Connection Knowledge with Application Safety Health Work Automotive Engineering Education Student Makassar State University

Rahman Pance[1]; Mohammad Ahsan S. Mandra[2]; Darmawang[3]; Muhammad Yahya
[1] *Automotive Engineering Education Student Faculty of Engineering, Universitas Negeri Makassar, Indonesia.*
[2,3,4] *Lecturer in Automotive Engineering Education Faculty of Engineering, Universitas Negeri Makassar, Indonesia.*
[1] *Contributor Email: rahmanpwk2021@gmail.com*

Abstract

Makassar State University Automotive Engineering Education conducts occupational health and safety programs in accordance with legal regulations. However, in fact, even as of 2019, many students did not take labor protection measures when performing welding work in the laboratory, and as a result, many people had eye pain after welding. The purpose of this study was to explain the occupational safety and health knowledge of students in the Automotive Engineering Education Laboratory of Makassar State University, explain the application of occupational safety and health, and explore the relationship between the knowledge of occupational safety and health and the application of occupational safety and health. to find out. This type of study uses observational data collection techniques, and quantitative descriptive methods using questionnaires processed through the SPSS application. The study population consisted of only his 2019 automotive engineering students, and his sample was 39 from Harry King's nomogram formula. As a result, the correlation coefficient, r_{Count} was 0.466 and the obtained significance value was 0.003. The correlation coefficient of r_{Table} with N=39 is 0.466 and the error rate is 5% (0.05). The r_{Count} value of 0.466 is greater than the r_{Table} = 0.316. This means that there is a positive and significant correlation between theoretical knowledge of OSH and the application of OSH.

Keyword: Automotive Engineering, Education, Knowledge, Safety Health Work, Student

Abstrak

Pendidikan Teknik Otomotif Universitas Negeri Makassar telah menerapkan program K3 sesuai peraturan perundang-undangan. Namun kenyataannya pada tahun 2019 masih banyak mahasiswa yang belum menerapkan K3 di laboratorium pada saat melaksanakan pengelasan, akibatnya banyak yang mengalami mata pedis setelah selesai melakukan pengelasan. Penelitian ini bertujuan untuk mendeskripsikan pengetahuan K3 mahasiswa, mendeskripsikan penerapan k3 dan mengetahui hubungan pengetahuan dan penerapan k3 laboratorium Pendidikan Teknik otomotif universitas negeri makassar. Jenis penelitian ini menggunakan metode deskriptif kuantitatif dengan teknik pengambilan data test dan angket yang diolah melalui aplikasi SPSS. Populasi dalam penelitian ini seluruh mahasiswa Pendidikan Teknik otomotif angatan 2019 sebanyak 46, dengan sampel sebanyak 39 dari rumus Nomogram Harry King. Hasil penelitian menunjukkan bahwa koefisien korelasi/r_{hitung} sebesar 0.466 dan nilai signifikansi yang diperoleh sebesar 0.003. koefisien korelasi sebesar 0.466 pada r_{tabel} dengan N=39 dan taraf kesalahan 5% (0.05). Nilai r_{Hitung} 0.466 lebih besar daripada r_{tabel} sebesar 0.316. artinya terdapat hubungan positif antara pengetahuan teori K3 dengan penerapan K3

Kata Kunci: Keselamatan Kesehatan Kerja, Pendidikan, Pengetahuan, Teknik Otomotif,

A. Introduction

Health and Safety Work (K3) on the spot Work ensures that students, lecturers even the environment around the laboratory always safe, Sharifa Wahidah Al Idrus (2020) comfortable Felix Pascalis (2018) and healthy, as well all tool practice can used in a manner safe Bekti wulandari (2018) and efficient (Solichin, 2014). There is a need urge for obtaining knowledge before introducing application health and safety work. Study Rini Yana (2019) provides an impact positive to a connection between K3 knowledge with perception of K3 behavior among student laboratories. The amount of accident Work keeps going increased and there is potential danger on the spot work. Identification danger environment Work can be done to minimize potency risk health and safety on site work. Due to factors chemical factor ergonomics, factor physical and K3 management in the laboratory (Dinda Nur Syakabania, 2017), accidents Work is a consequence of error human and error administration (Dwi, 2020). Factor risk in the environment Work can be characteristof ic physical chemical, biological, or psychosocial (Salawati, 2015). Factors the is reason main and decisive happening disease consequence Work consequence potency danger. Because of the institution study is businesses small and medium, death can happen Because of loss of economy, damaged equipment, disease consequences work, and even reason worse (Ayana et.al., 2017).

Potency hazard/risk material chemistry characteristic easy flammable, corrosive, and toxic (Amalia and Wicaksana, 2020). Danger potential other including exposure to radiation chemistry, infection (Priliawati, 2015), fire (Dani Nasirul Haqi, 2018), illness eye after welding (Isna Farikha Marurin, 2017), sting electricity, fall, and impact (Jefferson Onion, 2018). Factor risk laboratory covers factor human, physical, administrative, and environmental (Zhang et al., 2020). Next (Agustin Nuraini, 2020) factors additional contributions to risk accidents form variable environment work, permission work, and factors influencing human accident work. The highest in the sub-sector chemistry clinic disposal waste is infection from substances

containing toxins in waste and litter (Nova Mahani, et.al., 2018).

Studies show that accident Work caused by factors humans (Delima Agustin Nuraini, 2020). Man need K3 knowledge Gatut Rubiono and Anas Mukhtar (2021), Relations knowledge and attitude with application health and safety K3 students (Princess Elshadai Kumayas, 2018). K3 knowledge of awareness K3 student behavior Aspect health and safety Work Still not enough get attention in the laboratory education technique automotive. So that K3 is visible No regular or not stable moment practice. For example, student No use protector eye moment weld. Besides that, the lack of facilities and infrastructure supporter tool safety Work become a constraint application of K3 in the laboratory in a manner precise and accurate. Phenomenon This shows that the application of K3 in the laboratory technique automotive needs optimized because the very K3 is important for supporting effective learning for students and institutions of education. Prevention is also carried out through Gift Eye K3 College because need to understand or enhance knowledge of health and safety Work before entering the laboratory (Rim and Lim, 2014). As said Sholihah (2013), K3 is knowledge intended interdisciplinarity for maintaining and repairing the ng environment laboratory as well as preventing loss and pollution.

Application of K3 prevents and reduce the risk of accidents and illnesses consequence of work. Burke et al., (2011) suggested that training health and safety work (K3) can reduce risk of accident work. The more Lots knowledge you have user laboratory about K3, the more low-risk injury consequence practice, and vice versa. The more A little knowledge employee about K3, the taller risk injury consequence work. Accident Work started from bad management for ensure safety and health work (K3). inequality this is what it is reason main happening accident work. Remember the more many accidents work and damage consequence accident Work as well as increasing potency danger in the production process, then needed management safety and health effective, comprehensive, and integrated work, in management. K3 Management in the effective organization can

increase Spirit practice and in still trust to leadership laboratory (Akpan, 2011). Mission safety laboratory is for ensure that personnel, community, and environment user laboratory still healthy, comfortable, safe, productive and growing in place Work every when. Achievement objective the need willingness, capacity and good cooperation. from all parties involved (Agus Rahmantiyoko, et.al., 2019). As well as future studies needed with distribution exposure risk balanced physical and non-physical for determine estimate accurate and common risks (Lu, et.al, 2016).

Law No. 1 of 1970 about Safety work. Because it's important, that is is regulations applied at the university. For those facilities and infrastructure need attention special and get practiced in activity learning (Xiong ,2018). application of JSA one effort minimize accident (Azham Umar Abidin ,2019). Health and safety Work is objective all involved parties, in activities/practices work and its meaning everything around, laboratory want too healthy and safe. A number of objective safety Work according to AR Effendi (2018) securing power laboratory, user laboratory, sure whole activity laboratory safe, sure whole tools and materials in condition safe, as well create environment Work comfortable. As for Desired goal, achieved in study This as following:

1) Describe an overview of occupational safety and health knowledge of students of the Department of Automotive Engineering Education, Makassar State University.

2) Describe the application of occupational safety and health at the Laboratory of the Department of Automotive Engineering Education, State University Macassar.

3) Know the relationship knowledge theory with the application of occupational safety and health Laboratory of the Department of Automotive Engineering Education, Makassar State University.

B. Method

This study uses a quantitative approach to the *simple random sampling method* (Sugiyono, 2012). The location of the research was carried out in the Department of Automotive Engineering Education, Universitas Negeri Makassar, for 30 days. The research population consisted of 46 2019 batch students, with a sample of 39 students who had followed the eye K3 course obtained from Formulas Harry King Nomogram (sugiyono, 2012).

Data collection techniques in this study were carried out by means of test questions from question choice double Forgot it K3 knowledge and questionnaires are used to get mark application of K3. Inside instrument research is a tool that can be used to obtain, manage, and interpret information obtained from respondents using the same benchmark (Syofian Siregar, 2013). instrument research in the form of multiple-choice questions (multiple choice test) and questionnaires each of which is 30 questions. The score categories and the questions are as follows:

Table 1. Score Category Knowledge

Alternative answer	Score
Know	1
Unknowledgeable	0

The normality test works to find out whether the data of each research variable and the distribution of the data is normally distributed or not. The analytical technique used in this study is the *One-Sample Kolmogorov-Smirnov Test* t formula in SPSS. The linearity test is used to determine whether the independent variable (X) and the dependent variable (Y) have a linear relationship or not.

The research hypothesis to be tested is formulated as follows:

Ha : OSH knowledge has a significant or very significant relationship with OSH implementation.

Ho : OSH knowledge does not have a significant or very significant relationship with OSH implementation.

Testing analysis was done using the *SPSS* program *version 16 for Windows* (Darren George and Paul Mallery, 2019) with a level error of 5%. The If obtained *p* value <0.05, then Ho is rejected and Ha is accepted. The coefficient's correlation obtained, can used to measure the level of correlation of the second variable.

C. Result and Discussion

1) Results

Table 2. K3 Knowledge Data Information

Theoretical Knowledge	
Means	14.08
Media	14.00
Mode	11.00
Minimum	10.00
Your maximum m	19.00

Results data after done research on samples obtained the mean value is 14.08, the median value is 14.00, the mode value is 11.00[a], the minimum value is 10.00, and the maximum is 19.00, To determine amount class used formula, The value of N is amount respondent that is as many as 39 students so that obtained amount class as many as 6 class intervals, and length Class 2 presented in the table following.

Table 3. Interval Class Frequency K3

No	Interval Class	Frequency (F)	Relative (%)
1	09-10	3	7,69
2	11-12	9	23.08
3	13-14	10	25,64
4	15-16	9	23.08
5	17-18	7	17.95
6	19-20	1	2.56
		39	100.00

The results of the distribution of student theoretical knowledge variable data presented in the table above are illustrated in the histogram as follows.
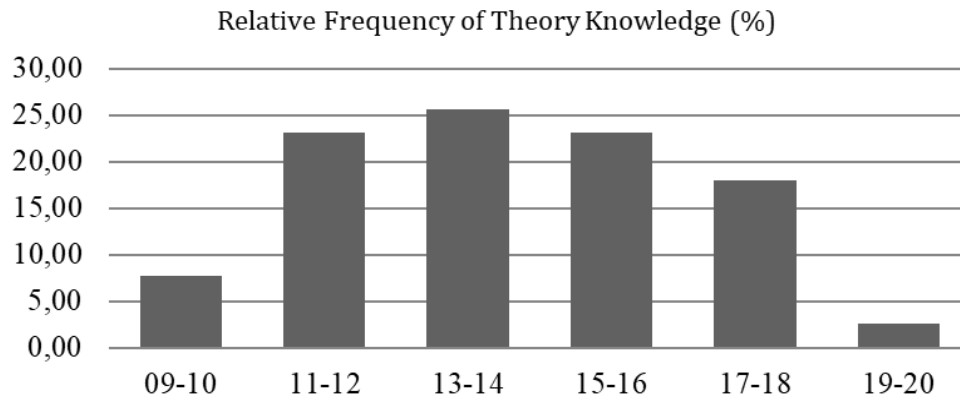

Figure 2. Frequency distribution of theoretical knowledge

Based on the primary research data, a frequency distribution table of trends for students' theoretical knowledge can be made as follows.

Table 4. Distribution of trend frequency

No	Ideal Score Interval	Frequency	Percentage (%)	Category
1	X≥ 16	13	33,33	Tall
2	13≤X<16	14	35.90	Currently
3	X < 13	12	30,77	Low
		39	100.00	

Table 5. Information on OSH implementation data

	application
Means	62.03
Median	61.00
mode	57.00
Minimum	44.00
Maximum	78.00

Result data after research on the sample obtained the mean value is 62.03, the median value is 61.00, the mode value is 57.00, the minimum value is 44.00, and the maximum value is 78.00. In addition to the table above, for a clearer description of the knowledge of occupational safety and health data, the data is presented in the Frequency Distribution Table.

The results of the distribution of student application variable data presented in the table above are described in the histogram as follows. Based on the primary data of the research, it is possible to make a table of the frequency distribution of tendencies for the application of students as follows.

Table 6. Distribution of Trend Frequency

No	Ideal Score Interval	Frequency	Percentage (%)	Category
1	X≥ 66.67	10	25,64	Tall
2	55.33≤X<66.67	21	53.85	Currently
3	X < 55.33	8	20,51	Low
		39	100.00	

The results above show that 2019 batch 9 students of the Automotive Engineering Education Department, Faculty of Engineering, Makassar State University, use applications with high categories as much as 20%, students use applications with medium categories much as 54%, and students who use applications with low categories as much as 20%. Based on the distribution table above, it can be concluded that the utilization of K3 application for class 2019 students of the Department of Automotive Engineering Education, Faculty of Engineering, Makassar State University, is classified as moderate.

The results of the analysis show that the significance value is 0.992, the significance value is greater than $\alpha = 0.05$ at the 5% significance level and it can be concluded that the data from this study are normally distributed. The F_{count} value obtained is 1,220 with a significance of 0.323. The results of the linearity test show that the value of F_{count} is smaller than F_{table} with a significance level greater than 5% (0.5). This applies to the independent variable to the dependent variable so that it can be concluded that the regression line is linear.

Hypothesis testing to find out whether there is/is not a relationship between the independent variables and the dependent variable. This test uses a significance level of 5%. The results obtained from statistical calculations are consulted with table values. If the rcount value is greater

than rTable or the Fcount value is greater than Ftable, then the coefficient is said to be significant and vice versa. This hypothesis was tested using *product moment* correlation analysis from Pearson. The hypothesis in this study is to have a relationship between theoretical knowledge and the application of OSH students' class of 2019 Automotive Engineering Education Department Makassar State University Faculty of Engineering.

Analysis results from correlation *Product moment* shows the coefficient correlation of 0.466 and value the significance obtained of 0.003. coefficient correlation of 0.466 consulted on r_{table} with N=39 and level error 5% (0.05). The price r_{table} obtained of 0.316 so the price r_{count} is bigger from r_{table} and the value the significance obtained is smaller from level error 5% (0.05). this _ means there is a connection positive and significant between knowledge of K3 theory and with application of the student K3 class of 2019.

2) Discussion

As for results analysis descriptive variable knowledge theory welding under consideration from an indicator that is knowledge students about health and safety work. In relation to matter the results acquisition test show that student class of 2019, who take advantage of knowledge theory with category tall as much 33.33%, students who take advantage knowledge theory with category currently as much as 35.90%, and students who use it knowledge theory with category low as much 30.77%. Based on table distribution above _ can concluded that utilization knowledge student K3 theory class of 2019, classified medium. results analysis descriptive variable knowledge K3 theory reviewed from indicator that is knowledge student about health and safety work. In relation with matter the results acquisition test showing that student class of 2019, who take advantage of application with category tall as much 25.64%, students who take advantage of application with category currently as much as 53.85%, and students who use it application with category low as much 20.51%. Based on the table distribution above _ can be concluded that utilization application of student K3 class of 2019, classified medium. Based on the results analysis, research

shows exists connection positive and significant between knowledge of K3 theory with the application of student K3 class of 2019 Automotive Engineering Education Department Makassar State University Faculty of Engineering. Through analysis correlation *product moments* are obtained with price r_{count} of 0.466, meanwhile table with N=39 at the level 5% significance of 0.316. So, the price r_{count} is bigger than the price r_{table} so the relationship is positive and significant. With thereby can be said that the taller knowledge of K3 theory, the taller application of K3.

E. Conclusion

Knowledge theory student class of 2019, category tall as much as 33.33%, category being 35.9%, and categories low as much as 30.77%. Application of K3 students Batch 2019 with category tall as much as 25.64%, category being 53.85% and categories low 20.51%. Based on the analysis results between K3 theoretical knowledge with the application of K3 class 2019 students. Through *product-moment* correlation analysis, a r_{count} value of 0.466 is obtained, while a r_{table} with N = 39 at a 5% significance level is 0.316. so, the r_{count} price is greater than the r_{table} price so the relationship is positive and significant. Thus, it can be said that the higher the knowledge of K3 theory, the higher the application of K3.

Acknowledgments

References

Agustin Nuraini, Delima. 2020. Hubungan lingkungan kerja, work permit, faktor manusia, dan kecelakaan kerja: pendekatan konseptual. *Jurnal Ilmu Manajemen*. Vol. 6.

Akpan, Emmanuel I. 2011. Effective safety and health management policy for improved performance of organizations in Africa." *International Journal of Business and Management*. Vol. 6. www.ccsenet.org/ijbm.

Al Idrus, S. W., Purwoko, A. A., Hadisaputra, S., & Junaidi, E. 2020. Pengembangan modul praktikum kimia lingkungan berbasis green chemistry pada mata kuliah kimia lngkungan. *Jurnal Pijar Mipa*, *15*(5), 541-547.

Amalia, Tisa, and Arif Bayu Wicaksana. 2020. Identifikasi potensi bahaya di laboratorium formulasi Pt X. *Jurnal Inkofar*. Vol. 1. Online.

Abidin, A. U., & Ramadhan, I. 2019. Penerapan job safety analysis, pengetahuan keselamatan dan kesehatan kerja terhadap kejadian kecelakaan kerja di laboratorium perguruan tinggi. *Jurnal Berkala Kesehatan*, *5*(2), 76.

Burke, Michael J., Rommel O. Salvador, Kristin Smith-Crowe, Suzanne Chan-Serafin, Alexis Smith, and Shirley Sonesh. 2011. The dread factor: how hazards and safety training influence learning and performance." *Journal of Applied Psychology* 96 (1): 46–70. https://doi.org/10.1037/a0021838.

Bawang, J., Kawatu, P. A., & Wowor, R. 2018. Analisis potensi bahaya dengan menggunakan metode job safety analysis di bagian pengapalan site pakal PT. Aneka Tambang Tbk. UBPN Maluku Utara. *KESMAS: Jurnal Kesehatan Masyarakat Universitas Sam Ratulangi*, *7*(5).

Cahyaningrum, D. 2020. Program keselamatan dan kesehatan kerja di laboratorium pendidikan. *Jurnal Pengelolaan Laboratorium Pendidikan*, *2*(1), 35-40.

Effendi, A. 2018. K3 laboratorium pendidikan, Bandar Lampung.

George, D., & Mallery, P. 2019. *IBM SPSS statistics 26 step by step: A simple guide and reference*. Routledge.

Hanifa, N. D., Respati, T., & Susanti, Y. (2017, September). Hubungan pengetahuan dengan upaya penerapan K3 pada perawat. In *Bandung Meeting on Global Medicine & Health (BaMGMH)* (Vol. 1, No. 1, pp. 144-149).

Haqi, D. N. 2018. Analisis potensi bahaya dan risiko terjadinya kebakaran dan ledakan di tangki penyimpanan lpg pertamina Perak Surabaya. *Indonesian Journal of Occupational Safety and Health*, *7*(3), 321-328.

Kumayas, P. E., Kawatu, P. A., & Warouw, F. (2019). Hubungan pengetahuan dan sikap dengan penerapan kesehatan dan keselamatan kerja (K3) pada perawat di rumah sakit bhayangkara Tk. III Manado. *KESMAS: Jurnal Kesehatan Masyarakat Universitas Sam Ratulangi*, *8*(7).

Lu, M. L., Putz-Anderson, V., Garg, A., & Davis, K. G. (2016). Evaluation of the impact of the revised national institute for occupational safety and health lifting equation. *Human Factors*, *58*(5), 667-682.

Muhani, N., Nuryani, D. D., & Indriyani, E. 2018. Analisis risiko keselamatan dan kesehatan kerja di laboratorium RSUD Dr. H. Abdul Moeloek Provinsi Lampung. *Jurnal Dunia Kesmas*, *7*(4), 8.

Masrurin, I. F., & Disrinama, A. 2017. Analisis faktor-faktor yang mempengaruhi gangguan penglihatan padapekerja pengelasan di

perusahaan pembuatan dan perbaikan kapal. In *Conference on Safety Engineering and Its Application* (Vol. 1, No. 1, pp. 159-164).

Nuraini, D. A. 2020. Hubungan lingkungan kerja, work permit, faktor manusia, dan kecelakaan kerja: pendekatan konseptual. *JIM (Jurnal Ilmu Manajemen)*, *6*(2), 16-24.

Pascalis, F. 2018. Perancangan laboratorium dasar terpadu universitas Tanjung Pura. *JMARS: Jurnal Mosaik Arsitektur*, *6*(1).

Priliawati, N. N. T., & Suryawati, N. 2015. Herpes zoster lumbosakral sinistra setinggi L4-L5-S1 pada seorang wanita 45 tahun dengan kanker serviks stadium IIIB pasca terapi radiasi eksterna 33 Fraksi. *Program Pendidikan Dokter Spesialis I Bagian Ilmu Kesehatan Kulit dan Kelamin FK Udayana. Denpasar.*

Rubiono, G., & Mukhtar, A. (2021). Identifikasi dan sosialisasi keselamatan & kesehatan kerja bengkel sepeda motor di kabupaten Banyuwangi. *Jati Emas (Jurnal Aplikasi Teknik dan Pengabdian Masyarakat)*, *5*(2), 57-62.

Rim, Kyung Taek, and Cheol Hong Lim. 2014. Biologically hazardous agents at work and efforts to protect workers' health: a review of recent reports. *Safety and Health at Work*. Elsevier Science B.V. https://doi.org/10.1016/j.shaw.2014.03.006.

Rahmantiyoko, A., Sunarmi, S., Rahmah, F. K., Sopet, S., & Slamet, S. 2019. Keselamatan dan keamanan kerja laboratorium. *IPTEK Journal of Proceedings Series*, (4), 36-38.

Sholihah, Q. 2013. Keselamatan dan kesehatan kerja, konsep, perkembangan dan implementasi budaya keselamatan. Jakarta: Penerbit Buku Kedokteran EGC.

Solichin, S., Endarto, F. E. W., & Ariwinanti, D. 2014. Penerapan personal protective equipment (alat pelindung diri) pada laboratorium pengelasan. *Jurnal Teknik Mesin*, *22*(1).

Salawati, L. 2015. Penyakit akibat kerja dan pencegahan. *Jurnal Kedokteran Syiah Kuala*, *15*(2), 91-95.

Syakbania, D. N., & Wahyuningsih, A. S. 2017. Program keselamatan dan kesehatan kerja di laboratorium kimia. *HIGEIA (Journal of Public Health Research and Development)*, *1*(2), 49-57.

Yana, R. 2019. Hubungan pengetahuan k3 terhadap kesadaran berperilaku k3 pada mahasiswa di laboratorium. *Indonesian Journal of Laboratory*, *1*(3), 46-50.

Walters, A. U., Lawrence, W., & Jalsa, N. K. 2017. Chemical laboratory safety awareness, attitudes and practices of tertiary students. *Safety science*, *96*, 161-171.

Wulandari, B. 2018. Analisis keselamatan dan kesehatan kerja bengkel dan laboraturium jurusan pendidikan teknik elektronika dan informatika FT UNY. *Elinvo (Electronics, Informatics, and Vocational Education)*, *3*(1), 1-8.

Xiong, R., Li, L., & Tian, J. (2018). Towards a smarter battery management system: A critical review on battery state of health monitoring methods. *Journal of Power Sources*, *405*, 18-29.

Zhang, Yi, Peng Mao, Hongyang Li, Yuxin Xu, Dan You, Hui Liu, Wei Huang, and Jingfeng Yuan. 2020. Assessing the safety risks of civil engineering laboratories based on lab criticity index: A Case Study in Jiangsu Province." *International Journal of Environmental Research and Public Health* 17 (17): 1–24. https://doi.org/10.3390/ijerph17176244.

Undang Undang No. 1 Tahun 1970 Tentang: Keselamatan kerja. *Sekretariat Negara: Jakarta.*