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ANALYZING THE 5S CULTURE IMPLEMENTATION IN ENGINEERING FACULTY, YOGYAKARTA STATE OF UNIVERSITY, INDONESIA

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ABSTRACT

This study contemplates to analyze the implementation of the 5S culture (seiri, seitom, seiso, seiketsu, shitsuke) in laboratories which is positioned at the Faculty of Engineering, YSU, which includes (1) planning 2) implementation, and (3) supervising (the implementation of 5S in the management of laboratories). To achieve the research goals, a descriptive qualitative research method was adopted. The lab coordinators, heads of departments, technicians, lecturers in charge of laboratories, and students from several departments at Faculty of Engineering, YSU were committed tobe participated as information resourches. Data collecting was run by observation, interviews and document study. The data analysis consists of reducing data, presenting data, concluding and analyzing qualitative data and checking the validity of the data in this study using triangulation. The findings revealed (1) 5S planning in management based on 5W+1H. Planning for the implementation of 5S involves the head of the department, lecturers in charge of practicum courses, lab coordinators and technicians. Planning for implementing 5S includes socializing 5S, establishing PIC, planning for managing facilities and planning that support 5S implementation, (2) Implementation of 5S in practical management belongs to excellent category. (3) Supervision of 5S involves heads of departments, lecturers in charge of practicum courses, coordinators and technicians. 5S supervision in laboratory management in the form of maintenance of practical tools and materials as well as filling a control checklist, (4) obstacles in implementing 5S work attitudes consisting of physical and non-physical factors, (5) how to overcome them by conducting 5S socialization, forming man who care for the environment, and maintain practice tools and materials regularly.

Keywords: 5S, Engineering Faculty, Laboratory, Evaluation

INTRODUCTION

Arrangements in the work environment are needed to be related to the responsibility to maintain safety and security. In addition to increasing safety and productivity, an adequately designed work environment can boost morale (Knechtges, et al., 2013). The 5R method (Brief, Neat, Clean, Caring, Diligent) is the stage for regulating workplace conditions (Aini & Sriasih, 2021). 5S (Brief, Neat, Clean, Caring, Diligent) is an adaptation of the 5S program (Seiri, Seiton, Seiso, Seiketsu, and Shitsuke) in the form of methods for organizing and cleaning workplaces developed and implemented in Japan (Rahma, et al., 2020). 5S is an ideal method to properly learn quality-related knowledge through the identification and commitment of all parties with equipment and work facilities that guarantee the start of the Total Quality Management process (Jiménez, et al., 2015). Maintaining or maintaining the workplace is one step to obtaining a quality product (Aryanti, 2019).

The 5S culture is essential for creating a safe work environment and a healthy organization (Susanto, 2022). 5S is a Japanese method for cleanly, efficiently and safely organizing

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workspaces to achieve a productive work environment (Veres, et al., 2018). 5S culture is a way or method to organize and manage a better and sustainable workplace (Rantung, et al., 2018). Occupational safety and health management have a role in controlling the system and minimizing the risk of work accidents to create a safe, efficient and productive workplace (Liliana & Suyadi, 2018). 5S is a method that promotes cleaner production systematically and helps clean up the entire process by reducing waste (Shahriar, et al., 2022). The 5S, implemented effectively, will give the desired results in terms of workplace cleanliness, order and work environment, which ultimately contributes to overall productivity and quality improvements (Kumar et al., 2021).

The application of 5S saves time in finding certain parts/items and makes it easier to know where to look (Ribeiro, et al., 2019). The successful implementation of 5S changes the organization, from working conditions to job satisfaction (Sharma & Lata, 2018). This method in workplace organization helps improve equipment cleanliness and regulates workplace operators, which leads to worker involvement and hence increases productivity (Sundarajan & Terkar, 2022). 5S is a process that humanizes the workplace, makes it easier to work when properly implemented, and teaches experimentation on work using scientific methods and how to learn how to recognize and eliminate waste in business processes (Prasad, et al., 2020).

Discipline is related to obedience and responsibility being applied until it becomes habitual (Apriliani, et al., 2021). The 5S culture that is not implemented in the workshop can be caused by a lack of knowledge about the concept of workshop management or the limited human resources that have an impact on work efficiency that cannot be achieved by the workshop (Widiyatmoko & Anitasari, 2022). There are several problems related to the equipment arrangement for activities involving students, such as poor filing, wasted time due to improper placement of items, inappropriate storage space, and damaged and old equipment. The main problem in laboratory management is the need for a system that can determine current settings and the disproportionate participation of all staff in workplace management (Sari, et al., 2017).

Each piece of equipment used has excellent value, so special treatment and care must be given to its use and storage, such as proper care and arrangement so that it does not suffer damage or unwanted incidents. In addition, with the implementation of 5R, laboratory performance will increase (Chung, 2019). The laboratory, as a means of learning activities, is expected to be a place to expand knowledge and improve skills (Devi, et al., 2019). Work culture rules or regulations significantly affect the discipline of students when carrying out learning activities in the laboratory (Mahasin & Suyitno, 2022).

Universities and technical colleges use educational laboratories with technical resources and functional characteristics comparable to industrial facilities. A neat and clean workplace can be a model of good work culture (Pita, 2020). The laboratory is an educational facility that engineering students use in carrying out practicums. Therefore, the authors want to conduct research related to the analysis of the implementation of the 5S culture in the management of workshops and laboratories of the Faculty of Engineering UNY. This study analyzed the planning, implementation, supervision and obstacles to implementing 5S in the management of laboratories and workshops at the Faculty of Engineering, UNY.

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METHOD

This evaluation research aims to determine the application of 5S in the management of laboratories and workshops at Engineering Faculty, YSU. Sources of data or respondents in this study were heads of departments, lecturers in charge of practicum courses, technicians and heads/coordinators of laboratories and workshops at YSU. Two people determined the sample of respondents for each lab/workshop: technicians and lecturers who served as heads/coordinators of laboratories and workshops in that area of expertise. Data collection was carried out using a questionnaire and observation. The observation method is used to validate the data obtained through a questionnaire so that the observation sheet contains the same points as the questions in the questionnaire. The research instrument was validated based on logical validity and carried out through expert judgment. The data analysis technique used in this research is descriptive statistics and qualitative descriptive analysis. The evaluation model used in this study is the discrepancy evaluation model from Provus. The measurement results for each 5S component are interpreted based on the evaluation criteria for the magnitude of the discrepancy (D) proposed by Suryantari & Sumantri (2016).

RESULTS AND DISCUSSION

Engineering Faculty, YSU's workshops and laboratories are used for practical learning activities in lectures so that those who require attention in their maintenance both from an environmental perspective and from the arrangement and facilities available. The work principles of concise, neat, clean, caring, and diligent (5S) in workshops and laboratories can be assessed by the management carried out. Effective and efficient laboratory management is needed to optimize the results of implementing 5S. The implementation of the 5S culture in the management of the Engineering Faculty laboratories can be seen from the planning, implementation, supervision, obstacles, and how to overcome them.

1. Planning of 5S

Planning for the implementation of 5S in the management of workshops and laboratories of Engineering Faculty is following 5W + 1H. Planning for the implementation of 5R involves the head of the department, supporting lecturers, lab coordinators and technicians. Planning for the implementation of 5S Engineering Faculty in the FT YSU workshop and laboratory includes:

a. Planning for the socialization of 5R, which is carried out to all members of the engineering faculty during meetings and practical lessons.

b. Formation of a Person In Charge (PIC) or someone responsible for managing the implementation of 5R in the FT YSU workshop and laboratory, namely the head of the department, supporting lecturers, coordinators and technicians.

c. Planning for the management of workshop facilities and infrastructure consists of valuable equipment and materials, including storage, administration of use, and maintenance of valuable equipment and materials. Storage of practice tools and

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materials following the place. Administration of use in the form of recording the procurement, use and removal of practice tools and materials. Maintenance of practice tools and materials includes scheduled, preventive, and emergency maintenance to keep valuable equipment and materials ready for use.

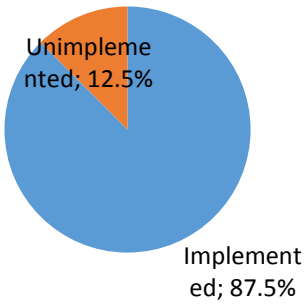
d. Planning activities supporting the implementation of 5S include making green lanes that show the main lines and markings as visual controls to provide information on workshop conditions, planning for workshop waste management, and planning for 5S training.

2. Actuating of 5S

Concise, neat, clean, well-cared for, and diligent in managing the workshops and laboratories of FT UNY in the excellent category.

a. Seiri (Concise)

Briefly, in implementing 5S in the Engineering Faculty YSU laboratory, namely managing everything and sorting according to specific rules or principles. The activities that need to be carried out are sorting which objects are used and which are not, which objects will be stored, and how to store them, so they are easy to use. The implementation of the concise aspect is in a suitable category.



Summary in general in the form of storing tools that are used in an easy-to-reach place, coding on storage racks, storing items that are not used in separate places, storing tools and functional materials based on education and training courses, storing tools separately between tool boxes, teaching aids, and warehouses storage, available stock lists, separate practice space between the workshop and power transfer, categorization of goods, as well as the activity of disposing of goods. The level of implementation of concise aspects in the Engineering Faculty YSU laboratory is 87.5%. You can see the concise aspects of the Engineering Faculty laboratory here:

1. Checking the goods in each area
2. Label, color code and number on the storage rack
3. Determination of categories of goods that are used or not

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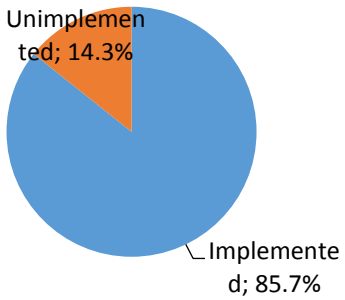
4. Throw away unnecessary items
5. Availability of a place to store/dispose/destroy unused items.
6. Storage of tools and materials that have been labeled in a color to a predetermined place
7. The practice room is separated between the engine workshop, electrical workshop, chassis workshop and power transfer
8. Availability of a list of stock items

b. Seiton

Seiton, storing goods in the Engineering Faculty laboratory in the right place makes it easier to find items. The existence of neatness in the management of workshops and laboratories makes the environment more orderly and comfortable.



Tidying generally takes the form of arranging each tool and material according to the place, labelling storage racks, providing a ledger listing items (inventory, collection, not yet returned or lost), sheets for the use of practice tools and materials, tidying up practice tools and materials after the activity, labelling of supplies, data on tools to be disposed of or written off. The level of implementation of neat aspects in the Engineering Faculty laboratory is 85.7%. You can see the neat aspects of the Engineering Faculty laboratory here:

1) Arrangement of all tools and materials needed in the space provided
2) Labelling to facilitate use and return
3) There is a ledger that contains a list of inventory, goods taken, goods that have not been returned or goods lost
4) Sheets for the use of practical tools and materials contain user information, tools and materials used, quantity, and completeness
5) Students tidy up practice tools and materials after practical learning activities are used before being returned to storage
6) Labeling of supplies
7) Data collection on the equipment to be disposed of or written off

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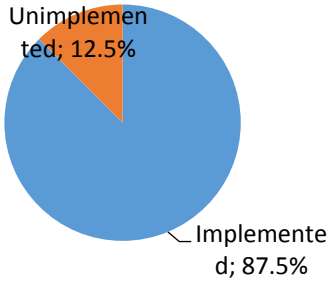
c. Seiso (clean)

Cleanliness in the Engineering Faculty laboratory is a commitment to protecting the environment, and all items are always in a clean condition. The clean process can be done by managing daily hygiene procedures. This is done so that there is no dust, dirt or odour so that the workshops and laboratories of Engineering Faculty are kept clean for the sake of occupational health and safety.



Cleanliness generally in the form of availability of facilities and infrastructure for cleaning practice tools, availability of cleaning practice workshop rooms, there is a person in charge of cleaning, cleaning practice rooms before use, checking the condition of practice tools and materials before use, cleaning practice tools after use, cleaning after use, available posters about the importance of keeping clean. The clean aspect implementation level in the Engineering Faculty laboratory is 87.5%. The clean aspects of the Engineering Faculty laboratory can be shown from:

1) There are facilities and infrastructure for cleaning practice tools
2) Availability of facilities and infrastructure for cleaning practice workshop rooms
3) There is a person in charge of cleanliness for certain areas
4) Cleaning of the practice room by the person in charge before being used for practice activities
5) Examination of the condition of tools and practice materials by technicians before being used for practice
6) Cleaning of practice tools by students after being used for practical activities
7) Cleaning of practical workspaces by students after being used for practical activities
8) There are posters about the importance of maintaining cleanliness

d. Seiketsu (well cared for)

Taking care of the Engineering Faculty laboratory means maintaining conditions that provide an orderly, clean and tidy atmosphere. Care is taken so that in the Engineering Faculty laboratory, only items are needed, not scattered, and not dirty.

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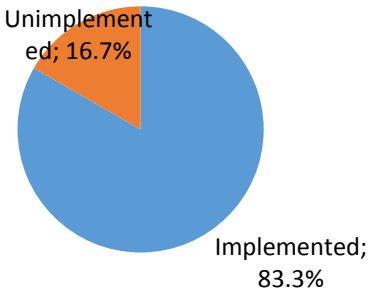
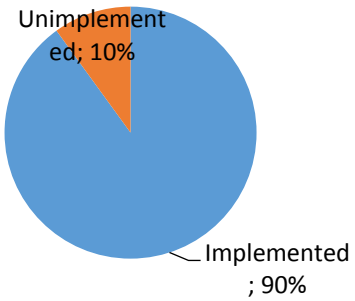


Maintenance generally takes the form of the availability of preventive maintenance procedures for tools; there are warnings to be careful and how to operate specific tools, marking practical tools that are under repair, labelling periodic inspection of tools and practical materials, marking damaged tools, there are a code specific colours for specific areas. The level of implementation of the maintenance aspect in the Engineering Faculty laboratory was 83.3%. The internal care aspects in the Engineering Faculty laboratory can be seen from:

1) Preventive maintenance procedures are in place on the equipment
2) There are warnings to be careful and how to operate certain tools
3) Marking of practice tools that are under repair
4) Labelling weekly, monthly and yearly inspection of tools and materials for good practice
5) Marking on a tool that has been damaged
6) There is a certain color code for certain areas such as red as a dangerous area boundary, yellow as a work area boundary, green as a work area.

e. Shitsuke (diligent)

Diligent is the commitment of each individual to be disciplined in complying with regulations in the workshop and laboratory of the Faculty of Engineering, YSU. This is done so that it becomes a habit to maintain the Engineering Faculty laboratory environment and can remind each other if there are mistakes or deficiencies in implementing the rules.



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Diligent is generally manifested by activities such as the use of work clothes according to the rules, storage of practical tools and materials following the place, cleaning of the workshop space according to schedule, filling out loan vouchers before borrowing practice tools and materials, using practice tools and materials according to procedures, cleaning tools and valuable materials after the activity, cleaning the practice room after the activity, maintenance of tools and suitable materials according to schedule, marking of tools that are under repair, and data collection on tools that will be removed. The diligent aspect implementation level in the Engineering Faculty laboratory is 90%. You can see the diligent aspects in the Engineering Faculty laboratory:

1) Students wear work clothes according to the rules when doing practice
2) Students store practice tools and materials according to their place
3) Cleaning the workshop space by the person in charge according to the cleaning schedule
4) Students borrow data before borrowing practical tools and materials
5) Students use practical tools and materials in accordance with the procedure for use
6) Students clean practice tools and materials after practical activities
7) Students clean the practice room after practical activities
8) Carry out maintenance of practice tools and materials in accordance with the maintenance schedule by the person in charge
9) The person in charge gives marking to the tool that is under repair
10) Collect data on the tools to be removed

3. Controlling of 5S

Supervising the implementation of a concise, tidy, clean, caring, and diligent workshop management involves the head of the department, technicians and teachers. Supervised the implementation of concise, neat, clean, caring, and diligent management of the workshop in the form of maintenance of practical tools and materials as well as filling in the control checklist. The control checklist monitors the use of facilities and infrastructure in the Engineering Faculty laboratories. Supervision activities are also carried out using practical tools and materials, as well as a control so that damage does not occur. Supervision is carried out to ensure that every job is carried out safely and follows every procedure and work instructions determined.

4. Barriers of 5S

Obstacles in the implementation of 5S consist of physical and non-physical factors. Barriers from physical factors consist of workshop layouts that still need to be in accordance with the industry, storage of practice tools and materials that are not yet appropriate, and preparation of

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incomplete documents. At the same time, the obstacles are from non-physical factors, namely, many students who need help understanding the 5S, and its application of the 5S.

This obstacle can be caused by the need for more understanding of all laboratory personnel, aspects of quality documents, aspects of laboratory resources and aspects of attitudes and behaviour of laboratory personnel. In accordance with the requirements contained in ISO/IEC 17025: 2005, there are four stages of corrective action, namely: cause analysis; selection and implementation of corrective actions; monitoring of corrective actions; and additional audits. Corrective action must be taken immediately when discrepancies occur in the laboratory, both in the management system and in laboratory techniques.

5. Solutions

Obstacles in the implementation of 5S in the Engineering Faculty laboratory must be overcome so that they do not cause problems in using tools and goods and affect safety in practical learning. The way to overcome this is by carrying out 5S socialization, forming cadres who care about the environment, and regularly maintaining practice tools and materials.

a. 5S socialization is carried out by expert staff, lecturers and technicians who understand the concept and application of 5S in workshops and laboratories of Engineering Faculty.

b. Formation of man who care about the environment so that they can assist in supervision and control to create comfort and safety in the workshops and laboratories of Engineering Faculty.

c. Routine maintenance of practice tools and materials, such as cleaning practice tools and materials after use and arranging practice tools and materials according to their place. To its original place and try to tidy it up properly, clean aspect by cleaning and preventing dirt from reappearing, maintenance aspect by preventing deterioration of workshop and laboratory environmental conditions, the diligent aspect with discipline to practice good habits.

CONCLUSION

The planning is concise, neat, clean, cared for, and diligent in the Engineering Faculty laboratory following 5W + 1H, including planning for 5S socialization, forming PIC, planning for managing workshop facilities and infrastructure and planning activities that support the implementation of 5S. Concise, neat, clean, caring, and diligent management has been carried out correctly. Supervision is carried out in the maintenance of practice tools and materials and filling in the control checklist. Obstacles in the implementation of 5S consist of physical and non-physical factors. Solutions to obstacles include socialization, Formation of 5S cadres and routine maintenance, both physical and non-physical.

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