Contemporary Educational Technology, 2023, **15**(4), ep468
ISSN: 1309-517X (Online)

OPEN ACCESS

Review Article

Exploring the integration of bite-sized learning: A scoping review of research in education and related disciplines

Chamil Arkhasa Nikko Mazlan [1*]
0000-0002-0088-3849

Mohd Hassan Abdullah [1]
0000-0003-0235-3574

Mohd Azam Sulong [1]
0009-0002-5864-280X

Ashardi Abas [1]
0000-0003-0254-4717

Mohamad Rohieszan Ramdan [1]
0000-0002-4899-7079

Abdul Rahman Safian [1]
0009-0004-5864-974X

Dayang Rafidah Syariff M. Fuad [1]
0000-0002-3550-6656

[1] Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak, MALAYSIA
[*] Corresponding author: chamil@fmsp.upsi.edu.my

Citation: Mazlan, C. A. N., Abdullah, M. H., Sulong, M. A., Abas, A., Ramdan, M. R., Safian, A. R., & Syariff M. Fuad, D. R. (2023). Exploring the integration of bite-sized learning: A scoping review of research in education and related disciplines. *Contemporary Educational Technology, 15*(4), ep468. https://doi.org/10.30935/cedtech/13622

ARTICLE INFO

Received: 24 May 2023
Accepted: 3 Aug 2023

ABSTRACT

This scoping review investigates the potential of bite-sized learning approach in music education. The review identified articles from Scopus and ERIC databases, revealing that bite-sized learning is widely discussed in the field of ICT, mathematics, and medicine. Bite-sized learning is pedagogical and pragmatic, providing easy access, convenience, and reducing cognitive load. The study suggests that music educators can incorporate bite-sized learning by refining music content into manageable small units, utilizing flexible platforms such as TikTok, and tailoring the approach according to learner interests. Bite-sized learning can improve the quality of learning by creating an enjoyable, useful, and understandable learning session, reducing time to mastery, and improving mental health. Moreover, bite-sized learning can align with the 21st century learning traits such as personalization. This review highlights the potential of bite-sized learning in music education and recommends further research to examine its effectiveness in various instruments and related subjects. The study concludes that bite-sized learning can be recognized as a pragmatic, flexible, brevity and personalized learning approach that aligns with the needs of modern learners for the 21st century.

Keywords: bite-sized learning, music education, pedagogue, teaching and learning approach, 21st century learning

INTRODUCTION

The emergence of the 21st century has introduced fresh methods in various educational domains, including music education. Consequently, utilizing the extensive range of immersive databases, publishing research related to education can act as a catalyst for fostering lifelong learning. Hence, this led to a radical

change in how music educators teach and learn (Halimi & Mazlan, 2023). Music and education itself should be dynamic and not autocratic (Mazlan & Abdullah, 2020). Some examples of the 21st century learning methods in music education are project-based learning (Albar & Southcot, 2021; Botella Nicolás & Ramos Ramos, 2020; Kathar & Bradder, 2022) and mixed learning (Arshad et al., 2022; Cruywagen, 2020; Swanwick, 2011), personalized learning (Johnson, 2020; McPherson & Welch, 2012; Shi, 2021), competency-based learning (Battisti, 2016; Mazlan & Abdullah, 2020), and technology integration (Mohd Ramli et al., 2021; Spieker & Koren, 2021). Overall, the development of these various methods of learning also demonstrates that music education needs to evolve to reflect the diversity of today's learners. There are many more approaches that we can use in music lessons. Apart from that, all these approaches can be mixed or combined to enhance students' understanding and appreciation of music learning. For example, a teacher could use a personalized learning approach to encourage students to explore and discover their own musical interests and styles. In this way, students gain more control over their own learning. The concept of personalized learning is also reflected in the concept of Education 5.0 (Lantada, 2020).

As we continue to discuss the idea of personalized learning, our investigation of the "bite-sized" learning strategy fits right in. This is also supported by earlier research, which shows that bite-sized learning is consistent with individualized, personalized learning (Hughey, 2020). Bite-sized learning is a teaching and learning approach in education that essentially divides educational material into smaller, more manageable pieces (Arnab et al., 2021; Halimi & Mazlan, 2023; Manning et al., 2021). In addition to these benefits, bite-sized learning has the potential to improve learning effectiveness and efficiency by presenting information in smaller, easier-to-digest chunks, which learners can easily absorb (Annamalai, 2021; Arnab et al., 2021; Bratt, 2020; Goodwill & Chen, 2021; Hiremath et al., 2021; Salleh et al., 2022; Trans, 2020). The learner can focus on the core concepts of the materials without becoming overwhelmed by the volume of related information by breaking the learning concept down into smaller chunks. As a result, this also fits with inductive learning approaches, which stage the flow of information from specific to general (Ochoa et al., 2019; Tsai, 2019). Moreover, bite-sized learning can address the challenge of having a busy schedule, which our daily lives are typically incorporate comprehensive information into prolonged classes or multi-day events, the current trend is to present content in a protracted manner (Burton, 2022). Consequently, bite-sized e-learning modules are discrete units of information that are compact in size and self-contained. These modules generally have a duration of one to fifteen minutes and concentrate on one or two closely defined learning outcomes (Greany, 2021).

Adam and Metljak (2022) have pointed out the advantages of online learning that need to be further examined. They have emphasized that the limitations of online learning could vary based on the technological proficiency of both instructors and participants. This contextual factor highlights the importance of considering the varying technological skills when evaluating potential drawbacks of online learning. In contrast, Nsairat et al. (2022) have identified that music education involves a practical component that requires students to learn by playing musical instruments, resulting in several challenges when studying music online.

Despite the availability of e-learning platforms like MOODLE, these systems have not adequately met the needs of music education and students. However, e-learning presents opportunities for more flexible study options that can attract more students to learn and benefit from it. Given the necessity to sustain education during crises, e-learning can serve as an enabling agent to help students continue their education. Nonetheless, the effectiveness of e-learning in music education relies on individual interests, passions, influences, and financial resources, as a student's willingness to study and progress is not solely dependent on the availability of online instruction.

In addition to the advantages offered by learning approaches such as bite-sized learning, it is imperative to carefully examine and reflect on the practical realities that surround music education. While the pedagogical benefits of bite-sized e-learning modules are well-documented, their implementation within the specific context of music education warrants a more nuanced analysis. For instance, Swallow (2019) has list down six biggest challenges in music education, such as commitment, priority, financial, adaptation for student needs, motivating students and assessing progress. In the realm of education, it is imperative to acknowledge that students possess unique sets of preferences. In light of this, educators are tasked with the

Table 1. Search strings

SCOPUS database	ERIC database
TITLE-ABS-KEY ("bite-sized learning") AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))	"bite-sized learning"

responsibility of revaluating their methods, unlearning outdated practices, and acquiring new skills that cater to the diverse needs of their students (Kenyon, 2022; Needs, 2017; Parrish, 2019; Vallikat, 2021).

However, little research has been conducted to examine the effectiveness of this strategy in music education contexts. As stated by Lehman (2020), it is essential to periodically evaluate and update our standards, and it is imperative to involve all stakeholders in this review process, particularly for music educators. In another research on student's attitudes toward online music education by Rucsanda et al. (2021), result shows the perceived compatibility of e-learning methods with online music education was found to positively influence the perceived utility of such methods. This positive association, in turn, was found to predict a higher level of satisfaction toward e-learning. Despite the increased apprehension surrounding social interaction during the pandemic, anxiety related to the unknown and intolerance of uncertainty did not have a significant impact on satisfaction with e-learning platform.

Other disadvantages of online music education, the findings of the study indicated that a vast majority of the participants had no prior experience with distance education, encountered challenges in utilizing musical instruments during online lessons, and experienced synchronization issues in all music-related activities.

Additionally, participants reported encountering difficulties such as internet connectivity issues, low student motivation, the inadequacy of online lessons, digital fatigue, and concerns surrounding children's exposure to harmful content on the internet (Akarsu, 2021). Another typical learning approach in learning music is master-apprenticeship, which Klickstein (2013) argues as this model is dead and irrelevant with the preparation in the 21st century. Institutions of higher music education across the globe generally rely on one-on-one teaching as the primary method of instruction for students learning to play a musical instrument (Beihammer, 2011; Daniel & Parkes, 2015).

METHODOLOGY

This article employed a method called document analysis, specifically focusing on scoping reviews. Scoping reviews are an integral part of the methodology used to ensure clarity, transparency, and prevent inadequate reporting. Despite being a relatively recent approach to synthesizing data, scoping reviews are extensively utilized across various research fields (Akbarialiabad et al., 2021; Daniel et al., 2021; De Wit & Plastow, 2021; Linardon et al., 2022; Munn et al., 2018; Peters et al., 2022; Razak et al., 2022; Yahaya et al., 2022).

To effectively create a scoping review, it is essential to possess a thorough comprehension of the distinct phases encompassed within the procedure. This article utilizes the five-stage approach formulated by Arksey and O'Malley (2005) as a framework to steer the scoping review process. The initial stage focuses on determining the research objective or question, which establishes the review's trajectory. The subsequent stage entails identifying pertinent studies by conducting a methodical exploration of literature databases and other relevant sources. This stage guarantees the inclusivity of all relevant studies, thus ensuring the comprehensiveness of the review.

Stage 1: Determining Research Objective or Question

The initial step in conducting a scoping review is to precisely define the research question and delineate the scope of the review. Levac et al. (2010) have highlighted the importance of formulating a broad question that encompasses the population, concept, and context (PCC). Alternatively, Peter et al. (2020) have suggested that a single research question may be sufficient to cover these aspects. In the present scoping review, we have adopted the latter approach and focused on a single research question, namely: "what does the existing literature reveal about the implementation of bite-sized learning?" Through this research question, we aim to explore and synthesize the existing body of knowledge regarding the use of bite-sized learning. This approach will enable us to identify gaps and opportunities for future research and inform the development of effective educational practices (**Table 1**).

Table 2. Criteria outline on SCOPUS database

Criteria	Inclusion	Exclusion
Document type	Article	Book chapter, review, book, conference paper, note, erratum, editorial, letter, short survey, & retracted
Language	English	Non-English

Table 3. Criteria outline on ERIC database

Criteria	Inclusion	Exclusion
Publication type	Journal articles	Reports–research, Report–evaluative, Reports–descriptive, information analyses, & test/questionnaires

Stage 2: Identify Relevant Studies

To achieve a comprehensive coverage of the existing literature, search queries were tailored with key terms that were relevant to the research topic. Specifically, the search was focused on collecting content related to bite-sized learning, using the identified key themes and search terms outlined in **Table 1**. In order to ensure that the search was up-to-date, multiple attempts were made to retrieve relevant literature from two prominent academic databases with a multidisciplinary focus, namely Scopus and ERIC (Education Resources Information Center). This process involved updating the key terms used in the search queries to include newly published literature and to broaden the scope of the search. This approach exemplifies the importance of employing appropriate and relevant key terms in search queries when conducting a scoping review, as it allows for a comprehensive and thorough examination of the existing literature. By utilizing multiple databases and updating search terms, researchers can ensure that their review is up-to-date and that the findings are grounded in current and relevant research.

Stage 3: Studies Selection or Screening

In the pursuit of rigorously identifying relevant literature for the present study, an initial screening process was undertaken. The purpose of this process was to establish clear inclusion and exclusion criteria that would enable the identification of high-quality articles that address the research question. The criteria were developed based on the research objectives of the study and were applied systematically to ensure that only relevant articles were selected. To facilitate the screening process, two major databases, Scopus and ERIC, were utilized to retrieve potential articles. The search strings employed in the search process were specifically designed to retrieve articles that are relevant to the research question. The results from the search process were then collated, and the inclusion and exclusion criteria were applied to filter out articles that did not meet the study's objectives. The inclusion and exclusion criteria used in the screening process are presented in **Table 2** and **Table 3** for Scopus and ERIC databases, respectively. The criteria were based on several factors, including the date of publication, language of publication, and the relevance of the article to the research question. The criteria were designed to ensure that only high-quality articles were included in the subsequent stages of the study. In summary, the initial screening process was critical in ensuring that only relevant articles were selected for the study. The criteria were established based on the research objectives and were systematically applied to filter out articles that did not meet the study's requirements. The inclusion and exclusion criteria are presented in **Table 2** and **Table 3**, respectively, for Scopus and ERIC databases.

Stage 4: Charting the Data

Following the screening process, the subsequent stage involves interpreting the data obtained from the chosen literature. During this phase, the relevant information is organized in a structured manner, which may include graphical representations. This process, commonly referred to as data extraction, is also known as charting the data (Huges et al., 2021; Oravec et al., 2022; Sharma et al., 2022). Data extraction methods vary across different areas of study, as the purpose of extraction is to compile and present the available evidence (Pollock et al., 2021). Therefore, we will incorporate data extraction protocols recommended in prior research, such as the year of publication, title, author details, aim/purpose, and study design (Buchanan et al., 2020; Huges et al., 2021; Oravec et al., 2022; Yahaya et al., 2022). Detailed explanation of the extracted data from selected articles will be provide in the subsequent section below.

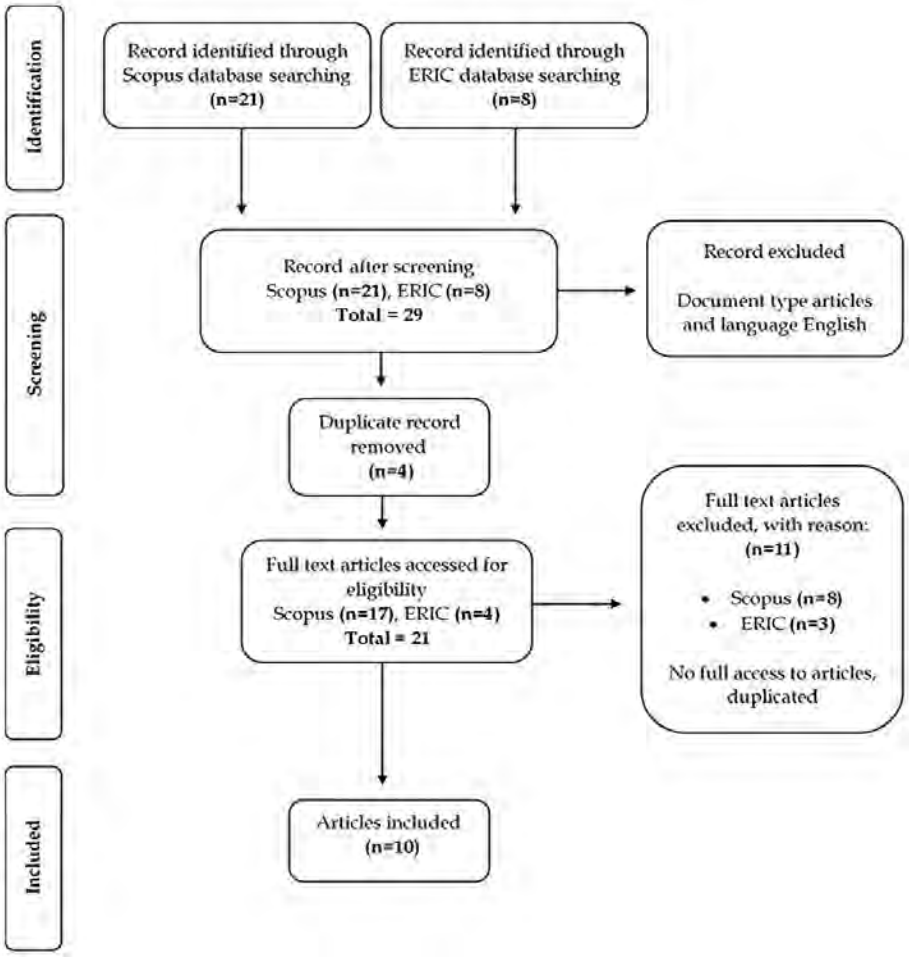

Figure 1. Flow diagram of study selection process using PRISMA (adapted from Moher et al., 2015)

ANALYSIS AND RESULTS

In the present study, a scoping review approach was adopted to synthesize and analyze the existing literature related to a specific research question. The selection process for this scoping review followed preferred reporting items for systematic reviews (PRISMA) model, as adapted from Moher et al. (2015) (**Figure 1**). This model provides a comprehensive framework for conducting systematic reviews, and its application in this study aimed to ensure the transparency, rigor, and replicability of the review process. The search strategy, as described in the previous section, resulted in the identification of 21 relevant articles that met the inclusion criteria. These articles were subjected to a rigorous screening process, which involved the evaluation of their relevance, quality, and scope. We have chosen ten suitable articles as the primary sources for our scoping review. The data from the selected articles were then extracted and compiled into a structured summary. In the next phase of the study, the data will be analyses and synthesized, with the aim of identifying key themes, trends, and gaps in the literature. This analysis will be guided by the research question and objectives of the study. Finally, the findings of the study will be discussed in detail, highlighting the implications of the review for music education research and practice. To summarize, the present study aims to provide a comprehensive overview of the existing literature related to a specific research question using a scoping review approach. PRISMA model was employed to ensure the rigor and transparency of the review process.

Stage 5: Collect, Summarizing, and Reporting Results

This section elucidates the extracted data from the selected articles, meticulously presented in **Table 4**. The delineated information encompasses the authors and publication years, titles, objectives or purposes, study designs, fields of study, and the emergent thematic aspects. This comprehensive approach enables a critical analysis and synthesis of the relevant scholarly content.

Table 4. Data charting matrix

Reference	Title	Aim/purpose	Study design	Field of study	Theme
Bothe et al. (2019)	From MOOCs to micro learning activities	Aim is to examine potential of micro learning activities in context of MOOC, purposing a personalized curriculum framework.	Experimenting MOOC and survey	Computer, MOOC, & e-learning	Short-term learning session
Foster (2013)	Resisting reductionism in mathematics pedagogy	Aim is to offer more holistic alternatives in mathematics pedagogical paradigm.	Review & observation	Mathematic	Quick & easy, simplified, & sufficient time to explore different ways
Horst et al. (2020)	Bite-sized virtual reality learning applications: A pattern-based immersive authoring environment	Aim is to introduce an authoring toolkit that relies on VR implementation of nuggets & show that a nugget-based approach is also facilitating authoring of VR learning content.	Questionnaire, semantic differential scale, & testing using IN-Tiles toolkits	Computer & game engineering software	Cognitive load, piece by piece, chronological, & short familiarization time
Khachan and Ozmen (2019)	IMSSAP: After-school interactive mobile learning student support application	Aims are to introduce a new mobile bite-sized learning tool, (IMSSAP), after-school interactive m-learning student support.	Questionnaire	Computer & information system engineering	Understand learner needs, easy to understand information, mobile learning, bite-sized enhance interaction, active contribution, & promote m-learning acceptance
Manning et al. (2021)	The micro revolution: Effect of bite-sized teaching (BST) on learner engagement and learning in postgraduate medical education	Aim of this study was to assess impact of bite-sized teaching approach on knowledge acquisition & student attitudes in postgraduate medical education.	Cross sectional survey & pre-post-test	Medical	Brief, focus learning units, deconstruction & rebuilding, manage cognitive load, & immediate knowledge recall
Petrakieva (2015)	Mobile technologies and learning: Expectations, myths and reality	Aim is to embrace adaptive learning, integrating pedagogy &AI techniques, which indicates a promising future for adaptive m-learning.	Review	Information communication technology	Flexibility, better learning process, & incorporate
Quinones and Griffiths (2019)	Reducing compulsive Internet use and anxiety symptoms via two brief interventions: A comparison between mindfulness and gradual muscle relaxation	Aim is to tested effectiveness of a brief mindfulness intervention (10 min a day for two weeks) to reduce compulsive internet use, anxiety, & depression symptoms, in relation to an equivalent length classic arousal descending technique (i.e., gradual-muscle-relaxation), & a wait-list control group.	Randomized controlled trial & pre-post-test	Medical	Short, easy to fit in concept, brief intervention for those who are busy, & promote mindfulness

Table 4 (Continued). Data charting matrix

Reference	Title	Aim/purpose	Study design	Field of study	Theme
So (2016)	Mobile instant messaging support for teaching and learning in higher education	Aim is to evaluate use of mobile instant messaging tools, WhatsApp to support teaching & learning among teacher-training students of database management course.	Pre-post-test & questionnaire	Information communication technology	Pragmatic, easy access, convenience, less overwhelming, & small chuck of information
Steehler et al. (2023)	The smart use of smart technologies in teaching and learning: Where we are and where we need to be	Summarizes relevant changes in medical school and residency training practices that promote a more effective learning environment.	Review	Medical	Acquire knowledge or skills in short term, valuable and essential for future, more about less, & learning and doing
Tutar et al. (2021)	Personalized lecture recommendations to facilitate bite-sized learning	Aim is to present users with a personalized set of lectures that may be of interest to learners to learn English courses on udemy.com	Content catalogue from Udemy for business on English courses	Information system & applied computing	Personalized learning of learners interests & preferences, fundamental concept of the field, enjoyable, useful, & understandable, repetitive

Table 4 reveals an intriguing finding that bite-sized learning has been discussed more frequently in the fields of ICT, mathematics, and medicine. Scholars such as So (2016) argues that the bite-sized approach is both pedagogically and practically advantageous, as it offers easy access, convenience, and presents information in small, manageable chunks, which can help to reduce learner overwhelm. Earlier studies, such as that by Foster (2013), have also supported the notion that bite-sized learning approaches can be quick, simple, and easy to digest, with simplified content that provides learners with sufficient time to explore different ways of connecting their knowledge and skills.

Incorporating bite-sized learning approaches into the classroom environment can help create a more conducive learning environment for learners. Petrakieva (2015) highlights the flexibility of bite-sized learning, providing learners with more time to incorporate and apply what they have learned, which may help to enhance the overall learning process by reducing information overload. Additionally, studies by Bothe et al. (2019), Horst (2020), Quinones and Griffiths (2019), and Steehler (2023) have shown that using bite-sized learning can significantly reduce the time needed to acquire knowledge or skills. Furthermore, by reducing the time needed to master a topic or lesson, bite-sized learning may also help to promote better mental health, such as mindfulness (Quinones & Griffiths, 2019) and reduced cognitive load (Horst, 2020; Manning et al., 2021).

Bite-sized learning approaches also align with current 21st century education trends such as personalization, enabling learners to choose skills or knowledge that are valuable and essential for their future growth (Steehler, 2023). By integrating bite-sized learning into the complex and often busy schedules of students, it can create an enjoyable, useful, and easily understandable learning session, as demonstrated in studies by Bothe et al. (2019), Kachan (2019), Manning et al. (2021), and Tutar et al. (2021).

Based on the discussions of findings, a framework has been proposed based on several themes that have emerged from selected studies (**Figure 2**). Framework serves as a useful guide for educators and researchers to understand and implement bite-sized learning approaches effectively in various educational contexts.

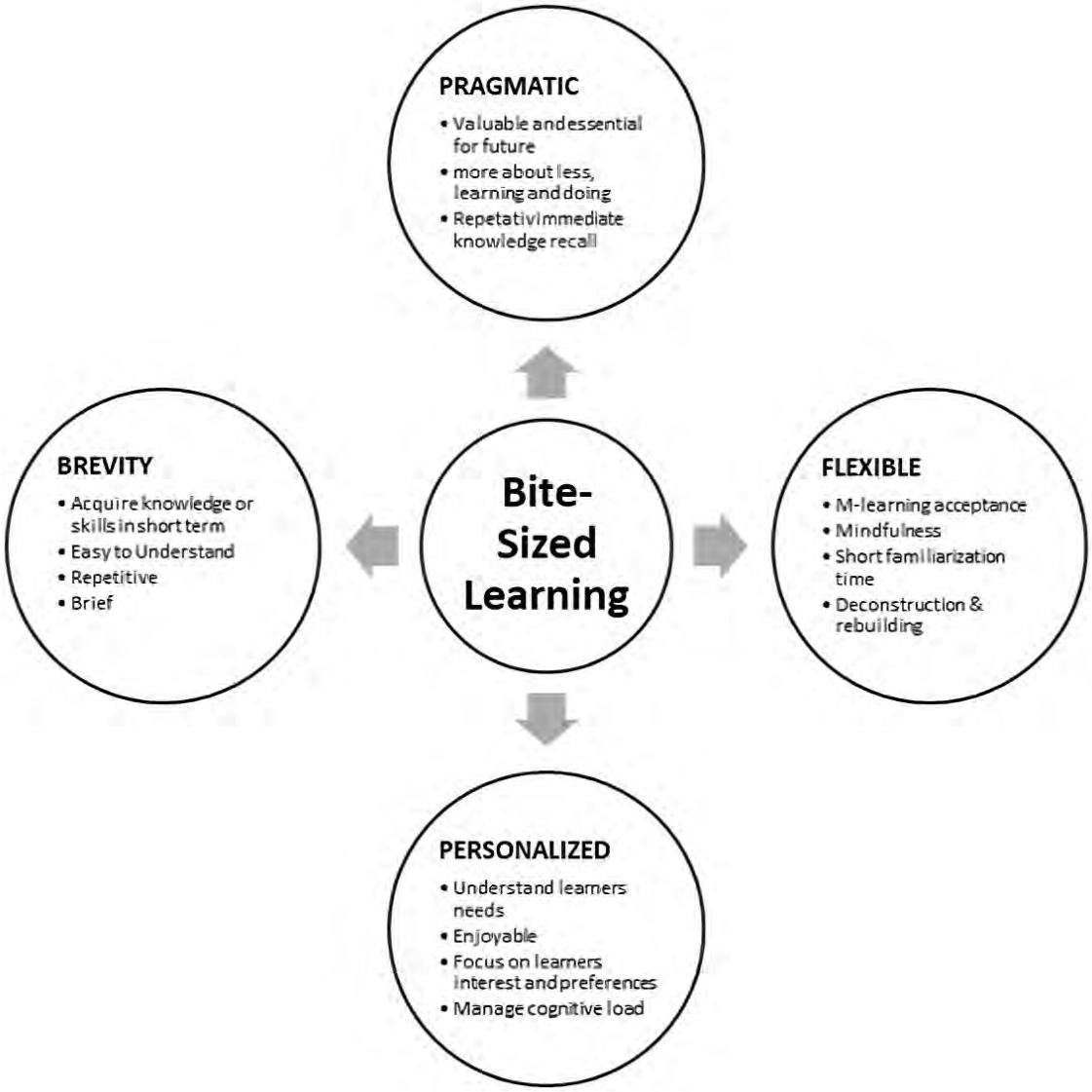

Figure 2. Bite-sized learning framework (Source: Authors)

DISCUSSION AND CONCLUSIONS

The findings of this review suggest that bite-sized learning is compatible with contemporary 21st century learning styles and appears to hold appeal for implementation in music education. This is largely due to the pedagogical and pragmatic advantages that are associated with bite-sized learning, such as personalization, pragmatic, flexibility, and brevity. For example, content of learning music can be transformed into a bite-sized learning, which giving alternative to inefficiency of online learning (Akarsu, 2021). Nonetheless, additional research in this area is needed to further explore the potential benefits and limitations of bite-sized learning in music education, as well as to identify strategies for effective implementation.

In conclusion, music educators can use the bite-sized learning approach to enhance the quality of teaching and learning by breaking down content into smaller units, providing flexibility, and tailoring the approach to learners' interests. Moreover, the scoping review highlights that bite-sized learning can be tailored to the learner's interest and preferences, which can contribute to a more engaging and enjoyable learning experience. In addition, bite-sized learning can also be used in the assessment of learning, which prioritizes the students' learning process and progress. The concept of bite-sized learning also can be integrated with online platforms, which students can access the contents in a conducive learning environment of their own (Ahmad et al., 2015; Dart, 2006; Ghias et al., 2017; Xu et al., 2022). As noted earlier, incorporating bite-sized

learning into music education can enhance the teaching and learning process. To implement this approach, music educators must first break down the necessary music content into smaller, more manageable units of topic. For instance, Mohd Ramli et al. (2021) used Google Classroom to store Gamelan ensemble performance techniques, emphasizing basic hand skills, while Halimi and Mazlan (2022) proposed the use of TikTok as an alternative platform for music education. These concepts align with the Malaysian education development plan (higher education) 2015-2025, which emphasizes the use of ICT to improve the quality of learning in Malaysia (Ministry of Education Malaysia, 2015).

Secondly, music education, particularly instrumental music lessons, is rooted in the master-apprentice concept, but students today have access to numerous online music materials. Thus, flexibility is crucial before applying the bite-sized learning approach (Colin, 2013; Petrakieva, 2015; So, 2016; Steehler et al., 2023; Tutar et al., 2021). In the context of music learning, flexibility can take various forms. In our current ongoing research, we utilized the bite-sized learning approach to teach jazz guitar reharmonization techniques by deconstructing the content into smaller units, recording, and uploading them to the TikTok application. Each uploaded video is less than five minutes long. As So (2016) argues, bite-sized learning approaches are pragmatic, and in the pragmatism paradigm, change is essential as the world continues to evolve (Mazlan & Hassan, 2020). Finally, the bite-sized learning approach can be recommended in the context of assessing learning, which prioritizes students' learning processes (William, 2011). This is in line with previous research that suggests that bite-sized learning should be tailored to learners' interests (Steehler et al., 2023; Tutar et al., 2021).

Future research can explore the effectiveness of incorporating the bite-sized learning approach in music education and its impact on student learning outcomes. Digital platforms, such as Google Classroom, YouTube, Facebook, and TikTok, offer opportunities to present content in a concise and easily digestible manner. By leveraging these platforms, educators can streamline information delivery and ensure that students can readily access course materials, anytime anywhere. Moreover, these platforms can provide a range of multimedia resources, such as videos, infographics, and interactive exercises, which can enhance student engagement and comprehension (Chicca & Chunta, 2020; Ismaeel & Al Mulhim, 2021).

While the scoping review found that bite-sized learning approach seems to be compatible with the 21st century learning style and has potential in music education, it is important to acknowledge the limitation of the study. The scoping review only examined selected articles from Scopus and ERIC databases, which may not represent the full scope of research on bite-sized learning in music education. Therefore, further research is needed to investigate the effectiveness and practicality of implementing bite-sized learning in different contexts of music education, such as vocal or instrumental music, music theory, and music history. Despite the limitation, the scoping review suggests that bite-sized learning can be a useful approach for music educators to adopt in their teaching and learning practices.

Author contributions: CANM: conceptualization, design, analysis, writing, & securing funding; **MHA:** editing/reviewing, supervision, & securing funding; **MAS & ARS:** editing/reviewing & supervision; **AA & DRSMF:** critical revision of manuscript; & **MRR:** editing/reviewing, supervision, & critical revision. All authors approved the final version of the article.

Funding: This article was supported by the Universiti Pendidikan Sultan Idris (UPSI) through the Fundamental University Research Grant (GPUF), project code 2021-0213-106-01.

Acknowledgements: The authors would like to thank all the researchers and colleagues who contributed to this research, both directly and indirectly.

Ethics declaration: The authors declared that the study did not involve either human or animal subjects within the. Furthermore, authors expounded that the methodological approach undertaken was one of documentary research, characterized by the procurement of primary data gleaned from publicly accessible databases.

Declaration of interest: Authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

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