**JISIP (Jurnal Ilmu Sosial dan Pendidikan)**
Vol. 10 No. 2 Maret 2026
*e-ISSN : 2656-6753, p-ISSN: 2598-9944*
DOI: *10.36312/jisip.v10i1.10101/http://ejournal.mandalanursa.org/index.php/JISIP/index*

# Development of Interactive E-Modules Based on N-Track Studio to Improve Students' Digital Music Writing Competence

**Muhammad Ahsin Maulana[1], Hendro T.G. Samosir[2], Kristiani Natalina[3], Hidaka Hita Situmorang[4], Aghisna[5]**
Sendratasik Education Study Program, Faculty of Teacher Training and Education, University of Palangka Raya

**Article Info**
***Article history:***
Received: 26 December 2025
Publish: 30 January 2026

***Keywords:***
*E-module;*
*N-Track Studio;*
*Digital music composition;*
*DAW;*
*ADDIE.*

**Abstract**
*The transformation of music education in the digital age requires the integration of music theory and mastery of digital music writing technology. This study aims to develop an interactive e-module based on N-Track Studio as a learning medium for the Computer Music Writing course in the Performing Arts Education Study Program at the University of Palangka Raya. The method used is Research and Development (R&D) with the ADDIE model, which includes the stages of needs analysis, design, product development, implementation, and evaluation. The validation results by subject matter experts, language experts, and media experts obtained an average score of 83.3%, which was categorized as sufficiently valid. Field trials with 20 students showed an excellent response with an average score of 90%, in terms of ease of use, appearance, and learning effectiveness. The research results indicate that the N-Track Studio-based e-module is capable of improving students' understanding of digital music concepts and DAW-based music writing skills. Thus, this e-module is suitable for use as a learning medium and can be further developed in the context of other digital music learning.*



***Corresponding Author:***
**Muhammad Ahsin Maulana**
University of Palangka Raya
Email: ahsinmaulana07@fkip.upr.ac.id

## 1. INTRODUCTION

The development of digital technology over the past decade has fundamentally changed the paradigm of music education around the world, where the learning process no longer focuses solely on performativity, but also on the ability to produce, edit, and write music using digital devices (Giri, 2016). This transformation is in line with the global trend in modern music education, which emphasizes audio technology literacy as an important academic competency for both prospective educators and professional musicians (Ruthmann & Mantie, 2017). In Indonesia, the demand for mastery of digital music technology is growing stronger due to the needs of the creative job market and the increasing use of Digital Audio Workstations (DAW) in commercial and academic music production. Research shows that music technology students use DAWs not only as production tools but also as mediators of creative expression, and preferences for using various DAW platforms are influenced by technical, pedagogical, and creative factors in the context of music learning (Jaohari, Karyono, Sukmayadi, & Purwanto, 2025). In addition, DAWs such as N-Track have been studied as mobile-based learning tools that enhance engagement, collaboration, and digital music practice, especially when access to high-performance computers is limited (Sembiring, Sukmayadi, & Sunaryo, 2025).

A literature review shows that the use of interactive digital media in education has been proven to increase student engagement, participation, and creativity through interactive features and strong visual/auditory media support (Samosir et al., 2025). Mobile learning conducted via smartphones provides students with greater flexibility and accessibility in the learning process, enabling learning anytime and anywhere (Tarazanny et al., 2024). Other studies in music education emphasize that learning techniques such as modeling and digital collaboration play an important role in developing students' creativity and musical skills, although the complexity of the application can be a challenge in itself (Southam & Costley, 2024). However, many studies show that professional DAW applications often require high-specification hardware, which is an access barrier, especially among students who do not all have high-powered devices (Surya et al., 2025).

In this context, N-Track Studio emerges as a potential solution because it is a lightweight, easy-to-use Android-based DAW that supports multitrack recording, MIDI sequencing, and can be run on a smartphone (Sembiring, Sukmayadi, & Sunaryo, 2025). However, its use in formal music education in Indonesia is still very limited and has not been equipped with interactive e-modules that can guide students to learn systematically. This literature gap shows that there has been no research that comprehensively develops N-Track Studio-based e-modules that integrate digital music theory, technical guidance, project exercises, and learning assessments. Thus, this research has scientific novelty in two main aspects: (1) the development of interactive e-modules specifically for N-Track Studio as an alternative to mobile DAWs in the context of music education; and (2) the integration of a practice-oriented digital pedagogical approach into the Computer Music Writing curriculum, which has not been done in previous research in Indonesia.

Based on these gaps, this study addresses the following issues: (1) the lack of relevant and portable digital learning media to support digital music writing; (2) students' low proficiency in sequencing, mixing, and composing digital music; and (3) the unavailability of e-modules that integrate theory, practice, and the use of digital audio technology. Therefore, this study aims to: (1) develop an interactive e-module based on N-Track Studio as a self-learning medium; (2) determine the feasibility and practicality of the e-module based on expert validation and field testing; and (3) analyze the effectiveness of the e-module in improving students' digital music writing competencies. The novelty of this research is expected to contribute scientifically to the development of digital music learning media and increase students' access to music production technology that is more inclusive, adaptive, and easy to use.

Research in multimedia learning shows that technology-based interactive modules can increase student engagement, conceptual understanding, and problem-solving skills due to richer content presentation and adaptation to students' learning styles (Mayer, 2009). In addition, a project-based learning approach combined with digital modules provides opportunities for students to explore content non-linearly and produce real products as part of the learning process (Hmelo-Silver, 2004; Cennamo, 2017). D igital modules equipped with multimedia features such as video tutorials and simulations have also been proven to increase knowledge retention and learning motivation in the context of higher education (Clark & Mayer, 2016). Given the complexity of digital music production technology, which includes audio editing, sequencing, mixing, and mastering, the integration of mobile-based interactive modules is highly relevant to bridge the gap between theory and practice, especially for students who have limited access to high-powered computers.

## 2. METHOD

This study used the Research and Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) (Sugiyono, 2017). This model was chosen because it is suitable for the development process of learning products such as e-modules based on Digital Audio Workstation.

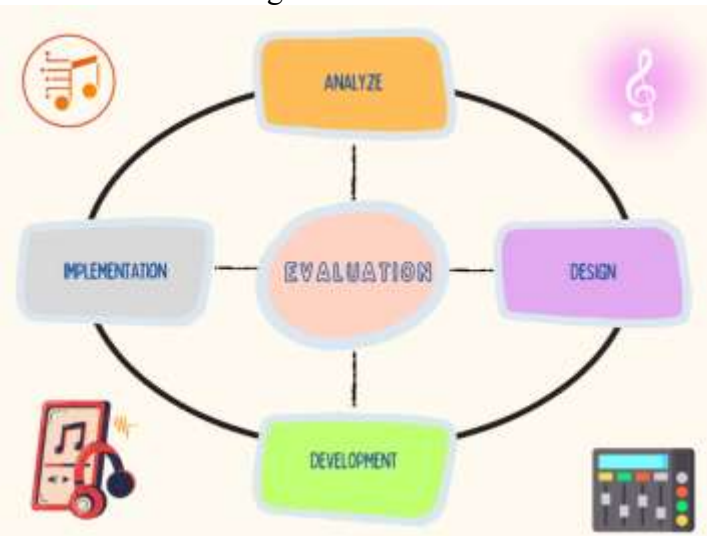


**Figure 1.** Illustration of the ADDIE Model

An initial analysis was conducted to identify the fundamental problems encountered in learning Computer Music Writing. Then, the design stage was where the e-module was designed based on the initial analysis. Based on the initial draft design, the e-module was developed and validated by subject matter experts, media experts, and language experts to refine the e-module. The implementation stage is where the e-module is implemented in the Computer Music Writing learning process. After that, students are asked to fill out a questionnaire regarding the feasibility of the e-module, which will be used for the evaluation stage. The research was conducted at the Palangka Raya University Performing Arts Education Study Program with 20 students taking the Computer Music Writing course as subjects. Validation was carried out by three experts, namely subject matter experts, media experts, and language experts. Data were collected through observation, interviews, validation sheets, and questionnaires on the use of e-modules. Data analysis was carried out descriptively and quantitatively by calculating validation scores, practicality, and gain scores to assess the effectiveness of learning.

## 3. RESULT AND DISCUSSION

### 3.1. Results

The research produced an N-Track Studio-based Digital Music E-Module through the following development stages:

1. *Analyze*

   This stage was conducted to analyze problems that occurred during Computer Music Writing lessons. The analysis was carried out using a fishbone diagram. A fishbone diagram is a tool for solving problems by analyzing the causes that can lead to a single effect (Neyestani, 2017). (Tantri & Djajanto, 2024) mention that there are six indicators that can be used, namely Machine, Method, Material, Man, Measurement, and Environment. Of the six indicators, the author uses five indicators that are adjusted to the phenomena that occur, as shown in the figure below.

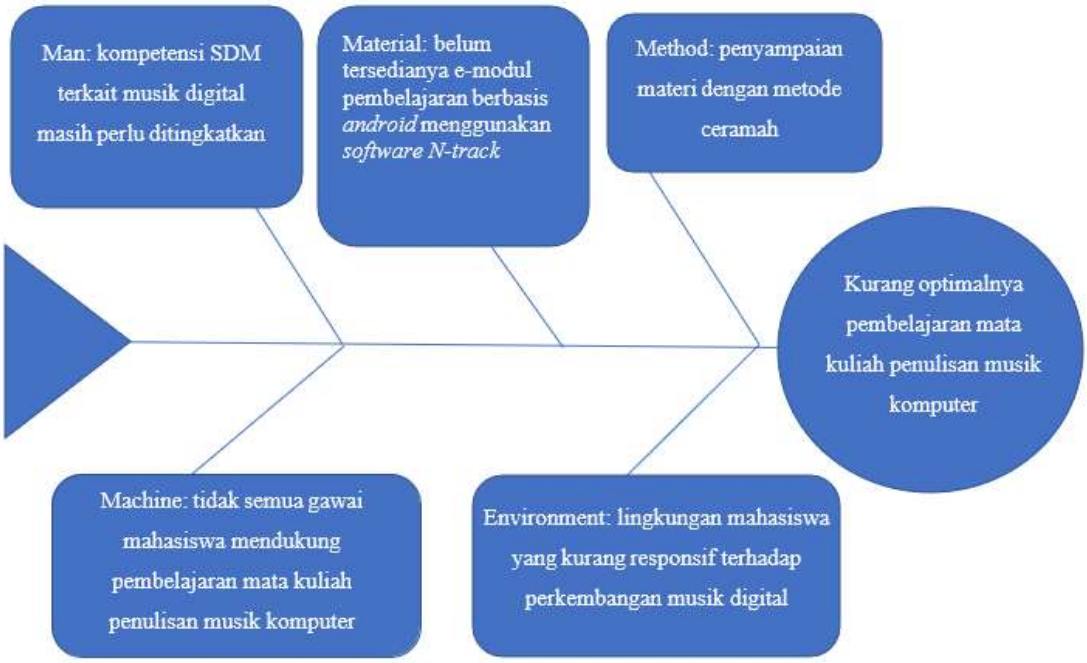


**Figure 2.** Fishbone Analysis

Based on the above analysis, an e-module is needed so that students can learn Computer Music Writing more optimally and flexibly.

2. *Design*

The framework and initial design of the e-module include the selection of the cover design and material on the use of N-Track Studio in writing MIDI blocks. The e-module is designed with a Project-Based Learning approach with the aim of strengthening the integration of theory and practice.

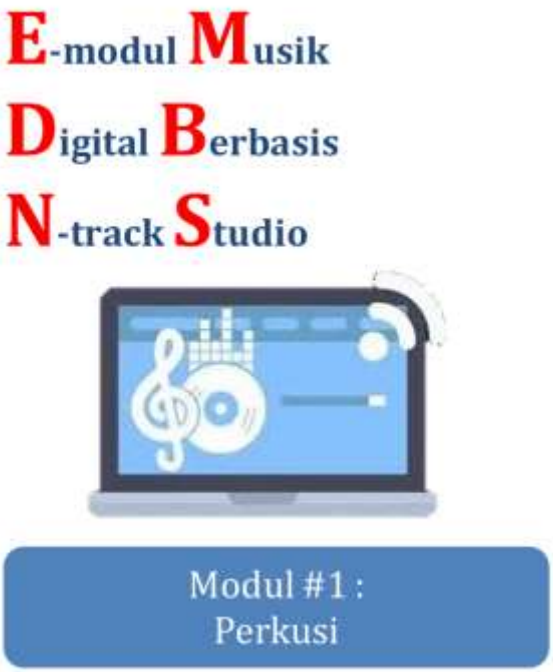


**Figure 3.** Initial Design of N-Track Studio-Based Digital Music E-module

3. *Development*

This stage is the development process of the N-Track Studio-Based Digital

Music E-module. To optimize this e-module product, validation by validators is required in terms of material, design/presentation, and language. Expert validation shows an average score of 83.3%, which means it is sufficiently valid. The e-module can be used but requires minor revisions, with details as follows: 1) content aspect at 84%, 2) language aspect at 84%, and 3) design/presentation aspect at 82%.

**Table 1.** Validation criteria according to validator assessment

| No | Percentage Scale | Validity Level |
|---|---|---|
| 1 | 85,01% - 100% | Highly valid, can be used without revision |
| 2 | 70,01% - 85% | Moderately valid, can be used but requires minor revision |
| 3 | 50,01% - 70% | Less valid, not recommended for use as it requires major revision |
| 4 | 0% - 50% | Not valid, should not be used |

Source: Adapted from Saputri, Delma, et al. (2023)

After validation, there were minor revisions in the development of the N-Track Studio-Based Digital Music E-module, including: 1) a more attractive cover design, 2) percussion, melody, and harmony materials in one e-module, 3) the use of supporting videos as part of the interactive e-module, and 4) digital music project-based exercises. The revised e-module can be viewed at the following link https://bit.ly/emoduln-track

4. *Implementation*

After going through the validation stage, the final e-module can be implemented in Computer Music Writing classes. This implementation stage is carried out by testing the e-module on 20 students from the Performing Arts Study Program who are taking the Computer Music Writing course to see how students respond to using the N-Track Studio-based Digital Music E-module.

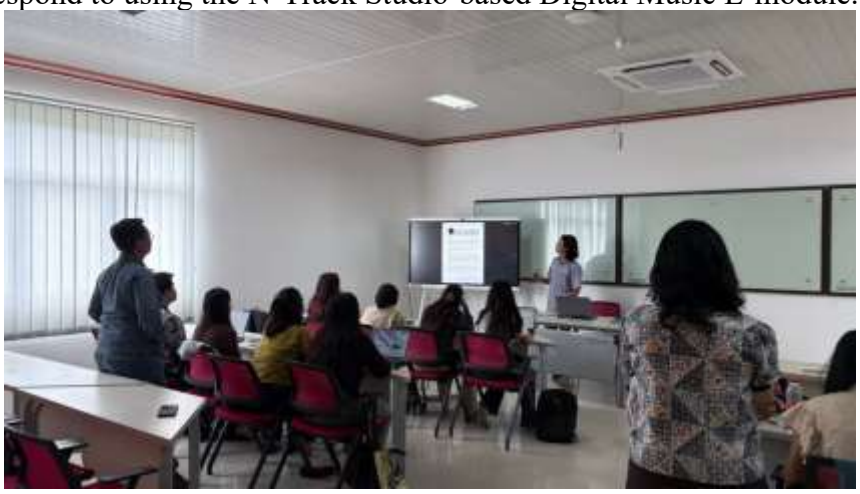

**Figure 4.** Implementation of N-Track Studio-Based Digital Music E-module

5. *Evaluation*

The next step is the evaluation of the e-module. The evaluation is conducted by distributing a questionnaire to students regarding their response to the N-Track Studio-based Digital Music E-module through the following link: https://bit.ly/responE-modul. Analysis of the questionnaire shows that 92% of students rated the e-module as helpful in understanding digital music concepts; 88% rated its appearance as attractive; and 90% of students stated that learning became more enjoyable, as students could immediately practice the theory of digital music. These results explain that student response to the N-Track Studio-

based Digital Music E-module was very good, with an average rating of 90%.

**Table 2.** Student Response Criteria

| Student Response Score (%) | Category |
|---|---|
| 75 < Rm < 100 | Very Good |
| 50 < Rm < 75 | Good |
| 25 < Rm < 50 | Fairly Good |
| 0 < Rm < 25 | Poor |

Source: Adapted from Lintang & Wardani (2017)

Based on this evaluation, the N-Track Studio-based Digital Music E-module successfully provided a more meaningful learning experience. With its flexibility and ability to integrate music theory (rhythm, melody, and harmony) with digital practice using N-Track Studio software, students can directly apply music theory in digital music composition. In line with (Hamdani, 2020), the integration of theory and practice based on multimedia enhances concept retention and technical skills among learners.

### 3.2. Discussion

The results of the study show that the development of interactive e-modules based on N-Track Studio has been able to address the needs of Computer Music Writing learning, which was previously conventional and not supported by adequate practice media. Findings from the analysis using a fishbone diagram confirm that the main problems lie in the lack of practice media, limited understanding of DAW, and minimal integration between digital music theory and direct practice. This condition is in line with the findings (Biasutti & Concina, 2020) which confirm that the main obstacles to digital music learning in higher education are the limitations of easily accessible practice media and the lack of interactive learning modules that bridge theory and practice. Thus, the Analyze stage in this study provides a strong basis for the need for flexible, portable, and self-administered digital learning media to improve students' digital music writing competencies.

The Design and Development stages produced an N-Track Studio-based e-module structured through a Project-Based Learning (PjBL) approach, so that students not only read the material but also engage in digital music projects in stages. The validity of the e-module, which reached an average of 83.3%, indicates that this product is in the "sufficiently valid" category and is suitable for use after minor revisions. Expert validation of the material, language, and design aspects shows coherence between the content and student competency requirements. This finding is reinforced by (Arsyad, 2021) , who explains that interactive and multimodal digital modules (combining text, images, audio, and video) can increase learning effectiveness and optimize independent learning experiences. Thus, the success of this development stage confirms that interactive e-modules are an important tool in DAW-based digital music learning in the modern era.

The implementation of e-modules on 20 students showed that N-Track Studio as an Android-based DAW has the advantages of accessibility and flexibility, allowing students to practice anytime without relying on high-performance computers. The results of student responses, which reached 90% in the "very good" category, indicate that these e-modules are effective in improving understanding of rhythm, melody, harmony, and sequencing techniques. This study is in line with the results of research (Cayari, 2020) which shows that the use of mobile DAW applications increases student creativity and participation in digital music learning through more accessible practical experiences. In addition, these findings confirm that mobile learning media can be a

significant alternative to overcome technological device inequality among art and music education students.

The use of this e-module also shows that the integration of multimedia, especially video tutorials, audio examples, and MIDI writing steps, has a positive impact on students' retention of concepts and technical skills. The increase in students' understanding of basic DAW concepts and their ability to compose MIDI blocks shows that teaching strategies that combine music theory with digital practice are very effective. These findings are reinforced by (Hamdani, 2020) which states that the integration of multimedia-based theory and practice increases concept retention by up to 30% higher than theoretical learning alone. Thus, the N-Track Studio e-module not only functions as a learning resource but also as a means of practice that directly develops students' technical competencies.

From the perspective of previous literature, this study fills a literature gap regarding the availability of mobile DAW-based e-modules in music education in Indonesia. Most previous studies have only developed computer-based modules or professional DAW applications that require expensive devices, as found in the study by (Lebler & Vallim , 2021) which highlights the limited access to high-performance devices as an obstacle in digital music education. Therefore, the use of N-Track Studio as the main platform for e-modules is an innovative contribution because it utilizes a mobile application that is easy to use, lightweight, and suitable for the conditions of students in Indonesia. The success of this e-module proves that the development of smartphone-based learning media can be an effective pedagogical solution for institutions with limited technological infrastructure.

Overall, this study shows that interactive e-modules based on N-Track Studio can improve students' digital music writing skills through a more practical, independent, and structured learning approach. The increase in positive responses from students and the validity of the e-modules reinforce that this medium is relevant to the needs of modern music education curricula. This is in line with the findings (Sembiring, Sukmayadi, & Sunaryo, 2025) which explain that the use of mobile-based DAW can increase the level of engagement, collaboration, and creativity in music learning. Thus, this study makes a significant contribution to the development of digital media for music education and opens opportunities for the implementation of other technology-based e-modules in arts and music learning in higher education.

## 4. CONCLUSION

The N-Track Studio-based Digital Music e-module is deemed highly feasible, practical, and effective in improving students' digital music writing competencies. This product can serve as an innovative learning medium and a development model for other DAW-based music learning platforms such as FL Studio or Ableton Live. Moving forward, large-scale testing and the integration of digital learning analytics features are recommended to comprehensively monitor students' skill development.

## 5. BIBLIOGRAPHY

Arsyad, A. (2021). *Media Pembelajaran.* Jakarta: PT Raja Gradindo Persada.

Biasutti, M., & Concina, E. (2020). Music education and digital learning: Students' perceptions in virtual and blended contexts. *Technology, Pedagogy and Education*, 29 (4), 407-421.

Cayari, C. (2020). Integrating music technology in higher education: Mobile learning and student creativity in digital composition.`. *Journal of Music, Technology & Education*, 13 (1), 55-74.

Giri, E. S. (2016). Empat Pilar Perubahan Paradigma Pendidikan Seni. *Imaji: Jurnal Seni dan Pendidikan Seni*, 1-10.

Hamdani. (2020). Integrasi teori, praktik, dan multimedia dalam e-modul pendidikan musik digital. *Jurnal Pendidikan Musik Digital*, 5 (2), 45-53.

Hamdani. (2020). *Strategi Pembelajaran Berbasis Multimedia untuk Meningkatkan Retensi Belajar.* Bandung: Alfabeta.

Jaohari, E. J., Karyono, T., Sukmayadi, Y., & Purwanto, A. (2025). Preferensi Digital Audio Workstation (Daw) Dan Pengaruhnya Terhadap Gaya Estetika Mahasiswa Minat Studi Musik Teknologi. *Jurnal Citra Pendidikan* , 5 (2).

Lebler , D., & Vallim , D. (2021). Digital audio workstations in tertiary music education: Rethinking access, equity, and curriculum design. *International Journal of Music Education*, 39 (1), 56-72.

Mayer, R. E. (2009). Multimedia Learning. *Cambridge*.

Neyestani, B. (2017). *Seven Basic Tools of Quality Control: The Appropriate Quality Techniques for Solving Quality Problems in the Organizations.* SSRN Electronic Journal.

Ruthmann, S. A., & Mantie, R. (2017). The Oxford Handbook of Technology and Music Education. *Oxford University Press.*

Samosir, M., Marlina, L., Sains, F., Informasi, T., Pembangunan, U., & Budi, P. (2025). Penerapan Teknologi Web Dalam Pembelajaran Interaktif Sejarah Untuk Siswa Kelas VI Sekolah Dasar Dengan Menggunakan Metode Design Thinking. *Jurnal Minfo Polgan*, *13*, 2582–2591.

Sembiring, P., Sukmayadi, Y., & Sunaryo, A. (2025). Collaborative Music Learning : Utilizing n-Track Application in Private Music Education. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran*, 679-690.

Southam, A., & Costley, J. (2024). The role of modelling during instruction in collaborative creativity. *Thinking Skills and Creativity*, *54*(June), 101660. https://doi.org/10.1016/j.tsc.2024.101660

Sugiyono. (2017). *Metode Penelitian: Pendekatan Kuantitatif, Kualitatif, R&D.* Bandung: CV ALfabeta.

Surya, B. I., Shoumi, F. P., Hanifa, A. S., Agustin, D. A., Salsabila, & Hasanah, F. N. (2025). Pemanfaatan Media Digital Interaktif Dalam Meningkatkan Kualitas Pembelajaran Di Sekolah Dasar Harapan Mulia. *Prosiding SEMAI 3 Seminar Nasional PGMI 2025*, 112–123.

Tantri, M. F., & Djajanto, L. (2024). Application of Fishbone Diagram in Using Root Cause Analysis (RCA) for Developing of Revenue and Expenditure System in Manufacturing Company. *International Journal of Economy, Education and Entrepreneurship*, 4 (1), 47-55.

Tarazanny, N. M. D., Sukrawarpala, I. W., & Tegeh, I. M. (2024). Pengembangan Media Pembelajaran Berbasis Mobile Learning pada Mata Kuliah Koreografi Dasar bagi Mahasiswa Prodi Pendidikan Seni Pertunjukan Isi Denpasar. *Journal of Education Research*, *5*(1), 746–756.