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THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE MANAGEMENT ON THE EFFECTIVENESS OF THE TEACHING AND LEARNING PROCESS AT SUPERIOR HIGH SCHOOL ACEH BESAR

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Abstract. This study aims to determine the influence of the management of facilities and infrastructure on the effectiveness of the teaching and learning process at SMAN Unggul Aceh Besar. Using a quantitative approach, data collection techniques are carried out through observation, interviews, documentation, and questionnaires. Data analysis was carried out using the T test and N-Gain, where the results of the T test showed very high significance (0.000) and the N-Gain test reached 0.71, reflecting an increase in effectiveness of about 71%. These findings show that there is a significant influence of the management of facilities and infrastructure on the teaching and learning process. The limitations of this study include limited sample sizes and challenges in data collection, as well as potential biases that can affect the results. Emphasis on the role of school principals in the management of facilities and infrastructure, along with the support of education personnel and the community, is key in ensuring the sustainability of effective educational facilities.

Keywords: *Management of Facilities and Infrastructure, smooth teaching and learning process*

I. INTRODUCTION

The teaching and learning process in schools is the core of formal education which plays an important role in forming a competent and qualified next generation. This process involves interaction between educators and students in order to transfer knowledge, skills and values to students (Al-Nofaie, 2020; Coman et al., 2020; Murkatik et al., 2020). The teaching and learning process at school does not only include activities in the classroom, but also various extracurricular activities, guidance and character development which are carried out comprehensively to support students' holistic development ((Aningsih et al., 2022; Buckley & Lee, 2021; Díaz-Iso et al., 2019).

SMAN Unggul in Aceh Besar Regency is one of the educational institutions that is committed to creating a conducive and quality learning environment. In the context of education, adequate facilities and infrastructure play an important role in creating effective learning. Effective learning is learning that focuses on developing student competencies (Falloon, 2020; Yulianti & Sulistiyawati, 2020). This effectiveness can be seen from the ability of

students to develop the knowledge, skills, and values necessary to interact with their social environment (Anis et al., 2020; Matitaputty & Sopacua, 2023; Uge et al., 2019). With good facilities, the learning process not only focuses on achieving results, but also encourages students to understand and apply intelligence and positive values in daily life, so as to be able to create wise and highly competitive individuals (Dewi & Primayana, 2019; Hamilton et al., 2021; Munna & Kalam, 2021).

The problem of this study focuses on the lack of adequate facilities at SMAN Unggul in Aceh Besar Regency and its impact on effective learning. Based on existing data, many infrastructures are not maintained, such as damaged toilets and buildings that need repairs. In addition, educational facilities such as laboratories and classrooms also show a worrying condition, where most of them are in a state of disrepair. This limitation is exacerbated by a lack of human resources, where teachers do not have enough skills to take advantage of modern learning technology.

TABLE 1. Description of Facilities and Infrastructure at SMAN Unggul in Aceh Besar Regency

Facilities and Infrastructure	SMAN A	SMAN B
Accreditation	A	A
Classroom	8 (Good)	18 (Moderately Damaged)
Laboratory		
IPA	3 (Good)	3 (Heavily Damaged)
Language	1 (Good)	0
IPS	0	0
Computer	1 (Good)	1 (Heavily Damaged)
Library	1 (Good)	1 (Heavily Damaged)
Sanitation		
Teacher	2 (Good)	2 (Minor Damage)
Student	18 (Good)	2 (Heavily Damaged)

Management of infrastructure and facilities to facilitate the teaching and learning process can be used to arouse student enthusiasm and passion in certain fields (Jumasrin, 2020). The infrastructure here is a tool to help students develop their potential talents and interests, as well as provide satisfaction with the quality of the school and the students' parents (Saefullah et al., 2019). The existence of this superior school can also convince the public that the school has excellence not only in terms of academics but also excellence in managing the infrastructure at the school so that students are comfortable and safe in the learning process (Asiah et al., 2022; Mishra et al., 2020).

Several studies that have been conducted on the management of school infrastructure, such as research conducted by Santoso (2020) regarding the influence of infrastructure on the effectiveness of the learning process, show the results that infrastructure has an influence on the effectiveness of the learning process. Research conducted by Herlinawati et. al (2023) shows the results that good facilities and infrastructure can improve the quality of learning and the quality of education well. Apart from that, research conducted by Hasanah (2020) shows that the implementation of structured and controlled management of facilities and infrastructure will support improving the quality of the teaching and learning process. However, some of this research has not focused on the impact of the management of facilities and infrastructure on the effectiveness of the teaching and learning process at Unggul Aceh Besar High School, so this research is important to carry out. Therefore, this study aims to see the influence of facilities and infrastructure on the effectiveness of the teaching and learning process at SMAN Unggul Aceh Besar. In addition, this study also aims to investigate specific aspects of management that can affect the quality of learning. This research will explore how the physical condition of facilities, such as classrooms, laboratories, and libraries, contributes to student motivation and engagement in learning. In addition, aspects of human resource

management, such as teacher training in using modern technology and innovative teaching methods, will also be analyzed to understand their impact on classroom interaction.

II. METHODS

The quantitative approach was chosen in this study because of its ability to measure the relationship between variables systematically and objectively. By using this method, the study can clearly identify and analyze the influence of facilities and infrastructure management (X1) on the effectiveness of the teaching and learning process (Y). In this study, the sampling method used is non-probability sampling with a purposive sampling approach. The research subjects consisted of 16 people, which included 2 school principals, 2 education staff in the field of facilities and infrastructure, 6 teachers, and 6 students. Participants were selected from two Superior High Schools in Aceh Besar, namely SMA Ali Hasjmy Unggul 3 and SMA Negeri Unggul Modal Bangsa. The criteria for inclusion in this study were that the respondents must be employees of SMA Unggul Aceh Besar, ensuring that they have a relevant understanding of the management of facilities and infrastructure in the school. The research framework can be seen in the following image.



Fig. 1 research design

Hypothesis:

H1: There is a positive influence of management of facilities and infrastructure (X1) on the effectiveness of the teaching and learning process (Y)

H2: There is no positive influence of management of facilities and infrastructure (X1) on the effectiveness of the teaching and learning process (Y)

Data collection techniques in this research are observation, interviews, documentation and questionnaires. Observation Using a rubric or observation guide such as calculating the existing infrastructure at Unggul Aceh Besar High School. The interviews used were structured interviews according to variables, aspects and indicators related to the management of infrastructure. Documentation Using tools such as cellphones to record interviews and document infrastructure. The questionnaire uses a Likert scale using a Google form which is given to respondents. The questionnaire indicators used for this research can be seen in the following table.

TABLE 2
 RESEARCH QUESTIONNAIRE

N	Variables	Indicators	Item Number
1	Management of Facilities and	Location and place	1

Infrastructure		Building	2
		Sports field	3
		Room	4
		Teaching materials	5, 6
		Library	7
		Laboratory	8
		Instructional Media	9, 10
2	Teaching and learning process	Achievement of learning completeness	11, 12, 13
		Achieving the effectiveness of student activities	14, 15, 16
		Achievement of the effectiveness of the teacher's ability to manage learning, and positive student responses to learning	17, 18, 19, 20

Before being implemented as a data collection instrument in the field, the questionnaire went through a validity and reliability testing stage to ensure trustworthiness and accuracy in evaluating teacher performance. Item validity was assessed using the Pearson product moment correlation test, while reliability was evaluated using the Cronbach Alpha test. The following are the results of evaluating the validity and reliability of the instrument.

TABLE 3
QUESTIONNAIRE VALIDITY RESULTS

No.	Variable Indicator	Sig value. (2-tailed)
1.	Management of Facilities and Infrastructure	0.654
2.	Teaching and learning process	0.617

From the results of testing the validity of the items, it was revealed that all items were proven to be valid because the significance value exceeded the value of 0.05. After that, report the results of the instrument reliability testing which can be seen in the following table.

TABLE 4
QUESTIONNAIRE RELIABILITY TEST

Cronbach's Alpha	N of items
0.624	16

Based on the data presented, it can be seen that the three variables have Cronbach Alpha values above 0.05, which indicates that the questionnaire developed is reliable.

The data that has been collected is then analyzed using descriptive statistical analysis methods. Previously, several prerequisite tests were also carried out such as normality tests and homogeneity tests. Apart from that, to test the hypothesis, several techniques are used such as the partial significance test (t test) and the N-Gain test. In this study,

the T test and the N-Gain test were chosen as statistical methods to analyze the data and test the hypothesis. The T-test is used to measure the significance of the mean difference between the two groups, which in this context can help determine whether there is a significant difference in the effectiveness of the teaching and learning process before and after the management of facilities and infrastructure is implemented. Meanwhile, the N-Gain test was used to measure the improvement in student learning achievement after the intervention. N-Gain provides a value that shows how much progress has been made, allowing researchers to quantify the effects of facility and infrastructure management in improving the quality of learning.

III. RESULT

A. Normality Test

Normality testing is carried out to determine whether residuals or errors in a dataset follow a normal distribution pattern. In this case, the test statistic called the p value (probability) is calculated based on the data value, using a significance level (α) of 0.05. In this study, the One Sample Kolmogorov Smirnov Test was used to evaluate the assumption of normality, and the p value obtained (0.058) was compared with the significance level (0.05) to indicate that the remaining data were considered normally distributed.

TABLE 5
NORMALITY TEST

Class	Asymp. Sig. (2-tailed)
Pretest	,298
Posttest	,581

The output of the normality test can be seen as the Asymp.Sig.(2-tailed) value in the experimental class from the normality test with a pretest value of 0.298 and a post-test value of 0.581. So the significance value of the experimental class is greater than 0.05. So it can be concluded that the test data is normally distributed.

B. Homogeneity Test

Test the homogeneity of the experimental class which will be used as a research sample. This test is carried out to determine whether the class is homogeneous or not. The homogeneity test results can be seen in the following table.

TABLE 6
HOMOGENEITY TEST RESULTS

Levene Statistics	df1	df2	Sig.
,197	1	43	,611

Table 4 shows the results that the pretest and posttest data have a significance value of 0.611. The significance value is greater than 0.05 which indicates that the data is homogeneous.

C. T-Test

The T test is used to assess the influence of one independent variable, which can be the management of facilities and infrastructure, on the dependent variable,

namely the teaching and learning process. The table below displays partial test results from the study.

TABLE 7
T TEST RESULTS

Class	Asymp. Sig. (2-tailed)
Pretest	0,000
Posttest	0,000

The significance level used in the T test in this study was set at $\alpha = 0.05$. That is, if the p-value generated from hypothesis testing is less than 0.05, then the result is considered statistically significant. In the context of the study, the p value of 0.000 shows that there is a very strong relationship between the management of facilities and infrastructure and the effectiveness of the teaching and learning process. Since the p(2-tailed) value of 0.000 is much smaller than $\alpha = 0.05$, the alternative hypothesis (H1) is accepted, while the null hypothesis (H2) is rejected. This means that the management of facilities and infrastructure has a significant influence on learning effectiveness, indicating that improvements in infrastructure and educational resources can contribute positively to student learning outcomes.

D. N-Gain Test

The N-Gain test aims to determine the level of effectiveness of using a particular treatment in research. The N-Gain test results can be seen in the following table.

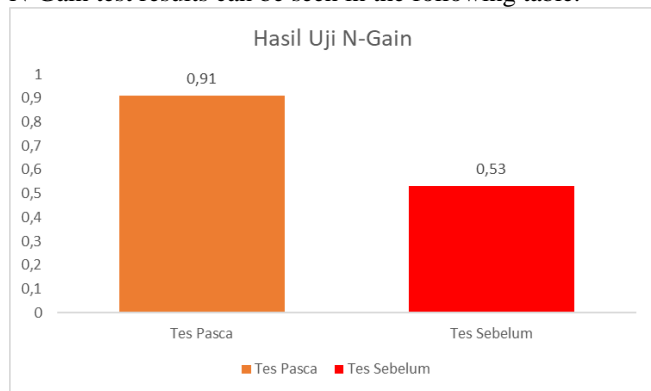


Fig 2. N-Gain Test Results

Based on table 7. The N-Gain test results for the Posttest N-Gain test class are greater than the pretest class, where the posttest N-Gain value is 0.91 (High) and the Pretest N-Gain value is 0.53 (Medium).

IV. DISCUSSION

The findings of this study show that effective management of facilities and infrastructure contributes significantly to increasing the effectiveness of the teaching and learning process at SMA Unggul in Aceh Besar. The results of the T test which showed a significance value of 0.000 and an N-Gain value of 0.71, which means there was an increase of 71%, indicated that improvements in the management of educational facilities had a strong positive impact on student learning outcomes. The results of this

research support previous research conducted by Santoso (2020) showing the results that infrastructure has an influence on the effectiveness of the learning process. Research conducted by Herlinawati et. al (2023) shows the results that good facilities and infrastructure can improve the quality of learning and the quality of education well. Implementation of structured and controlled management of facilities and infrastructure will support quality improvement in the process of teaching and learning activities (Hasanah, 2020). The aim of managing educational infrastructure is to provide services and professionals in the field of educational infrastructure in order to carry out the educational process effectively and efficiently (Komalasari et al., 2020). If teaching is seen as a process of delivering material, then learning facilities are needed in the form of tools and materials that can convey messages effectively and efficiently (Puspitarini & Hanif, 2019; Rahim et al., 2022; Winarto et al., 2020). In other words, the existence of good facilities not only increases the comfort of learning, but also supports a more interactive and comprehensive pedagogical process. Overall, this study emphasizes the importance of paying attention to the management of facilities and infrastructure in the context of education, which can have a significant impact on improving the quality of education in Aceh Besar.

From the results of research at Unggul Aceh Besar High School, it can be concluded that planning for the management of facilities and infrastructure is very structured using three types of planning, namely long, medium and short term. This planning prioritizes the needs and priorities of the school community, which are then included in the school's RPJM after being carried out by the school principal and educational facilities and infrastructure staff. The research results also show that maintenance of facilities and infrastructure is carried out periodically to maintain the continuity and quality of facilities, while the system for eliminating facilities and infrastructure is carried out with strict operational standards to eliminate facilities that are no longer suitable for use or are not functioning. Supervision and control carried out by educational staff are responsible for ensuring that the management of facilities and infrastructure runs optimally and in accordance with established provisions. All of these efforts aim to achieve the effectiveness of the teaching and learning process and improve the quality of educational infrastructure at Unggul Aceh Besar High School.

Effective and organized management of facilities and infrastructure in schools has a direct positive impact on the efficiency of learning activities ((Iqbal et al., 2019; Sahibzada et al., 2020; Tjahjadi et al., 2019). Dekar (2024) said that well-managed facilities and infrastructure will produce results in accordance with educational goals, which in turn enable students to adapt and contribute to society. If infrastructure is well maintained, it will reduce the risk of student learning failure. Management of facilities and infrastructure is very important because by managing the facilities and infrastructure of educational institutions, their use will be maintained and clear (Gulua, 2019; Kasneci et al.,

2023; Latham & Layton, 2019). In managing the school, the school must be responsible for the facilities and infrastructure, especially the school principal who directly handles the facilities and infrastructure (Ahmad, 2021). And the school must also be able to maintain and pay attention to existing school facilities and infrastructure. So, with the facilities and infrastructure in schools, students can learn optimally and as efficiently as possible (Puspitarini & Hanif, 2019). So, the management of educational facilities and infrastructure on the effectiveness of supporting student learning is very influential. Because with good management of facilities and infrastructure, the learning process will run well and smoothly. So that students in the learning process can use these facilities and infrastructure to access learning.

The findings of this study have significant practical implications for school administrators and policymakers. With evidence showing that effective management of facilities and infrastructure can increase the effectiveness of the teaching and learning process, school administrators are advised to prioritize the improvement of infrastructure and educational facilities. Investments in the maintenance and improvement of facilities, such as classrooms, laboratories, and learning tools, can improve the quality of the student learning experience. Policymakers can also use these insights to formulate policies that better support the management of educational facilities. For example, they can allocate a larger budget for the construction and maintenance of school infrastructure. In addition, policies that encourage training for educators in utilizing facilities and infrastructure more effectively can also strengthen learning outcomes. Insights from this study can be applied to improve facility management in other schools by conducting periodic evaluations of the condition of facilities and infrastructure, as well as involving stakeholders, including teachers and students, in the decision-making process related to facility management.

While the findings of this study provide valuable insights, there are some limitations that need to be acknowledged. One of the main limitations is the specific context of SMAN Unggul Aceh Besar, which may not fully reflect the conditions in other schools in different regions or regions. Differences in culture, resources, and educational policies can affect the results obtained. In addition, the potential for bias in data collection is also an important consideration. For example, if participants have an overly positive or negative view of the management of facilities and infrastructure, this can affect the accuracy of the data collected.

V. CONCLUSIONS

The results of the study at SMA Unggul Aceh Besar show that the management of structured facilities and infrastructure—through long-term, medium, and short-term planning—significantly increases the effectiveness of the teaching and learning process, with an increase in learning effectiveness reaching around 71%. These findings underscore the importance of effective management of facilities and infrastructure in education, which not only affects student learning outcomes but also the overall quality

of education. For this reason, school administrators are advised to conduct data-based evaluation and planning, as well as involve various stakeholders in the management of facilities. In the future, the research can be expanded with longitudinal studies involving several schools to obtain more representative results, as well as considering other variables such as student psychological factors and teacher motivation, in order to produce a more comprehensive analysis related to the management of educational facilities. The practical implications of the findings of this study show that school policies need to prioritize the routine maintenance of facilities and infrastructure, as well as ensure adequate funding to support quality educational infrastructure. Community involvement in the management of school facilities is also very important, because it can create a greater sense of ownership and support for efforts to improve the quality of education. In addition, training programs for principals and staff on effective facility management should be prioritized, so that they can understand the importance of structured and responsive management to the needs of students and the learning environment.

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