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The Effect of Game Based Learning and Perfect Ear on Learning Concentration In Reading Rhythmic Notation

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Abstract

The learning of Art Music in Junior High School can be conducted in various ways, one of which is the use of innovative media. One of these innovative media is Perfect Ear as an Android application used to train aural skills and musical taste in a person who is eager to learn about music theory, specifically rhythmic training. Perfect Ear has been widely played and uploaded by a large number of people. This study aims to measure the effect of Perfect Ear on students' learning concentration level. The method used in this research is Classroom Action Research with a Quantitative approach and using statistical analysis (SPSS). The results showed that the independent variables X1: Game Based Learning, X2: Perfect Ear, and X3: Reading rhythmic notation have a correlation with each other on the dependent variable Y: Learning Concentration. Here are the research results: 1) Game Based Learning is 95% proven to significantly affect the level of learning concentration, 2) Perfect Ear is also proven by 95% in influencing the level of concentration, 3) Reading rhythmic notation has no influence on the level of learning concentration, but 4) Game Based Learning, Perfect Ear, and reading rhythmic notation have a 95% influence on the level of learning concentration when they are combined. And in the final measurement, the R Squared value is 31.80%, which means that the total percentage of the effectiveness of the independent variables (X1, X2, X3) on the dependent variable (Y) is smaller than the total percentage derived from other independent variables.

Keywords: Game Based Learning, Perfect Ear, Reading Rhythmic Notation, Learning Concentration.

INTRODUCTION

Learning concentration is the centralization of attention in the process of changing behavior expressed in the form of mastery, use and assessment of attitudes and values of knowledge and basic skills contained in various fields of study (Aviana & Fatichatul Hidayah, 2015). In the learning process, concentration is required to fully understand the teaching material provided by the teacher in class. There are five factors that affect the level of learning concentration according to super and crities in (Sanga & Purba, 2019) including: 1) Focused attention on the subject matter, 2) Comprehending the material through appropriate responses according to the learning material, 3) Activeness during the learning process, 4) Accuracy to the problem questions, 5) Class order during the explanation of the material. In the midst of the widespread use of gadgets, according to a survey by the Indonesian Internet Providers Association (APJII), the majority of users are teenagers, surely it is a challenge as well as an opportunity for teachers to create fun learning strategies and in accordance with the learning achievement targets. However, in reality there is a substantial gap, due to the limited competence of teachers in the real field who are lacking in exploring more powerful learning strategies for effective learning, most of the learning strategies used are conventional methods. Meanwhile, learning methods have a wide variety, such as: interactive learning, innovative learning methods that utilize the Game Based Learning model.

According to (Arbayu Maulidina & Abidin, 2018) Game-based learning is a form of learner-centered learning that involves electronic or digital games for learning purposes. Game-based learning is a learning model that involves games in the process of delivering learning materials. One of the games presented in the lesson is either digital or Android-based. This is in accordance with the interests of students these days as they like to use gadgets. And based on previous

research (Zioga et al., 2024), learning based on students' interests will stimulate children's creativity. However, teachers must be careful of their students' interests. Therefore, without a proper control, the students' preferences may get misinterpreted and thus deviate from the intended learning objectives. This becomes the gap from the purpose of the research. The fact that most teenagers nowadays use gadgets for entertainment purposes only, while the use of gadgets in an educational context aims to help students to understand learning materials better. In order to implement this approach, a comprehensive policy is required as gadgets provide both positive and negative influences depending on the purpose of their usage. By aiming to build a counter habit pattern as opposed to the usual entertainment purpose, gadgets are now used to support student learning in the classroom.

It is important to ensure that the role of the teacher as the leader of learning in the classroom is highly required, especially in proposing a class agreement as an indirect rule of the game in involving gadgets during learning process. The Learning Outcomes stated in the decree of the Board of Curriculum Standards and Educational Assessment (BSKAP) suggested that to develop students' musicality, it is required to comprehend and feel the elements of musical sound and its rules. It is essential for students to be able to experience the elements of music directly and explore them. Notation reading learning materials are required to be delivered to students at the High School level. However, the results of classroom observations stated that most students studying the music arts are not necessarily able to read rhythmic notation. The presentation of conceptual material requires a strategy to ensure the learning outcomes are properly conveyed. Based on the researcher's observation, there were some obstacles faced in the classroom, i.e. some students were less focused in the learning process, lack of student involvement in learning, and a tendency to get bored if the explanation of

conceptual material was carried out in a one-way method. This problem was also experienced by previous researchers (Andeka et al., n.d.) who stated that the respondents had low learning motivation as evidenced by the presence of students preferred to carry on conversations and play a joke while the teacher was explaining the material. In his article, the factor of the problem was caused by the teacher's lack of applying an interesting learning strategy for the students. This issue needs a solution to ensure that learning outcomes are achieved.

As the industrial revolution 4.0 develops, the government recommends that all levels of society from various fields as well as the education sector should involve in using technology in the learning process. Furthermore, this directive is aligned with the Game Based learning model, in which, one of the steps is prior to the initiation of the lesson, the teacher chooses a game to support learning process in the classroom. This is an opportunity for teachers to build positive habits within the general public regarding the negative connotation of using gadgets. The game application utilized in the study is an Android-based game application entitled Perfect Ear. It is an application to encourage students' learning in developing their musicality from basic music elements, i.e. music theory regarding the number of beat values, the shape of the block note symbol, as well as practicing their auditory skills and training solfeggio. However, the limitation of the scope of this research is the use of Perfect Ear in training auditory skills to read rhythmic notation.

Based on the background thought above, hence the next step is to find answers to the issues, the researcher determines a quantitative approach with the title "The Effect of Game Based Learning and Perfect Ear on Learning Concentration in Reading Rhythmic Notation". The following are research questions from the phenomenon mentioned earlier:

- 1) How is the correlation between auditory skills and the features given in the

Perfect Ear when it is used in the Game Based Learning method?

- 2) What are the obstacles faced when implementing the Perfect Ear game in the Game Based Learning process?
- 3) How can the correlation analysis between Game Based Learning, Perfect Ear and Reading Rhythmic Notation affect the level of student's learning concentration?

METHOD

This research employed a Classroom Action Research Method with a Quantitative approach. The data collection technique was carried out by means of surveys, interviews, and classroom observations. The term Classroom Action Research derived from English, each of the words has a meaning (Arikunto, Suhardjon, and Supardi, 2006) in (Sudaryono, 2023) defines:

- 1) Research is interpreted as an activity in observing an object using certain rules of procedure to obtain data.

- 2) Action is a deliberate activity with a focus on a cycle of activities for students.
- 3) Class is defined as a group of students who all receive the same subject matter from the teacher.

Thus, the definition of Classroom Action Research is research conducted by means of a rule to observe the activity cycle of a group of students in receiving learning simultaneously.

The research approach was carried out in a quantitative way which aimed to prove hypotheses on the variables used with supporting theories. The variables contained within this study can be measured for their correlation and influence on the dependent variable through measurement tests between variables or often referred to as correlational research (Annisa I W. H., 2017). The steps of this research were carried out in a deductive inductive manner starting from a theoretical framework, the ideas of experts, or the comprehension of researchers based on their experience later developed into problems along with problem solving proposed to obtain justification in the form of data in the real field.

The technique of collecting research data carried out by survey has three important objectives, in (Sudaryono, 2023) according to Cohen and Nomion, as follows: 1) describe the natural state alive at that time, 2) identify the current state measurably to be compared, 3) determine the correlation of things alive between specific events. In addition to conducting surveys, researchers also conducted unstructured interviews with a focus on the topic of study as prepared by the researchers to ensure the interviews could be carried out effectively, the other data collection technique was classroom observation, at this stage researchers observed the learning cycle activities carried out by students in the class used as the object of research.

THE RESULTS AND DISCUSSION

The correlation between Auditory skills and Perfect Ear feature in Game Based Learning.

Problems related to music learning are frequently encountered. The difficulty of students to focus on following the rhythm of the

song as explained by the teacher, the lack of competitiveness of students and the curiosity that continuously requires to be stimulated. Thus, it inspires researchers to examine which learning methods are able to improve students' auditory abilities in learning music education, especially in reading rhythmic notation material. Therefore, a fun learning strategy is required, by adjusting to the latest era for generation Z. The learning that adapts to its era is in accordance with the rules of Kihajar Dewantara, i.e. considering the nature of the era for students (Petrus Rafael et al., 2022). To adjust the current nature of the era, researchers try to implement game-based learning.

Game-based learning is one of the learning models that combines educational elements with games to attract students' interest in learning (Kurnia Sari et al., n.d.). The presentation of learning packaged with games fosters intrinsic motivation to learners (De-Marcos et al., 2016). Piaget's theory (1962) explained that playing indicates a child is in the process of cognitive growth. Reading rhythmic notation is an abstract material that requires certain analytical skills. According to Piaget's (1962) theory of cognitive development, the ability to analyze can only be done by students aged 11-18 years which according to (Budingsing) are: 1) Children are able to work effectively and systematically, 2) Be able to analyze in combination, 3) Think proportionally, 4) Derive generalizations fundamentally on one type of content.

Piaget's theory of cognitive development stated that the more developed a person's cognitive level is, the more abstract his or her thinking becomes. This theory is in accordance with the thinking ability of students to be able to read rhythmic notation. The concept of reading rhythmic notation is sufficiently abstract material, it is due to the auditory ability of a child needs to be able to listen to visuals presented in the form of note symbols to sound in accordance with the tempo. It is not just about seeing and listening, students should process what they listen to with the note symbols that appear along with reading the notation in accordance with the beat and tempo values. According to Kodaly regarding the

theory of reading notation in (Sari et al., 2022), in reading rhythmic notation, students should train their auditory skills in order to harmonize the sound of the notes with the rhythmic beat and tempo. The technique of reading rhythmic notation according to Kodaly is Rhythm Syllable. It means a technique in music learning that combines sound and movement to help students understand and remember rhythmic patterns. This technique employs certain spoken syllables to represent various musical note values, such as long and short notes. For instance, the syllables frequently used in this technique are “ta” for full notes, “ti” for half notes, and “sh” for silent notes.



Figure 1. Visual notes using Rhythm Syllable

Kodaly's implementation of sound and hand movements mimics the technique of playing Perfect Ear, in which the player must tap the device according to the tempo time and beat value. Meanwhile, Rhythm Syllable is described as sounding a rhythmic note symbol adjusted to the short length of the beat on the note. These two techniques are applied to the Perfect Ear game and added to the Perfect Ear game system that can be done repeatedly, allowing students to repeat it multiple times.

The Perfect Ear game features several training to improve musical abilities, including: 1) Theory articles, 2) The concept of learning intervals, scales, chords and adjustable rhythms, 3) The concept of learning chord progressions, 4) The concept of learning melody dictation, 5) The concept of learning Sight reading, 6) The concept of learning to sing notes (Cahya, n.d.). These six features help students in improving their auditory ability to learn music. However, the growing needs of users of the Perfect Ear application developed until the 3.9.87th version. In this version the game features are more categorized based on the learning method, such as: Ear training, Rhythm training, Drills, and Theory. Each of

these features has its own sub games. The focus of this research is to learn the Rhythm Training game feature and employ rhythm tapping in one of the rhythm training sub features. Sub Rhythm training consists of theory, rhythm tapping, rhythm input, and rhythm imitation.

The implementation of rhythm tapping as learning media in Game Based Learning has the same purpose as Kodaly's theory. Based on the researcher's observation of classroom learning and literature study, there is a relation between Kodaly's rhythmic reading technique (rhythm syllable) and the Perfect Ear game feature (rhythm tapping). The correlation is seen based on the learning objectives, both rhythm syllable and rhythm tapping are exercises to develop students' auditory. The relation between the two auditory training also is evident in the technique of reading out the rhythmic notation. Rhythm Syllable taps the note value based on voice and hand movement, while the rhythm tapping game feature taps the note value based on the timing of the metronome sound with a beat adjusted to the note value on the device screen. These two techniques of reading rhythmic notation both employ sound elements and hand movements as determinants of accuracy in reading rhythmic notation.

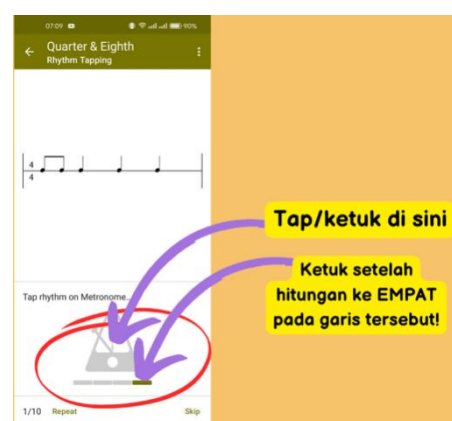


Figure 2. Technique for playing the Perfect Ear game feature: rhythm tapping.

(Tap here)

(Tap after the count of FOUR on this line)

Based on the game system, the Perfect Ear game application is repeatable. Therefore, students are able to continue playing the game

until it is completed without worrying about mistakes made. This builds intrinsic motivation for students to continue playing the game (Hanus & Fox, 2015a). This repetitive gameplay is a process of practicing in developing Auditory skills (Lestari & Setiaji, 2021). According to Dave Meier, auditory is learning by prioritizing speaking and listening. It is also explained that intellectually refers to an experience conducted during the learning process in terms of thinking about an experience and its connection to the meaning behind it, as well as the plan and value of the experience. On the other hand, repetition is defined as something provided regularly at certain times or at times when repetition is deemed necessary (Meier 2002:99).

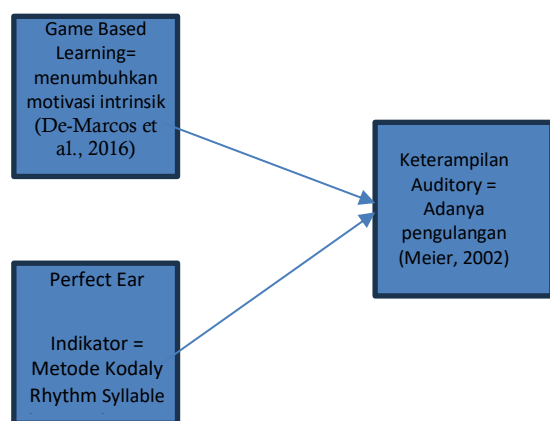


Figure 3. Flowchart of theoretical framework (GBL stimulates intrinsic motivation) (Perfect Ear Indicator = Kodaly's method of Rhythm Syllable and Hand Signing) (Auditory Skill = requires repetition)

The obstacles of applying Game Based Learning and Perfect Ear on the Material of Reading Rhythmic Notation.

Reading rhythmic notation requires skills adjusted to the length and shortness of the notes to sound. The implementation of Game Based Learning in reading rhythmic notation is easily understood as the concept of reading rhythmic notation presented in the form of a game contained in Perfect Ear. One of the results of the researcher's interview with one of the students stated that the Perfect Ear game was simple to operate. By downloading the application on the Play store, and following the

rules of the steps directed by the teacher in class, the students found it easy to follow and play it. In addition to this, the students also stated that it was easier for them to understand the method of reading rhythmic notation since it was presented in the form of a game. In addition, they also stated that their comprehension of playing Perfect Ear could be smoothly played with the first step, i.e. by downloading the game first in the play store, then clicking Rhythm Training, next clicking Rhythm tapping, after that selecting the game level, then clicking Start Exercise, next clicking start and then the game was available to play. Based on the data reduction of the interview results obtained above, it is concluded that students almost did not find any obstacles when implementing the perfect ear game in game-based learning on the material of reading rhythmic notation.

The correlation between Game Based Learning, Perfect Ear, and reading rhythmic notation on learning concentration

The correlation between Game Based Learning, Perfect Ear, and reading rhythmic notation on learning concentration

Notation reading is a basic material required by students studying music education. The Learning Outcomes contained in the BSKAP (Board of Curriculum Standards and Educational Assessment) stated that students are required to have an aesthetic experience in learning. Aesthetic experience is optimized for students once they understand the musical elements contained in music learning. One of these musical elements is the ability of students to understand ways to read rhythmic notation in learning. Based on the results of the researcher's analysis, it is found as follows: each variable in learning has an influence and relation to each other.

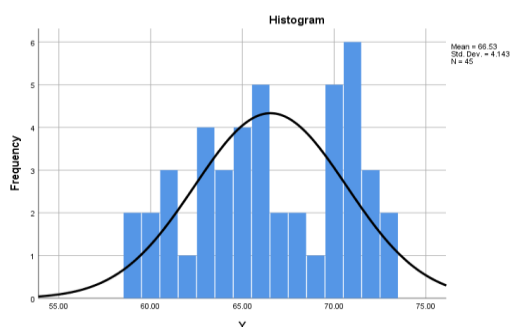
Descriptive Statistics

Variable Y (Learning Concentration)

Table 1. Statistics Y**Statistics Y**

N	Valid	45
	Missing	0
Mean		66.5333
Std. Error of Mean		.61759
Median		66.0000
Mode		71.00
Std. Deviation		4.14290
Variance		17.164
Range		14.00
Minimum		59.00
Maximum		73.00
Sum		2994.00

Based on the results of the statistical description table, it is known that the number of observations in this study is 45. The maximum value of the learning concentration level in this study is 73 and the lowest is 59. Meanwhile, the average value of student competitiveness in this study is 66.5333. In addition to descriptive statistics, the data shows the histogram graph, the figure is as follows below:

**Figure 4.** Learning Concentration Histogram

From the figure above, it shows the shape of the histogram, which shows that most of the learning concentration variables spread in the range of 61-62. Variable Y in the research as the dependent variable becomes the output associated with the variables outside of it, i.e. the independent variable (Sugiyono, 2018). The statistical results above show that the dependent variable (concentration level) of

respondents on average spreads homogeneously, with a mean value of 61-62.

Variable X₁ (Game Based Learning)

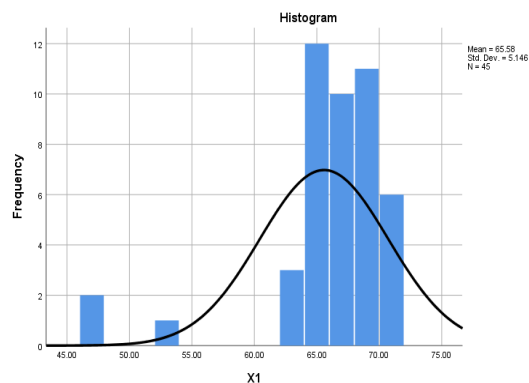
Statistics X₁.

Based on the results of the statistical description table below, it is known that the number of observations in the study is 45. The maximum value of the influence of Game Based Learning in this study is 71 and the minimum is 47 and the average is 65.5778.

Table 2. Statistics X₁

N	Valid	45
	Missing	0
Mean		65.5778
Std. Error of Mean		.76705
Median		67.0000
Mode		65.00
Std. Deviation		5.14556
Variance		26.477
Range		24.00
Minimum		47.00
Maximum		71.00
Sum		2951.00

Meanwhile, the histogram graph shows as follows:

**Figure 5.** Game Based Learning Histogram

The figure above shows the shape of the histogram, which indicates that most of the Game Based Learning variables spread in the range of 65-66. The statistical results show the independent variable X (game-based learning) is a free variable which influences the dependent variable (Y: learning concentration). The result shows that variable X with a

population of 45 people has an average value of 65 to influence the dependent variable.

Variable X₂ (Perfect Ear)

Table 4. Statistics X₂ Perfect Ear

Statistics X₂

N	Valid	45
	Missing	0
Mean		63.7111
Std. Error of Mean		.99322
Median		66.0000
Mode		70.00
Std. Deviation		6.66273
Variance		44.392
Range		25.00
Minimum		48.00
Maximum		73.00
Sum		2867.00

The results of the X₂ variable above are as follows based on the histogram graph:

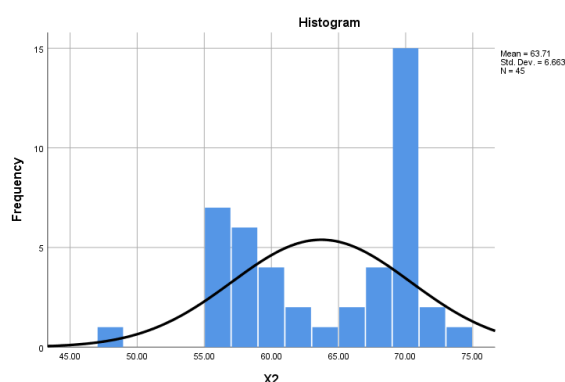


Figure 6. Perfect Ear Histogram

The figure shows the shape of the histogram, showing that most of the Perfect Ear variables spread in the range of 60-61. Variable X₂ is also an independent variable as it affects the level of learning concentration. It appears the effect of the perfect ear variable also has a function of influence on the dependent variable,

as in the theory (Hanus & Fox, 2015b) that stated the game is able to influence students' learning enthusiasm.

Variable X₃ (Notation Reading)

Table 5. Statistics X₃ Reading Rhythmic Notation

Statistics X₃

N	Valid	45
	Missing	0
Mean		67.7778
Std. Error of Mean		.76071
Median		69.0000
Mode		70.00
Std. Deviation		5.10298
Variance		26.040
Range		21.00
Minimum		52.00
Maximum		73.00
Sum		3050.00

Based on the results of the statistical table above, it shows a total of 45 observations in the study. The maximum value of the effect of reading rhythmic notation on the level of learning concentration is 73 and the minimum is 52, with an average value of 67.7778.

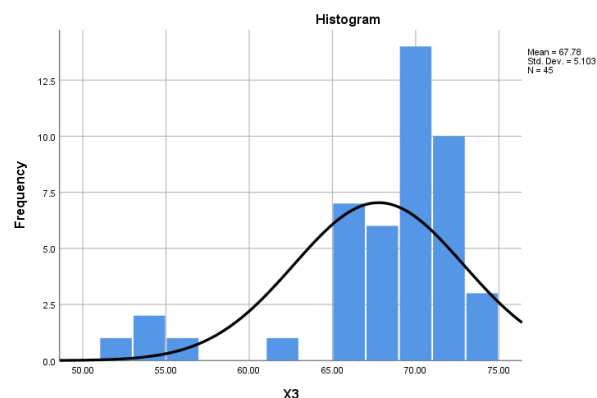


Figure 7. Histogram of Reading Music Notation

The statistical table shows the histogram as illustrated above showing the majority of the notation reading variables have data distribution in the value range of 65-66. Based on the statistical results above, it indicates the independent variable X₃ has a normal function

of influence on variable Y. This is also supported by previous research (Sumaryanto & Kunci Kemampuan Membaca, 2017) which stated the results of his research on the effect of notation reading skills on playing pianica instruments. Therefore, variable X3 may have a chance to influence variable Y: learning concentration.

Table 6. Test of Normality One-Sample Kolmogorov-Smirnov Test

		Unstandar dize d Resi dual
N	45	
Normal Parameters ^{a,b}	Mean	.0000000
	Std.	3.42065579
L e v i a t i o n		
Most Extreme Differences	Absolute	.103
	Positive	.080
	Negative	-.103
Test Statistic		.103
Asymp. Sig. (2-tailed)		.200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Source: Output results of SPSS version 26

The table shows the value of Asymp. Sig. (2-tailed) value of 0.200, in which the value is greater than the significance level of 0.05 ($\alpha = 5\%$), thus it can be concluded the data used in the research model is normally distributed.

Test of Multicollinearity

Source: Output results of SPSS version 26

Coefficients^a

		Stand				
Unstanda rdi zed Co effi cie nts Std.					Collinearit y Stat istic s	
					Toler	
Model	B	Beta	t	Sig.	VIF	
(Consta n t)	53.3	10.87	4.9	.000		

Game Based Learning	.395	.105	.491	3.7	.000	.986	1.014
Perfect Ear	-.082	-.292	-.033	.956	1.046		
Reading-Rhythmic Notation	.108	-.022	.870	.948	1.054		

a. Dependent Variable: Learning Concentration Level

The table above shows the Collinearity Statistics (VIF) value for each independent variable is all smaller than the cutoff according to Damodar N. Gujarati and Dawn C. Porter in (Savitri et al., 2021), which is 10, therefore it can be concluded there is no strong linear relation between the independent variables. In other words, there is no multicollinearity problem.

Test of Heteroscedasticity Coefficients^a

Model	B	Beta	Unstandardized Coefficients	Standardized Coefficients	Sig.
1	(Constant)	3.354	5.861	.572	.570
	Game Based Learning	.011	.056	.031	.845
	Perfect Ear	.027	.044	.097	.542
	Reading Rhythmic Notation	-.044	.058	-.120	.453

a. Dependent Variable: RES_2

Source: Output results of SPSS version 26

Sig. heterodeck must be greater than 0.05

The table above shows that the Sig. values for all independent variables are all greater than the significance level of 0.05 ($\alpha = 5\%$), therefore it can be concluded the data used has variance, in other words there is no heteroscedasticity problem in the model.

Multiple Regressions Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients (Beta)		t	Sig.
		B	Std. Error	Beta	Std. Beta		
1	(Constant)	53.352	10.873			4.90	.000
	Game Based Learning	.395	.105	.491		3.78	.000
	Perfect Ear	-.181	.082	-.292		-	.033
	Reading Rhythmic Notation	-.018	.108	-.022		-.164	.870

a. Dependent Variable: Learning Concentration Level

Source: Output results of SPSS version 26

The table above shows the form of the regression equation model is as follows:

$$Y = 53.352 + 0.395 X_1 - 0.181 X_2 - 0.018 X_3 + e$$

Notes:

Z = Organizational Commitment

X₁ = Transformational Leadership

X₂ = Work Environment

ε = Error rate (standard error)

The model of equation 1 (one) above can be known as follows below:

Intercept (constant) (53.352)

It is the base value of the concentration level as the value of Game Based Learning (X₁) and Perfect Ear (X₂) variables and Reading Rhythmic Notation (X₃) is zero. It implies that if the value of Game Based Learning and Perfect Ear is significantly low (both variables are 0), then the base value of Learning Concentration is at 53.352 one unit.

Coefficient X₁ (0.147)

An increase of one unit in the transformational leadership scale (for example from 0 to 1) will increase organizational commitment by 0.147 one unit. Therefore, if transformational leadership increases by 1 unit, organizational commitment will increase by 0.147.

Coefficient X₂ (0.158)

An increase of one unit in the work environment scale (for example from 0 to 1) will increase organizational commitment by 0.158 units on a scale of 0-100. Hence, if the work environment increases from 4 to 5, then organizational commitment will increase by 0.158.

Error Rate (ε): It is the part of the equation represents the variation or error unexplained by the regression model. It includes other factors that affect organizational commitment but are not included in this model.

The T-test

Partial testing (t-stat) is utilized to test whether the independent variable partially has a real influence on the dependent variable. The table below shows the critical limit values for t-statistic testing, each at the 5% significance level (Alfiani & Syamsir, 2023).

Critical Limit Values of the T-test

df	α 5%
41	1.68288

Notes:

df = n-k,

n = number of observations,

k = number of regression coefficients,

α = confidence level

T-statistic Test Results

Independent t Variable	t	Hypothesis H_0	Conclusion
Game Based Learning	3.78	H_0 rejected	Significant at $\alpha = 0.05$
Perfect Ear	-	H_0 rejected	Significant at $\alpha = 0.05$
Reading Rhythmic Notation	-	H_0 accepted	Not Significant

Source: data processing

The table shows the following below:

1. The independent variable Game Based Learning X1 has a t-stat of 3.782, which is greater than the t-table (1.68288, $\alpha = 0.05$), so the H_0 hypothesis is rejected. Hence, it can be concluded that the Game Based Learning X1 variable partially affects the Learning Concentration (Y) variable significantly with a confidence level of 95%.
2. The independent variable Perfect Ear X2 has a t-stat of -2.211, which is smaller than - t-table (-1.68288, $\alpha = 0.05$), thus the H_0 hypothesis is rejected. Therefore, it can be concluded that the Game Based Learning X2 variable partially affects the Learning Concentration (Y) variable significantly with a confidence level of 95%.
3. The independent variable Reading Rhythmic Notation X3 has a t-stat of -0.164, which is greater than - t-table (-1.68288, $\alpha = 0.05$), thus the H_0 hypothesis is accepted. Then it can be concluded that the Reading Notation X3 variable partially does not affect the Learning Concentration Y variable.

To conclude, the results of the independent variables that affect the dependent variable are X1 and X2. Therefore, the indicators regarding Game-based learning and the selected application have an influence on learning concentration (dependent variable). Indicators that influence the independent variable according to (Hamari et al., 2016) stated that games that have levels, leader boards, and real counts influence students to continue to try the game completely. It also creates intrinsic motivation in students to continue to focus on learning (Hanus & Fox, 2015b).

The F-test

The F test is conducted as there are independent variables that jointly affect the y variable.

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1. Regression	240.361	3	80.120	6.381	.001 ^b
Residual	514.839	41	12.557		
Total	755.200	44			

Dependent Variable: Learning Concentration Level

b. Predictors: (Constant), Reading Rhythmic Notation, Game, Basic Learning, Playing the game

F-stat is utilized to test the significance level of the influence collectively in explaining the variation of independent variables. Despite the regression results containing variables that are individually insignificant in an equation, but the overall effect is significant in the equation. The table below shows the critical limit values for the F-statistic test, each at the 5% significance level.

**Table of
F-test Critical Limit Value**

N1 (k-1)	N2 (n-k)	α 5%
2	42	3.22

Notes: N1 = df numerator, N2 = df denominator, n = number of respondents, k = number of regression

coefficients, α = confidence level (E.S. Pearson, 1966).

**Table of
F-stat Value of Regression Results**

F-Stat	Hypothesis H ₀	Conclusion
6.381	H ₀ rejected	Significant at $\alpha = 0,05$

Source: data processing

The F-stat value of the data regression results has an F-stat of 6.381, which is greater than the F-table (F-stat 6.381 > F table 3.22) at the 95% confidence level, thus the H₀ hypothesis is rejected. Therefore, it can be concluded that in combination, the independent variables used in the model affect the dependent variable Learning Concentration (Y). The uniqueness of this F-stat result strengthens the independent variables to mutually influence the dependent variable. The results of the data analysis are in accordance with the theory in the previous paragraph, showing that the active involvement of a student in learning, playing the game and the results that come out directly is able to influence students to generate creative ideas in playing music. It also indicates that the elaboration between independent variables leads to optimal research. As referred to in previous research (Zioga et al., 2024) which stated that learning influenced by pleasure in learning methods, as well as fondness for the material learned makes students enjoy and voluntarily learn the material provided, and it produces a good influence on art education.

R Squared (R^2)**Model Summary**

	R	S	Std. Error
		q	of
		u	the
		a	Esti
Model		r	mat
R		e	e
Adjusted R Square			
1	.564 ^a	.318	.268
			3.54359

a. Predictors: (Constant), Reading Rhythmic Notation, Game Based Learning, Perfect Ear

The test is conducted to see the amount of variation of the independent variable to be explained by all the independent variables contained in the equation.

The R^2 value in this study is 0.318, this value indicates that 31.80% of variations or changes in the Learning Concentration variable (Y) are explained by the independent variables contained in the model and the remaining 68.20% is determined by other variables that are not included in the model. The results of the analysis above state that there are other variables outside that are able to optimally have a greater influence on learning concentration.

CONCLUSION

Based on the research findings, it can be concluded that the combination of Game-Based Learning, the Perfect Ear application, and Reading Rhythmic Notation has a significant collective influence of 95% on students' learning concentration. However, the final measurement shows an R^2 value of 31.80%, indicating that while these three variables do contribute meaningfully, the overall effectiveness of these independent variables (X_1 , X_2 , X_3) on the dependent variable (Y) is relatively limited. This suggests that other external factors or variables not examined in this study may play a larger role in influencing students' concentration levels during the learning process.

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