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Analysis of the Effectiveness of a Music Learning Information System for Early Childhood (Golden Age) using the Technology Adoption Model (TAM)

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ABSTRACT: Advances in information technology have brought significant changes to the education sector, including in the learning process for early childhood. The integration of information systems into learning activities is no longer limited to administrative functions but also serves as a learning medium capable of enhancing the effectiveness of the learning process. This study aims to analyze the effectiveness of implementing a music learning information system and to examine the relationship between the quality of the information system and student learning outcomes. The research analysis framework is based on the Technology Acceptance Model developed by Fred D. Davis to explain how perceptions of ease of use and information quality influence users' adoption of technology. This study employs a quantitative approach with a correlational design. The study population consists of students in the New Primary music program at Yamaha Forte Music Bandung, totaling approximately 800 students. The research sample was determined using purposive sampling, calculated as $rxy = (n\Sigma XY - (\Sigma X)(\Sigma Y)) / \sqrt{[(n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2)]}$, with a total of 63 students who actively supported the use of the digital learning system. Data collection was conducted via a Likert-scale questionnaire measuring three primary dimensions of the information system: usability, information quality, and learning impact. Validity was assessed using Pearson's Product-Moment correlation, while reliability was evaluated using Cronbach's Alpha > 0.70. The research results indicate that the effectiveness of the music learning information system falls into the "very effective" category, with an average score of 81.3%. The usability dimension received the highest score of 87.5%, followed by information quality at 84.2%, and learning impact at 81.3%. The results of the correlation analysis indicate a positive relationship between the quality of the information system and student learning behavior, such as increased practice discipline, learning motivation, and self-confidence in music.

Keywords: educational information systems, music education, Golden Age, system effectiveness, student learning outcomes.

INTRODUCTION

Advances in information technology have brought significant changes to various aspects of life, including the education sector. The integration of information systems into the learning process no longer serves merely as an administrative support tool but has evolved into a learning medium capable of enhancing the effectiveness of the learning process. In the context of early childhood education, the use of information systems has become increasingly important because it can facilitate the delivery of learning materials in a more interactive, systematic, and accessible manner for students. The "Golden Age" period in a child's development is a crucial phase, as it is during this time that rapid cognitive, motor, and emotional growth occurs (Rachmat Agus Santoso dkk., 2023). In early childhood education research, this period is often considered the most effective time for developing a child's fundamental potential, including musical ability. Music education at this stage serves not only as an artistic activity but also contributes to a child's cognitive development, motor coordination, concentration, and social skills.

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Music education institutions are beginning to integrate digital technology into their learning systems. One form of this integration is the use of information system-based learning applications that enable the delivery of course materials, practice schedules, and practical assignments online (Ferdiansyah & Rukhviyanti, 2024). This system facilitates a more structured learning process for students. The use of information systems in music education also supports communication between teachers and parents. Parents can access learning materials, practice videos, and updates on their children's assignments through a digital platform. This is particularly important because, in early childhood education, parental involvement as learning partners is a critical factor in the success of the learning process.

The learning process is no longer limited to face-to-face interactions in the classroom. Students can review the material, revisit music-playing techniques, and practice on their own at home using the guidance available within the system (N Hayati & N Rukhviyanti, 2022). Therefore, information systems have the potential to improve the consistency of practice and foster more disciplined learning habits among students. Although the use of information technology in education has grown rapidly, research specifically examining the effectiveness of information systems in early childhood music education remains relatively limited. Most research in the field of educational information systems tends to focus on the implementation of e-learning, learning management systems, or the evaluation of users' acceptance of technology.

Previous research has generally focused on the ease of use of the system, the quality of information, and the level of technology acceptance by users, as described in the Technology Acceptance Model developed by Fred D. Davis. This model explains that perceptions of a technology's ease of use and benefits will influence users' acceptance of the system. This study aims to analyze the effectiveness of implementing an information system to support the music learning process for young children in the Golden Age of development (Sepryhatin Dioputra & Novi Rukhviyanti, 2020). At this stage of development, the learning process requires a structured approach and the support of educational media capable of facilitating interaction between students and teachers. Therefore, this study aims to examine the extent to which the use of a music learning information system can contribute to improving the quality of the learning process and student learning outcomes. More specifically, this study aims to identify the level of system usability and the quality of information provided in the music learning application. These two aspects are important components in the evaluation of information systems because they are directly related to the user experience in accessing learning materials, understanding practice schedules, and completing tasks assigned by teachers. An analysis of these two dimensions was conducted to determine whether the system used has been able to effectively meet user needs.

LITERATURE REVIEW

The Three Main Dimensions of Information Systems from the TAM Perspective

Within the framework of the Technology Acceptance Model developed by Fred D. Davis, users' acceptance of technology is influenced by their perceptions of ease of use and perceived usefulness. In the context of this study, these two constructs are operationalized into three main dimensions of information systems: usability, information quality, and accessibility & system support.

Usability

The usability dimension describes the extent to which a music learning information system is easy for students to use. In the context of early childhood education (the Golden Age), ease of use is a critical factor because students are in the early stages of cognitive development and still require systems with simple, intuitive interfaces. A system with clear navigation, an engaging interface, and easy-to-understand features will enhance the user experience when accessing learning materials (Nikou & Economides, 2021). This aligns with the concept of perceived ease of use in the Technology Acceptance Model (TAM), where the easier a system is to use, the higher

the level of technology acceptance among users. This ease of use also leads to an increase in the frequency of system use, which ultimately encourages students to be more active in practicing music on their own.

Information Quality

The information quality dimension indicates the extent to which a system is able to provide clear, relevant, and easily understandable learning information to students. In music education, information quality encompasses practice materials, usage instructions, learning schedules, and feedback on students' practice results (Aldholay, Abdullah, dkk., 2020). From a TAM perspective, information quality is closely linked to perceived usefulness—that is, the extent to which a system is considered helpful in supporting learning activities. Structured and easily accessible information helps students better understand the material, thereby making the learning process more effective. High-quality information also plays a role in boosting students' motivation to learn, as material presented clearly and engagingly can stimulate students' interest and involvement in the music learning process.

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Accessibility and System Support

The dimensions of accessibility and system support reflect the system's ability to provide stable, responsive access that can be used anytime and anywhere. In digital-based learning, flexible access is one of the key advantages over conventional learning methods. The continuous availability of the system allows students to independently review exercises outside of formal class schedules (Venkatesh & Davis, 2022). This is crucial in music education, as mastering musical skills requires consistent and sustained practice. A robust system featuring fast access speeds, minimal errors, and device compatibility will enhance the user experience. In the context of TAM, these factors strengthen the link between ease of use and perceived benefits, thereby encouraging sustained use of the system.

The Relationship Between Information System Variables and Learning Outcomes

According to the TAM framework, a high-quality information system will increase users' acceptance of the technology. When a digital learning system is perceived as easy to use and provides clear information, users will be more likely to actively utilize it in their learning activities (Mostafa Al-Emran dkk., 2023). In this study, the relationship between the information system variable (X) and student learning outcomes (Y) was analyzed using statistical correlation methods. The analysis aimed to determine whether there is a significant relationship between the quality of the digital learning system and improvements in student learning behavior in the Golden Age music program.

Variable X in the Music Learning Information System

The independent variable in this study is the effectiveness of the music learning information system used in the Golden Age program. This variable refers to the extent to which the system is able to support the learning process through digital features that facilitate access to information and learning activities (Stavros Nikou & Anastasios Economides, 2021). Operationally, information system variables are measured using several key indicators adapted from the TAM framework and educational information system evaluations, namely:

Usability: Ease of Use Describes the degree to which users can easily operate a system, including application navigation, access to content, and the ease of understanding available features.

1. Information Quality: Indicates the extent to which the learning materials provided in the system are clear, relevant, and comprehensive in supporting students' music practice.
2. Accessibility and System Support: Describes the system's ability to provide stable, responsive access and to support continuous learning activities.

These variables are measured using a Likert-scale questionnaire, in which respondents rate the ease of use, information quality, and benefits of the system in supporting learning.

Variable Y Student Learning Outcomes and Learning Behavior

The dependent variable in this study is student learning outcomes in the early childhood music program (Golden Age). In the context of children's music education, learning outcomes are measured not only by academic achievement but also by changes in learning behavior that emerge during the learning process (Aldholay, Isaac, dkk., 2020). Operationally, the learning outcome variables in this study include several indicators of learning behavior, namely:

Study Discipline: A student's ability to follow a practice schedule and complete music assignments regularly.

1. Motivation to Learn: The level of students' interest and enthusiasm in participating in music learning activities.
2. Confidence in Music: Students' ability to demonstrate confidence in playing an instrument or completing music exercises independently.

These indicators were selected because, during the Golden Age phase, children's development is reflected more in changes in learning behavior than in formal academic achievement. Therefore, the learning outcomes in this study can be understood as a combination of students' mastery of basic musical skills and the development of their learning behavior.

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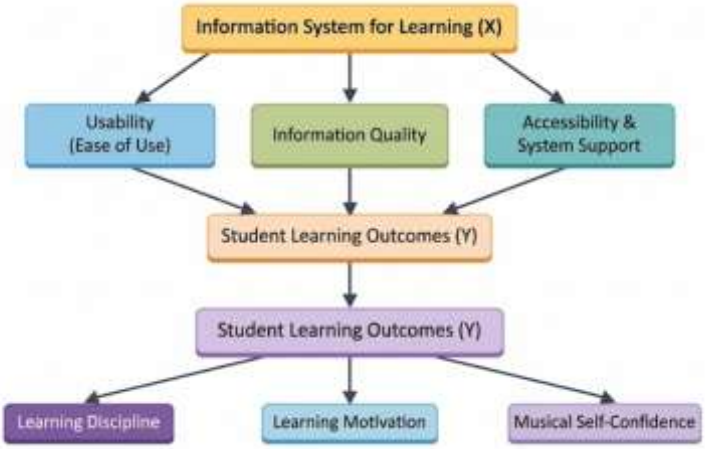

Figure. 1 Conceptual Model of the Influence of Learning Information Systems on Student Learning Outcomes
Source: Adapted from Fred D. Davis (1989) and the development of modern e-learning models

This diagram shows that the Learning Information System variables (X) comprising usability, information quality, and accessibility & system support influence student learning outcomes (Y), as measured by the indicators of study discipline, learning motivation, and self-confidence in music.

METHOD

Research Design (Quantitative Correlational Approach)

This study employs a quantitative approach with a correlational design, which is a research method aimed at statistically measuring the relationship between two or more variables without manipulating the variables under study. The quantitative approach was chosen because this study focuses on objectively measuring the effectiveness of the information system and the relationship between system usage and student learning outcomes using numerical data (Ching Sing Chai dkk., 2022). This study examines two main variables: the independent variable (X), which is the effectiveness of an app-based music learning information system; and the dependent variable (Y), which is student learning outcomes in the early childhood music program (Golden Age). The relationship between these two variables was analyzed using statistical correlation techniques to determine whether there is a significant relationship between the use of the information system and improvements in student learning outcomes.

The correlational approach in information systems research is often used to measure how users' perceptions of a system influence their behavior or performance. The analytical framework of this study also draws on the Technology Acceptance Model (TAM) developed by Fred D. Davis, which emphasizes that perceptions of ease of use and information quality can influence users' adoption of technology systems. The effectiveness of information systems is measured through several key dimensions, namely usability, information quality, and learning impact. (Mostafa Abdekhoda & Abdolrahim Dehnad, 2021). These three dimensions are used to evaluate the extent to which information systems can support music learning activities for young children.

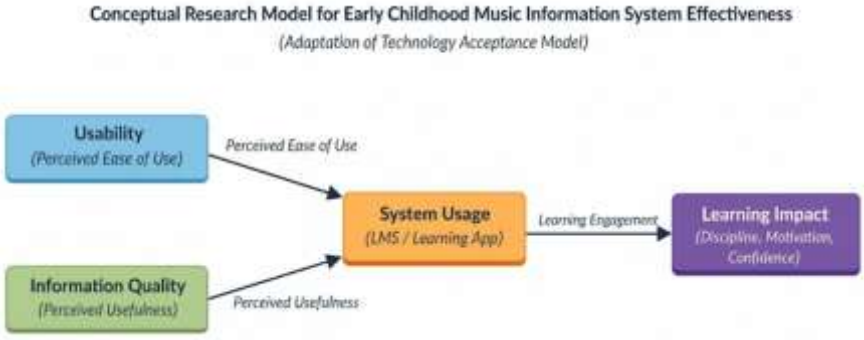

Figure. 2 Conceptual Model of the Effectiveness of an Early Childhood Music Learning Information System Based on the Technology Acceptance Model (TAM)Usability (Perceived Ease of Use)
Source: Adapted by the researcher based on Fred D. Davis (1989)

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Usability describes the ease with which users can operate a digital learning system. In the context of music learning applications, usability relates to the ease of navigating the application, accessing practice materials, and the clarity of features available on the learning platform. Within the Technology Acceptance Model framework, usability represents the concept of perceived ease of use, which is the user's perception that the technology can be used without requiring significant effort. When a system is perceived as easy to use, users tend to utilize it more frequently in their learning activities.

Information Quality (Perceived Usefulness)

Information quality refers to the quality of the information provided in a digital learning system. This dimension encompasses the clarity of learning materials, the relevance of music practice content, and the comprehensiveness of the information provided by the system. In the TAM model, information quality is linked to the concept of perceived usefulness that is, users' perception that the technology provides tangible benefits in improving performance or learning activities. If users perceive that the system provides clear and useful information, their level of system usage will increase.

Mediating Variable System Usage

In the diagram, these two variables influence system usage, which refers to the extent to which users utilize the digital learning system. This variable describes the intensity of students' use of learning applications during home-based learning activities. In early childhood music education, system usage reflects the frequency of using the application to access practice materials, watch instructional videos, and complete assignments given by teachers. The higher the level of system usage, the greater the opportunity for students to interact with learning materials repeatedly.

Dependent Variable Learning Impact

The dependent variable in this model is learning impact, which describes the effect of information system use on students' learning behavior. During the Golden Age developmental phase, learning outcomes are measured not only by academic achievement but also by changes in learning behavior that emerge during the learning process.

Sampling Techniques and Instrument Testing

The population in this study consists of all students in the New Primary music program (levels 1.1 to 2.2) at Yamaha Forte Music Bandung, totaling approximately 800 students. Since not all members of the population have direct experience using the learning application, this study employed purposive sampling. Purposive sampling is a sampling method based on specific criteria established by the researcher to ensure that the selected respondents are truly relevant to the research objectives. In this study, the sampling criterion was students who

actively use the music learning information system. The determination of the number of respondents in this study was based on purposive sampling, namely the selection of samples based on specific criteria relevant to the research objectives. From a population of approximately 800 music program students, 63 respondents were selected students who actively use the music learning information system. The number of respondents is considered representative because not all members of the population have direct experience in using digital learning systems.

Validity testing was conducted to ensure that each item in the questionnaire accurately measures the intended variable. Validity testing was performed using Pearson's product-moment correlation between each item's score and the total score of the variable.

The formula used is:

$$rxy = (n\Sigma XY - (\Sigma X)(\Sigma Y)) / \sqrt{[(n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2)]}$$

The criteria for validity testing are as follows:

If r is **> r If the item is in the table, it is considered valid.**

- If r is **< r If the item does not match the table, it is considered invalid.**

Legend

- rxy = the correlation coefficient between variables X and Y
- n = the sample size
- ΣX = the sum of the scores for variable X
- ΣY = the sum of the scores for variable Y
- ΣXY = the sum of the products of the X and Y scores

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- ΣX^2 = the sum of the squares of the X scores
- ΣY^2 = the sum of the squares of the Y scores

The test results show that all items have a correlation coefficient above the table r value **(α = 0,05)** Thus, the research instrument was deemed valid and suitable for data collection.

Instrument Reliability Test

A reliability test was conducted to determine the instrument's consistency in measuring the research variables. The reliability test was conducted using Cronbach's Alpha, a coefficient introduced by Lee J. Cronbach.

The formula for Cronbach's Alpha is:

$$\alpha = (k / (k - 1)) (1 - (\Sigma\sigma i^2 / \sigma t^2))$$

Legend

- **α = Cronbach's Alpha reliability coefficient**
- **k = number of items in the instrument**
- **$\Sigma\sigma i^2$ = sum of the variances of each item**
- **σt^2 = total variance of the instrument**

Table 2. Cronbach's Alpha Values in the Reliability Test

Cronbach's Alpha Value	Category
> 0,90	Very reliable
0,80 – 0,90	Reliable
0,70 – 0,79	Quite reliable
< 0,70	Less reliable

The results of the reliability test show that the Cronbach's Alpha value **> 0,70**, Thus, the research instrument was found to have a good level of consistency and can be used for further analysis.

Criteria for Categorizing System Effectiveness

To assess the effectiveness of the music learning information system, this study uses a percentage analysis of scores based on respondents' answers on a Likert scale. The effectiveness percentage is calculated using the following formula:

$$P = (\Sigma X / Smax) \times 100\%$$

Note:

$\sum X$ = total score of the respondent's answers

- **Smax = ideal maximum score (number of respondents × highest score)**

The results of the calculations were then categorized using the following effectiveness rating system:

Table 3. Criteria for Interpreting the System Effectiveness Rate

Percentage	Category
0 – 20%	Very Ineffective
21 – 40%	Ineffective
41 – 60%	Moderately Effective
61 – 80%	Effective
81 – 100%	Very Effective

Based on the results of the data analysis, the average effectiveness of the music learning information system is 81.3%, which falls into the very effective category. This indicates that the information system used is able to optimally support the music learning process for early childhood, both in terms of ease of use, quality of information, and its impact on students' learning process.

RESULTS

This study aims to analyze the effectiveness of a digital music learning information system on student learning outcomes in an early childhood music program (Golden Age). The analysis was conducted using a descriptive quantitative approach based on the Technology Acceptance Model (TAM) introduced by Fred D. Davis. This model was used to explain how users' perceptions of technology can influence system acceptance and its impact on learning activities(Novi Rukhviyanti & others, 2025). Based on the results of a questionnaire distributed to 63 student respondents who actively use the Canvas digital music learning application. The research

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variables consist of three main indicators: usability, information quality, and learning impact, which represent the effectiveness of the information system on student learning outcomes.

1. Mean

$$\bar{X} = \Sigma X / n$$

Notes:
$\bar{X}$ = mean value
ΣX = total sum of respondents' scores
n = 63 respondents

1. Effectiveness Percentage

$$P = (\Sigma X / Smax) \times 100\%$$

Explanation:
P = effectiveness percentage
ΣX = total respondent scores
Smax = n × highest score (5)

2. Pearson Correlation

$$rxy = (n\Sigma XY - (\Sigma X)(\Sigma Y)) / \sqrt{[(n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2)]}$$

Explanation:
rxy = correlation coefficient
n = 63
ΣX = sum of variable X scores
ΣY = sum of variable Y scores
ΣXY = sum of the products of X and Y
ΣX^2 = sum of the squares of X

Table 4. Descriptive Statistics of Research Variables

Variable	N	Mean	Std. Deviasi	Minimum	Maximum
Usability	63	4.38	0.52	3.00	5.00
Information Quality	63	4.21	0.58	3.00	5.00
Learning Impact	63	4.06	0.63	3.00	5.00

Based on Table 4, it can be seen that the highest mean score was found in the usability variable (4.38), indicating that the majority of respondents rated the music learning information system as easy to use and having an intuitive interface. The mean score for the information quality variable (4.21) indicates that the learning materials, schedules, and assignments delivered through the system are considered clear and easy to understand. Meanwhile, the learning impact variable received a mean score of 4.06, indicating that the use of the information system has a positive influence on students' learning behavior, such as increased discipline in music practice, learning motivation, and students' confidence in participating in learning. Inferential analysis was conducted to test the relationship between the effectiveness of the information system and student learning outcomes. Hypothesis testing was performed using Pearson's Product-Moment correlation, aimed at determining the strength of the relationship between the information system variable (X) and student learning outcomes (Y).

Table 5. Results of the Pearson Correlation Test

Variable	r (Pearson Correlation)	Sig. (p-value)	N	Correlation Category
Information System (X) – Learning Outcomes (Y)	0.62	0.000	63	Strong

The correlation test results showed an r value of 0.62 with a p-value of 0.000 ($p < 0.05$). This indicates that there is a positive and significant relationship between the effectiveness of the information system and student learning outcomes. A correlation coefficient of 0.62 falls into the category of a strong relationship, meaning that the better the quality of the learning information system used, the better the students' learning outcomes in the Golden Age music program. These findings suggest that the learning information system functions not only as a medium for distributing materials but also as a tool capable of enhancing student engagement in the learning

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process. The integration of technology in music education enables students to access practice materials, learning schedules, and assignments in a more structured and flexible manner.

Table 6: Tam Operations

Dimensions	Indicators	Operational Definition	Scale
Usability (Perceived Ease of Use)	Navigation Ease	The system is easy for students to understand and use	Likert
Usability (Perceived Ease of Use)	Accessibility	Learning materials can be accessed anytime	Likert
Usability (Perceived Ease of Use)	Interface Clarity	The interface is simple and not confusing	Likert
Information Quality (Perceived Usefulness)	Clarity of Material	The material is easy for students to understand	Likert
Information Quality (Perceived Usefulness)	Content Relevance	The material is relevant to music learning	Likert
Information Quality (Perceived Usefulness)	Completeness of Information	Videos, assignments, and guidelines are available	Likert
System Usage	Frequency of Use	How often students use the system	Likert
System Usage	Learning Intensity	Duration of time spent using the application	Likert
System Usage	Consistency of Use	The system is used regularly	Likert
Learning Impact	Learning Discipline	Students regularly participate in practice	Likert
Learning Impact	Learning Motivation	Students are more motivated to learn music	Likert
Learning Impact	Self-Confidence	Students are more confident in playing music	Likert

The Technology Acceptance Model (TAM) was used in this study to explain the process of acceptance and utilization of the music learning information system by students. This model emphasizes that perceived ease of use and perceived usefulness are the primary factors influencing the intensity of system use. In this study, these two main constructs are represented by the dimensions of usability and information quality. When the system is perceived as easy to use and capable of providing clear and relevant information, students tend to be more active in utilizing the learning system. This usage activity is then represented in the system usage dimension, which reflects the frequency and intensity of students' interactions with the system. Consistent system usage will have an impact on students' learning behavior, which is measured through the learning impact dimension. These impacts include increased discipline in practicing, learning motivation, and self-confidence in playing musical instruments. The TAM model in this study not only explains technology acceptance but also describes the process by which information systems contribute to improving the quality of learning.

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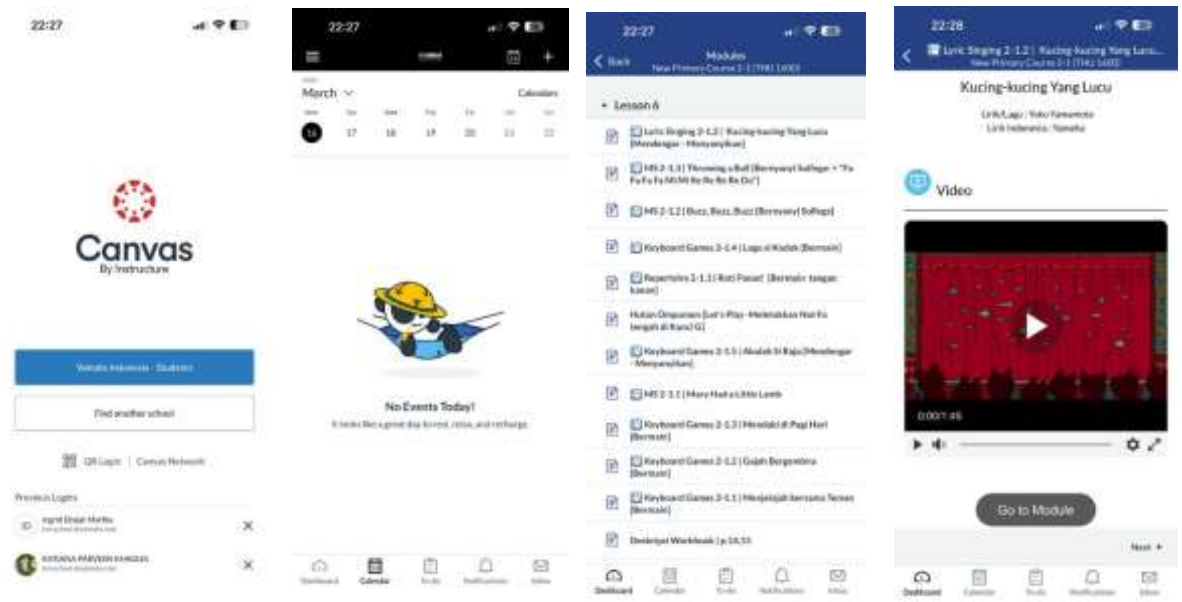

Source: Researcher's Documentation (2026), taken from the Canvas LMS app

Figure 3. The Calendar Feature in the Canvas App

The use of the Canvas LMS application in this study served as the primary medium for supporting the digital-based music learning process for early childhood students (Golden Age). This platform is a Learning Management System (LMS) designed to facilitate the distribution of learning materials, assignment management, and integrated communication between teachers and students. Based on the application interface used in this study, the calendar feature in Canvas demonstrates the system's ability to organize learning schedules systematically. The "No Events Today" display indicates that on a given day there are no scheduled learning activities, allowing students to easily understand the sequence of learning activities they must complete. This feature supports usability by providing clear, simple, and easily understandable information to users without requiring complex technical skills. According to the Technology Acceptance Model (TAM) developed by Fred D. Davis, perceived ease of use is a key factor influencing users' acceptance of technology. The intuitive interface of the Canvas application—such as its menu navigation (dashboard, calendar, to-do, notifications, inbox)—enables students to access learning features more efficiently. This aligns with research findings showing that the usability dimension received the highest average score, indicating that students find the system easy to use.

The calendar feature also contributes to improving students' study discipline. With a structured schedule, students can see when exercises and assignments are due. Even though certain views may show no activities, the system still provides clear information, preventing confusion among users. This indicates that the system possesses good information quality, meaning it is capable of presenting relevant and timely information. From a learning behavior perspective, the use of the Canvas application impacts learning outcomes, particularly in fostering more consistent study habits. Students have access to a learning system that can be used at any time, enabling independent practice repetition. This flexibility is crucial in music education, as musical skills heavily depend on consistent practice. The implementation of the Canvas LMS in this study demonstrates that the learning information system functions not only as a medium for delivering content but also as a tool capable of enhancing the effectiveness of the learning process. Ease of use, clarity of information, and system feature support contribute to increased student engagement in music learning activities.

DISCUSSION

The results of the analysis indicate that the music learning information system in the Golden Age program has a positive impact on improving student learning outcomes. This effectiveness can be attributed to the integration of the platform's user-friendliness, the quality of the information provided, and the system's ability to support independent practice activities (Huda Aljader, 2023). The use of learning technology in early childhood music education serves not only as a medium for distributing educational materials but also as a tool that expands students' opportunities to engage with learning content in a more flexible manner. According to research by Fred D. Davis on the Technology Acceptance Model, user acceptance of technology is influenced by perceptions of

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ease of use and perceived benefits. Both factors play a crucial role in determining the intensity of system usage by users.

In a digital learning environment, ease of interaction with the system is a key factor, as the use of technology is centered on the learning experience of students as the primary users. Learning platforms designed with a simple interface allow students to grasp the application's navigation structure more quickly without requiring complex technical skills. An intuitive system design makes it easy for students to access practice materials, follow the learning path, and utilize the features available within the system. This ease of use leads to increased frequency of system use in learning activities. Students can access learning materials flexibly, both inside and outside the classroom, thereby enabling a more repetitive and continuous learning process. In music education, repetitive practice plays a crucial role in developing motor skills, rhythmic sensitivity, and precision in playing instruments. In line with the findings of Viswanath Venkatesh and Fred D. Davis, the ease of use of technology contributes to an increase in the frequency of system use by users. When students feel that the system is easy to use, they tend to be more active in accessing learning materials and practicing independently. This indicates that a user-friendly system design not only facilitates interaction but also encourages student engagement in the learning process.

Flexible access to learning resources allows students to review material according to their individual needs and abilities. This creates a more adaptive learning experience, where students can set their own pace. In early childhood music education, this approach is crucial because skill development depends not only on conceptual understanding but also on consistent, repeated practice. Materials presented through practice videos, guides on musical techniques, and a systematic learning schedule provide a clear framework for student activities. In the context of early childhood music education, consistent practice is a key component in developing motor coordination, rhythmic sensitivity, and the ability to accurately discern pitch. Research by Ralph A. Webster on the use of digital technology in music education indicates that computer-based media can enhance the quality of student practice by providing faster feedback and easily accessible materials (Rima Utami dkk., 2025). The findings of this study are also consistent with the evolving literature on the application of information systems in the field of education. Various studies indicate that the success of educational technology implementation is significantly influenced by users' perceptions of ease of use and the perceived benefits of the system. This perspective aligns with the Technology Acceptance Model framework, which explains that users' acceptance of technology is influenced by their perceptions of usefulness and ease of use. Research by Kinshuk and Marcus Specht shows that Learning Management System-based learning systems can increase learning engagement when designed with a clear structure of materials and navigation that is easy for users to understand.

Research by Mingfong Jan shows that digital learning environments can increase student participation by providing interactive multimedia materials. When digital platforms offer flexible access to materials and intuitive navigation, user participation in learning activities tends to increase. This more active participation gives students the opportunity to engage with the materials repeatedly, allowing their understanding of the learning content to develop more effectively (Nur Rahmi Akbarini, 2024). Other literature also confirms that the integration of technology into the educational process serves not merely as a medium for conveying information, but also as a means of creating a more adaptive learning experience. Digital learning systems are capable of supporting a self-directed learning approach through the provision of multimedia materials, systematic assignment management,

and technology-based assessment mechanisms. Research by Neil Selwyn confirms that educational technology plays a role in transforming learning interactions into more collaborative ones that are oriented toward students' active engagement in the learning process.

CONCLUSION

Based on the analysis results, the system's effectiveness level, which reached the "highly effective" category (81.3%), indicates that the information system used has met the key aspects of system evaluation, namely usability, information quality, and system accessibility and support. The usability dimension emerged as the most dominant factor in driving students' acceptance of the technology, which directly increased the intensity of system use. Meanwhile, good information quality enables students to understand the material more effectively and supports the process of repeated independent practice—a key component in music learning. The results of the correlation test indicate a positive and significant relationship between the effectiveness of the information system and student learning outcomes ($r = 0.62$; $p < 0.05$), which indicates that improvements in system quality are directly proportional to improvements in student learning behavior. These effects are reflected in increased academic discipline, motivation, and students' confidence in music-making. These findings reinforce the relevance of the Technology Acceptance Model (TAM) framework in explaining that perceptions of the system's ease of use and benefits contribute to usage intensity, which ultimately influences learning outcomes. Theoretically, this study contributes to the development of educational information systems research, particularly in the context of early childhood music education, which remains relatively limited. Practically, the results of this study underscore the

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importance of designing digital learning systems with a user-centered approach and high-quality learning content. Further research is recommended to develop a more comprehensive model by considering other variables, such as parental involvement and pedagogical factors, to enrich our understanding of technology implementation in early childhood education.

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Sumber: Adaptasi dari Fred D. Davis (1989) dan pengembangan model e-learning modern

Sumber: Diolah peneliti berdasarkan Fred D. Davis (1989)

Sumber: Dokumentasi Peneliti (2026), diambil dari aplikasi Canvas LMS

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