

# Optimizing Educational Facilities and Infrastructure Management: Operational Standards with Ergonomic Principles

Muhammad Raihan Rondo<sup>1</sup>, Mutsanna Bin Muhammad<sup>2</sup>

<sup>1</sup>Islamic Education Management, <sup>2</sup>Islamic Education Management, Faculty of Tarbiyah and Keguruan Scienci, UIN Sunan Kalijaga, Jl. Marsda Adisucipto No 1 Yogyakarta 55281, Indonesia. Tel. (0274) 513056,

Corresponding author

[rhnrondo3@gmail.com](mailto:rhnrondo3@gmail.com), [mutsannamuhammad@gmail.com](mailto:mutsannamuhammad@gmail.com)

**Abstract:** Research on ergonomics in educational facilities and infrastructure is still very limited. It is important to conduct research related to ergonomics in education to produce optimal management of facilities and infrastructure. Optimizing the management of facilities and infrastructure will have a good effect on educational institutions. This study aims to analyze the application of ergonomic principles in operational standards in the management of educational facilities and infrastructure. The background of this study is based on the increasing attention to the health and comfort of users in the educational environment, which affects the effectiveness of learning. The method used in this study is literature analysis from various sources, including journal articles, books and research reports related to ergonomics and educational infrastructure. The results show that the application of ergonomic principles can improve students' physical comfort, reduce the risk of injury, and support a more productive learning atmosphere. This is because ergonomic principles always prioritize linkages and connections between facilities and infrastructure and operational standards. The conclusion of this study emphasizes the importance of integrating ergonomic principles in the design and management of educational facilities and infrastructure to achieve optimal educational outcomes.

**Keywords:** Ergonomics, Facilities and Infrastructure, Operational Standards.

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## Introduction

The application of ergonomics in facilities and infrastructure is a success factor in education management. (Azizah & Isnaini, 2023). This is because the principle of ergonomics in educational facilities and infrastructure has a significant impact on the process of organizing learning. Ergonomics in education focuses on the relationship between educators and the environment. (Uche & Fanny, 2015). The connection that occurs has a direct impact on the educational process in educational institutions. The ergonomics approach in educational institutions provides comfort through the facilities and infrastructure available, thus providing an effective, healthy and safe impact on the learning process. (Ghozali, 2022). Facilities and

infrastructure are a supporting factor in the success of the learning process in educational institutions.

There are many facts in educational institutions, facilities and infrastructure have not been managed properly. The management of facilities and infrastructure is only centered on tracking the needs that support the educational process, so that it cannot have a significant impact on educational institutions. (Sari, 2021). Ideally, facilities and infrastructure support the success of the educational process that occurs in educational institutions. So that it can be seen the development of students during education. The management of educational facilities and infrastructure requires the principles of ergonomics to support the success of the educational process, where the involvement of ergonomic principles has an impact on the

relationship between students, teachers and the learning environment in the learning process (Soetisna et al., 2018).

In addition to the application of ergonomic principles in educational facilities and infrastructure, there needs to be operational standards in managing good educational facilities and infrastructure. Operational standards for facilities and infrastructure are carried out in stages starting from planning the facilities needed, procurement, inventory, maintenance, evaluation and elimination. (Gusli et al., 2023). In management, special attention is needed to optimally utilize the available facilities and infrastructure. Educational institutions are responsible for the management of facilities and infrastructure, especially leaders who deal directly with the management of facilities and infrastructure. (Maizah & Ratnawati, 2024).

Based on the explanation above, educational facilities and infrastructure must be managed properly. There are operational standards to maximize the utilization of educational facilities and infrastructure in educational institutions. (Danim, 2020). The available facilities and infrastructure support the continuity of the educational process. The goal is to make it easier for students and pupils to interact during the learning process. The concept of ergonomics adds comfort to the learning process by providing a good learning environment. This is to provide an effective and efficient impact during the learning process.

Departing from this, this article is prepared to be a reference or reference for educational institutions in managing facilities and infrastructure. Where the management of facilities and infrastructure that facilitates the learning process of students during learning. Not only on the students themselves, teachers and staff also have an impact on the ease and comfort in providing services to students, so that the implementation of education in an educational institution will achieve the goals that have been set. This is because facilities and infrastructure have a connection between teachers, staff and students with a good learning environment (adequate facilities and infrastructure).

## Materials and Methods

### Study area

This article uses a library research method by reading, collecting and processing literature, so that it becomes a research. (Diah Priharsari, 2022) The literature collected has relevance to the topic of discussion. Literature collection is always a data collection technique carried out by tracing and identifying relevant literature, such as articles and books related to infrastructure management, operational standards and ergonomic concepts in educational facilities and infrastructure.

### Procedures

This research discusses optimizing facilities and infrastructure management through operational standards and ergonomic principles. So that it can be a reference to produce good facilities and infrastructure to support the education process. This research uses descriptive qualitative analysis to present data (Sugiyono, 2020). Data presentation is organized systematically using words. Compilation of data is done by identifying, evaluating, and analyzing problems regarding the management of facilities and infrastructure. Data processing is done by putting forward the ideas of experts and facts that occur in the environment of educational institutions.

## Results and Discussion

### Facilities and Infrastructure Management

Facilities and infrastructure are an inseparable part of education. In relation, facilities and infrastructure have a function and role in carrying out the educational process in educational institutions. Functions and roles provide significant benefits to the educational process (Fauzi, 2020). Within the scope of management of educational facilities and infrastructure, it will organize and manage facilities and infrastructure as a support for the process of organizing education to achieve goals. The arrangement and management of educational facilities and infrastructure will manage from the planning stage to its effective and efficient use.

In the process, education will always involve interaction between teachers and students, so that facilities and infrastructure will provide convenience during the process. The better the management of facilities and infrastructure owned by educational institutions will make it easier for teachers to carry out their duties as educators. (Parid & Alif, 2020). Fulfilling the needs of teachers in carrying out their duties as education personnel, will be fulfilled through the management of facilities and infrastructure, so that teachers can utilize all facilities and infrastructure to facilitate the learning process.

### **Operational Standards for Educational Facilities and Infrastructure**

In optimizing the management of facilities and infrastructure requires an operational standard in its management, this is to increase the effectiveness and efficiency of management. According to Subroto, the operational standards of educational facilities and infrastructure are divided into several, namely:

#### a. Determination of needs

At this stage, checking existing assets and tracking the needs of facilities and infrastructure needed in the learning implementation process is carried out. In preparing the needs must pay attention to the activities and needs of goods in terms of the type or volume of goods. In addition, planning needs must also pay attention to several aspects, namely, procurement and development of facilities and infrastructure, land acquisition for building construction, procurement and construction of school buildings, and planning for the procurement of educational furniture and equipment.

#### b. Procurement

This stage focuses on the procurement of all facilities and infrastructure needs using a budget sourced from government fees, tuition fees, and community assistance.

#### c. Usage

At this stage it is divided into two, namely consumables and non-consumables. Consumables, must compile a list of equipment tailored to the needs of the school activity plan each month, compile the costs required for

procurement each month. While non-consumable goods must compile a list of equipment and be adjusted to the needs of the activity and pay attention to existing equipment that can still be used, pay attention to the planned costs by paying attention to the specified standards, and compile a priority scale and scale of needs for the preparation of an annual procurement needs plan.

#### d. Recording and Management

At this stage must have an inventory book that is useful for inventorying facilities and infrastructure, a purchase book to record all purchases of goods, a deletion book to record items that are no longer suitable for use, and item cards to record information about facilities and infrastructure owned.

#### e. Accountability

At this stage, all facilities and infrastructure starting from planning to use must be made accountable reports to superiors. The accountability report is prepared based on procurement costs, storage costs, distribution costs, investment costs, and write-off costs.

### **Ergonomics**

Ergonomics is an interdisciplinary scientific approach to the application of the principles of human behavior of human behavior with machines directed at adjusting machines and auxiliary equipment to improve performance with aspects of safety, comfort, efficiency, health and safety at work. According to Charpanis, quoted by Sanders, "Ergonomics is a systematic branch of science to utilize information about the nature, abilities, limitations, and other human characteristics to design tools, machines, jobs, work systems, and the environment so that people can live and work on the system productively, effectively, safely and pleasantly." (Idkhan et al., 2021). Based on this explanation, ergonomics connects humans with work and supporting facilities. So that it can increase productivity in doing work.

In the world of ergonomics education provides convenience in the work of teachers in the learning process. The convenience that exists is the result of the connection between students, teachers, and supporting facilities in the education process. This is because ergonomics has the main goal, namely

increasing effectiveness and efficiency in work and developing safety at work. So it can be concluded that the application of ergonomics in the scope of education is a success factor in the education process.

### **Ergonomic principles in educational facilities and infrastructure**

The concept of ergonomics focuses on the relationship between tools, methods, and the work environment with human abilities and limitations so as to create safe, comfortable, effective, efficient, and productive working conditions. (Siboro et al., 2013). It aims to create a good environment so that the educational process that occurs in educational institutions can be carried out optimally. There are several ergonomic principles to consider, namely:

a. Neutral posture

Neutral posture focuses on how humans work in sitting and standing positions. It aims to provide comfort during interactions between teachers and students. Examples include specifications for tables, chairs, whiteboards and other media used in the learning process.

b. Classroom design

Focuses on classroom design that provides comfort to learners and teachers. This includes temperature, lighting, ventilation and more. Not only that, the layout of the classroom must also be arranged to facilitate learners in learning, such as the location of tables, chairs, whiteboards, and chairs. (Widiastuti, 2006). Everything must be organized so that the classroom arrangement provides convenience so that learners and teachers are free to interact.

c. Supporting Facilities

All supporting facilities must be able to facilitate students must be able to facilitate students and provide a safety impact on its users. For example, laboratory equipment must be safe and not have a negative impact on students and teachers.

### **Linkage of Operational Standards and Ergonomic Principles**

Optimizing the management of educational facilities and infrastructure must pay attention to ergonomic principles in the operational standards

that are carried out. Where in operational standards with ergonomic principles have a significant impact on the management of educational facilities and infrastructure. The impact provides comfort and a good learning environment in the learning process. Operational standards in educational institutions will plan the facilities and infrastructure that will be used. Ergonomic principles play a role in being able to provide comfort and a good environment for educational institutions.

Operational standards start from planning needs that focus on what is needed for the learning process in educational institutions. Furthermore, the utilization of facilities and infrastructure owned to be used as well as possible in supporting the success of learning. In the final stage, operational standards will evaluate the available facilities and infrastructure to see how useful they are and also to see the feasibility of conditions for use in the next school year. Meanwhile, the principle of ergonomics will ensure the suitability between users (teachers and students) and existing facilities and infrastructure has a connection that produces physical comfort for students, reduces the risk of injury, and supports the creation of a more productive learning atmosphere.

### **Conclusions**

Facilities and infrastructure as a component of education support the continuity of the education process. In its management, it must be managed properly so that it can have a significant impact. Management of educational facilities and infrastructure plays a role to manage and manage facilities and infrastructure so that they can be maximized during the educational process. Of course, in the continuity of the educational process supported by facilities and infrastructure, there are operational standards that serve as a guide for the management of facilities and infrastructure. Operational standards have an effective and efficient impact on the planning and use of facilities and infrastructure. In the management of facilities and infrastructure, the principles of ergonomics have a positive impact by paying

attention to the safety and comfort aspects of teachers and students during the educational process.

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