



## Development of a Management Guide Module for Vocational Secondary School Concrete Workshop Practical Tools and Materials

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### Article Info

Article History :  
Received  
August 2022  
Accepted  
November 2022  
Published  
July 2023

#### Keywords:

Workshop Management;  
5S/R Work Culture;  
Guide Module; Vocational  
Education

### Abstract

The quality of management in the practical workshop area determines the quality of practical activities in it. Teachers need to prepare a good workshop implementation process by paying attention to everything, starting from the effectiveness of implementation to achieving implementation that provides good habits for students in it. In this case, the thing that is being considered is the implementation of the 5S/5R culture.

This research uses Research and Development using the ADDIE development model. The assessment of the suitability of the media being developed is carried out by a judgment expert. The product trial was carried out at SMK Negeri 2 Salatiga with 36 students in the experimental class. Data collection from experts uses material and media validation instruments for product suitability, while data collection on application to students uses teacher assessment through observation instruments and checklist data by researchers to test product effectiveness.

The results of this research show (1) that the product developed is a module for management of tools and materials for Vocational High School concrete workshops; (2) The product is declared valid and reliable using the Aiken v test and expert percentage. (3) the module was developed practically based on responses from Experts/Validators consisting of lecturers and teachers practicing Construction and Housing Engineering (4) effectiveness testing using the N Gain test showed that the data for the experimental and control classes had increased with a percentage of 47.59%.

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## INTRODUCTION

The quality of management in the practical workshop area will determine the quality of the practical activities within it. Teachers need to prepare a good workshop implementation process by paying attention to everything that must be considered, starting from the effectiveness of implementation to achieving implementation that provides good habits for students in it. In this case, the thing that is being considered is the implementation of the 5S/5R culture. The 5S/R work culture is a habit to shape a person's behavior by prioritizing the 5S/R principle itself, which stands for concise, neat, tidy, caring and diligent.

The concrete masonry workshop is one of the facilities provided by vocational education institutions (SMK) for students in the Construction and Housing Engineering expertise concentration. Students will be given learning in the form of practicums in a concrete masonry workshop to be able to understand the procedures for practicing building science. Practicum implementation requires tools and materials needed to create or complete a practicum project. So, management of tools and materials is needed to avoid waste of materials.

Management is important for an organization or agency to achieve the goals of that organization or agency. An effective workshop management concept or model is needed to achieve good learning goals. Management has 4 basic functions, namely Planning, Organizing, Actuating and Controlling. These four management functions are abbreviated as POAC. In management there are several factors that can influence/hinder each activity, such as funding problems, limited number of human resources and expertise possessed by implementers in maintaining educational facilities and infrastructure, implementers do not take firm action against users who do not comply with the rules.

The result of management development will have an important role for students and teachers. Currently, developing workshop implementation management by implementing a 5S/R work culture in vocational high schools is

needed to improve the results of graduates who are disciplined in the world of work and industry. Currently the 5S/R principles have not been fully implemented in vocational schools. The 5S/R principle is usually applied at the factory or industrial level.

Based on research by Kuswanto, B (2015), the average number of students who understand work rules and safety in workshops is still small, so there is a need to develop a management model to improve the quality of students' understanding in the workshop environment. He also stated that currently there is still a need to develop workshop management models to be able to increase work safety figures in workshops.

Based on Rohmadi's research, M (2020) in his research found that several factors can influence students' management abilities. Among them are the factors of competent teaching staff, facilities and infrastructure, as well as the learning system used which will be able to improve students' abilities and habits in carrying out practicums in workshops.

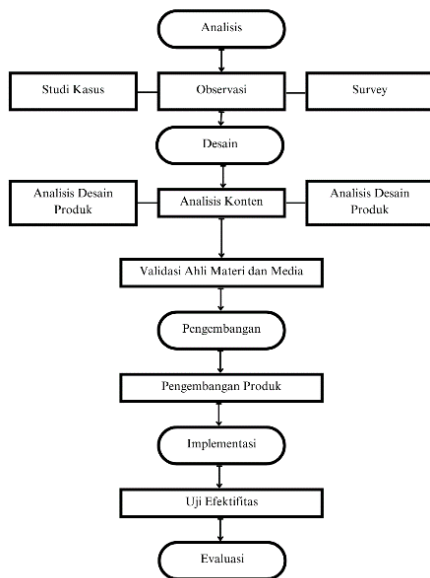
According to Sutopo, P (2021), the problem of work culture is a major problem in an organization or company. To form a good and optimal culture, organizations and companies must be formed with commitment.

Based on this preliminary study, the researcher is interested in creating a guide module for implementing 5S/R in the management of tools and materials for concrete masonry workshops at SMKN 2 Salatiga. It is hoped that this study can become a reference for various parties in improving the quality of vocational education, especially in the management of workshop implementation in the Construction and Housing Engineering expertise concentration.

## METHODS

This research method is research and development. According to (Sugiyono, 2014) research and development is a research method used to produce new product designs, test the effectiveness of existing products, as well as develop and test the effectiveness of existing products, as well as develop and create new

products. The research and development model (research and development R&D) functions to help produce new products in the form of management concepts which are used as student study guides in implementing workshop practices in the Construction and Housing Engineering skills program. The development flow is as follows:



The media development design in this research was adapted from the ADDIE development model which consists of five development stages, namely Analysis, Design, Development, Implementation, Evaluation (Alodwan, 2018: 43.) Educational development research includes the development process, product validation, product testing, and evaluate. The ADDIE model is a class-oriented development model. The development of the ADDIE model is identical to the development of a learning system.

The research analysis method used in this research is descriptive research analysis using a quantitative approach. This research method was used to measure the level of application of the tool and material management guidance module in the concrete masonry workshop towards the implementation of 5S/R in the Construction and Housing Engineering skill group at SMK Negeri 2 Salatiga. The object of this research is the practical workshop.

## Analysis

The analysis stage is the initial stage in carrying out research in collecting data which will become a reference in formulating problems and sharpening research focus. The activities carried out are in the form of needs analysis to create a management concept for workshop implementation. Researchers collect data by direct observation.

## Design

At this stage, researchers begin to formulate or compile the implementation management concept that will be developed. The workshop implementation management concept will be prepared based on references referring to 5S/5R and Ergonomics. The results of the initial draft/design will be discussed with experts in the field of facilities and infrastructure. Then the next step will be the realization of the concept that has been approved.

## Development

In the development stage, management concepts that have been discussed with experts will be developed based on the input that has been provided. Next, the development results will be submitted to expert validators consisting of material experts. Where the material experts are experts and practicing teachers. Next, the results of the development will be tested for practicality and feasibility, which will then be continued by testing the effectiveness of its implementation.

## Implementation

At the implementation stage, the application of implementation management concepts will be used as a guide by students in carrying out practicums in workshops. At this stage, data will be obtained regarding the practicality and quality of the product through criticism and suggestions.

### 1. Research Location

The location of this research was carried out at the Construction and Housing Engineering expertise concentration at SMK Negeri 2 Salatiga.

## 2. Sample and Population

According to Sugiyono, PD (2015): "Population is a generalized area consisting of objects or subjects that have certain qualities and characteristics that are determined by researchers to be studied and then conclusions drawn." Populasi yang diambil dalam penelitian ini adalah peserta didik kelas XI konsentrasi keahlian TKP SMK Negeri 2 Salatiga, dimana peserta didik menggunakan laboratorium dan bengkel sekolah secara intensif.

## 3. Data Collection Techniques

Data collection techniques use documentation and observation with direct observation.

### 3.1 Observation

According to Sugiyono (2010: 146) structured observation is observation that has been designed systematically, regarding what will be observed, when and where the data collection will be carried out.

Data collection in this research used structured observation techniques. Observations were carried out to find out the actual situation related to the implementation of 5S/R during practicum in the workshop area by the researcher seeing directly the actual situation to find out the condition of facilities and infrastructure in the field and to see directly the implementation of 5S carried out by students.

### 3.2 Documentation

Data collection using this method is used to retrieve documentary data such as photographs, documents and others, which can later be used as supporting data for the research being carried out.

## Evaluation

The evaluation stage will analyze the data that has been obtained to determine the shortcomings of the product being developed. Evaluation results data in the form of suggestions and questionnaires. Uji Efektivitas

This research aims to develop a product and test its effectiveness, namely to improve students' habits in implementing the 5S/R work culture. The media developed was carried out for

feasibility tests and effectiveness tests were also carried out experimentally, namely using the quasi-experiment research method.

### 1. Normality and Homogeneity Test

To find out the distribution of data in the Normal and Homogeneous distribution categories

### 2. Wilcoxon and Mann Whitney Test

An alternative test to the T-test is because the data obtained from the implementation results does not have normal variance and the data is heterogeneous.

### 3. N-Gain Test

Normalized Gain (N-Gain) was carried out with the aim of determining the improvement in students' habits in implementing the 5S/R work culture after receiving treatment. This increase in learning outcomes is taken from the pretest and posttest scores obtained by students. N-Gain is a comparison of the actual gain score (gain) with the maximum gain score. (Richard R. Hake, 1998:65). The actual gain score is the gain score obtained by the student, while the maximum gain score is the highest possible gain score that the student can obtain.

## RESULTS AND DISCUSSION

### Research Results

#### A. Analysis

This analysis activity includes students' practical activities in concrete workshops, the application of 5S/R work culture in concrete workshops, and reference books/guides for implementing 5S/R in the management of tools and materials in concrete workshops. From the results of observations, researchers found that the application of 5S/R does not yet have a specific reference in concrete masonry workshops so that its application still refers to other workshops that already have a reference for the application of 5S/R. In practical activities, several obstacles were found in managing tools and materials before and after use, so a guide was needed that could help support tool and material management activities during practical activities.

B. Design

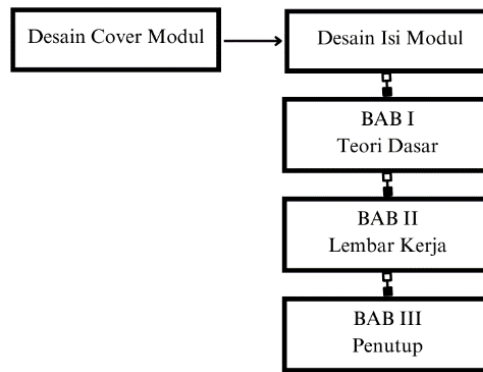


Figure 1. First Design

This guide module contains material regarding workshop management, 5S/R work culture, benefits and targets of 5S/R, 5S/R principles and an introduction to the tools and materials used in the concrete workshop area in CHAPTER I. Then CHAPTER II discusses the steps work on implementing 5S/R into tool and material management activities during practical implementation in the concrete masonry workshop area. In CHAPTER III there is a guide to evaluating student activities.

At this stage, the design results are tested by experts consisting of material experts and media experts. Experts carry out assessments based on the instruments that have been prepared. Based on the results of the instrument that has been filled in by validators including material experts and media experts, the following scores are obtained:

Table 1. Score of Validity Expert

No	Name of Validator	Score
1	Validator 1	37
2	Validator 2	38
3	Validator 3	39
Total Score		114

Based on the table of score results for the material assessment aspect in product development, we got a score of 37 on validator 1,

a score of 38 on validator 2 and a score of 39 on validator 3, so we got an overall score of 114 out of a maximum score of 120.

Table 2. Score of validity expert

No	Name of Validator	Score
1	Validator 1	35
2	Validator 2	34
3	Validator 3	33
Total Score		102

Based on the table of results obtained by media experts' scores in the development product assessment aspect in the form of guide media, they obtained a score of 35 on validator 1, a score of 34 on validator 2 and a score of 33 on validator 3, resulting in an overall score of 102 from a maximum score of 108.

C. Development

At this stage the design that has been created is implemented into a real form. At the development stage, researchers make improvements and add material content along with the physical design of the module product before it is realized in printed form. The guide module product is adjusted with input from experts. The following is the final cover of the module developed.



Figure 2. Final Design

At this stage the module is realized in the form of printed media using A5 size paper with a printed form in the form of a booklet.

#### D. Implementation

At the implementation stage, researchers together with practicing teachers made direct observations on students' practical activities. The indicators observed are the 5S/R activities that students apply to each practicum activity.

##### 1. Seiri / Concise

The seiri / concise indicator is the activity of sorting or setting aside tools and materials according to needs, where if there are tools or materials that are no longer used, they must be thrown away or separated from the storage area for tools and materials that are still in use.

Based on the results of observations, it was found that students carried out brief activities at the beginning of the practicum activities and at the end of the practicum activities. The following are the results of documentation of students' practical activities on seiri/concise indicators:

- a. Sorting. Students sort materials, separating coarse materials from fine materials.
- b. Elimination. Students set aside materials that have been sorted/separated so that they are not scattered.
- c. Labeling. Students label items that have been made and will be stored. As a marker between items that will still be used and those that are no longer used.
- d. Disposal. Students separate unused/unused materials into the disposal box provided. These materials can later be reused. Seiton / Neat

The seiton / neat indicator is the arrangement of tools and materials stored in an orderly / neat manner. The results of observations

found that there was a special storage room for tools and materials. Tool storage is equipped with a tool loan book and the number of tools available for practical activities

Students collect data on borrowing tools in the tool room. In this indicator, students must borrow and return tools and materials to their proper place to maintain neatness.

##### 2. Seisou / Clean

The third indicator is cleanliness activities, cleaning activities that are implemented in practical work areas to maintain the condition of the room/work area in a clean condition. The results of observations found that students carried out rehearsal activities, namely cleaning the room area so that it was ready for practical use. After the practicum, the tools used are cleaned again before being stored in the tool storage area. The remaining materials that can still be used are stored back in the materials storage area. The following is the documentation of the rehearsal activities:

- a. Student activities in carrying out rehearsals include cleaning the room before and after carrying out practical activities. Rehearsal activities include cleaning the practice area from sand scattered by the wind and the remains of practice activities.
- b. Student activities in carrying out rehearsals, students clean up leftover practical materials on materials that will be used in practical activities. Students clean tools and materials before and after practical activities are carried out.

##### 3. Seiketsu / Careful

Seiketsu / maintenance indicators are activities that maintain the continuity of activities that are concise, neat and tidy. In this indicator, if

one of the activities is concise, neat and tidy, one of the activities is not fulfilled, then the maintenance activity is said to have not been carried out.

Grooming activities, where students do concise, neat and clean activities together. By carrying out maintenance activities, a balance in maintaining cleanliness, neatness and safety will be maintained and can provide a sense of security and comfort during practical activities.

#### 4. Shitsuke/ Diligent

The indicator of this diligence is the continuity of conciseness, neatness, cleanliness and grooming into disciplined activities that truly make 5S/R a habit for every student so that consciously and unconsciously it becomes a part of their practical, work and daily life.

Disciplinary activities for students, where students must be independently aware of maintaining the 5S/R work culture. They must be able to remind each other to implement each S/R point in 5S/R in their activities inside and outside the workshop.

Tool and material management activities during practicum

In implementing the management of tools and materials in students' practicum activities, researchers obtained data through observation sheets with direct observations during practicum activities. Based on the observation sheet, the data obtained during the practicum activities are as follows :

##### a. Planning

Based on the results of direct observations/field observations, it was found that planning activities for practicum needs were carried out by practical teachers. However, pupils and students still carry out planning activities. The planning activity carried out by students is planning the need for equipment and materials that will be used by each group. Equipment and material requirements are adjusted to the directions given by the teacher when providing the material. Students coordinate with each other in planning the distribution of tasks.

##### b. Organizing

At the management stage, students and their practicum groups organize all the equipment and materials needed to be used during practicum

activities. Management activities carried out by students and their groups are working together to manage preparations, organize and ensure that the tools to be used are in complete condition as needed. Students work together to share assignments and prepare a suitable framework so that it can be used during practicum.

##### c. Actuating

In the implementation stage, students carry out all activities according to what was planned at the beginning of the practicum. Students work together to carry out practical activities starting from planning, managing materials and tools according to needs, carrying out practical activities to make a roster according to the tools and materials that have been planned and prepared according to the distribution..

##### d. Controlling

Supervision activities are carried out jointly between students and teachers. This activity is carried out to ensure that all practicum activities can run smoothly in accordance with the learning plan (for teachers), as well as in accordance with the objectives of the practicum activity (for students) making rosters. At the supervision stage, teachers and students coordinate to ensure that the tools are kept clean and neatly arranged, return materials that can still be used and clean the practice area so that when they leave the room it is clean and tidy. Practicum activities are carried out under teacher supervision so that the practicum can be completed according to the planned time.

##### e. Evaluation

The effectiveness test can be seen from the differences in the graphs obtained based on the results of the assessment on the 5S/R implementation instrument filled in by the teacher and the results of direct observations carried out by researchers in the field. The effectiveness test was tested using the N-Gain test to see the increase in the results of implementing the 5S/R work culture in students. The increase in implementation results can be seen from the results at the 1st (first) and 3rd meetings. Based on the N-Gain calculation, the average result was 47.59%, where the N gain result was in the medium category.



The results of this development in the form of a guide module are suitable for use as a guide for implementing 5S/5R in tool and material management activities in concrete masonry workshops. Based on direct observation activities on the implementation of 5S/5R among students, it was found that 5S/5R activities can be implemented well but cannot be fully fulfilled because at point 5 (five), namely at the Diligent or Shitsuke point, students must have unconsciously implemented the activities. 4S/R.

### Discussion

Research and development of a module for manual management of tools and materials in concrete workshops through a gradual process using the ADDIE (Analysis, Design, Development, Implementation and Evaluation) method. This development research is based on the lack of books/modules that discuss the application of 5S/R in the educational realm, especially in concrete workshops at Vocational High Schools (SMK). So a module was created in the form of a guide to implementing the 5S/R work culture in the management of tools and materials in concrete workshops.

The development results show that the product developed is feasible through expert testing. The expert tests carried out include material expert tests and media expert tests. At the test stage, the validator carries out an assessment based on the proposed aspects and indicators including aspects of content, language, presentation and practicality of the material. Meanwhile, the media validator assesses it based on aspects of the module cover design, module content and practicality. Based on these aspects, a total of 3 (three) material validators (experts) and 3 (three) media validators (experts) carried out assessments so that results were obtained which stated that the guide module product was declared feasible with validity and reliability.

The product, whose suitability has been tested, is tested by implementing it on class XI Construction and Housing Engineering students who are carrying out practical activities in the concrete masonry workshop. This was done to measure an increase in understanding of tools and materials management by applying 5S/R

principles in practicum activities. At this implementation stage, researchers and practicing teachers observed student behavior in implementing 5S/R. The observation stage was carried out in several meetings to see any changes in XI TKP students in implementing 5S/R. Observations were carried out using instruments as an assessment reference to assess the implementation carried out by students. The researcher also made observations using checklist data to see the general picture without looking at specific individuals but in general or in groups to see the implementation carried out by students referring to the principles of 5S/R work culture and management.

Implementation was carried out in 2 classes XI TKP A and XI TKP B as control and experimental classes. In the control class, the treatment was given as an oral explanation of the material as an introduction to the material, while in the experimental class, the treatment was given as an oral explanation and given a hard file in the form of a guide module which could be used as a reference or guide in implementing 5S/R in practical activities for managing tools and materials during practical activities. To measure the increase in understanding in the implementation of 5S/R activities for students, the researcher divided 3 meetings, the first meeting as a form of pretest where the sample had not been given any treatment, the second meeting was to provide treatment, and the 3rd (three) meeting was the final result of visible treatment. So data is obtained to measure changes over time.

Evaluation of the implementation of 5S/R is carried out based on an assessment instrument that has been agreed upon by the validator which is also stated in the guide module. This evaluation is used to obtain data in the form of scoring/giving scores to students in implementing the 5S/R work culture. The score obtained will later be converted into a value of 1-100 to make it easier to give an assessment. Evaluation is carried out by involving teachers as observers and assessors.

The results of calculating the validity of the material using Aiken V and its reliability show that the average Aiken V score for the material is 0.933 and the reliability is 95% so that the results



of using the material in the module are valid and reliable. This calculation was obtained from the results of the material expert's assessment of the content aspect with 4 (four) indicators, namely; conformity of the material content with the title; suitability of material content with learning activities; significance; and evaluation. Linguistic aspects include writing indicators and effective use of language in sentences and communicative indicators. Serving aspects include indicators of clarity of general instructions and order of presentation. Practical aspects include indicators of ease in teaching and learning and providing focus of attention in learning. The total statement of all indicators in each aspect is 40 items.

Meanwhile, the average Aiken  $v$  score obtained on the media module is 0.926 and the reliability is 95% so that the use of the module is valid and reliable. This calculation is obtained from media assessment based on aspects of media cover design with indicators of color design, module cover illustrations, writing on the module cover (typography), layout on the module cover. Aspects of module content design with indicators of completeness of content design elements, writing on module content (typography) and layout of module content. The practical aspect includes indicators of practicality for teachers and technicians, for students and flexibility. The total statement of all indicators in each aspect is 36 items.

If we look only at the practicality assessment section, at this stage the validator also assesses the practicality side in terms of ease/flexibility of use by teachers and students in terms of form and content. The guide module shows decent results with an average validity for the material and module of 0.956 and reliability. 97%.

From the evaluation results regarding the implementation of the 5S/R work culture for students, data was obtained whose results can be analyzed through N-Gain calculations, showing that there was an increase in students in implementing it by 47.59% so that the increase was in the medium category. Testing was carried out using normality and homogeneity tests. The data obtained does not have normal variance and is homogeneous (heterogeneous). So a non-

parametric test was carried out using the Wilcoxon test and Mann Whitney U-Test to determine whether there were significant differences and influences in the implementation of the tool and materials management guide module. The Wilcoxon test shows that there is an influence in the use of the module and the Mann Whitney test shows that there are differences in the results of application in the control and experimental classes. So it can be concluded that this research has a significant influence on the application of the tools and materials guide module to increase the application of the 5S/R work culture in students.

The results of this research can be supported by previous research through the results of measuring the level of understanding of 5S/R work culture obtained by Listianto, M A in 2022 using a questionnaire instrument. Where the results of the questionnaire showed that the level of implementation of the 5S/R culture in concrete workshops was 90.7% for short activities (Seiri), 96% for short activities (Seiton), 92.93% for clean activities (Seisou), 81.31% for maintenance activities ( Shitsuke), and 95.48% for Diligent activities (Seiketsu). So it can be said in general that the implementation of the 5S/R work culture is in very good condition.

Based on the results of this research, where the research used direct observation, it was found that the application of the 5S/R work culture in the management of tools and materials in concrete masonry workshops during student practicum activities, on an average scale, it was obtained that Concise activities (Seiri) obtained 83%, Concise activities ( Seiton) got 78%, Resik (Seisou) activities got 94%, Care activities (Shitsuke) got 85%, 4S/R activities were carried out well, while Diligent (Seiketsu) got 57% in the medium category. This is because to obtain good diligent results requires much longer observation.

## CLOSING

The results of this research show that the product developed is in the form of a guide module for the management of tools and materials for concrete masonry workshops with a concentration of construction and housing

engineering expertise with the application of the 5S/R work culture. This product is able to improve students' habits of implementing the 5S/R work culture in implementing tool and material management during practicum activities in workshops. To determine a good level of effectiveness, implementation must be carried out over a longer period of time.

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