

Research Article

The Eco Office Approach to Achieving Environmentally Friendly Offices

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Abstract.

The current level of environmental damage has become a global problem. Office buildings have many activities that require a lot of energy consumption, including water and electricity. They also produced a lot of waste which harms the environment. Overcoming this environmental problem requires cooperation from all elements of society, especially academics in universities who act as the scientific community. The Eco Campus/Eco-Office program is the solution that is applicable in overcoming problems in the campus's environment. This study aims to develop a design for implementing the Eco-Office at the Faculty of Engineering, Universitas Islam Bandung (UNISBA). The method used is a descriptive qualitative method using observations, in-depth interviews, and documentation studies. The results of this study were in the form of alternative and technical strategies. These alternative strategies included policy documents, standard operating procedures (SOP) for Eco-Office, and the formation of a special team to handle the Eco Office and routine outreach at the Faculty of Engineering, UNISBA. The technical strategies based on the existing conditions were energy efficiency (water and electricity), waste management, reducing the usage of papers, and maintaining office sanitation.

Keywords: Environmental, eco-office, campus, standard operating procedures, technical strategies

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1. INTRODUCTION

The problem of environmental damage in recent years has become an important issue. The greenhouse effect increased the earth's temperature and resulting in global warming. More environmental damages happened due to the increasing number of industries with processed and packaging materials. If global warming is left unchecked, it will have an adverse impact. Units that will be affected by global warming include the earth and living creatures, which impacted health and social life [1]. The extreme damage from the impact of global warming is climate change, where climate change can change rainfall, unpredictable air quality, storms, and others [2]. Environmental management efforts are increasingly complex with many indicators. On the one hand, human knowledge of the environment is not optimal, one of which is environmental

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problems that occur in universities. The limited number of supporting infrastructures is a major factor that contributes to this environmental problem.

Office buildings have many activities that require a lot of energy consumption, including water and electricity. They also produced a lot of waste which harms the environment. If the residual wastes from these activities are not solved, it will cause environmental pollution, including poisoning and noise pollution [3]. Two main aspects must be considered in building an environmentally friendly campus. The first is the physical environmental aspect, which involves reducing energy consumption, land use, and environmentally friendly buildings. The second is the socio-cultural aspect that involves management, education, practice, behaviour, and relationships with parties who effectively use the physical elements of an environmentally friendly campus [4].

Based on several studies on Eco Campus that is applied in almost all campuses in North America, one of which is implementing the ecocity model. The outline of this ecocity model is green facilities, facility management, emission reduction, environmentally friendly transportation, ecological restoration, and sustainable landscaping [5]. Other research has also suggested that the University British of Columbia is also implementing "car-sharing" programs and cycling culture and closing middle lane traffic to non-emitting vehicles [6]. To create an Eco campus, of course, requires some preparation to support the program, such as what was done by architectural engineering students at Pennsylvania State University by developing mobile computer-based prototype design skills to develop the Eco Campus concept with the help of AR technology [7,8].

To implement UNISBA's eco campus, the Faculty of Engineering as a Faculty that teaches environmental disciplines pays great attention to implementing UNISBA's eco campus and must start with the implementation of the eco office program at the Faculty of Engineering, UNISBA. The preparation of SOPs is one way to create an Eco- Office, which will be used later as a reference in implementing the Eco Office at the Faculty of Engineering. With the SOP, the Faculty of Engineering UNISBA will have clear guidelines and standard guidelines so that the program will run more effectively. To measure the applied system properly, an evaluation tool is needed to measure the success of the system is applied. As a similar system has been done in a university in China, the Eco Campus Program is measured using FAHP which claims to be able to calculate index weights and compare indexes on the same row [9].

2. STANDARD OPERATING PROCEDURES (SOPs)

SOPs are a collection of standard operating procedures that serve as guidance in a work environment to ensure that the work steps of each worker are running well and by their portions. SOPs are made with the objectives, among others: a) Maintaining consistency of employee work b) Knowing the roles and functions of work in each section c) Clarifying the steps of the duties and responsibilities d) Avoiding administrative errors e) Avoiding mistakes, doubts, duplication, and inefficiency. The functions of SOPs are as follows: a) Facilitating the activities of workers in one company/office b) Legal umbrella when there are problems that go wrong c) A tracker for any errors that occur d) Guiding workers in carrying out work to remain obedient and committed e) Guidelines for every work activity every day [10]. The results of previous research indicate that companies or educational environments that implement SOPs will experience changes for the better [11].

3. ECO-OFFICE CONCEPT

The concept of Eco Campus/Eco Office is a management concept developed by institutions to create a green and environmentally friendly campus environment by prioritizing conservation, saving (reduce, reuse, recycle), and good, healthy, and environmentally friendly.

In determining a campus or building as an Eco-Office, there are several criteria according to various sources, namely:

1. Consideration of human health and welfare
2. High level of comfort
3. Design that follows changes
4. Utilization of the latest technology
5. Human resources training [12].

Based on previous studies on Eco Campus / Eco Office conducted at the College of Engineering at Anna University, they conducted initial studies on energy consumption patterns, on-campus influences in various locations and made an Eco Map for the campus. This Eco Map is created as a basic reference in implementing the Campus concept as the result of mapping locations within the campus environment [13].

4. METHODOLOGY

4.1. Type of Research

This study uses a descriptive method with a qualitative approach. In fact, qualitative research does not emphasize numerical representations, but rather deepens certain problems of understanding. In qualitative research, researchers can be both the subject and the object of their research. The purpose of this qualitative method is to produce in-depth and illustrative information so that it can be implemented [14]. Qualitative research suggested collaborating with the appropriate and deeper aspects of aspirations, beliefs, values, and attitudes of relationships, processes, and phenomena that cannot be reduced to operationalizing variables [15]. The steps are taken in this research include:

1. Observation: identification and formulation of problems, literature study, and field studies at the Faculty of Engineering, UNISBA.
2. Documentation: documenting every corner of the environment of the Faculty of Engineering, UNISBA.
3. Interview: direct questions and answers with experts / other stakeholders related to the Eco Office on the campus of UNISBA.
4. Discussion and Analysis: Information and data obtained from observations and documentation are then discussed with relevant experts/stakeholders.
5. Compilation and Output: preparation of SOPs and preparation of research reports.

4.2. Research Focus

The focus of research is alternative strategic steps and technical strategies carried out to realize the Eco Office concept in the Faculty of Engineering, UNISBA.

5. RESULTS AND DISCUSSION

5.1. SOPs Eco Office

The results of this study include the draft policy of the environmental culture office in the faculty of engineering UNISBA, Guidelines for the implementation of eco office Faculty

of Engineering UNISBA, and Design Standard Operating Procedure (SOP) Eco Office Faculty of Engineering UNISBA.

These SOPs are part of the Eco Office alternative strategy. This SOP was made with the aim that the application of the Eco Office at the Faculty of Engineering, UNISBA can be well managed. Several SOPs were made to regulate the implementation of the Eco Office, include:

1. Saving energy use (electricity).
2. Water use savings.
3. 3R based waste management.
4. Saving paper usage.
5. Maintaining office sanitation.
6. Waste management of food waste.

5.2. Alternative Strategic Steps

Several alternative strategies are prepared based on the results of observations and interviews. Among others are making policies document related to the implementation of the Eco Office, creating a special team under the supervision of the Dean who has the function of planning and implementing the Eco Office, developing a Standard Operational Procedure (SOPs) for an environmentally cultured campus program, and regular socialization related to Eco Office which is followed by all work units within the Faculty of Engineering, UNISBA.

5.3. Technical Strategy

Technical strategies are prepared based on physical and environmental conditions at the Faculty of Engineering, UNISBA, and refers to the eco Office guidelines. The technical strategies are as follows: 1) energy efficiency (Water and Electricity), 2) 3R-based Waste Management, 3) reduction of paper usage and 4) office sanitation maintenance. Documentation of the existing conditions at the Faculty of Engineering, UNISBA, and the proposed Eco Office technique are shown in table 1. The alternative strategy steps and techniques mentioned above are the result of interviews with experts and literature studies from various sources, one of which is the Eco Office Guidelines made by the Ministry of Environment and Forestry (KLHK) and GBCI.

TABLE 1: Existing condition table and eco-office strategy at the faculty of engineering UNISBA.

Physical and Environmental Conditions of the UNISBA Faculty of Engineering Building	
Existing	Strategies
The use of taps that do not save water for ablution activities, washing of cutlery, etc.	Setting the tap water system during ablution activities, washing cutlery, etc.
Use of a Toilet that is not Eco-Friendly	Use of <i>eco-friendly</i> toilets
Lack of sunlight when entering the room	Optimizing the entry of sunlight into the room, yet minimizing the use of lights
Use of air conditioning at a temperature of 19° Celsius	Use of air conditioning at a temperature of 24-25° Celsius
A waste management system that has not been segregated	Application of the 3R waste management system (sorted trash cans)
Snack box that still uses plastic packaging and mineral water	Use of snack box packaging with reusable plastic boxes
Excessive use of paper	Application of paper savings, with a double-sided printing system and electronic manuscripts
Not use cleaning agents, insect-killing agents, air fresheners that are environmentally friendly	Using cleaning agents, insect-killing agents, air fresheners that are environmentally friendly
There are no green plants in the building environment	Provision of Living Plants in the Building Environment

6. CONCLUSION

Based on the results of observations, it can be concluded that the Faculty of Engineering, UNISBA has not implemented the Eco Office concept by the Eco Office Guidelines. Therefore, alternative strategies and technical strategies were formulated so that the implementation of the Eco Office at the Faculty of Engineering, UNISBA could be implemented properly. The content of this alternative strategy is in the form of initial steps that must be taken, while the technical strategy is the implementation of the Eco Office concepts adapted from the Eco Office Guidelines. One of the determining factors for the success of implementing the Eco Office is the creation of SOPs that function to regulate the implementation of the Eco Office at the Faculty of Engineering, UNISBA.

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