International Journal of Social Learning
April 2026, Vol. 6 (2), 526-540
e-ISSN 2774-4426 and p-ISSN 2774-8359
DOI: https://doi.org/10.47134/ijsl.v6i2.545

MIDI-Based Music Dynamics Learning: A Strategy to Improve Expression and Musical Sensitivity of Third Grade Elementary School Students Pedagogia

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ABSTRACT

Music education in elementary schools plays an essential role in nurturing students' musical sensitivity and vocal expressiveness. However, initial observations of third-grade students at Pedagogia Elementary School showed that singing activities were conducted without accompaniment or expressive guidance, resulting in flat, monotonous performances. This study investigates the effect of a Musical Instrument Digital Interface/MIDI-assisted music-dynamics learning strategy on vocal expression and musical awareness. Using a descriptive quantitative approach with a one-group pretest–posttest design, the study involved 25 third-grade students who learned dynamic markings such as forte, piano, crescendo, and decrescendo supported by MIDI tracks. Data were collected through observation sheets, vocal performance rubrics, and field notes. The findings reveal significant improvements in articulation clarity, in the accuracy of applying dynamic symbols, and in the liveliness of facial expressions. Overall, the results demonstrate that integrating MIDI technology can effectively strengthen expressive singing skills and enrich musical learning experiences in elementary education for young learners.

***Keywords*:**

Musical Dynamics; Vocal Expression; Musical Sensitivity; MIDI; Elementary Music Education.

ABSTRAK

Pendidikan musik di sekolah dasar memainkan peran penting dalam menumbuhkan kepekaan musik dan ekspresivitas vokal siswa. Namun, pengamatan awal terhadap siswa kelas tiga di Sekolah Dasar Pedagogia menunjukkan bahwa kegiatan menyanyi dilakukan tanpa iringan atau

Submitted: 2025-09-24; Accepted: 2026-02-04; Published: 2026-04-28
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bimbingan ekspresif, sehingga menghasilkan penampilan yang datar dan monoton. Studi ini menyelidiki pengaruh strategi pembelajaran dinamika musik yang dibantu oleh Musical Instrument Digital Interface/MIDI terhadap ekspresi vokal dan kesadaran musik. Menggunakan pendekatan kuantitatif deskriptif dengan desain pretest-posttest satu kelompok, studi ini melibatkan 25 siswa kelas tiga yang mempelajari penandaan dinamika seperti forte, piano, crescendo, dan decrescendo yang didukung oleh trek MIDI. Data dikumpulkan melalui lembar observasi, rubrik penampilan vokal, dan catatan lapangan. Temuan menunjukkan peningkatan signifikan dalam kejelasan artikulasi, dalam ketepatan penerapan simbol dinamika, dan dalam ekspresi wajah yang lebih hidup. Secara keseluruhan, hasil menunjukkan bahwa integrasi teknologi MIDI dapat secara efektif memperkuat keterampilan menyanyi ekspresif dan memperkaya pengalaman belajar musik di pendidikan dasar untuk anak-anak usia dini.

***Kata kunci*:**

Dinamika Musik; Ekspresi Vokal; Sensitivitas Musik; MIDI; Pendidikan Musik Dasar.

1. Introduction

Music education at the elementary school level is crucial for shaping students' overall personalities, fostering aesthetic sensitivity, helping them express emotions, and helping them appreciate cultural values (Hendriks et al., 2023). Music serves both as entertainment and as a profound educational tool. Hallam et al. (2012) demonstrates that musical experiences support children's affective, linguistic, and cognitive development, with singing among the most common musical activities in elementary education. Through this vocal activity, children practice breathing and articulation techniques and develop their musical sense, namely, the ability to recognize, feel, and respond to basic musical elements such as rhythm, melody, and dynamics. This is as stated by Campbell & Scott-Kassner (2019), who explain that children's musical development is inseparable from the development of aesthetic empathy and active listening skills internalized through singing practice.

However, implementing music education in various elementary schools in Indonesia still faces several challenges (Rahmawati e t al., 2026). One of these problems was evident in the author's observations conducted in the even semester of the 2024/2025 academic year at the Elementary School of Pedagogia, particularly in grade III. During a learning session to sing the children's song "Selalu Ada di Nadimu" (Jumbo soundtrack), the teaching method was traditional, with students invited to sing along without support from digital media or technical guidance on the song's dynamics. Liu et al. (2025) Report that digital tools can substantially improve elementary students' musical engagement, understanding, and learning outcomes. Of the 25 students who participated in the lesson, 18 (72%) sang the song with flat intonation, without any volume or pitch variation, indicating a lack of musical interpretation. This phenomenon suggests that aspects of musical expression, particularly

the understanding and application of dynamics, have not been a primary focus in the learning implemented.

This situation highlights a clear research problem: many elementary students are unable to demonstrate expressive vocal interpretation because music lessons rely heavily on conventional singing methods that do not introduce dynamic markings or provide supportive digital media (Biasutti, et al., 2022). Within the Pedagogia Elementary School framework, the insufficient integration of technology and the absence of explicit instruction on musical dynamics have led to reduced expressiveness and diminished musical sensitivity among third-grade students.

The selection of Pedagogia Elementary School as the research site is rooted in preliminary findings indicating a consistent disparity between the anticipated expressive vocal abilities and students' actual performance. The school's consistent use of traditional teaching practices, combined with minimal exposure to digital music tools, makes it an appropriate setting to investigate the impact of a more innovative learning approach (Liñares et al., 2023).

This situation indicates that the music learning process is still dominated by a mechanical approach that only emphasizes memorization of lyrics and pitch accuracy. However, this approach does not foster a meaningful musical experience. Recent studies indicate that technology-enhanced music learning environments support students' creativity and expressive abilities when digital tools are effectively integrated into student-centered instructional practices in contemporary music education contexts (Cheng et al., 2023). According to Bruner (1977), in his pedagogical theory, a quality learning experience must be comprehensive and emphasize students' active involvement in understanding the structure and meaning of the object being studied. This perspective aligns with recent developments in digital music education, where technology is increasingly viewed as a means to broaden how both students and teachers develop musical abilities (Gül, 2023). Ma & Wang (2025) argue that emerging technologies are transforming the ways musical abilities are developed and practiced in contemporary music education contexts. Supporting this view, Cuervo et al. (2023) reported that incorporating digital tools into music teacher education through service learning can strengthen teachers' digital competence and enrich students' overall learning experiences. In music learning, understanding musical structure encompasses aspects of pitch and rhythm, as well as how a song can be "*dihidupkan*" through dynamics and expression.

One reason for students' limited musical expression is the lack of supporting learning materials. Digital technologies in music learning environments have been found to enhance student engagement while promoting greater creative participation in musical activities (Topal et al., 2023). More broadly, the use of technology in music education has been found to open new opportunities for flexible practice, creativity, and learner-centered approaches, while still presenting challenges related to teacher preparedness and equitable access (Maharaj & Gill, 2023). Ouyang (2023) reported that mobile learning through the ChordIQ application significantly enhanced students' performance in music education, particularly in mastering solfeggio. The song "Selalu Ada di Nadimu" was presented without digital musical support, such as MIDI (Musical Instrument Digital Interface), even though such technologies have the potential to enrich music learning experiences (Crawford, 2017). Kersten (2004) also notes that MIDI accompaniments can provide flexible, high-quality backing tracks for vocal and instrumental activities, enabling students to practice independently in school and at home.

Pereira et al. (2022) explain that employing MIDI resources in music education can be beneficial for developing knowledge connected with digital and modern technologies and improving traditionally pursued music competencies. This strengthens the argument that MIDI is an entertainment medium and a pedagogical tool that can improve students' musical competence, including theory, analysis, and sensitivity to sound color (timbre). In line with this, Shen & Wu, (2023) explain that, through MIDI technology, students can intuitively see symbols, melodies, intervals, and other musical elements, and deepen their understanding of music theory and practice by combining actual instrument performance with arrangement (Park, 2025). This quote emphasizes that MIDI can facilitate students to understand musical symbols and structures visually and practically. Thus, this media helps teachers convey solfeggio theory and strengthens the integration of singing theory and practice.

MIDI allows teachers to present songs with various tempos, dynamics, and timbres, providing students with a more contextual and expressive listening experience. Shen & Wu (2023) explain that, through MIDI technology, students can intuitively see symbols, melodies, intervals, and other musical elements, and deepen their understanding of music theory and practice by combining actual instrument performance with arrangement. This quote emphasizes that MIDI can facilitate students' visual and practical knowledge of musical symbols and structures. Therefore, this medium not only assists teachers in conveying Solfeggio theory but also enhances the integration of singing theory and practice. These benefits align with evidence that digital music tools expand students' creative and interpretative musical experiences. In this regard, using MIDI can bridge students' understanding and their ability to imitate dynamic changes in music. In their research, Crawford (2017) demonstrated that technology-enhanced music learning environments strengthen students' understanding of musical structures and expressive concepts. Similarly, studies show that technology-based music tools enhance students' understanding of musical concepts and reinforce the role of digital media in improving their knowledge of dynamics (Liu, Zhang, & Wong, 2025).

Musical dynamics are a crucial element in shaping the integrity of musical expression. This element encompasses changes in vocal strength, such as crescendo (increasing intensity), decrescendo (decreasing intensity), forte (loud), and piano (soft). The application of dynamics allows students to convey the emotional nuances of a song, making their singing more lively and communicative. Without dynamics, a song would sound stiff and lose its expressive character. Meissner & Timmers (2020) found that dialogic teaching and modeling can help young musicians become more aware of musical meaning and improve their expressive performance.

The theoretical framework of music education emphasizes that meaningful learning must be grounded in aesthetic experiences involving feeling, empathy, and personal interpretation of musical works (Silverman, 2020). Therefore, learning dynamics serves not only as technical training but also as an effort to shape students' emotional sensitivity to the song's musical meaning. Similarly, M. Hakanpää et al., (2023) found that voice-quality training enhanced singers' emotional expression, indicating that focused vocal training can improve expressive performance in singing. This statement demonstrates that vocal instruction emphasizing performative details, including dynamics, can help elementary school students exhibit more vivid musical expression. With MIDI as an aid, this training can be more focused because students receive concrete examples of dynamic changes to imitate.

Similar benefits have been reported through the use of digital music technologies in education, enhancing students' creative cognition and aspects of musical self-efficacy (Ma & Wang, 2025).

As a follow-up to the problems identified in the initial observation, the teacher began implementing a dynamic-based learning strategy, supported by MIDI media as accompaniment for songs. In this stage, students were introduced to fundamental dynamics concepts through verbal explanations, audio examples, and vocal exercises, with MIDI as an aid. The results of the re-evaluation showed quite significant changes. Of the 25 students who participated in the follow-up learning, 20 (80%) began to identify and practice dynamics such as forte and piano when singing the song “Selalu Ada di Nadimu”. Moreover, students appeared more enthusiastic about participating in the learning, and their singing sounded more expressive, with volume variation that showed appreciation for the lyrics and melody. This learning strategy is in accordance with what has been stated in previous studies (Liu, Zhang, & Wong, 2025), who found that teachers who use digital devices during music lessons achieve better results in attitudes towards the use of digital devices and digital educational content in Music Culture lessons. The findings confirm that teacher readiness to utilize digital media, including MIDI, positively impacts music learning outcomes. Fernández et al. (2021) emphasize that teachers’ digital competence strongly determines the success of technology-supported music lessons. In other words, technology integration benefits students and enhances teachers’ pedagogical quality in presenting music learning that is relevant to current developments.

Teachers who can deliver contextual and multimodal learning have been shown to create more meaningful and relevant music learning experiences. Furthermore, previous studies have highlighted that digital technologies can foster student motivation and active engagement in music learning environments (Beirnes, 2022). However, studies on using MIDI to develop vocal expression through dynamics mastery at the elementary school level are still limited. This indicates a crucial research gap that needs to be addressed, particularly in music learning in Indonesia, where current efforts encourage integrating aesthetic values with digital literacy.

This condition highlights a research gap: the limited number of studies that investigate the integration of MIDI technology to enhance vocal expression and musical dynamics mastery among elementary school students. While prior studies emphasize the influence of digital media on motivation and music appreciation, limited studies have investigated its direct effects on expressive vocal performance and dynamic sensitivity.

Given these issues, the present study aims to analyze the effectiveness of a MIDI-assisted music-dynamics learning strategy in improving vocal expression and musical sensitivity among third-grade students at Pedagogia Elementary School. This purpose is based on the need to address the deficiency in expressive singing abilities and the restricted use of musical dynamics revealed in the initial findings. This scenario suggests that music education remains largely mechanical, emphasizing memorization and pitch accuracy, while research indicates that digital technologies expand opportunities for student-centered, creative, and innovative music learning (Beirnes, 2022).

The main research question addressed in this study is: How does MIDI-assisted music-dynamics learning influence the development of vocal expression and musical sensitivity in third-grade students at Pedagogia Elementary School?

2. Methods

2.1. Research Design

This study adopted a descriptive, quantitative methodology to objectively assess the impact of MIDI-assisted music-dynamics learning methodologies on voice expression and musical sensitivity among elementary school students. The one-group pretest-posttest approach was used as it facilitates direct assessment of alterations in student performance before and after treatment. Hallam et al. (2012) emphasizes that effective music instruction requires guided exploration, active engagement in performance, and reflective practice.

2.2 Population and Sample

The population of this survey comprised third-grade students at Pedagogia Elementary School during the even semester of the 2024/2025 academic year. A total of 25 students were chosen as the sample through purposive sampling, based on their previous exposure to conventional singing instruction that lacked expressive and dynamic guidance. They were assigned to the intervention group.

2.3 Variables of the Study

The study focused on two primary variables:

2.3.1 The independent variable: the MIDI-assisted musical dynamics learning strategy.
2.3.2 The dependent variable: students' vocal expression and musical sensitivity, assessed by the precision in executing dynamic markings (forte, piano, crescendo, decrescendo) in singing.

2.4 Instruments

Three instruments were employed for data collection:

2.4.1 Observation sheets, utilized to evaluate students' application of musical dynamics during singing activities, both prior to and following the intervention.
2.4.2 Vocal performance assessment rubrics, encompassing indicators such as variation in volume, transitions in sound intensity, precise application of dynamics, and facial expressions.
2.4.3 Field notes are utilized to record student behavior, emotional reactions, and the overall classroom environment throughout the learning experience.

The instrument was designed in accordance with Campbell & Scott-Kassner (2019) music pedagogy theory, which was subsequently validated by expert assessors comprising music lecturers and seasoned arts educators.

2.5 Data Collection Procedure

The research was conducted in three stages:

2.5.1 Pre-learning Stage (Pretest)

Students sang the song “Selalu Ada di Nadimu” without MIDI accompaniment and without explicit instruction on expressive elements or dynamics. Their performance served as the baseline data.

2.5.2 Treatment Stage

Students received learning materials on musical dynamics through explanations, demonstrations, and interactive singing practice. MIDI accompaniment was used to provide audible examples of dynamic changes. Students practiced vocal expression by integrating dynamic symbols into their performance.

2.5.3 Post-learning Stage (Posttest)

Students performed the same song again, incorporating dynamics and MIDI accompaniment. Their performance was evaluated to assess improvements in expression and musical sensitivity.

2.6 Data Analysis Techniques

The data were analyzed using quantitative descriptive statistical methods. Student scores were converted into percentages to facilitate comparison of pretest and posttest performance across three indicators: vocal expression, application of dynamics, and facial expression. Qualitative data from field notes were used to enhance the interpretation of the quantitative findings and to document observable behavioral changes throughout the learning process.

This combined quantitative–qualitative interpretation ensures a more holistic understanding of how MIDI-assisted dynamics learning influences students' musical outcomes.

3. Results and Discussion

3.1 Results

This study aims to assess the effectiveness of MIDI-assisted music-dynamics learning strategies in improving third-grade students' vocal expression and musical sensitivity at Pedagogia Elementary School. Assessment was conducted using observation sheets and a vocal performance assessment rubric covering three main aspects: vocal expression, the ability to apply musical dynamic signs, and facial expressions or musical affect. This study used a pretest–posttest design on one group of students as subjects.

In the initial stage (pre-learning), students sang the song "Selalu Ada di Nadimu" together without digital music accompaniment or dynamic guidance. Observations show that most students were unable to display varied vocal expressions. Vocals sounded flat and monotonous, without changes in volume or pitch emphasis. This was reflected in the average scores students achieved in these three aspects. The results of the pretest are shown below. The results of the pretest and posttest are presented in Table 1.

Table 1. result pre-test and post-test

Indicator	Pre-test (%)	Post-test (%)
Vocal Expression	40%	76%
Application of Music Dynamics	32%	80%
Facial expressions	36%	84%

The data in Table 1 indicate a substantial improvement across all three assessed indicators after the implementation of MIDI-assisted dynamics learning. Vocal expression increased by 36 percentage points, the implementation of musical dynamics rose by 48 percentage points, and facial expression improved by 48 percentage points. These enhancements illustrate that students not only acquired technical proficiency in dynamic signs but also demonstrated more expressive, emotionally resonant singing.

To ensure alignment with the research objectives, these results clearly demonstrate measurable improvements in expressive performance, technical application of dynamics, and affective facial engagement, confirming that the intervention produced positive, quantifiable learning outcomes. After being taught musical dynamics using MIDI, students showed significant improvements. They began to understand dynamic markings such as forte, piano, crescendo, and decrescendo, and could apply them simply in their vocal practice. The learning was conducted through a participatory approach, in which the teacher provided audio examples, demonstrated vocal expression, and facilitated repetitive vocal practice with MIDI accompaniment.

In the posttest, students were asked to re-sing the song “Selalu Ada di Nadimu” using dynamics and MIDI accompaniment. Evaluation results show an increase in average scores across all three assessment aspects. Thus, there is a 36% increase in vocal expression, a 48% increase in dynamics, and a 48% increase in facial expression. Overall, students demonstrated improved musical and emotional interpretation of the song.

These results collectively affirm that the MIDI-assisted dynamics learning approach had a substantial positive impact on students' musical sensitivity and expressive singing capabilities, aligning with the study's objectives.

3.2 Discussion

After the MIDI-assisted dynamics learning was applied, students demonstrated clear improvements in their musical expression. These enhancements were visible not only in their numerical scores but also in their performance behavior during singing activities. These findings directly address the research question by showing that MIDI-supported instruction enhances vocal expression and musical acuity among elementary students. To illustrate these differences, this study included a set of photographs documenting the pre-test and post-test sessions.

Picture 1. Pre-test: Students Singing Without MIDI Accompaniment

In Picture 1, students are seen performing the song without dynamic guidance or MIDI accompaniment. They don't seem to vary their voice delivery at all. The majority of students show little emotion and little interest in the musical material. This visual evidence aligns with the low pre-test scores recorded across the three indicators, reinforcing the observation that students had not yet developed sensitivity to musical dynamics.

Picture 2. Post-test: Student Singing With MIDI-Assisted Dynamics Learning

Picture 2 illustrates students during the post-test session, where MIDI accompaniment and explicit instruction on dynamics had already been applied. Compared to the pre-test session, students show clearer articulation of dynamic markings, with softer delivery in piano sections and greater intensity in forte sections. Their facial expressions also indicate stronger emotional involvement, aligning with the quantitative results indicating an improvement in expressive performance.

Taken together, Pictures 1 and 2 visually support the effectiveness of the MIDI-assisted learning strategy. The differences between the pre-test and post-test performances reinforce the interpretation that the intervention enhanced not only students' technical accuracy but also their emotional connection to the music. Thus, the photo series provides qualitative evidence that complements and strengthens the earlier statistical findings.

The significant improvement in students' learning outcomes in musical expression demonstrates the positive impact of MIDI-enabled music-dynamics learning strategies (Mohammadian et al., 2026). This reinforces the assumption that music instruction emphasizing memorization, pitch accuracy, and elements of expression and technology can broaden elementary school students' musical experiences. In particular, the consistent upward trend across all indicators underscores the efficacy of combining technology with vocal pedagogy.

3.2.1 Contextual and Meaningful Music Learning

The success of the learning process in this study is inseparable from the contextual approach applied. The teacher conveyed theories of musical dynamics and connected them to concrete experiences through singing and listening. In arts learning, context is crucial, so students memorize musical symbols and experience their function and meaning. This aligns with Campbell & Scott-Kassner (2019) findings that state that elementary school children's musical experiences will be more meaningful when emotional and contextual engagement taps into musical affection and empathy.

The results of this study further reinforce this theoretical perspective, as the observed enhancements in expressive performance indicate that contextual instruction augmented by technological instruments, such as MIDI, can promote a deeper emotional and musical comprehension among young learners. These findings align with the extensive body of research on technology-assisted collaborative creativity, emphasizing that digital platforms for collective music-making can enhance engagement and facilitate creative interaction among learners (Gündoğdu & Merç, 2022).

3.2.2 The Influence of MIDI Media on the Development of Musical Sensitivity

One key factor in the success of this learning process is the integration of MIDI media. With MIDI, teachers can adjust tempo, volume, and accompanying instruments and provide varied examples of dynamics. Students can also hear the song's structure more fully, not just the melody without accompaniment. MIDI is a tool that can illustrate musical structure more concretely and engage students, especially in understanding changes in sound intensity and timbre. Kang & Yoo (2021) show that virtual instruments offer expressive, culturally immersive, and interactive opportunities for musical performance within educational settings.

According to Shen & Wu, (2023) MIDI, as part of digital music technology, has strong potential to support students' musical sensitivity by applying it in solfeggio and ear-training to help them recognize musical notes more effectively. In this learning, MIDI's role is as a static accompaniment and an interactive medium that provides space for musical exploration.

The substantial 48% rise in dynamic application observed in this study corroborates their findings. It illustrates that MIDI actively facilitates students' perception and implementation of expressive elements, affirming MIDI's pedagogical significance beyond simple accompaniment.

3.2.3 Formation of Vocal Expression and Emotion Through Dynamics

Applying dynamic symbols such as forte, piano, and crescendo improves students' technical abilities and strengthens their emotional expression when singing. Musical dynamics are crucial in conveying a song's message and meaning. A song sung with a single, unvaried timbre will sound stiff and lifeless. Therefore, learning strategies emphasizing dynamics can help students channel their musical expression more personally.

Reimer (2003) the theory of musical expression holds that emotional engagement with music is at the heart of meaningful arts education. Music is not simply a structure of notes, but also a means of conveying feelings, empathy, and imagination. This is reflected in the changes in the students' facial expressions in this study. Initially, they appeared passive and flat, but as the lesson progressed, they began to exhibit facial expressions reflecting feelings of joy, sadness, or enthusiasm, depending on the song's character. Such improvements are consistent with findings that targeted training on expressive details can enhance emotional communication in children's singing (Hakanpää et al. 2021). Similarly, research indicates that dialogic teaching combined with teacher modeling effectively enhances expressive performance among young musicians (Meissner & Timmers, 2020). Juntunen & Nikkanen (2023) conceptualize vocal expression as an embodied process that encompasses gesture, respiration, and emotional transmission.

These observations unequivocally illustrate that MIDI-assisted dynamics learning enhances not only technical proficiency but also fosters students' emotional engagement, filling a void in existing research that typically emphasizes motivation or cognitive results alone.

3.2.4 Increasing Participation and Enthusiasm for Learning

In addition to improving observation scores, learning positively impacted student engagement. Many previously passive students became more active, asking questions and practicing dynamics. Teachers noted that during practice sessions, students were enthusiastic about repeating songs at varying volumes and pressures. The use of digital-based learning media, such as digital storytelling, has been shown to improve students' listening skills and learning effectiveness in music education, contributing to the development of music appreciation (Hadi et al., 2023).

In the field notes, the teacher noted that several students spontaneously preferred singing with MIDI accompaniment to singing without it. They felt like they were performing on stage or singing with an orchestra. This indicates an increased affective musical appreciation, reflecting successful learning from cognitive, psychomotor, and affective perspectives.

This study adds new evidence that increased engagement is directly linked to improvements in expressive competencies, demonstrating a deeper level of learning than reported in previous motivation-focused studies. Supporting this perspective, Popular music pedagogies can support students' 21st-century skills by encouraging critical thinking, collaborative problem solving, and effective use of technology and media (Vasil et al., 2019)

3.2.5 Relevance to the Curriculum and Development of 21st Century Competencies

The findings of this study are relevant to the principles of the Merdeka Belajar curriculum, which emphasizes interest-based learning, expression, and character. Musical sensitivity, creativity, and self-expression are 21st-century competencies that must be developed early. In line with this, research shows that technology-enhanced music learning environments promote higher levels of creative thinking and problem solving (Ma & Wang, 2025). Beyond contexts solely related to music, Biasutti (2018) demonstrates that digital collaborative environments promote creativity and facilitate interactive learning.

Music arts instruction cannot simply emphasize the reproduction or imitation of songs; it must also provide opportunities for students to interpret and express themselves through sound. Supporting this perspective, Vasil et al. (2019) demonstrates that popular music pedagogies, frequently facilitated

by digital technologies, have the potential to foster collaboration, communication, and creativity as essential 21st-century skills within school music education (Weatherly et al., 2026).

Singing the song “Selalu Ada di Nadimu” using a dynamic approach and digital media allows students to become performers and interpreters of works of art. According to Bruner (1977) this aligns with the goal of arts education: for students to comprehensively understand the structure and meaning of learning materials through active and reflective thinking. In accordance with this perspective, research shows that arts integration supported by digital technologies enhances creativity and fosters essential twenty-first-century skills among students in primary education (Henriksen et al., 2021).

4. Conclusion

Based on the research findings, it can be concluded that the MIDI-assisted music dynamics learning strategy effectively enhances vocal expression and musical sensitivity among third-grade students at Pedagogia Elementary School. The intervention facilitated students in exhibiting more precise articulation, enhanced dynamic application, and greater emotional engagement, aligning with the substantial improvements observed across all measured indicators. These results corroborate that MIDI-supported instruction effectively improves both the technical proficiency and expressive quality of children's singing, thereby addressing the initial issue of flat and monotonous performances observed during the preliminary assessment.

Furthermore, the study offers significant insights into the pedagogical function of MIDI within elementary music education. Aligned with the discussion, the findings show that MIDI functions not only as accompaniment but also as a meaningful instructional tool that supports contextual learning, deepens musical interpretation, and promotes aesthetic engagement, as evidenced by comparisons with previous studies. This study emphasizes the precise impact of MIDI on students' mastery of vocal dynamics. This area is still understudied in the context of Indonesian elementary schools, in contrast to other research that has mostly focused on motivation or general involvement. Given the limited research on MIDI's impact on expressive vocal development at the elementary level, this study provides valuable evidence supporting its incorporation into classroom practice. Future research could examine the long-term effects of MIDI-assisted learning on a broader range of musical skills and evaluate its adaptability across diverse educational settings and grade levels.

Acknowledgements

With respect and gratitude, the author sincerely thanks the entire Pedagogia Elementary School family, especially the principal, third-grade teachers, and students, who graciously welcomed him throughout the observation and research process. The students’ enthusiasm and eagerness to learn were powerful inspirations for this article.

The author also expresses his gratitude to the supervising lecturers and colleagues in the Arts Education study program for their ongoing support, input, and encouragement. Furthermore, he also expresses his appreciation to the instrument validation team and those who assisted in developing the MIDI media, which enabled more engaging and meaningful learning for students.

Finally, the author hopes that this simple work can make a real contribution to the development of music arts learning in elementary schools and become part of a collective effort to form a generation that is sensitive, expressive, and loves art.

5. References

Beirnes, S. (2022). Learner-Centered Pedagogy and Student Engagement in a Virtual Elementary Instrumental Music Program. *International Journal of Music Education, 40*(4). https://doi.org/10.1177/02557614221074378.

Biasutti, M. (2018). Strategies Adopted During Collaborative Online Music Composition. *Journal of Computer Assisted Learning, 34*(3), 243–253. https://doi.org/10.1177/0255761417741520.

Biasutti, M., Philippe, R. A., & Schiavio, A. (2022). Assessing Teachers' Perspectives on Giving Music Lessons Remotely During the COVID-19 Lockdown Period. *Musicae Scientiae, 26*(3), 585–603. https://doi.org/10.1177/1029864921996033.

Bruner, J. S. (1977). *The Process of Education*. Cambridge: Harvard University Press.

Campbell, P. S., & Scott-Kassner, C. (2019). *Music in Childhood: from Preschool through the Elementary Grades (4th ed)*. Boston: Cengage Learning.

Cheng, L., Lam, C. Y., & Leung, C. H. (2023). Digital Competencies of Music Teachers Under the 'New Normal' in Hong Kong. *International Journal of Music Education, 42*(4). https://doi.org/10.1177/02557614231186413.

Crawford, R. (2017). Rethinking Teaching and Learning Pedagogy for Education in the Twenty-First Century: Blended Learning in Music Education. *Music Education Research, 19*(2), 195–213. https://doi.org/10.1080/14613808.2016.1202223.

Cuervo, L., Bonastre, C., Camilli, C., Arroyo, D., & García, D. (2023). Digital Competences in Teacher Training and Music Education Via Service Learning: A Mixed-Method Research Project. *Education Sciences, 13*(5), 459. https://doi.org/10.3390/educsci13050459.

Fernández, I. D. G., Anguita J. M., Fernández, R. D. L. H., & Garrido, D. C. (2021). Digital Competence and the Use of Technological Resources by Teachers in Music Conservatories and Schools of Music. *Música Hodie, 21*. https://doi.org/10.5216/mh.v21.69145.

Gül, G. (2023). Use of Technology-Supported Educational Tools in General Music Education and Its Contribution to the Process of Music Education. *Acta Educationis Generalis, 13*(2), 63–81. https://doi.org/10.2478/atd-2023-0014.

Gündoğdu, O., & Merç, A. (2022). A Systematic Review of Tech-Supported Collaborative Creativity Practices in the Field of Education. *Journal of Open Learning and Teacher Development, 10*(2), 45–68. https://doi.org/10.53850/joltida.953760.

Hadi, W. H., Ramadhani, R., Marini, A., Yarmi, G., Safitri, D., & Dewiyani, L. (2023). Digital Musical Storytelling to Enhance First-Grade Elementary School Students' Listening Skills. *Journal of Education Technology, 7*(2), 220–225. https://doi.org/10.23887/jet.v7i2.63167.

Hakanpää, M., Waaramaa, T., & Laukkanen, A. (2023). Voice-Quality Training Enhanced Singers' Emotional Expression: Focused Vocal Training Improves Expressive Performance in Singing. *Journal of Voice, 37*(2), 202–210. https://doi.org/10.1016/j.jvoice.2022.10.004.

Hakanpää, T., Laitinen, & Eerola, T., L. (2021). Training the Vocal Expression of Emotions in Singing: Effects of Including Acoustic Research-Based Elements in the Regular Singing Training of Acting Students. *Journal of Voice, 35*(6), 953.e1-953.e12. https://doi.org/10.1016/j.jvoice.2020.12.032.

Hallam, S., Rinta, T., Varvarigou, M., Creech, A., Papageorgi, I., Gomes, T., & Lanipekun, J. (2012). The Development of Practising Strategies in Young People. *Psychology of Music, 40*(5), 652–680. https://doi.org/10.1177/0305735612443868.

Hendriks, L. H., Steenbeek, H. W., Bisschop Boele, E. H., & van Geert, P. L. C. (2023). Promoting Creative Autonomy Support in School Music Education: An Intervention Study Targeting Interaction. *Frontiers in Education, 7*. https://doi.org/10.3389/feduc.2022.1102011.

Henriksen, D., Creely, E., Henderson, M., & Mishra, P. (2021). Creativity and Technology in Teaching and Learning: A Literature Review of the Uneasy Space of Implementation. *Educational Technology Research and Development, 69*(4), 2091–2108. https://doi.org/10.1007/s11423-020-09912-z.

Juntunen, M. L., & Nikkanen, H. (2023). Expression in Popular Music Singing as Embodied and Interpersonal. *Frontiers in Education, 8*, 1092736. https://doi.org/10.3389/feduc.2023.1092736.

Kang, S., & Yoo, H. (2021). Elementary Students' Music Compositions with Notation-Based Software and Handwritten Notation Assisted by Classroom Instruments. *Bulletin of the Council for Research in Music Education, 227*, 29–44. https://doi.org/10.5406/bulcouresmusedu.227.0029.

Kersten, F. (2004). Using MIDI Accompaniments for Music Learning at School and at Home. *Music Educators Journal, 90*(4), 17–21. https://doi.org/10.2307/3399998.

Liñares, T. C., Rodríguez, J. R., Rodríguez, M. C., & Suelvesc, D. M. (2023). Digital Didactic Resources and Music: Mapping the Last Decade of Research. Music Education Research, 25(4), 351–366. https://doi.org/10.1080/14613808.2023.2244520.

Liu, M., Zhang, & Wong, M. X. (2025). The Use and Effectiveness of Digital Tools in Elementary Music Education: A Systematic Review. *Research Studies in Music Education*. https://doi.org/10.1177/20592043251363338.

Ma, Y., & Wang, C. (2025). Empowering Music Education with Technology: A Bibliometric Perspective. *Humanities and Social Sciences Communications, 12*. https://doi.org/10.1057/s41599-025-04616-2.

Maharaj, S., & Gill, J. (2023). Technology in Music Education. *Canadian Journal of Learning and Technology, 49*(1), 1–25. https://doi.org/10.21432/cjlt28153.

Meissner, H., & Timmers, R. (2020). Young Musicians' Learning of Expressive Performance: The Importance of Dialogic Teaching and Modeling. *Frontiers in Education, 5*. https://doi.org/10.3389/feduc.2020.00011.

Mohammadian, R., Ardakani, S. P., & Zavaraki, E. Z. (2026). A Systematic Review of Technology-Enhanced Music Learning Models: Impacts on Music Education. *Computers & Education: Open*, 100354. https://doi.org/10.1016/j.caeo.2026.100354.

Ouyang, M. (2023). Employing Mobile Learning in Music Education. *Education and Information Technologies, 28,* 5241–5257. https://doi.org/10.1007/s10639-022-11353-5.

Park, E. J. (2025). Music Dynamics Visualization for Music Practice and Education. *Multimedia Tools and Applications, 84,* 36145–36161. https://doi.org/10.1007/s11042-025-20637-0.

Pereira, A. E., Borodina, D., Dias, P. A., Thi, D. D., Coelho, I. C. P., & Mészáros, G. (2022). MIDI in Formal Music Education: Reflections on the Application of MIDI-Oriented Tools in Teaching and Learning. *Journal of E-Learning Research, 1*(3), 44–60. https://doi.org/10.33422/jelr.v1i3.87.

Rahmawati, G., Abduljabar, B., & Rozak, R. W. A. (2026). Project-Based Learning in Music Education: A Scopus-Based Bibliometric Review of Research Trends and Intellectual Structure. *Journal Pedagogy, 13*(1), 266–277. https://doi.org/10.33394/jp.v13i1.19068.

Reimer, B. (2003). *A Philosophy of Music Education: Advancing the Vision (3rd ed.)*. New Jersey: Prentice Hall.

Shen, S., & Wu, K. (2023). Solfeggio Teaching Method Based on MIDI Technology in Digital Music Education. *International Journal of Web-Based Learning and Teaching Technologies, 18*(1), 1–15. https://doi.org/10.4018/IJWLTT.331085.

Silverman, M. (2020). Sense-Making, Meaningfulness, and Instrumental Music Education. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.00837.

Topal, A. D., Geçer, A. K., & Budak, E. O. (2023). The Effect of Using Digital Technology in the Music Education of Elementary School Students on Musical Achievement and Attitudes. *Education and Information Technologies, 28*, 10041–10060. https://doi.org/10.1007/s10639-022-11334-8.

Vasil, M., Weiss, L., & Powell, B. (2019). Popular Music Pedagogies: An Approach to Teaching 21st-Century Skills. *Journal of Music Teacher Education, 28*(3), 85–95. https://doi.org/10.1177/1057083718814454.

Weatherly, K. I. C. H., Wright, B., & Lee, E. Y. (2026). Digital Game–Based Learning in Music Education: A Systematic Review (2011–2023). *Journal of Music Education Research, 48*(1). https://doi.org/10.1177/1321103X241270819.