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Article

Discover the Fun of Playing Music and Understanding Music Theory Using Flashcards

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Abstract: This study aims to explore the effectiveness of flashcard media in music learning, especially in helping students understand music theory and increase motivation to play music through a fun and interactive approach. Using the *Systematic Literature Review* (SLR) method, this study identified, evaluated, and synthesized eight selected scientific articles published between 2015-2025. The selection process was based on PRISMA guidelines and Zawacki-Richter's SLR model, including the formulation of research questions, screening of articles based on inclusion and exclusion criteria, and assessment of study quality. The results showed that the use of flashcards - both in manual and digital form - consistently contributed positively to the improvement of rhythmic ability, understanding of notation concepts, and affective engagement of learners from various levels. Flashcards proved effective in simplifying complex musical material into concrete visual representations, strengthening long-term memory through *retrieval practice* and *spaced repetition* techniques. Furthermore, the integration of flashcards in project-based pedagogical approaches (PjBL), character learning, as well as digital technologies such as apps and AR, shows great potential in enriching music learning experiences that are inclusive, collaborative and meaningful. Therefore, this study recommends the continued development of interactive technology-based flashcard media as a future music learning innovation.

Keywords: Interactive Music Education, Music Flashcards, Rhythmic Learning, Visual Music Theory.

1. Introduction

Music has long been recognized as an educational tool that is not only aesthetically pleasing, but also has a significant influence on the cognitive, social, and emotional development of learners (Hallam, 2010) . Engaging in musical activities from an early age has been shown to improve focus, memory, creativity, and language and math skills. (Colbran et al., 2014) . However, while playing music is often associated with fun activities, learning music theory is often considered the most boring and challenging aspect of formal music education (Widhiprasetya et al., 2021) .

Music theory, which includes an understanding of notation, rhythm, scales, intervals, chord structure, and harmony, is an important foundation in mastering musical skills. Unfortunately, conventional approaches to teaching music theory often emphasize memorization and passive lectures, which often make students feel burdened, lose motivation, and experience conceptual understanding barriers (Yang, 2023) . Thus, there is a need for innovative learning methods that are not only cognitively effective, but also affective fun and motivating.

In this context, flashcards emerge as one of the promising learning media. Flashcards are visual aids designed to present information in a simple Q&A format and can be used independently or collaboratively. The main advantage of flashcards is their ability to support the learning strategies of *retrieval practice* and *spaced repetition*, two techniques that have been scientifically proven to improve long-term retention and deep understanding of material (Dunlosky & Rawson, 2015) . When applied in the context of music education, flashcards can

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help learners memorize notation, musical symbols, chord progressions, and even complex musical terminology in a fun and interactive way (Hallam, 2010) In addition, the development of digital technology has also expanded the scope of the use of flashcards through computer and mobile-based learning applications such as Anki, Quizlet, Brainscape, and others. These apps allow students to access music learning materials with engaging visual features, sounds, as well as adaptive algorithms that personalize the frequency of repetition based on the student's level of mastery (Yang, 2023) . This allows for a learning experience that is flexible and suited to each individual's learning style.

In terms of educational psychology, the use of flashcards can also increase intrinsic motivation as they foster a sense of gradual achievement and provide instant positive feedback (Page et al., 2021) . By making learning a form of fun challenge, flashcards contribute to the creation of a more positive and participatory learning climate (Zhang & He, 2020).

However, the use of flashcards in music learning, especially in the realm of music theory, has not received enough attention in the academic literature. Existing research generally focuses on the use of flashcards in language or science learning. Therefore, it is important to explore and summarize the results of recent studies that have evaluated the effectiveness of flashcards in the context of music learning.

Therefore, this paper aims to conduct a systematic literature review on the use of flashcards in music learning in the period 2019-2025. The main focus is to evaluate how this medium can unlock the fun side of learning music theory while supporting the development of musical skills through a more active, personalized and enjoyable learning experience.

2. Proposed Method

This research uses the Systematic Literature Review (SLR) method which aims to identify, evaluate, and synthesize scientific studies relevant to the use of flashcards in music learning and music theory fun. This approach uses the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standard as the main procedure in selecting and analyzing literature from various academic sources (Page et al., 2021) .

The SLR model in this study is based on the approach developed by Zawacki-Richter (Kerres & Bedenlier, 2020) which consists of five stages:

1. Formulating the research question,
   Research questions (RQs) were developed to clarify the focus of the study and screen the relevant literature:
   RQ1. What is the theoretical information about the use of flashcards in learning music theory and music performance?
   RQ2. What are the methodological approaches used in studies on the use of flashcards in music learning contexts?
   RQ3. What are the main findings of studies examining the effectiveness of flashcards in improving music theory understanding and motivation to play music?
2. Determining selection criteria (inclusion & exclusion),
   Selection criteria were used to reduce articles that were not relevant to the topic. This process was conducted based on the following Inclusion and Exclusion Criteria:
3. developing a search strategy,
   The process of searching for data through online databases and has a large repository for academic studies. The databases are *ScienceDirect, Google Scholar* and *SciScape*. Data search *strings* based on Latifah & Ritonga's theory are needed for more specific data searches and avoid global filtering Latifah & Ritonga (2020). Meanwhile, the use of keywords according to Setiadi, Respati et.al is done in the list and filter process to find relevant articles.
4. Study selection process
   After the initial search resulted in 217 articles, the screening process was conducted through three stages:
   1. Title and abstract screening
   2. Full-text screening
   3. Matching to the research question
   4. Only articles that met the inclusion criteria and answered at least one of the research questions would proceed to the quality assessment stage.

5. Assessment of study quality.
   A quality assessment is conducted to assess the contribution of each study to the topic. The three main indicators of assessment are:
   QA1. Does the study provide theoretical information about flashcards in music learning?
   QA2. Does the study explain the methodology of using flashcards in the context of music theory
   or motivation to play music?
   QA3. Do the results support the effectiveness or positive contribution of using flashcards?

   Scoring is done with three categories:
   Y (Yes): Corresponds to the indicator
   T (No): Not in accordance
   P (Partial): Partially compliant

3. Results and Discussion

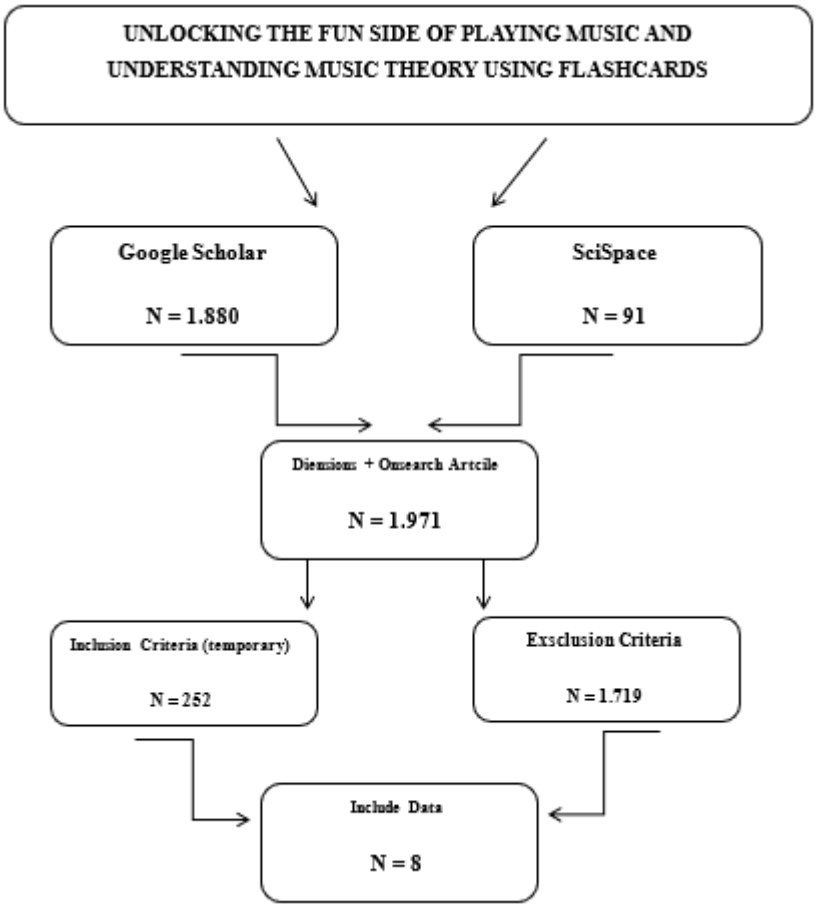

Figure 1. Research Result

Based on the results of the literature search to answer the problem formulation related to the utilization of flashcards in improving understanding of music theory and pleasure in playing music, a search was conducted on several databases, namely Google Scholar and SciSpace. The search process uses keyword strings that are tailored to the theme of the research topic. The total articles found in the initial stage of the search amounted to 1,880 articles from Google Scholar and 91 articles from SciSpace, so the total number of articles collected was 1,971 articles.

The next step is to unify the search results and perform an initial identification stage of the collected articles by utilizing the Dimensions and Onsearch Article platforms. The collected articles then went through a selection stage based on inclusion and exclusion criteria to filter out the most relevant articles.

During this selection stage, a total of 1,719 articles were excluded (exclusion criteria) because they did not meet the research criteria. The main reasons for exclusion included:

1. Articles did not provide empirically tested results,
2. Articles were not relevant to the focus of the problem formulation,
3. Journal quality or publication credibility was questionable,
4. Articles published outside the 2015-2021 timeframe, and
5. Articles not written in English or not indexed in international databases.

Meanwhile, 253 articles met the inclusion criteria temporary and proceeded to the content scanning stage for further evaluation. The inclusion criteria in this study included:

1. Articles addressed the relationship between music, visual aids (including flashcards), and cognitive or motivational aspects of learning,
2. Articles were able to explicitly answer the problem formulation,
3. Published within 2015-2021,
4. Reputable and credible journal, and
5. Written in English and indexed in international academic databases.

After further evaluation through review of titles, abstracts, and research results, only 8 articles met all inclusion criteria and were suitable to be used as the main data (included data) in this literature synthesis.

The eight articles were then further analyzed through the Quality Assessment (QA) stage to ensure that each article has a quality value that can be accounted for. The assessment was based on methodological soundness, thematic relevance, and significance of contribution to the review objectives. All included articles received a "Yes (Y)" rating on each QA indicator, as shown in the following table:

Table 1. Analyzed Articles

No	Title & Author (Year)	Research Design	Intervention	Sample	Instrument	Q1	Q2	Q3
1	*Media Flashcard sebagai Suplemen Pembelajaran Rhythm Musik Anak Usia Dini* Indyana, Suryandoko, & Sabri (2024)	Qualitative	Rhythmic flashcards with fruit symbols based on Kodaly & Piaget theory	VII grade junior high school students	Expert validation & class trial	Y	Y	Y
2	*Designing a Notation Card Game Media...* Sella, Sukmayadi, & Fetrianggi (2024)	R&D (ADDIE)	Flashcard-based rhythmic game cards	Middle/high school students	Expert validation, digital test, observation	Y	Y	Y
3	*Media Flashcard Interaktif Berbasis Web...* Adela (2022)	R&D (4D)	Web-based digital flashcards (notation, scales)	Preschool children	Teacher and child observation & interview	Y	Y	Y

4	*Flashcard sebagai Media Pembelajaran Nilai Karakter...* Sulistyo, Wuryandani, & Sukamto (2023)	Descriptive Qualitative	Music flashcards for character strengthening	Junior high school students	Observation, journal, project evaluation	Y	Y	Y
5	*Peningkatan Hasil Belajar... PjBL Berbantuan Flashcard* Sabrina & Indrawati (2024)	PTK 2 Cycle	Flashcards as a support for Project Based Learning	Students with special needs	Observation, teacher reflection, documentation	Y	Y	Y
6	*Music Reading for Students with Learning Disabilities* Morrow (2023)	Reflective Case Study	Multisensory flashcards for dyslexia & ADHD	Users of flashcard platform (general)	Theoretical study & system design	Y	Y	Y
7	*The Role of Digital Flashcards in Legal Education* Colbran et al. (2014)	Conceptual-System Development	Multimedia-based digital flashcards (Flash Cram)	Elementary school students (two groups)	Pretest-posttest, statistical test	Y	Y	Y
8	*Pemanfaatan Media Flashcard untuk Meningkatkan Hasil Belajar IPS (Alat Musik Tradisional)* Natalia & Susarno (2014)	Quantitative Experiment	Flashcards of Indonesian traditional musical instruments	VII grade junior high school students	Expert validation & class trial	Y	Y	Y

The final result in the *include* article is to analyze the data to answer the *Research Question* which is used as the final result and primary data in *finishing the* research.

RQ1. What is the theoretical information about the use of flashcards in learning music theory and music performance?
RQ2. What are the methodological approaches used in studies on the use of flashcards in music learning contexts?
RQ3. What are the main findings of studies examining the effectiveness of flashcards in improving music theory understanding and motivation to play music?

1. Media Flashcard sebagai Suplemen Pembelajaran Rhythm Musik Anak Usia Dini
Indyana, Suryandoko, & Sabri (2024)

Abstract:
This study discusses the importance of visual media in rhythmic learning for early childhood. Based on Kodály's theory and Piaget's cognitive stages, flashcards are designed with images familiar to children, such as fruits, to simplify abstract rhythmic notation symbols. The purpose of the study was to evaluate the effectiveness of using rhythmic flashcards in improving children's understanding of the tempo and beat of music.

Keywords: Flashcards, rhythm, early childhood, music learning, visual representation
(Indyana et al., 2024)

RQ1: This research explains that rhythmic learning is essential yet challenging for young children due to limited numeracy and abstraction of the concept of time. Flashcards are used to simplify rhythmic understanding by replacing complex notation symbols with familiar visual representations (e.g. pictures of fruit). This approach is based on Kodaly's rhythmic syllable theory and Piaget's child cognition and Bloom's taxonomy (C1 and C2).

RQ2: Using qualitative methods with an observation, interview and literature study approach, this research focused on creating rhythmic flashcards designed based on early childhood cognitive needs. Researchers conducted validation through field tests on students and direct observation of children's responses to using flashcards.

RQ3: Results show that rhythmic flashcards can improve children's focus, engagement, and understanding of tempo and beat. Children feel more comfortable because the rhythmic symbols are associated with fruit names, which are familiar and easy to understand. The learning process also becomes fun and motivates children to be more active.

2. Designing a Notation Card Game Media to Improve the Ability to Read Rhythmic Music of 7th Grade Junior High School

Sella, Sukmayadi, & Fetrianggi (2024)

Abstract:
This study developed a rhythmic notation card game media to improve the ability to read rhythmic music of seventh grade junior high school students. Based on the 21st century learning approach and game-based learning, this media is designed to improve students' music literacy and motivation in understanding basic rhythmic notation.

Keywords: notation card, rhythm, music literacy, game-based learning, ADDIE
(Music & High, 2024)

RQ1: Flashcard media was developed in the form of a notation card game designed to improve rhythmic reading skills in grade VII students. The theory used refers to the needs of 21st century education that emphasizes basic music literacy, active learning, and game-based learning.

RQ2: This study used the R&D method with the ADDIE approach. In the development stage, the rhythmic cards were adjusted to the level of understanding of junior high school students. Validation was conducted by material experts and media experts, and trials were conducted in real classroom learning.

RQ3: The media is proven to improve rhythm reading ability, collaboration between students, and motivation to learn music. Students understand simple notation patterns such as crotchet, quaver and rest faster. Learning activities become more dynamic, competitive and interactive.

3. Media Flashcard Interaktif Berbasis Web sebagai Media Pembelajaran Musik Dasar

Adela (2022)

Abstract:
This research designs and develops web-based digital flashcard media for learning basic music theory. With interactive technology, students can learn notation, scales, and intervals flexibly and independently. The research emphasizes the importance of multimedia support in music education.

Keywords: digital flashcards, music theory, interactive media, educational technology, independent learning
(Musik et al., 2023)

RQ1: Digital flashcards are used as an interactive visual medium that can introduce basic music theory concepts such as scales, notation, and intervals in an easy and flexible way. This research emphasizes the role of technology in assisting students' independent learning process.

RQ2: This research utilizes the 4D model (Define, Design, Develop, Disseminate) R&D approach. Development was conducted digitally based on the web, allowing students

to access the material at any time. The feasibility test was conducted by involving material experts and digital learning media experts.

RQ3: The results show a significant increase in music theory learning outcomes, especially for students who study independently. Digital flashcards provide engaging visualization and user-friendly navigation, which helps improve concentration and learning efficiency.

4. Flashcard sebagai Media Pembelajaran Nilai Karakter dalam Pembelajaran Seni Musik Anak Usia Dini

Sulistyo, Wuryandani, & Sukamto (2023)

Abstract:

This study examines the use of flashcards in early childhood music learning to instill character values such as discipline, independence, and curiosity. Flashcards not only deliver cognitive material but also stimulate children's affective aspects through fun learning experiences.

Keywords: character values, music, early childhood, flashcards, character education

(Sulistyo et al., 2023)

RQ1: Flashcards not only serve as cognitive aids, but also as a tool to instill character values such as discipline, curiosity, and independence. Learning music with flashcards creates a learning situation that is structured, full of repetition, and activates children affectively.

RQ2: The method used was descriptive qualitative. Researchers conducted observations and interviews with PAUD teachers and students in music learning activities. Flashcards are designed to stimulate children's visual and verbal interaction.

RQ3: Children showed improvement in following the rules of playing music (discipline), learning to compose simple rhythm patterns independently (independence), and showing enthusiasm to explore the cards (curiosity). Teachers also found it helpful in delivering basic music materials.

5. Peningkatan Hasil Belajar Peserta Didik dalam Pembelajaran Seni Musik dengan Menerapkan Model PjBL Berbantuan Media Flashcard

Sabrina & Indrawati (2024)

Abstract:

This study examines the application of flashcard media in a project-based learning (PjBL) model in music learning. The aim is to increase student engagement in the music exploration process through visual media that support creative project activities.

Keywords: flashcards, PjBL, music learning, learning outcomes, music project

(1 , 2 1,2, 2024)

RQ1: Flashcards are used as a tool in the project-based learning (PjBL) model. They support the exploration of music notation and rhythm as part of the students' music project, strengthening critical and reflective thinking skills.

RQ2: This study used the Classroom Action Research (PTK) method in two cycles. Flashcards were used while students worked on the music making project. Data was collected through observation, student journals, and evaluation of project results.

RQ3: Results showed that flashcards improved student learning outcomes in both cognitive (mastery of music theory) and affective (enthusiasm, responsibility) aspects. Project activities became more focused because students were helped by visual media that guided them in the process of creating music.

6. Music Reading for Students with Learning Disabilities

Morrow (2023)

Abstract:

As a professional cello educator and certified dyslexia instructor, the author is often asked by music teachers to provide insight on how to help students who struggle with reading music. Through a survey of string teachers, it was found that music reading difficulties are a hidden problem with no research-based solutions. This study examines the challenges that students with dyslexia, ADHD and auditory processing disorder face

in reading music, as well as multisensory approaches that can help them overcome these barriers.

Keywords: dyslexia, music learning, learning difficulties, multisensory approach, reading music
(Morrow, 2023)

RQ1: Morrow examines the use of flashcards in music learning for students with learning disabilities such as dyslexia, ADHD and auditory processing disorder. Flashcards were developed based on structured and explicit multisensory (visual, auditory and kinesthetic) learning principles, similar to the Orton-Gillingham approach commonly used in literacy interventions. In the context of music, flashcards are used to strengthen the connection between the notation symbols and the sounds they produce, while addressing the limitations of short-term working memory. This is particularly important as students with learning disabilities often struggle to store and integrate information simultaneously.

RQ2: The approach used in this research is reflective and case study in nature, with direct application in music learning practice. Flashcards were introduced gradually starting from the most basic concepts, such as whole note and half note, accompanied by structured repetition exercises. The strategy is conducted in a small and intensive learning environment, with direct assistance from the teacher. This approach allows for individualized adaptation based on student ability and instant feedback on learning progress.

RQ3: The research findings show significant improvement in the ability to read notation and understand note duration for students with special needs. Students became more confident as the flashcards helped them to recognize the symbols and connect them with the real movements and sounds of the musical instruments. In addition, flashcards also helped reduce students' anxiety levels that usually arise in performance-based music learning.

7. The Role of Digital Flashcards in Legal Education: Theory and Potential

Stephen Colbran, Anthony Gilding, & Samuel Colbran (2014)

Abstracts:
This article describes, evaluates and reflects on the potential use of digital flashcards in legal education, both in traditional digitally expressed formats and interactive flashcards that utilize rich media and Web 2.0 technologies. A taxonomy of digital flashcards is developed along with a discussion of how they can be used in legal education. An analysis of the position of digital flashcards within the HoTel, Biggs and Tang SOLO, and Atkinson SOLE learning theory frameworks is presented. A free cloud-based flashcard tool, FlashCram, is introduced that allows easy assembly and sharing of digital flashcards. The article concludes by showing how traditional flashcards can be transformed into useful tools in legal education in the digital age.

Keywords: digital flashcards, legal education, learning technology, Web 2.0, FlashCram
(Colbran et al., 2014)

RQ1: Although not from the field of music, this article discusses in depth the theoretical use of digital flashcards with cross-disciplinary applications. Digital flashcards are based on theories of constructivism and active cognitive processing. In music learning, these concepts are relevant as they allow students to build understanding from visual, auditory and interactive associations. Digital flashcards are enriched with multimedia features (images, sounds, animations) that can represent musical concepts dynamically, such as sounding rhythm examples when symbols are selected.

RQ2: The methodological approach is conceptual and based on the development of technological systems. This research developed a platform called FlashCram, which allows users to create, share and access different types of flashcards. Categories such as "case cards" or "problem cards" are tailored to active learning needs, which in the context of music can be developed into "note cards," "rhythm cards," or "chord challenge cards."

RQ3: The results show that digital flashcards encourage collaboration, independent learning, and student participation. In the context of music, their use opens up technology-based self-directed learning opportunities with flexible interfaces. Their potential lies in their adaptive ability to adjust difficulty to the user's ability, making them ideal for individualized and repeated practice-based music theory instruction.

8. Pemanfaatan Media Pembelajaran Flashcard untuk Meningkatkan Hasil Belajar Mata Pelajaran IPS Materi Alat Musik Tradisional Indonesia

M.D. Natalia & L.H. Susarno (2015)

Abstract:

This study aims to improve the learning process by using flashcard media. This research is a classroom action research conducted in two cycles. The subjects of this study were fifth grade students of SDN Balongsari 7 Mojokerto. The results showed that the use of flashcards media can improve student learning outcomes in social studies subject matter of traditional Indonesian musical instruments.

Keywords: flashcards, social studies learning, traditional musical instruments, learning outcomes, elementary school students

(Natalia & Susarno, 2015)

RQ1: This study focuses on the use of flashcards to improve primary school students' learning outcomes on traditional musical instruments. Although the context is social studies, the material covered is closely related to music and the skill of recognizing musical instruments. The theory used emphasizes that visual learning is more effective for early learners, as visual information is easier to digest and remember than verbal. Flashcards become a medium for symbolic and concrete representations simultaneously.

RQ2: The method used was a quantitative experiment with a Pretest-Posttest Control Group design. The study involved two groups of students: one using flashcards, and the other not. The flashcards contained pictures of musical instruments, the name of the region of origin, as well as the function and how to play the instrument. Evaluation was conducted using a statistical test (t-test) to measure the effectiveness of improving learning outcomes.

RQ3: Results showed significant improvement in the experimental group compared to the control group. Flashcards were shown to speed up the identification process of musical instruments and increase student participation. Learning became more enjoyable, students were more motivated to learn, and classroom interaction improved as the flashcard activity encouraged discussion and engagement.

5. Conclusions

Based on the results of the *Systematic Literature Review of* eight articles that discuss the use of flashcards in music learning, it is found that flashcards play a strategic role in improving the understanding of musical concepts, rhythmic literacy, as well as the development of character values and learning motivation of students from early to secondary levels. The use of flashcards has consistently shown effectiveness in simplifying complex material such as rhythmic notation, scales and musical structures into concrete, interactive and familiar visual forms for learners.

Theoretically, the approach used is rooted in cognitive learning theory (Piaget, Bloom), multisensory theory, constructivism, and *game-based learning* that allows students to be actively involved in the learning process. Flashcards, both in conventional and digital form, not only support the improvement of cognitive aspects such as the ability to read notation and understand music theory, but also affective aspects such as self-confidence, motivation, discipline, and curiosity. Flashcards provide a link between individual musical experience and a communicative, reflective and collaborative learning environment.

Furthermore, research shows that the integration of flashcards in learning models such as *Project-Based Learning (PjBL)* and digital technology (web-based, multimedia) expands access to learning and enables personalization of music learning, including for students with special needs such as dyslexia or auditory processing disorder. These results confirm that flashcards are not just visual aids, but holistic pedagogical media that are adaptive, efficient and can accommodate various learning styles.

Thus, flashcards have a significant contribution to improving meaningful music learning outcomes, both in the context of formal classroom learning and in the context of independent and inclusive learning. The implementation of this media is recommended to be continuously developed as technology advances and the needs of music learning become more complex.

As a follow-up to the findings in this literature, it is recommended to develop Augmented Reality (AR)-based music flashcards as an innovation in music learning at the senior high school level. AR-based flashcards allow the integration of visual, audio and interactive elements in real-time through mobile devices, which can enrich students' learning experience in understanding music theory such as note shapes, pitch values, scales and rhythmic structures more immersively. The application of AR is also in line with the characteristics of the digital-native generation at the high school level, who tend to be responsive to visual media and interactive technology. By incorporating AR technology, music flashcards can be enhanced not only as a visual aid, but also as a contextual, flexible and fun means of musical exploration. This innovation is expected to be able to answer the challenges of music learning in the digital era and support the creation of meaningful, collaborative, and future technology-based learning.

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