Educational Resources (OERs) during the past ten years, academic research on blended learning has advanced quickly. Based on the current forecasted trends of the Horizon Report, the terminology "blended learning" has gained enormous popularity, making it a crucial research topic for the future growth of education. (Pelletier et al., 2022). According to Dziuban (2018), blended learning is the current standard in higher education. The use of blended learning is now widespread worldwide and has emerged as a critical component of efforts to improve higher education. Stevenson (2010) points out that blended learning is a style of education in which students learn through electronic and online media and traditional face-to-face teaching and learning. It increasingly appears in practical activities across disciplines, and music educators have shown a strong interest in the idea that trying blended learning presents new opportunities for music teaching and learning (Crawford, 2016).

As the study of blended learning progresses, its definition has evolved to become increasingly intricate. Inclusive definitions and models and ambiguous boundaries of the ideas have led to practically all forms of education, whether face-to-face learning or some components of online learning, being defined as blended learning. (Hrastinski, 2019). The literature differentiates blended learning (BL) and hybrid learning (HL) by noting that BL includes at least one face-to-face, physical teaching and learning setting, whereas HL transfers these face-to-face activities from a physical to a virtual space (Hrastinski, 2019; Staker & Horn, 2012; Alammary et al., 2014; Graham, 2006; Garrison & Kanuka, 2004). In general, BL is a pedagogical technique that combines face-to-face and online teaching and learning, a strategy that employs asynchronous or synchronous online and offline forms for teaching and learning activities. (Simonova, 2019; Rasheed et al., 2020). Although BL is used in many educational practices, no single standard of usage tells us how it should be scientifically applied and how organisers should effectively combine what, why, and how. (Rudhumbu, 2022; Wang, 2019; Cakir & Bichelmeyer, 2016). Some believe that this occurrence illustrates the adaptability and inclusion of blended learning. (Anthony et al.,2019； Bokolo et al., 2020).

Barrett and Webster (2014) argue that the way music is taught is frequently habituated to being locked in old conceptions and formats, and constantly seeking innovative teaching methods and studying music should be prioritised. Crawford (2016) highlighted blended learning as an endeavour to genuinely give a high-quality music education experience as early as 2016, effectively mixing virtual technologies with face-to-face instruction. From the standpoint of music education, music requires more from teachers than other subjects since it is a complicated endeavour that calls for varied abilities. In addition to musicology, it relies on a variety of musical skills as well as professional proficiency in explicit instruction (Ruokonen et al., 2017). The hearing and performing of music, as well as musical behaviour, singing, playing an instrument, appreciating music, utilising music scores, and composition, are all critical aspects of current music education (Hogenes et al., 2021). Consequently, the implementation of blended learning approaches in the multifaceted context of music education teaching and learning is more intricate than in other disciplines. It requires thoroughly considering all the unique characteristics inherent to music education. Furthermore, before implementing blended learning practices, music educators and researchers must determine the best design and technology integration approaches for the subject. Because of this, there is a need for more studies on blended learning in music education. Several studies indicate that music teachers in par-

ticular nations or regions hesitate to actively employ combined learning practices in their classrooms (Cruywagen & Potgieter, 2020).

While there are authoritative research organisations in the field of music education that have developed a unified model and guidelines for the use of blended learning, these organisations still need to be created. As a result, music teachers must give full play to their professional passions, improve their professional development skills, and patiently design and plan blended learning strategies. Therefore, this study intends to synthesise the experiences of combined learning practices in music education and to understand the findings of research on blended learning in music education through a systematic evaluation of blended learning techniques during the past ten years. Since it will influence music education research and practice and improve our understanding of the implications and usage of blended learning methodologies in music education.

This systematic review aims to evaluate blended learning in music education research and address the following research topics: (1) What different blended learning strategies have been used in the last ten years of music education? And (2) What are the outcomes of the research on blended learning in the last ten years of music education?

METHOD

This study adopted a systematic review approach to conduct a comprehensive search for articles on blended learning related to music education to answer the question of the strategies used in blended learning in the process of teaching and learning music and the research outcomes. This section will describe the approach used in this study to find papers about using blended learning methodologies in music education. According to the research question, the authors discussed the study's protocol. Ramalingam et al. (2022) concluded that adopting a protocol before the research starts can minimise potential bias. Meanwhile, this review followed the requirements of PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) to set the criteria to ensure the scientific and rigorous study process. This study focused on searching, identifying, and sorting out articles related to blended learning strategies applied to music education, in addition to extracting information and evidence according to the research objectives. Three databases—Web of Science (WoS), Scopus, and ERIC—were utilised to search for publications in this study. The four steps of systematic review identification, screening, exclusion, and qualification were then carried out individually.

Systematic Review with PRISMA Protocol

Researchers consider a systematic review a scientific strategy for addressing essential topics in allied disciplines (Richard & Richardson, 2012). It initially emerged with the growth of the research field in the study of the medical sciences. When other disciplines caught up with it, it developed into a more sophisticated method of literature evaluation. Compared with the general literature review, scholars generally believe that the systematic review can present the experience and results of the research field more objectively. This is because it emphasises the transparency and replicability of the research process, increases the breadth of the literature search, systematically sorts out the articles, and extracts the knowledge, experience, and data of the research articles in the related fields. Systematic review research in education must adhere entirely to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards (Regona et al., 2022). PRISMA offers researchers precise exclusion and inclusion criteria, explains the research objectives for which systematic reviews are relevant, and enables researchers to acquire article resources by looking through extensive scientific data-

bases. PRISMA offers a good technique for this study that may be utilised to discover blended learning approaches and research findings in music education.

Literature Search Strategy and Criteria

The systematic search strategy of this study is divided into three main stages: identification, screening, and eligibility. The study relies on two major databases (WoS and Scopus) and ERIC's search data for support and supplementation. Academics believe WoS and SCOPUS to be the most specialised and comprehensive databases due to the volume of journal articles and topic areas they cover and their sophisticated search and filtering tools (Ramalingam et al., 2022). The authors restricted the search of WoS to two databases in the Web of Science Core Collection, SSCI, and A&HCI, to enhance the quality of article searches. ERIC was incorporated into this study since it is a database run by the U.S. Department of Education that offers academic publications on educational research to educational researchers. August 2023 marked the start of the study's literature search, which was completed in September 2023. Given the rapid development of information technology, blended learning includes online learning aspects. Online learning must consider the equipment and systems required for online learning to reveal better the use of blended learning in the field of music strategies and outcomes; this study focuses only on academic literature within the last ten years (2014-2023) to avoid identifying outdated blended learning strategies and outcomes.

Literature Identification

The first stage of the systematic search is identifying appropriate phrases for the study's keywords, blended learning, music education, strategies, and outcomes. This step aimed to determine the articles in the databases more thoroughly and guarantee that more relevant articles were included in the assessment system. The keywords were chosen based on the preparation of the preliminary study. Even though different databases have different search methods and algorithms, the authors did not use the same strings when searching the literature depending on the context; however, the lines used were similar in meaning to the keywords appearing in the title of this study. The authors used the Boolean operators search strategy for the keyword strings, as shown in Table 1.

Literature Screening

For the first screening of papers, authors closely adhered to the criteria in Table 2. Pollock and Berge (2018) emphasised the need to develop article inclusion and exclusion criteria standards before assessing them in systematic review research. Finally, based on the proposed standards, writers retrieved 3681 articles, of which 3349 were collected from WoS, 321 from Scopus, and 11 from ERIC. Although the period provided in the inclusion criteria includes the year 2023, because the search was done from August to September 2023, some research publications will not be published as of this writing according to the inclusion criteria.

The authors then exported the data of these identified articles in EXCEL for-

Table 1. Search String

Database	Keywords
Web of Science (Web of Science Core Collection, SSCI & A&HCI)	TS= (blended learning OR blended education OR blended courses OR flipped classroom AND music OR music education AND strategies AND outcomes)
Scopus	ALL ("blended learning" OR "blended education "OR "blended courses" AND "music" OR "music education" AND "strategies" AND "outcomes")
ERIC	blended learning OR blended education OR blended courses AND music OR music education AND strategies AND outcomes

mat, which included crucial information such as title, abstract, name, journal name, publication date, and DOI for subsequent identification of duplicate papers and article inclusion. After deleting ten duplicates, the authors had 3671 publications after aggregating the detected entries from the three databases.

Eligibility and Inclusion

Figure 1 shows the flowchart of the literature system search. Firstly, we screened titles and abstracts, and the authors deleted 3211 papers unrelated to the research direction, including 1919 articles in the field of education and educational sciences, 425 articles in the field of environmental sciences, 265 articles in the field of language and linguistics, 97 papers in the field of psychiatry and psychology, and 505 articles in other areas. After this selection round, only 460 articles remained to be considered and evaluated as full text. Four hundred forty-seven publications were rejected because they needed more empirical evidence relevant to the study's aims. Finally, 13 suitable research articles remained to be co-reviewed.

Table 3 lists 13 articles that were reviewed and analysed to guide this study. The information listed includes author, title, research method, research design, participants, and country.

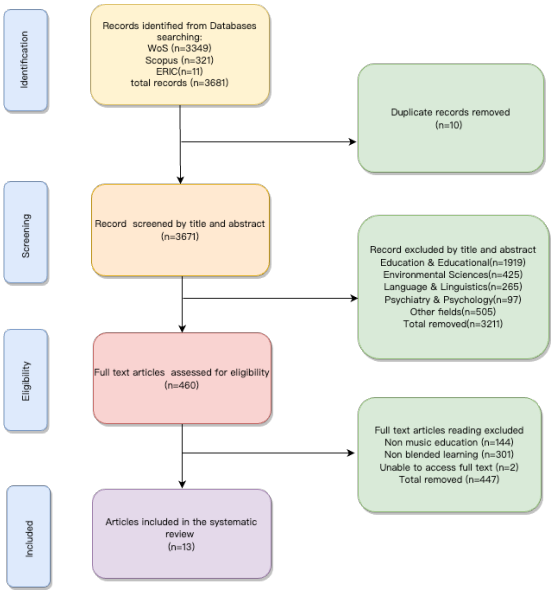

Figure 1. Systematic Review Searching Flowchart

RESULTS AND DISCUSSION

The authors categorised the data obtained into two findings to answer the corresponding research questions: for the first question, four themes emerged to respond to the implementation of blended learning strategies, and for the second question, the outcomes of blended learning research in the field of music education were presented.

Basic Information and Research Background of the Included Articles

Table 2. Exclusion and Inclusion Criteria

Inclusion	Exclusion
Research journal articles	Review articles, Conference proceedings, book series, chapters in books, books, and dissertations.
It can be read as full-text	Full-text articles not available
Writing in English	Articles written in non-English
Articles from 2014 to 2023	Articles outside of this time
Combination of virtual and face-to-face classes	Articles that are entirely focused on other types of learning (e.g., online, face-to-face)
Research needs to focus on the field of music education	Non-music education field

Table 3. Included Articles of the Study

Author	Title	Research Method	Research Design	Participants	Country
Montgomery et al.,2017	Using learning analytics to explore self-regulated learning in flipped blended learning music teacher education	Quantitative	Investigation	Pre-service music teachers	Canada
Lin,2022	Teaching Mode of Basic Piano Course in Colleges Based on Students' Application Ability under FC Environment	Quantitative	Survey	Pre-service music teachers	China
Peng and Wang, 2022	Online Education of a Music-Flipped Classroom Based on Artificial Intelligence and Wireless Network	Quantitative	Survey	Music teachers and undergraduate music students	China
Tan and Cao, 2022	Evaluation of the Online Music Flipped Classroom under Artificial Intelligence and Wireless Network	Quantitative	Survey	AI and Wireless	China
Edward et al., 2019	The impact of teaching oriental music using blended learning approach	Quantitative	Experimental study	Senior secondary school students	Malaysia
Jenkins and Crawford, 2021	Pre-service Music Teachers' Understanding of Blended Learning: Implications for Teaching Post COVID-19	Qualitative	Open-ended questionnaire	Pre-service music teachers	Australia
Crawford, 2016	Rethinking teaching and learning pedagogy for education in the twenty-first century: blended learning in music education	Mixed method approach	Survey & semi-structured interview	Secondary school teachers and students	Australia
Edward et al., 2018	Effect of blended learning and learners' characteristics on students' competence: An empirical evidence in learning oriental music	Quantitative	Experimental & Survey	Senior secondary school students	Malaysia
Kim, 2020	Music teachers' understanding of blended learning in Korean elementary music classes	Qualitative	Observation & interview	In-service music teachers	South Korea
Cruywagen and Potgieter, 2020	The world we live in A perspective on blended learning and music education in higher education	Qualitative	Open-ended focus group interviews	Undergraduate music students	South Africa
Nethsinghe et al., 2022	Teaching songs from diverse cultures to pre-service teachers using a "Four Step Flipped" method	Qualitative	Autoethnography	Pre-service teachers	Australia
Beirnes and Randles,2023	A Music Teacher's Blended Teaching and Learning Experience during COVID-19: Autoethnography of Resilience	Qualitative	Co-autoethnographic	Pre-service music teachers	U. S
Shin,2023	Korean preservice music teachers' perceptions of blended learning in music education course	Qualitative	Semi-structured interviews	Pre-service music teachers	South Korea

As demonstrated in Table 4, there has been a general increase in interest in blended learning research in the field of music education, as evidenced by the number of years in which the 13 publications chosen for systematic review were published. Afterwards, the first publication on blended learning research in music education emerged in 2016 (Crawford, 2016), and studies have appeared every year since, one per year from 2017 through 2019 (Montgomery et al., 2017; Edward et al., 2018; Edward et al., 2019). From 2020 onwards, the number of articles increased, and although the number of papers fluctuated in 2021, it did not affect the exponential growth in 2022, when four research articles appeared. By early September 2023, two articles had appeared, but the number of articles in 2023 is not indicative as the article search did not cover the whole year.

Figure 2 shows the annual publication volume over the last ten years. Blended learning research in the field of music education was only formally proposed in 2016, and scholars have proposed reform ideas utilising blended learning by reflecting on music teaching and learning in the twenty-first century. It brings blended learning thinking to scholars in the field of music education. Considering that scholars were carefully exploring the possibilities of blended learning in the field of music education before 2020, more blended learning research has been generated as the teaching and learning environment has changed due to worldwide pandemic outbreaks that have forced music education to venture into the practice of teaching and learning in blended environments for the sake of it.

The distribution of regional publications in Figure 3 is described below: the United States, Canada, and South Africa each published one study (Montgomery et al.,2017; Beirnes & Randles,2023; Cruywagen & Potgieter,2020); Malaysia and South Korea each published for two (Edward et al.,2018; Edward et al.,2019; Kim,2020; Shin,2023); and Australia and China published for three studies (Lin,2022; Tan & Cao,2022; Peng,& Wang,2022; Jenkins & Crawford,2021; Crawford,2016; Nethsinghe et al.,2022). The audacity of music teaching in the countries that practice blended learning strategies is equally representative of Australia and China. Australia was the first country to implement blended learning strategies in music education, and it also has a considerable number of publications, which may be connected to the early commencement of the study. In contrast, the sudden appearance of research in China in 2022 may be related to the Chinese government's educational policies during the pandemic, which released many documents focusing on educational and pedagogical reforms during the pandemic, with a focus on supporting teaching institutions and organisations in developing blended teaching and research on various types of blended learning strategies (Yang et al., 2023).

Table 4. Annual and Regional Distribution of Studies

Country/Area	Quantity	Year
U. S	1	2023
South Africa	1	2020
Canada	1	2017
Malaysia	2	2018, 2019
South Korea	2	2020, 2023
Australia	3	2016, 2021, 2022
China	3	2022

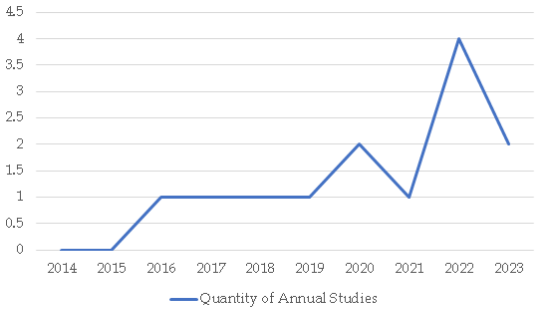

Figure 2. Quantity of Annual Studies

Strategies for Blended Learning in Music Education

This systematic review categorises

music-blended learning strategies into four directions: blended learning models, teaching styles, technical assistance, and teaching modules.

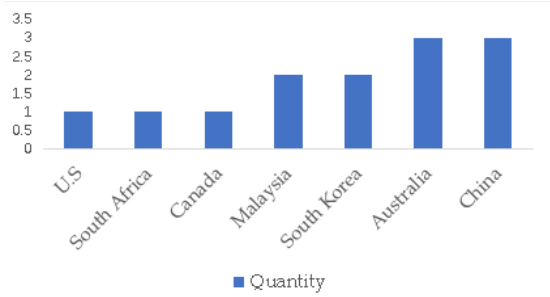

Figure 3. Quantity of Regional Studies

Blended Learning Models

The terminology of blended learning has evolved so far, and scholars have different understandings of its modelling structure. According to different definitions, the authors have proposed different models of blended learning. Porter et al. (2014) argued that blended learning models usually focus on physical or surface features rather than pedagogical or psychological features. Different perspectives are offered by Garrison and Vaughan (2008), who contend that blended learning models must thoughtfully combine in-person learning in the classroom with online learning experiences while considering the three cognitive facets of blended learning: cognitive proximity, pedagogical proximity, and social proximity (Hrastinski, 2019). Watson (2008) proposed a continuum connecting fully online learning and traditional face-to-face learning and classified blended learning models into seven different settings, ranging from fully online learning environments to fully face-to-face learning environments, with a different percentage of online and face-to-face portions and different allocation of online and classroom resources in each model.

Scholars have often debated and used Staker and Horn's research on blended learning methods (Staker & Horn 2012). They divide blended learning into four categories: the rotation model, the flex model, the A La Carte model, and the enriched-virtual model, and they believe that these four models can be applied in many blended learning programs in the K-12 sector. To avoid the disadvantages of both in-person and online learning, Graham (2006) advises instructors to select the optimum blended strategy depending on the reality of the classroom. He favours giving instructors a choice to combine the two learning settings. The flexibility and diversity of blended learning have also encouraged a huge number of academics to create various blended learning formats for their study.

According to the systematic review of this study can be seen in Table 5, four studies in the last 10 years have used the blended model of Flipped Classroom in the rotation model proposed by Staker and Horn (2012), which is very popular in teaching and learning and which has been divided into three phases: before, during, and after the class (Montgomery et al.,2017; Lin,2022; Peng,& Wang,2022; Tan & Cao,2022). In the pre-class, students were exposed to the course content through online resources and engaged in practical activities and discussions in class. Then, in the post-class, teachers can assess students' perceptions and performances in the flipped course or personalise tutorials for students. However, Shin (2023) adopted a model that integrates a Flipped Classroom with the A La Carte model in the classroom of pre-service music education by dividing the course into two cycles and adopting the Flipped Classroom and A La Carte model according to the teaching and learning objectives of the before and after processes for better teaching and learning, respectively.

According to Kim (2020), the station-rotation model was used, which required students to rotate through classroom stations for a fixed period according to the instructor's lesson plan. The classroom was divided into multiple stations, at least one of which was used for online learning, a group discussion station, a reading station, and so on (Staker & Horn, 2012).

Cruywagen and Potgieter (2020) used

Picciano's Blending with purpose multimodal model, which proposes a mixed method approach based on six pedagogical objectives and activities; the content objective can be fulfilled through CMS/Media/MLIVE activities, the social-emotional aim can be fulfilled through face-to-face activities, the dialectic and questioning objectives can be fulfilled through discussion or board, and the evaluation can be accomplished through papers, presentation, and collaboration can be accomplished through Wiki, forums, and blogs for reflection (Picciano, 2009).

Nethsinghe et al. (2022) developed a new four-step flipped method for the multicultural music learning experience, which was divided into four steps: Asynchronous, Synchronous, Face-to-Face, and Feedback, where reading, listening, and research activities were carried out in the asynchronous phase, songs were performed in the synchronous phase step, and students engaged in face-to-face group music production and creation in the F2F phase. They choreographed, rehearsed, performed, and recorded their version of each song. In the feedback stage, the teacher reviews the students' asynchronous recordings and provides synchronised feedback (Nethsinghe et al., 2022).

Beirnes and Randles (2023) opted for a blended learning approach that synchronises distance online learning with face-to-face classroom learning, dividing the learning environment into two spaces, length online and face-to-face physical teaching, with some students participating in the virtual environment outside the classroom, and some in face-to-face learning between the teacher and the instructor, a learning process that takes place at the same time.

A further four studies discussed blended learning as a generic concept without mentioning what model was used, with two of these simply mentioning online and face-to-face learning at 50 per cent each (Jenkins & Crawford, 2021; Crawford, 2016; Edward et al., 2019).

Table 5. Blended Learning Models and Research Quantities

Blended learning model	Quantities
Flipped Classroom	4
Station-rotation model	1
Picciano's Blending with Purpose multimodal model	1
Four Step Flipped method	1
Blended synchronous learning	1
No specific model for blended learning	4
Flipped Classroom and A La Carte mode	1

Teaching Style

This section examines blended learning in the subject of music, including the responsibilities of the teachers and students in the classroom during the teaching and learning process. According to the content of the articles reviewed in this systematic review, a total of 8 out of 13 articles describe teaching methods, with five articles proposing the use of constructivist learning theory in a blended learning environment with a learner-centred and collaborative teaching style. (Montgomery et al., 2017; Jenkins & Crawford,2021; Nethsinghe et al.,2022; Cruywagen & Potgieter,2020; Barnes & Randles,2023). The learner-centered method emphasises the student's primary role, and teaching sessions should take the form of collaborative learning, which includes interaction, discovery, discussion, and knowledge sharing. According to Mccombs & Vakili (2005), learner-centred is about getting learners to work together in small groups to exchange ideas, discover solutions to issues, or create something new to contribute to current knowledge. Instead of stressing the instructor's dominating position in the classroom, this teaching technique emphasises active interaction between the student, the teacher, and other components of the teaching and learning process. Music students have become more engaged in what they are studying, adopting a learner-centred approach to teaching and learning in a blended learning setting (Jenkins & Crawford,2021).

Kim (2021) mentioned in the review articles that some music teachers are using a teacher-centred teaching style to support a blended learning environment, which may be limited by the specific content of the music course offered and the Station-rotation approach of the blended model, which requires teachers to organise the students and manage the classroom during implementation. Two studies on blended learning in teaching Oriental music in Sri Lanka were undertaken in 2018 and 2019, indicating that a blended environment teaching style should switch smoothly between teacher-centred and learner-centred methods (Edward et al.,2018; Edward et al.,2019). Therefore, more music teachers prefer a learner-centred teaching style when conducting blended learning. Figure 4 illustrates the percentage of teaching styles in blended learning for music education.

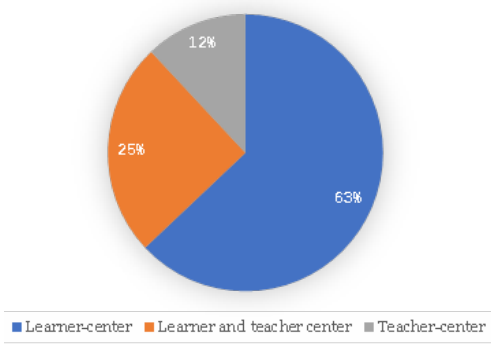

Figure 4. Chart of Teaching Styles as a Percentage

Technical Assistance

Blended learning can only be realised if technology promotes the transmission of learning materials and enables teachers and students to communicate successfully with one another. Learning environments support asynchronous, synchronous, or real-time interaction. According to this systematic review, this section analyses the technological help utilised for blended learning in music education. Table 6 lists the learning management system (LMS) and music apps used in the research studies. Four of these articles cited MOODLE as LMS. They stated that MOODLE for studying music in a multimedia environment may assist learners in conveniently accessing content and resources and communicating with others (Montgomery et al., 2017; Edward et al., 2019; Jenkins & Crawford,2021; Edward et al., 2018). This is also evident in blended learning studies in other subject areas, indicating that MOODLE can assist instructors in creating blended learning environments that emphasise content engagement and collaboration (Papadakis et al. et al., 2018; Wang et al., 2021). Three studies employed Google Meet to promote the online construction of blended learning; even though Google Meet is not a typical LMS, teachers have accepted it for use in blended music education (Lin, 2022; Nethsinghe et al., 2022; Barnes & Randles, 2023). Crawford (2016) was the first researcher in music education to describe the usage of blended learning in the literature. The LMS used in her study was Elluminate, which is thought to have been bought by Blackboard and renamed Blackboard Collaborate. Other than MOODLE, this is a frequently used LMS. In addition, four more studies needed a description of the LMS that they utilised for their research.

With scores being a crucial component to be presented in the music classroom, the specialisation of music education is distinct from other subjects in that it entails the transmission of a significant amount of music-related content in the form of audio or video, as well as the use of procedures related to music composition. Two articles in this study mentioned the use of music applications; Crawford (2016) used Audacity for editing and managing audio in her research and went through Elluminate to share information on the required audio with the students. According to Beirnes and Randles (2023), the music broadcast platforms used were Spotify and Logic. Soundtrap was also used as audio editing software, while Noteflight was chosen as the course's online music score editing program. And using the Chrome Music Lab to promote fascinating musical practices. The online components stated in the study were integrated into a blended

learning for music education. Although the articles in this study lacked detailed descriptions of the technical support aspects, the study's findings show that in the blended learning strategy for music education, students' ability to self-regulate and learn independently through the interaction of course materials in the online components were improved, as were students' interest and creativity in music learning.

Teaching Modules

As shown in Table 7, there are two types of modules for teaching music in a blended environment. The first is the music curriculum at the elementary education level (Edward et al., 2018; Edward et al., 2019), which focuses on the ontological elements of music, appreciation, singing, music theory, and composition. The second category is the professional modules for pre-service music teachers in higher education, which are centred around music teacher education courses as the main content, e.g. music teacher education theory courses, music methodology, and theory courses related to music education and instrumental techniques, i.e., the introductory piano course, the appreciation of oriental music, Ethnomusicological Education (Montgomery et al. 2017; Cruywagen & Potgieter,2020; Nethsinghe et al.,2022; Lin, 2022; Jenkins & Crawford, 2021). Meanwhile, more blended learning studies can be found to be set at the higher education level as indicated by the teaching modules (Montgomery et al., 2017; Cruywagen & Potgieter,2020; Nethsinghe et al.,2022; Lin, 2022; Jenkins & Crawford, 2021; Shin, 2023), which also confirms what some scholars believe that higher education is a hotbed for the implementation of blended learning, and higher education institutions are teaching subjects in a blended mode in the field of higher music education involving blended learning will also become the new dynamics in music education research (Smith & Hill, 2018).

Table 6. Technical Assistance

Author and Year	LMS	Music app
Montgomery et al., 2017	MOODLE	
Lin, 2022	Google Meet	
Edward et al., 2019	MOODLE	
Jenkins & Crawford, 2021	MOODLE	
Crawford,2016	Elluminate	Audacity
Edward et al., 2018	MOODLE	
Nethsinghe et al., 2022	Google Meet, ZOOM	
Beirnes & Randles, 2023	Google Meet	Spotify, Logic, Chrome Music Lab, Soundtrap, Noteflight

Table 7. Teaching Modules

Module	Participants
Music teacher education course	Pre-service music teachers
Basic Piano Course	Pre-service music teachers
Music Method	Pre-service music teachers
Music curriculum	In-service music teachers and students
Oriental Music	Secondary school students
Elementary Music Curriculums	Pre-service music teachers and in-service music teachers
Music education curriculum	Undergraduate music students
Ethnomusicological Education	Pre-service music teachers

Outcomes of Blended Learning in Music Education

Table 8 shows the different learning outcomes investigated in the 13 reviewed studies. The most examined effect, according to this systematic review, was assessing the attitudes and perceptions of blended learning participants (Beirnes & Randles, 2023; Kim, 2020; Jenkins & Crawford, 2021; Crawford, 2016); it is followed by studies on academic performance (Nethsinghe et al., 2022; Edward et al., 2019); on artificial intelligence and wireless networks (Peng & Wang, 2022; Tan & Cao, 2022); on blended learning experiences (Shin, 2023; Cruywagen & Potgieter, 2020) and research on competence development (Edward et al., 2018; Lin, 2022), all two studies in these aspects. In addition, there is only one study on self-regulated learning (Montgomery et al.,2017). According to Beirnes and Beirnes (2023), attitudes toward blended learning include both technological and pedagogical aspects, with technology providing insightful experiences for teachers and students in virtual environments and online applications enhancing knowledge; additionally, learner-centred pedagogical approaches are more likely to stimulate students' interest and motivate teachers to abandon traditional teaching and learning methods. According to the findings of four research exploring blended learning attitudes and perceptions, students were shown to have favourable impacts following the usage of blended learning, such as inspiring students to take an interest in studying music and perceiving that blended learning gave flexibility in education.

Furthermore, it was shown that blended learning improved students' academic performance in music as well as the growth of musical skills. The impact of music learning may also be measured using AI algorithms and wireless networks. Furthermore, blended learning has been discovered to promote the development of motivation, attitude, social interaction, and self-efficacy in music learning.

Table 8. Outcomes of Blended Learning in Music Education

Outcomes	Quantity
Self-regulated learning	1
AI and wireless networks	2
Attitude and perception	4
Design for blended learning	1
Academic performance	3
Competence development	2

CONCLUSION

This study provides a systematic review of blended learning in music education. The findings enable music educators and practitioners to carefully pick appropriate technology-based tools and resources for their instruction. Furthermore, the many blended learning methodologies adopted enabled music instructors to incorporate technology-based education as an additional instructional strategy. Music instructors need to enhance their Technological Pedagogical Content Knowledge (TPACK) competencies to effectively incorporate blended learning strategies (Bowman, 2022). The proficiency of music teachers' TPACK directly impacts the successful execution of blended learning approaches in music education.

According to Paivio's (1971) "Dual Coding Theory", We have identified that blended learning, which incorporates multimedia input, necessitates two modes of information processing: visual and linguistic. From this point of view, Blended learning can augment learners' understanding of music. Similarly, Mayer et al.'s (2014) "Cognitive Multimedia Learning Theory" suggests that when learners are exposed to both auditory and visual materials, they process information through both senses, resulting in stronger, more meaningful information. This study shows that blended learning improves student performance, supporting this theory.

In addition, findings confirm the most important and unique aspect of blended learning, its emphasis on face-to-

face instruction, which constructivists like Dewey (1963) and Vygotsky (1978) have stressed.

Furthermore, this systematic study of blended learning in music education gives insight into the development and implementation of blended learning in music education.

Starting from Australian scholar Crawford's (2016) proposal of blended learning to reflect on music pedagogy in the twenty-first century. Blended learning has gradually been noticed in the field of music education, with the emergence of related studies such as online music flipped classrooms based on artificial intelligence (AI) and wireless network, optimisation of BPNN model using genetic algorithm, and evaluation of the quality of music teaching in the flipped classroom (Peng and Wang, 2022; Tan and Cao, 2022). It indicates that the field of artificial intelligence has begun to make bold attempts and conduct research on music instruction. It also demonstrates that the teaching quality of music's flipped classroom can be evaluated using artificial intelligence, providing a foundation for future study on music teaching quality.

A limitation of this study is that the level of teaching and learning should have been included in this review as an indicator of assessment examination, as most blended learning studies have focused on undergraduate students in universities and colleges. This limitation undoubtedly opens new thinking for future research, particularly in research examining music learning at different levels and other musical skills. Secondly, the articles for this review came from the high-impact journals Web of Science and, Scopus and ERIC; therefore, if this review had been conducted using databases other than these (e.g., Google Scholar and Science Direct), the results may have been slightly different. Thirdly, the systematic review suggests that previous research on blended learning in the field of music education has been more concerned with exploring the attitudes of learners and educators, neglecting research on participants' intentions to use blended learning strategies and their motivation to learn. Yet, these elements are crucial in the adoption and use of blended learning strategies. Some of the articles analysed in this review needed to provide complete details about these elements, and these studies could be carried out in the future to analyse further the elements of blended learning practices in the music classroom.

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