

Effect of Noise Intensity of Aviation Activities on Student Learning Concentrations

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Article Info	ABSTRACT
<p>Article History Received Aug 11, 2020 Accepted Dec 18, 2020 Published Dec 31, 2020</p> <p>Keywords: Aviation activities Effect of noise intensity Learning concentration Sound level meter Students' concentration</p>	<p>This study aims to determine the effect of flight activity noise intensity on student learning concentration. This study involved 48 students (male = 24 and female = 24) who were randomly selected in the Islamic elementary school Waioti, Maumere. The intensity of flight activity noise during classroom learning activities is measured using a Sound Level Meter (SLM), and students' concentration levels were measured using a 5-level Likert scale learning concentration questionnaire. The effect of flight noise intensity on student learning concentration was determined using linear regression analysis. The results showed that the noise level due to flight activities in the Waioti Islamic Elementary School was 58.92 dB, exceeding the set threshold value. The intensity level of students' learning concentration disorders reached 71.43%, including frequent disturbance. The level of flight activity noise significantly affects student learning concentration with the regression model: $Y = 49.972 + 0.834X$ with R^2 of 0.635.</p>
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I. Introduction

Education becomes the main thing to support the government in realizing the ideals of the nation. Interaction between a person and the surrounding environment is the process of starting education. Every student needs to focus on the material being studied to absorb the material learned adequately in the learning process. Thus students can do something that has never been done before. Many factors affect students' success; for example, concentration factors in learning [1].

Teaching and learning are the interaction process of teacher and student interaction in a learning environment where the teacher helps students learn about the phenomena observed in daily life [2]. Concentration is the focus of attention on a particular object. Concentration in learning focuses on the mind's power over what is learned by avoiding things that are not related to something learned. Learning concentration has an important role, like concentrating on listening to an educator's explanation, understanding the material provided by educators, and doing the assignments to get the maximum learning results [3]. Someone experiencing impaired concentration will have difficulty concentrating on an object so that the person needs time to receive the information provided [4]. Changes in children's concentration are often challenging to do; therefore, these changes must be immediately recognized and given reinforcement by the school or family [5]. Difficulty concentrating is caused by several things, one of which is noise. Based on the decision of the minister of

environment Number: Kep. MNLH 11/1996, that noise can hurt someone who is exposed to noise, such as communication disorders, psychological

Noise can cause deafness. The environment which is affected by noise is one of them the school environment. The school is where the teaching and learning process is carried out. Schools provide a conducive atmosphere so that the expected educational goals can be achieved. However, several schools are located close to sources of noise/noisy centers. This noise causes students and teachers to experience interference in communication while in the school area. Communication problems that occur impact reducing students' learning performance, reducing students' level of concentration. Based on research. Goswami [6] said that educational institutions with high noise would make students unable to concentrate properly during the learning process. Students can lose interest in learning; high noise can also affect educators' concentration in explaining learning material. The main factor influencing learning activities is concentration. The higher the instructors and students' concentration, the more meaningful the learning activities are, but if students' concentration decreases, the results are achieved less [7].

The concentration of students at elementary school age becomes more selective, adaptable, and planned. First, children become more reliable at deliberately paying attention to only aspects of the situation relevant to their goals. Second, they can adapt flexibly to their concentration on task requirements. Third, planning

increases sharply at this age, namely by collaborating with more skilled planners. All aspects can help elementary school children achieve good performance if supported by school education [8].

Ruth conducted a study analyzing Soekarno-Hatta International Airport's noise levels when an airplane was passing (a case study at Pandidi Junior High School, West Jakarta). The results suggest that the noise that occurs in schools should be reduced by increasing the classroom acoustics because the resulting noise has exceeded the school area's noise threshold value [9].

Islamic elementary school in Waioti Maumere is a school adjacent to the runway at Fransiskus Xaverius Seda Airport, which is located \pm 500 m. If flight activities are in progress, such as an airplane when landing or take off, the noise level that occurs dramatically affects student learning concentration. Based on the above problems, the authors are interested in examining the effect of aviation activity noise intensity on student learning concentration.

II. Theory

Learning Concentration

Concentration focuses the mind on a particular object by putting aside things that are not related to the learning and teaching process [10]. Concentration is a centering up of attention in behavior change expressed in mastery, use, and assessment of attitudes and values, knowledge, and necessary skills in various fields of study. Theoretically, if students' concentration is low, it will lead to low-quality activities and a severe lack of learning. It is not trying that affects the power of understanding the material. However, concentration is the principal capital for students in receiving teaching material and indicates the learning process's success [11].

The ability to focus attention on the learning process is a definition of learning concentration. To strengthen students' concentration in the learning process, educators must use various exciting learning media by considering study time and other activities that need to be done at recess [12].

Learning concentration is influenced by two factors, namely, internal and external factors. Internal Factors are factors that originate from within an individual and can influence individual learning outcomes. These internal factors include physiological factors, psychological factors (intelligence, motivation, interests, attitudes, talents). External Factors are factors that originate from outside the individual and can influence individual learning outcomes. These external factors include the social environment (the social environment of the community, the social environment of the family, and the social environment of the school) and the non-social environment (natural environment and instrumental factors) [13].

Noise

Noise is an unwanted sound that can cause discomfort for the listener and can affect all human

activities. Noise can be interpreted as an unwanted sound originating from biological activities such as speech and human-made activities such as machines [14]. Noise is an undesirable form of sound or sound that is not appropriate to the place and time. The noise that has passed the noise level threshold is proven to affect the student learning concentration [15]. Noise is a sound that disturbs people when doing an activity, thus eliminating one's concentration on something that is done [16].

Noise Measurement Tool

Sound Level Meter (SLM) is a tool for measuring noise. The working principle of the tool is based on vibrations that occur. If some objects or objects vibrate, it will cause a change in air pressure will then be captured by the equipment system, and then the analog needle will show the number of noise levels expressed in dB values [17].

Noise Impact and Control

Noise is a bad influence for someone exposed to the noise, such as hearing loss, impaired communication, and can cause deafness. The effects of noise experienced by students resulted in a decrease in learning concentration, especially in reading or doing assignments [18].

Apart from hearing loss, noise can also cause various other physiological, psychological, and communication disorders. Psychological disorders can include discomfort, lack of concentration, insomnia, and irritability [19].

Diseases associated with chronic noise exposure may be limited to people in certain situations and do not occur universally in all people who are exposed to noise. Most individuals exposed to chronic noise, for example, from large airports, seem to be tolerating it [20].

Noise control can be done naturally and artificially. Naturally, control can be done by installing a barrier, such as using *Syzygium paniculatum* (*Pucuk Merah*), Spanish cherry (*Tanjung*), and *Terminalia catappa* (*Ketapang*). Meanwhile, artificially, control can be done by avoiding door with a hole pattern, installing weather stripping on each window, using dampening paint, and using curtains made from thick woven fabrics such as patterned brocade, velvet, and wool [21].

III. Method

This research was conducted with a quantitative approach; This type of research is ex-post facto research. The independent variable is the noise intensity of flight activities, and the dependent variable is the learning concentration of students.

This research was conducted at an Islamic elementary school located in Waioti, Alok Timur, Sikka, and Maumere. This study population was 262 students registered in the even semester of the 2019/2020 school year. Simultaneously, the target population is students of class IVA, IVB, VA, and VB, totaling 93 students. Sampling in this study was carried out randomly, and the sampling technique used was random sampling. Based on

the Slovin formula, a sample of 48 students (male = 24 and female = 24) was obtained.

Android-based Sound Level Meter (SLM) software on smartphones is used to measure the intensity of flight activity noise during classroom learning activities and to learn concentration questionnaires (30 items) to determine the level of student learning concentration. Measurement of learning concentration using a 5-point Likert scale. The favorable statement starts from never (score 1) to always (score 5), and the unfavorable statement starts from always (score 1) to never (score 5).

The instrument's validity was determined based on the expert and empirical team (48 students). Empirical validity is determined based on product-moment correlation. Meanwhile, instrument reliability was determined using the Cronbach alpha technique. The validity and reliability of the instrument were analyzed with the help of SPSS 20 software. The results of the analysis showed that the r -count value (0.318 - 2.093) > r -table (0.284) at the 5% significance level, and the Cronbach alpha value of 0.835. So it can be concluded that the learning concentration instrument has adequate validity and reliability

Linear regression analysis is used to see the effect of flight noise intensity on student learning concentration. The classic assumption test has been done before testing the hypothesis. Hypothesis testing uses several analyzes, namely linear regression analysis, F test, and Product Moment correlation test.

IV. Results and Discussion

Noise Intensity Level

The measurement of flight noise intensity during landing and take-off was used to obtain the average value of the noise generated at the Waioti Islamic Elementary School, Maumere. The noise measurement location is in class IVA, IVB, VA, and class VB, and measurements are made 12 times. The results of noise measurements using the SLM (Sound Level Meter) application are presented in Table 1.

Table 1. Noise intensity

Class	Noise	Unit
IVA	61.41	dB
IVB	60.72	dB
VA	58.31	dB
VB	55.25	dB

Based on the data in Table 1, the average noise level generated at Islamic elementary school Waioti, Maumere is 58.92 dB, which means that the noise level of flight activities at landing and take-off has exceeded the value of 55 dB as the threshold value set by the Minister of Environment.

Student Learning Concentration

The results of the classical assumption test are summarized in Table 2.

Table 2. Classical assumption

	Sig. calculation	Significance level
Normality	0.995	0.05
Linearity	0.926	0.05

Table 2 shows that the data is normally distributed, and there is a linear relationship between flight noise intensity and student learning concentration at the 5% significance level.

Hypothesis testing was performed using regression analysis and obtained $R = 0.635$. The study shows a positive influence between the intensity of flight activity noise on student learning concentration disorders. This means that if there is an increase in flight activities' noise intensity, it will be followed by an increase in student learning concentration disorders. The regression coefficient is used to determine the regression equation. The regression line is used to see the relationship between student learning concentration disorders due to flight activities' noise intensity. The summary of the regression coefficients can be seen in Table 3.

Table 3. Regression coefficient test results

Model	Coefficient	Sig.
Constan	49.792	0.000
noise	0.834	0.000
R	0.635	
R square	0.403	

Based on Table 3, it can be seen that there is interference with students' initial learning concentration when there is no noise from flying activities. The regression coefficient of flight activity noise intensity is 0.834. This means that if the noise intensity of flight activities increases by 1dB. The interference of student learning concentration will increase by 0.834. The R coefficient is positive, which means a positive relationship between the noise intensity of flight activities and students' learning concentration disorders. The higher the noise intensity of flight activities. The problem of student learning concentration will increase. R Square's value is 0.403, which means that the effect of the noise intensity of flight activities on student learning concentration is 40.3%. Meanwhile, Other variables influence 59.7%.

Summary of simple regression test the effect of flight activity noise intensity on students' learning concentration can be seen in Table 4.

Table 4. F-test results

Model	F	Sig.
Regression	31.095	0.000 ^b

Regression F test results in Table 4 Obtained a value of 31.059 from the number obtained significance < 0.05. it can be said that the intensity of flight noise to the concentration of learners has a significant correlation.

To determine the strength of the influence of flight activity noise intensity on student learning concentration

used product-moment correlation analysis. The results of the product-moment correlation test obtained that the r -value, according to the interpretation guidelines, the correlation coefficient has a substantial degree of closeness to influence. A summary of the results of the product-moment correlation test data processing can be seen in Table 5.

Table 5. Product-moment correlation test results

r	$Sig.$
0.635	0.000

Based on the test results obtained a significance value = 0.0002 (significant < 0.05). It can be said that there is an influence between the intensity of flight activity noise on student learning concentration. This finding is in line with research conducted by Gilavand and Jamshidnezhad. They found a negative impact of noise on student learning outcomes and achievement [21].

Refers to Table 5, the product-moment correlation test was obtained at 0.635, meaning that the effect of flight activity noise intensity on student learning concentration was in the healthy category. Educational institutions with a high noise level will make students unable to concentrate correctly during learning activities [6].

Judging from the location and position of the Waioti Maumere Islamic elementary school building, it is rectangular. There are several coconut trees (*Cocos nucifera*) and cherry trees (*Muntingia calabura*) whose leaves are quite thick. The existence of trees is useful for reducing noise. Besides, each classroom has a closed window, and a curtain or curtain is installed that can act as a noise damper during learning activities [22].

However, the noise of flight activities is not the primary trigger that can interfere with Islamic elementary school students' learning concentration, Waioti Maumere. Based on the calculation of the coefficient of determination, another significant factor, 59.68%, affects student concentration.

V. Conclusion

This study was conducted to determine how much influence the intensity of flight activity noise has on the learning concentration of Islamic elementary school students in Waioti, Maumere. The measured average noise level is 58.92 dB. This value has exceeded the threshold value set by the Minister of Environment Decree No.48/MNLH/11/1996. Students' learning concentration's distraction level reached 71.43%, which is included in the frequent disturbance level scale. Islamic elementary school, Waioti, Maumere is expected to reduce noise by planting noise-reducing plants such as cherry trees, mango trees, and guava trees. Schools must facilitate teachers with loudspeakers as a means of conveying the material being taught. Teachers do not get tired quickly because they have to scream a little when

they hear planes' sound while teaching in class. Besides, the learning media must be designed to attract students' attention and concentration to stay focused on the material being studied and ignore the noise.

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