

The Effect of 5S Culture and Workshop Alignment on the Application of Industrial Work Culture in Vocational Education

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Abstract

The purposes of this study was to determine the correlation of: (1) the cultures of seiri, seiton, seiso, seiketsu and shitsuke (5S) with the application of industrial work culture (BKI), (2) ergonomics of practice (ETP) with the application of BKI, (3) 5S culture with both ETP and BKI. This study was a correlational research that assigned 50 respondents of Vocational Education. The technique of data collection was done by using questionnaire. The data analysis was performed by using descriptive and regression analysis. Results show that: (1) there is a positive and significant correlation of 5S culture with BKI ($r: 0.681$, $p: 0.00$); (2) there is a positive and significant correlation of family planning with BKI ($r: 0.889$, $p: 0.00$); and (3) there is a positive and significant correlation simultaneously between 5S culture, ETP, and BKI ($r: 0.790$, $p: 0.00$). The contribution of 5S variable, ETP, to BKI was 80.6%. There is a relationship between 5S culture and ergonomics of practice on the application of industrial work culture in vocational education.

Keywords: 5S culture, workshop alignment, industrial work culture

INTRODUCTION

The Industrial Revolution Era 4.0 requires a skilled, skilled and professional workforce that is needed for the workforce at this time. The application of industrial culture in vocational education aims to create graduates who are able to eliminate waste while working. The work culture of the industry prioritizes work safety and creates awareness of work safety in carrying out work including the standard processes carried out in an effort to avoid work accidents and avoidable losses. [1]. Awareness on education and the safety of work can be done with educational efforts, direction, and training. The occupational health and safety (K3) is an effort to protect the workforce and other people in the workplace/ company always in a safe and healthy condition, so that each production can be used safely and efficiently [2].

Work learning activities in vocational education tend to be wasteful activities, goods from work practices cannot be sold, cannot be used, because they do not prioritize the quality of practical work results. Vocational education often overloads goods, which are actually useless, and not in neatly organized conditions. Unwrapiness in the arrangement, resulting in a waste of time in the search for tools, the use of tools that do not match its function will result in work accidents and low quality production. Overcoming this wastefulness requires an industrial work culture by using or applying 5S culture. 5S Culture is an intensive method of structuring and maintaining work areas that are used to maintain order, efficiency, and discipline at work sites while optimizing overall company performance [3].

5S culture is a term originating from Japan, namely: Seiri, Seiton, Seiso, Seiketsu and Shitsuke [3]. Whereas in Indonesia better known as 5R, namely: Concise, Neat, Clean, Caring, and Diligent. The advantage of implementing 5S culture is the achievement of increased efficiency, improvement, service, profit and safety. The application of 5S culture is carried out in conjunction with the application of kaizen in order to increase the effectiveness of implementing 5S. The purpose of implementing 5S culture is to create a workforce so that when it is clean, there will be comfort, discipline, handling of events, cooperation, and maintenance of work tools to increase the working life

of the equipment [3]. There are still many workers who think that implementing 5S culture is very difficult, productive work attitudes and neat workplaces can be done by themselves, but the reality shows that neatness still has to be created by itself. Basically the 5S culture changes the basic mentality of the workforce and changes from the simplest things that are usually done by people.

Ergonomics where the practice of knowledge that studies human interaction with the environment and work equipment will be used so that it can play a role in solving problems related to human incompatibility with the equipment used[4]. Ergonomics practice is one of the industrial work culture to accelerate a production activity.

The alignment of the workshop is closely related to individual characteristics to design the right work environment [5]. Workshop alignment is defined as a condition where a balance is made between workload and work pressure. The balancing is done to protect individual health so that it has the effect of increasing work productivity.

The handling of ergonomic aspects in a job needs to be done through several stages. That stage includes (1) organizing processes, (2) identifying problems, (3) analyzing problems, (4) developing solutions, (5) implementing solutions, and (6) evaluating results, including financial analysis. These stages can be applied in an effort to implement ergonomics in a job. Implementing this stage will make the workplace aware of the problems experienced at work and create solutions that might result from these problems.

Ergonomics Practices (ETP) is a way that can be developed to analyze or evaluate problems or potential hazards in the workplace [6,7]. The use of ETP is an attempt to analyze the conditions of the workplace so that it can be used as input to improve the ergonomic conditions of the workforce. ETP can be used as a guide in improving the quality of the work environment by prioritizing occupational health and safety. Ergonomics where this practice can be used to track problematic work conditions. Safe working conditions must be adapted to the condition of the human body to finalize workplace accidents. Workplace conditions that are in accordance with the conditions of the body create comfort in working to do work in order to increase productivity and minimize the risk of accidents. This process requires the discipline of workshop alignment science in the design of a work system. There is a phrase that says "*Without ergonomics, safety management is not enough*". This expression was pointed out by the number of companies that had passed the K3 management audit, but there were many complaints from workers related to education issues. One of them is a complaint about skeletal muscle disorders (Musculoskeletal disorder). This is due to the wrong working methods or not assisted with appropriate tools.

Workshop alignment is a standard in the industrial world established by the International Labor Organization (ILO). The alignment of the workshop results in a number of basic ideas about suppressing wasteful materials, reducing damage to work, improving work quality, increasing maintenance and repairing equipment, introducing more efficient layouts, preventing accidents, organizing workplaces safer and introducing better work methods [8].

Vocational education needs to implement this behavior since vocational education culture is still wasteful and the placement of equipment that is not in accordance with the alignment of the workshop. The application of industrial work culture in schools aims to avoid wasteful behavior during this time in schools and to prepare competent graduates, and to be ready to enter the world of industry.

Vocational Education is education that has collaboration with one of the industries, namely PT. Andaru Persada Mandiri, which is engaged in the supply of laboratory equipment. PT. Andaru Persada Mandiri has a culture of eliminating waste in work. This cooperation is carried out to improve the work culture in Vocational Education so that it is like the industrial world where it should be in accordance with 16 principles of vocational education such as 1) Vocational education will be efficient if there is a learning environment that is compatible with the (replica) environment in which they will work later. 2) Effective vocational training can only be given if the tasks given in the training have operational similarities with the same equipment and the same machine that will be used in future work. 3) Vocational education will be effective if the training is given directly and specifically in thoughts, concerns, interests and intrinsic intelligence with the greatest possible development. 4) Vocational education will be effective if the behavior that will be shown in the future work has been familiarized since in the exercise. 5) Providing effective vocational training for all professions, trades,

jobs can only be given to selected groups that do need, want and are able to use it. 6) Vocational education training will be effective if the provision of training in the form of special experience can be given manifest in the correct habits of doing and thinking repeatedly until the right mastery is obtained for its work. 7) Vocational education will be effective if the trainer is experienced and manages vocational education according to his abilities and skills in teaching. 8) For each job, there is a minimum competency that must be possessed by an individual in order to be in office. If training is not directed towards achieving minimum individual competence, the community will suffer losses. 9) Vocational education must be familiar with working conditions and market expectations. 10) The effective stabilization process of habits for each student will depend very much on the proportion as the exercise provides an opportunity to get to know the real work, and not just an imitation. 11) The most appropriate source of data for training in Vocational Education vocational education training material is nothing but experience that is closely related to work. 12) For each position, there is a very important core part and there are other parts that can be matched with other jobs or other positions. 13) Vocational education will be felt as efficient as preparing services for the community for certain needs at certain times. 14) Vocational education will be socially beneficial if human relations are considered. 15) Administration of vocational education will be efficient if it is flexible compared to the rigid one. 16) Although for one type of vocational education has been strived to reduce the cost per unit, if it reaches a minimum, but the results are not effective, it should be canceled.[9]. Based on the description above, it is necessary to study the relationship between industry work culture through 5S and ergonomics of practice in Vocational Education in order to obtain results that can be used by vocational parties to evaluate the industrial work culture that has been applied in the daily lives of vocational education participants in order to eliminate waste during practice.

The above study brings the writer to examine the presence or absence of 5S cultural relations and ergonomics of practice premises to industrial work culture, find out whether there is a relationship between ergonomics of practice premises to the application of industrial work culture, and to find out whether there is a relationship between 5S culture and ergonomics of practice places on the application of industrial work culture.

METHODS

This study was an ex post facto research. The approach used in this study is a quantitative descriptive approach. This study applied a quantitative descriptive approach since the data generated are in the form of numbers and analysis using descriptive statistics. The place of the study was conducted in vocational education in South Kalimantan.

The subjects of this study were Vocational Education participants with 41 respondents in the Vocational Education participants in the industrial area of South Kalimantan. The instrument used in this study was a Likert scale as data collection. The questionnaire of this study was adapted from the practical steps approach for implementing 5S in the workplace.[10], ergonomics of practice adapted from the questionnaire of ergonomics of *practice* and industrial work culture questionnaire adopted from research from Prof. Drs. Suyanto, M.Ed., Ph.D. entitled the industrial work culture in the Vocational High School..[11].

The data of the study were analyzed with several tests including: descriptive UI, analysis prerequisite test, and hypothesis testing. Descriptive tests include frequency distribution tables, pie charts, and data tendency values. The analysis prerequisite tests include normality test, linearity test, multicollinearity test and homogeneity test, while the hypothesis test uses t test for simple linear regression, and F test for multiple linear regression.

RESULTS AND DISCUSSION

The results of the study in the form of the response of educational participants chose the answer options on the questionnaire. Questionnaire that has been filled out by the respondent is then converted into a number with indicator value of 1 if the answer of the education participant strongly disagrees, 2 if the answer does not agree, 3 if the answer agrees and 4 if the answer strongly agrees.

Validation was done using the expert judgment method and reliability was done using Cronbach alpha reliability. The reliability results showed that each variable is reliable with the results of the analysis as follows: $0.868 > 0.6$ for 5S culture; $0.721 > 0.6$ for practice economic variables, and

0.709 > 0.6 for industrial work culture variables, In accordance with Suharsimi Arikunto's statement (11), the variables are said to be reliable if the Cronbach alpha value > 0.6.

Descriptive analysis was done to obtain mean, median, mode, sum, maximum value, minimum value, and standard deviation results. The total value of each respondent was then displayed in a diagram in order to determine the number of educational participants with the same interval value. Pie diagrams and spider webs were made separately from all the variables so that there are two pie diagrams and one spider web in this study. Diagram of the relationship between the total value of the variable participants' responses to frequency. Figure 1 shows the 5S culture spider web that explains the values of the application of 5S culture.



Figure1. The Spider Web of Culture of Jaring 5S

The implementation of 5S culture in South Kalimantan vocational education is included in the high category but a review of the weak points still needs to be reviewed. The observations show that there are behaviors that are still not right towards the application of 5S culture in vocational schools, there should be an implementation that improves culture and emphasizes implementation such as the first stage (concise): controlling the level of inventory, using the furniture for inventory, giving the furniture a place to store equipment practice, always checking practice equipment in a place appropriate to the storage table, controlling materials that come out for practice, controlling the stock of practical materials, while for near the practice place to get rid of items that are not used in the work area by grouping is not necessary, hesitant, and required.[12].

Table1. The Implementation of Concise (*Ringkas*)

Inappropriate	Appropriate
	

Second stage (neat): if for storing documents by marking a slash, each item has a place, the item is easily identified by labels and colors, makes a dividing line on the laying of the goods, gives a sign of placing the item, adds the color and type of goods to group at work as well as a place for storing goods, placing tools according to their uses (often, rarely, very rarely, and not used) the closer they are to their hands, the more often they are used.

Table 2. The Implementation of Neat (*Rapi*)

Inappropriate	Appropriate
	

The third stage (clean) by way of civilizing the cleanliness and inspection: checking the goods have been placed according to their original place, making a list of check marks, detecting the sources of dirt, always making corrections to the goods in the workshop, preventing the disposal of goods that are not appropriate in the workshop, not put things on the floor to always look clean and neat, always clean the place after practice.

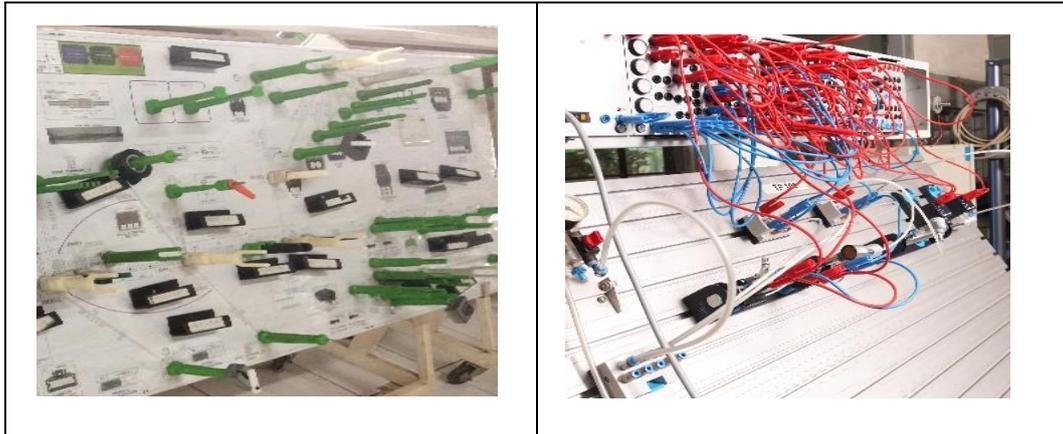
Table 3. The Implementation of Clean

Innapropriate	Appropriate
	

The fourth stage (care): use tools according to their use, do not install tools that have been damaged, report when there are damaged practice items, avoid overuse, always check the components to be used, make standardization or set rules so that work is always the same and orderly done, making standards must be easy to understand and easy to implement for students, standardize work attributes such as sealing, make K3 signs, form regulations in the workshop or LAB, make SOPs when practicing, make indicators on the application of coloring goods placed, determine the conditions abnormal when there is a repair shop and LAB must have practiced the first stage to the third stage which is sustainable.

Table41. The Implementation of Care

Innapropriate	Appropriate
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The last stage (Diligent): this stage is the stage of self-awareness of work ethics, always repeating the first to fourth stages, try to discipline in applying the previous 4S, discipline of standards, mutual respect between students, shame when doing a violation of the rules that have been made, happy to do repairs if there is an interruption or type in accordance with the situation where the practice, must have standards in management, must become accustomed to doing work properly and correctly continuously, do according to SOP (Standard Operating Procedure), do not do what should not be done , at this stage it can be said as the success stage of 5S as a habit rather than coercion so that an improvement initiative will emerge by itself.

Table52. The Implementation of Near

Tidak Sesuai	Sesuai
	

The implementation of 5S culture can be improved by these stages, so that the creation of workshop or laboratory conditions that are in line with 5S culture and avoid waste in the learning process. Each 5S culture must be improved to make the stages more effective and efficient.

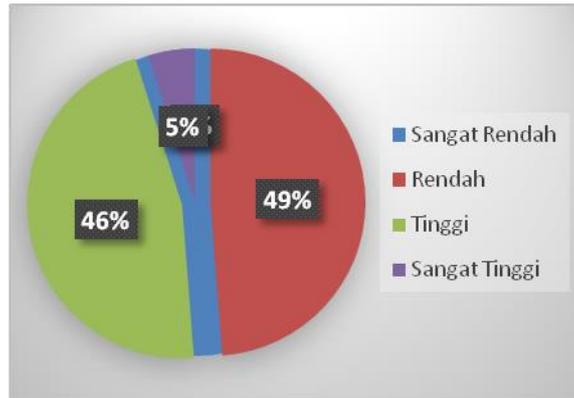


Figure2. A Circle Diagram of ergonomic of a practice site

Figure 2. explains the procedures of the implementation of ergonomics in the practice site in vocational education is in the low category. This shows that there is still a lack of harmony between the place of practice and the work of educational participants. Good alignment of the workshop will make quality practices good, not easily tired and reduce the occurrence of accident rates during practice, this can reduce waste of practice materials.[13].



Figure3. Diagram Lingkaran Budaya Kerja Industri Circle Diagram of Work Culture Industry

The implementation of industrial work culture in vocational education is included in the high category. This shows that the application of industrial work culture is less optimal in its application so far. The adoption of an industrial work culture for vocational school education is still minimal but the way of application such as the Sarpas already supports the emphasis on implementation of students. The culture of waste in vocational school education must be able to be transformed into productive activities in order to optimize and optimize the practical work that will be brought to completion upon graduation.

Prerequisite Test Analysis

The prerequisite test analysis is testing whether the data can be continued at the hypothesis testing stage. Analysis prerequisite tests include normality tests that are useful for knowing whether the data are normally distributed, linearity test to find out whether 5S linear culture on the awareness of industrial work culture and ergonomics of practice is also linear towards industrial work culture, multicollinearity test to determine whether there is a relationship between independent variables, homogeneity test to determine whether the respondent of each variable is homogeneous.

Hypothesis testing

The hypothesis test of this study consisted of two analyzes, namely simple linear regression analysis and multiple linear regression analysis. Simple linear regression analysis for the first and second hypothesis testing, while multiple regression analysis for the third hypothesis test. The first hypothesis of this study is the positive relationship between 5S (X1) culture and the application of industrial work culture (Y) to students in vocational education, South Kalimantan. The second

hypothesis of this study is the positive relationship between the workshop (X2) and the application of industrial work culture (Y) to students in vocational education. The third hypothesis of this study is the positive relationship between 5S culture (X1) and workshop harmony (X2) on the application of industrial work culture (Y) to students in vocational education.

The first hypothesis test can be said to be accepted. H_a was accepted and H_o was rejected. The first hypothesis test uses the t test or simple linear regression analysis. T test can be seen from the significant value and tcount. It is said that there is a relationship if the significant value <0.05 and $tcount > t$ table. The results of data analysis using SPSS software version 20 for Windows get a significant value of $0.009 < 0.05$ and $tcount < ttable (2.745 > 2,0003)$.

5S culture influences the application of industrial work culture because 5S culture eliminates waste and has been applied by various industries. These improvements such as a review were carried out to improve the existing low category. The things that already exist must be corrected to support the acculturation of 5S by repeating the stages of 5S as concise: controlling the level of inventory, using the furniture for inventory, providing the shelf for storage of practical tools, controlling the materials that come out for practice, controlling stock practice material.

The second stage is neat, if it is for storing documents by marking slashes, making lines on the placement of goods, marking items, adding colors and types of goods to group at work or place of storage, placing tools according to their use (often, rarely, very rarely, and unused) the closer to the hand, the more often the tool is used.

The third rehearsal by civilizing hygiene and the fourth examination using a tool in accordance with its use, do not put the equipment that has been damaged, report when there are damaged practice items, avoid overuse, always check the components to be used, must have practiced the first stage until the third stage is sustainable.

The fifth, always repeats the first stage to the fourth, try to discipline in applying the previous 4S, and must have standards in management. The application of 5S in vocational education can be improved with these stages, so that the creation of workshop or laboratory conditions that are in line with the 5S concept and avoid waste in the learning process.

The second hypothesis test can be said to be rejected. H_a was refused and H_o was accepted. The second hypothesis test uses the t test or simple linear regression analysis. T test can be seen from the significant value and tcount. It is said that there is a relationship if the significant value is $0,000 < 0.05$ and the value of $tcount > t$ table. The results of the data analysis obtained a significant value of $0.2679 < 0.05$ and $tcount < ttable (1.126 > 2,0003)$. The results of the calculation of linear regression analysis of simple location of the workshop (X2) to the attitude of industrial work culture (Y) then H_o is accepted and H_a was rejected. This proves that there is no relationship between the practice location and the practice location of the industry's work culture of vocational education participants.

The results of this study indicated that there is no relationship between the ergonomics of the place of practice to the attitudes of industrial work culture such as material handling and work organization, which does not provide a significant relationship to work pressures and the OSH system is more influenced by other things such as hauling distance, and others. The ergonomics of the place of practice do not have a relationship to work culture. The practice area ergonomics consists of 8 indicators, namely material handling, workplace design, safety on machinery, control of hazardous substances, lighting, workplace safety and environmental safety and work organization facilities. The material handling indicator does not have a connection because the storage of an item cannot affect if the application of storage is still lacking. The second indicator of workplace design is not so relationship considering the body size of each human being is different, so the design of the work station must be considered by its.[14].

The third hypothesis test can be said to be accepted. H_a was accepted and H_o was rejected. The second hypothesis test uses the t test or simple linear regression analysis. T test can be seen from the significant value and tcount. It is said that there is a relationship if the significant value is $0,000 < 0.05$ and the value of $tcount > t$ table. The results of data analysis using SPSS software version 20 for Windows get a significant value of $0,000 < 0.05$ and $tcount < ttable (14,249 > 2,0003)$. The relationship of 5S culture and ergonomics of practice on the application of industrial work culture was 42.9%.

The results of the analysis of this study explain that there is a positive influence of 5S and ergonomics of practice on the application of industrial work culture. Overall application of 5S and

ergonomics of practice so that education participants are accustomed to high industrial work culture. The application of an industrial work culture will bring education participants to prepare after graduating from vocational education and ready to face the industrial revolution 4.0. Based on the analysis in this study, it can be concluded that there is a positive relationship between 5S and the ergonomics of the place of practice towards the application of industrial work culture in vocational education. The results of this study are in line with the research conducted by Prihadi Waluyo on the analysis of the application of 5S and ergonomic practices in industrial work culture where this research proves an increase in productivity. Vocational education culture which is still a waste must be replaced by a culture of industrial work through the culture of 5S which is always repeated and emphasizes discipline in its application.[14].

CONCLUSION

In line with the objective of this study, the conclusion is made in that there is a positive relationship between 5S culture and the application of industrial work culture in Vocational Education with evidence of significant values <significance level (α) ($0.009 < 0.05$) and reinforced with the results from the t count> t table ($5,200 > p2,0003$). 5S is a repetitive behavior that makes the culture. This culture will be formed when graduating from vocational education to the industrial world.

There is no relationship between ergonomics of practice against the application of industrial work culture in Vocational Education. Simple linear analysis (t test) is a significant value of $0.267 > 0.05$ and is strengthened by the results of the t-count table with a table of $1.126 < 2,0003$ indicating that there is no relationship between the practice location and the practice of industrial work culture. This means that the second hypothesis in this study was rejected.

There is a correlation between 5S culture and ergonomics of practice to the application of industrial work culture in vocational education, with evidence of significance <significance level (α) of $0,000 < 0.05$ and Fcount> Ftable ($14,249 > 3.15$). The percentage value of the relationship of 5S and ergonomics of practice to the application of industrial work culture 42.9%.

SUGGESTIONS

Suggestions that can be delivered by the researcher based on the results of the study that has been reviewed, are as follow: The emphasis on 5S both in the workshop/ LAB and in the warehouse storage of goods, the establishment of ergonomics of practice in accordance with industrial design. Always monitoring the implementation of 5S in the workshop/ LAB, the implementation of this research can be adapted by adding other variables to maximize the relationship to the application of industrial work culture because in research this is still 57.1% of other factors that influence the application of industrial work culture in vocational education. This study also has limitations in the second hypothesis that there is no relationship between the practice location and the practice of industrial work culture, so the need for further study to find out the real reason in the field.

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