

RELATIONSHIP OF WORK ENVIRONMENT AND APPLICATION OF OCCUPATIONAL HEALTH AND SAFETY ON BIOLOGY LABORATORY TECHNICIAN WORK PRODUCTIVITY

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Received: August 28, 2022. Accepted: September 27, 2022. Published: September 30, 2022

Abstract: This study aimed to determine the simultaneous and partial effect of training variables, work environment, and occupational safety and health (OHS) application on the work productivity of laboratory technicians at University of Mataram, Indonesia. The type of research is explanatory research using a quantitative approach. Respondents in the study are 39 people. The data used in this study is taken using a questionnaire. Data were analyzed using multiple linear regression with the help of SPSS version 20.00 for windows. The results showed that: (1) training, work environment, and the application of OHS had a positive and significant effect simultaneously on the work productivity of the laboratory technicians, (2) training, the work environment, and the application of OHS had a positive and significant partial effect on the work productivity of the laboratory technicians, and (3) training is a variable that has a dominant influence on the work productivity of laboratory technicians at University of Mataram.

Keywords: *Training, Work Environment, Occupational Safety and Health, Laboratory Technicians.*

INTRODUCTION

High productivity is a goal that every organization, including laboratories, wants to achieve. Laboratory productivity cannot be separated from laboratory technicians' performance in their duties and responsibilities. Thus, the progress or failure of a laboratory is largely determined by the role and quality of its laboratory technicians. Organizational productivity is said to increase and become more qualified if the individuals in the organization succeed in achieving the work standards set by the organization and serve as a reference for determining individual success in work.

Efforts to increase the productivity of an organization are not by working harder but by working smarter [1]. The success of an organization in increasing productivity will greatly support its competitive ability. The demand for competence during the competition will eventually become something that should not be ignored. Various factors can affect productivity, for example, from the human resources themselves and outside, such as the work environment, production facilities, and health [2].

The work environment is a factor that can affect productivity in terms of work climate, working conditions, management system, company goals, organization, company goals, incentive system, personnel policy, and company size [3]. To achieve high employee productivity, an organization must ensure that the physical environment will produce freedom and interaction that facilitates organizational needs, formality and informality, ability, and discipline [4]. The work environment is a condition or place where a person carries out his duties and obligations and can

influence employees in carrying out the tasks assigned. The work environment can create a binding working relationship between the people in the environment [5].

There are several studies on the influence of the work environment on work productivity. The work environment positively affects employee productivity, meaning that the better the quality of the employee's work environment, the higher the productivity [5]. The results also show that employees who are not comfortable with physical conditions at work tend to be dissatisfied with doing their jobs. The work environment affects work productivity. Organizations that adopt environmental standards get one standard deviation higher than organizations that do not adopt environmental standards in their organizations [6].

Another factor that the organization must consider in maintaining and increasing employee productivity is by providing training. Training is a process by which people achieve certain abilities to help achieve organizational goals [7]. Training is a tool to develop intellectual abilities and human personality [8]. The exercises also encourage employees to work harder [9].

Training is a planned effort to facilitate employee learning to increase productivity following job requirements. Training is a continuous process emphasizing that employees must need to continue learning. In short, it can be said that every employee has high hopes to achieve high productivity with the assumption that management in the organization needs to facilitate employees so that they can further improve training for their employees [10].

Training significantly influences work productivity, and applying the types of activity in

work behavior will substantially affect the increase in work productivity [10]. The training program attended by employees has no significant effect on output and productivity [11]. However, the production and productivity of employees are mainly determined by the ratio of capital and employee capital.

Another factor that can affect employee productivity is the application of occupational safety and health. Occupational safety and health are one of the organization's responsibilities to its employees because the smooth Implementation of employees at work is very dependent on occupational safety and health [12]. The success of an organization in improving occupational safety and health is certainly influenced by employees who can comply with the regulations on occupational safety and health that the organization has determined. Implementing occupational safety and health in the organization will affect the quality of work life because a safe and comfortable working atmosphere will create a good quality of work life for employees to achieve organizational goals.

Improving the quality of employees' work life can also increase work productivity. The quality of work life is an issue that deserves the organization's attention. Safety and health also affect employee work productivity. Work productivity is the ratio of output produced to the input issued. Work productivity and profits will decrease if the organization does not properly apply safety and health.

Work productivity measures the extent to which an employee can complete his work following the quality and quantity set by the organization. An employee's productivity can be measured by the total output produced by an employee in doing his job [13]. An employee is said to be productive if the employee can make products per the organization's targets. Therefore, to increase employee productivity, the organization, in this case, the University of Mataram, needs to provide training to laboratory employee in the laboratory technicians, create a safe, comfortable work environment for laboratory technicians, and consistently implement OHS in laboratories. The University of Mataram includes the laboratory's layout and requirements for the laboratory technicians' workspace, personal protective equipment, hygiene, emergency equipment, chemicals, waste disposal installations, and electricity.

Based on the description above, the current study focuses on the Relationship between Training, Work Environment, and Application of Occupational Safety and Health to Work Productivity laboratory technicians at University of Mataram, Indonesia.

RESEARCH METHODS

This research is a survey on Education Laboratory Institutions at the University of Mataram. The studied samples are 39 laboratory technicians, which is the total number of the population. The data measurement technique used a questionnaire with a Likert scale. The questionnaire was prepared based on the researcher's information needs on the sample.

The research variable consisted of three independent variables and one dependent variable. The independent variables in this study are the effect of training, the work environment, and the application of OHS.

In contrast, the dependent variable is work productivity in the laboratory.

Data collection techniques used are observation, interviews, and questionnaires. Data were analyzed using multiple linear regression using the SPSS program version 20.0. The analysis was conducted to see the relationship between the independent variables on work productivity in the laboratory.

RESULTS AND DISCUSSION

Training is a process to improve the knowledge and skills of employees [14]. They get lessons in matters related to duties and responsibilities such as behavior, knowledge, abilities and skills, and attitudes [15]. Various kinds of benefits in training for employees and companies, as follows: increase employee satisfaction, reduce waste, reduce absenteeism and employee turnover, improve work methods and systems, increase income levels, reduce overtime costs, reduce machine maintenance costs, reduce the cost of maintaining machines, reduce employee complaints, reduce accidents, improve communication, increase employee multipurpose knowledge, improve employee morale and lead to better cooperation [16-17].

The multiple linear regression analysis results show the effect of training, work environment, and the application of OHS on work productivity. The hypothesis proposed in this study states that there is an effect of Training (X_1), Work Environment (X_2), and Application of OHS (X_3) together on Work Productivity (Y). To determine the effect of Training (X_1), Work Environment (X_2), and Application of OHS (X_3) together on Work Productivity (Y), multiple linear regression analysis was used. The results of the multiple linear regression analysis can be seen in Table 1.

From Table 1, the results of multiple regression analysis calculations on the variable data of Training (X_1), Work Environment (X_2), and Application of OHS (X_3) together on Work Productivity (Y), the regression direction is obtained: $a = 0,521$; $b = 0.128$ and $c = 2.73$ and a constant of $= 2.505$. Thus the form of the

regression equation is shown by: $= 2.505 + 0.505X_1 + 0.128X_2 + 0.273X_3$. A significance test was carried out to determine the significance of the regression equation, as shown in Table 2.

Table 2 above shows that there is a significant effect between Training (X_1), Work Environment (X_2), and Implementation of OHS (X_3) together on Productivity Work (Y). This is indicated by the sig value of 0.000 less than 0.05 and the regression equation: $= 2.505 + 0.521X_1 +$

$0.128X_2 + 0.273X_3$. It shows that there is a significant effect between Training (X_1), Work Environment (X_2), and the Implementation of OHS (X_3) together on Work Productivity (Y).

The relationship between Training, Work Environment, and OHS Implementation together on Work Productivity is obtained from the summary model, which is described in detail in Table 3.

Table 1. The results of the Statistical Test of Training, Work Environment, and the Implementation of OHS together on Work Productivity

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	2.505	7.639		0.290	0.074
Training Work Environment	0.136	0.136	0.468	3.822	0.001
OHS Implementation	0.128	0.187	0.279	2.467	0.050
	0.273	0.111	0.319	2.469	0.019

a. Bound Variable: Work Productivity

Table 2. Significance Test of the influence of Training, Work Environment, and OHS Implementation together on Work Productivity

Sum of Squares	df	Mean Square	F	Sig.	
Regression	775.137	3	258.379	16.069	0.000
Residual	562.761	35	16.079		
Total	1337.897	38			

a. Bound Variable: Work Productivity

b. Predictors: (Constant), Implementation of OSH, Work Environment, Training

Table 3. Coefficient Analysis of Training Determinants (X_1), Work Environment (X_2), and OHS Implementation (X_3) together on Work Productivity (Y)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.761 ^a	0.579	0.543	4.010

a. Predictors: (Constant, Training, Work Environment, Application of OHS)

Next, an analysis of the coefficient of determination is carried out. The coefficient of determination is the square of the correlation coefficient. The coefficient of determination X_1 , X_2 , and X_3 with Y of $(R_{y12})^2 = 0.579$. It means that 57.9% of the variation that occurs in the work productivity of laboratory can be explained by Training, Work Environment, and Application of OHS. In contrast, 42.1% is influenced by other factors not examined in this study. The results showed that if the Training (X_1), Work Environment (X_2), and Application of OHS (X_3) increased by one unit, it would contribute to the increase in work productivity of laboratory technicians by 0.521; 0.128 and 0.273 units at the constant 2.505.

The magnitude of the partial influence between Training, Work Environment, and OHS Implementation on the work productivity of laboratory technicians can be seen in Table 1. Each variable can be seen in the Standardized Coefficients (Beta) column. Training on laboratory technician work productivity influences 46.8%, meaning that work productivity is influenced by training by 46.8%. The remaining 53.2% is influenced by other factors not examined in this study. The work environment on work productivity affects 27.9%, meaning that the work environment impacts the work productivity of laboratory technicians by 27.9%, and other factors influence the remaining 72.1%. The application of OHS to work productivity influences 31.9%. The application of OHS affects the work productivity of

laboratory technicians by 31.9%, and other factors influence the remaining 68.1%.

Based on the results of the study, it can be seen that training, work environment, and the application of OHS to the work productivity of laboratory technicians at the University of Mataram. The magnitude of the influence of the independent variables simultaneously can be seen from the value of Sig. of 0.000. Because the value of Significant smaller than 0.05, it can be concluded that the dependent variable of laboratory technicians' work productivity (Y) can be significantly influenced by the independent variables Training (X_1), Work Environment (X_2), and OHS Implementation (X_3).

The contribution of the variables of training, work environment, and application of OHS to the work productivity of laboratory technicians is 57.9%. At the same time, the remaining 42.1% of the laboratory technicians' work productivity variables (Y) will be influenced by other variables that are not discussed in this study. Various factors can affect employee productivity, for example, from the HR and outside, such as the work environment, production facilities, and employee health. For high employee productivity, an organization must ensure that the physical environment will produce freedom and interaction that facilitates organizational needs, formality and informality, ability, and discipline. Productivity is a comparison of the effectiveness of making output (output) with the efficiency of using input sources (input) [21].

Implementing training, a comfortable work environment, and the Implementation of Occupational Safety and Health can create safe and comfortable working conditions so that laboratory technicians can increase work productivity in meeting the quality and quantity of work produced by laboratory technicians for universities. Another opinion supports that training is a process by which people achieve certain abilities to help achieve organizational goals (high work productivity) [22]. Training is a tool to develop intellectual abilities and human personality [23]. The exercises also encourage employees to work harder [9].

The magnitude of the partial influence between Training, Work Environment, and OHS Implementation on the work productivity of laboratory technicians can be seen in the Standardized Table Coefficients (Beta). The table shows training on work productivity laboratory technicians has an influence of 46.8 % means that work productivity is influenced by training by 46.8%, and the remaining 53.2% is influenced by other factors not examined in this study. The work environment on work productivity has an influence of 27.9%, which means that the work environment affects the work productivity of laboratory technicians by 27.9%, and other factors influence

the remaining 72.1%. The application of OHS to work productivity has an influence of 31.9%, which means that the application of OHS affects the work productivity of laboratory technicians by 31.9%, and other factors influence the remaining 68.1%. Based on the description above, it can be explained that training has a dominant effect on the work productivity of laboratory technicians at University of Mataram.

CONCLUSION

Training, work environment, and the application of OHS have a positive and significant effect simultaneously on the work productivity of laboratory technicians at University of Mataram. Training, work environment, and the application of OHS have a positive and significant impact partially on the work productivity of laboratory technicians. Training is a variable that has a dominant influence on the work productivity of laboratory technicians at University of Mataram.

REFERENCES

- [1] Widodo, S. E. (2015). Human resource development management. *Yogyakarta: Student Library*, 4(3), 43-65.
- [2] Soetrisno, E. (2016). *Manajemen Sumber Daya Manusia*. Jakarta: Kencana Prenada Media Group.
- [3] Sinungan, M. (2018). *Produktivitas apa dan Bagaimana*. Bumi Aksara.
- [4] Leblebici, D. (2012). Impact of workplace quality on employee's productivity: case study of a bank in Turkey. *Journal of Business Economics and Finance*, 1(1), 38-49.
- [5] Ghoniyah, N. (2011). Peningkatan Kinerja Karyawan melalui Kepemimpinan, Lingkungan Kerja dan Komitmen. *JDM (Jurnal Dinamika Manajemen)*, 2(2).
- [6] Senata, I. W., Nuridja, I. M., & Suwena, K. R. (2014). Pengaruh lingkungan kerja terhadap produktivitas kerja karyawan ud. Kembang sari kabupaten badung tahun 2012. *Jurnal Pendidikan Ekonomi Undiksha*, 4(1).
- [7] Susan, E. (2019). Manajemen sumber daya manusia. *Adaara: Jurnal Manajemen Pendidikan Islam*, 9(2), 952-962.
- [8] Dalimunthe, H. A., Dewi, S. S., & Faadhil, F. (2020). Pelatihan Universal Design for Learning untuk Meningkatkan Efikasi Diri Guru Sekolah Menengah Pertama Islam Terpadu dalam Mengajar. *Jurnal Diversita*, 6(1), 133-142.
- [9] Suwarno, D. K. (2019). Peningkatan Kompetensi Pengelolaan Laboratorium Melalui Pelatihan Terstruktur Dengan Tehnik Saling Berkunjung Bagi Kepala Laboratorium Di SMP Kecamatan Cepogo Pada Semester 2 Tahun 2017/2018. *Jurnal Profesi Keguruan*, 5(2), 145-149.

- [10] Sulman, L., & Irawan, J. (2016). Pengelolaan Limbah Kimia di Laboratorium Kimia PMIPA FKIP UNRAM. *Jurnal Pijar Mipa*, 11(2).
- [11] Aricò, P., Borghini, G., Di Flumeri, G., Sciaraffa, N., & Babiloni, F. (2018). Passive BCI beyond the lab: current trends and future directions. *Physiological measurement*, 39(8), 08TR02.
- [12] Manurung, G. A. V. (2021). Pengaruh Beban Kerja, Lingkungan Kerja Dan Tingkat Pendidikan Terhadap Kinerja Pegawai (Studi Kasus Pada Pegawai Dinas Lingkungan Hidup Kota Pontianak). *Jurnal Manajemen Update*, 10(3).
- [13] Graff Zivin, J., & Neidell, M. (2012). The impact of pollution on worker productivity. *American Economic Review*, 102(7), 3652-73.
- [14] Nurhayati, N., Zuhra, F., & Septiani, S. (2020). Peningkatan kompetensi calon guru ipa melalui pelatihan pengelolaan laboratorium. *JCES (Journal Of Character Education Society)*, 3(3), 679-687.
- [15] Bariqi, M. D. (2018). Pelatihan dan pengembangan sumber daya manusia. *Jurnal studi manajemen dan bisnis*, 5(2), 64-69.
- [16] Suryapriadi, Y. E. (2020). Manajemen Tenaga Pendidik Berbasis Kinerja Di Sekolah Laboratorium Percontohan (LABSCHOOL). *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, 6(2), 216-220.
- [17] Larasati, S. (2018). *Manajemen sumber daya manusia*. Deepublish.
- [18] Hanggraeni, D. (2012). *Manajemen sumber daya manusia*. Universitas Indonesia Publishing.
- [19] Asyhadie, H. Z., SH, M., & Rahmawati Kusuma, S. H. (2019). *Hukum ketenagakerjaan dalam teori dan praktik di Indonesia*. Prenada Media.
- [20] Moenir, H. A. S. (2006). *Manajemen Pelayanan Umum di Indonesia*, Jakarta, Bumi Aksara. *Bumi Aksara*.
- [21] Mulyani, S. (2021). *Pengantar Manajemen Sumber Daya Manusia*. Cipta Media Nusantara.
- [22] Ambita, A. (2013). Pengaruh Pendidikan, Pelatihan, Dan Pembinaan Sumber Daya Manusia Terhadap Kinerja Pegawai. *Management Analysis Journal*, 2(2).
- [23] Trasmini, S. W., Sunarto, D., & Ariyanti, N. A. (2021). Keselamatan dan Kesehatan Kerja Di Laboratorium Biologi. *Syntax Idea*, 3(12), 2768-2773.