The Readiness of Training Tools for Work Skills of Wood Charcoal Sawdust Briquette Molding

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Abstract. Generating new job skills needs to be supported by good training management, one of the training requirements is the readiness of the equipment or tools used as training media. The training was carried out for wood charcoal sawdust briquette printing skills using briquette production equipment. Proving that production equipment meets the requirements in training management, it is necessary to carry out a series of machine qualification tests consisting of Design Qualification (DQ), Installation Qualification (IQ), Operational Qualification (OQ), and Performance Qualification (PQ). Tests were carried out using instruments assessed by experts and Aiken's validation methods. The results of the assessment of 9 experts showed that the validation score was DQ=0.889, IQ=0.896, OQ=0.878, and PQ=0.867 and after being tested it was declared valid with the Aiken's-V value > 0.677. It was concluded that the sawdust charcoal briquette molding machine was suitable for use as production equipment and training support facilities.

Keywords: Training tools, Work skills, Briquette molding, Wood charcoal sawdust.

1 Introduction

The work competence includes mastery of knowledge, skills, and application of knowledge and skills in accordance with their field of expertise and vocational education programs can serve this purpose by providing skills to students [1],[2].

The work readiness of graduates of mechanical engineering vocational education in the industrial sector after the COVID-19 pandemic can be classified as low. Most of the graduates are less able to adapt to changes/developments in science and technology that require training to improve their skills, the application of various learning models is already available and one of them is a competency-based learning model [3].

The need for the world of work from vocational education graduates must have special skills, so it is necessary to increase the effectiveness of future training, one of which is by developing a training model that includes training analysis, training implementation and training evaluation, so that students can acquire new skills, knowledge and attitudes in training but also able to apply to work. The factors that influence the success of the training are expected to provide a direction for better training management in the future [4],[5],[6].

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An important step in developing and implementing a job-relevant training program that meets the needs of the trainee is to identify what needs to be learned. Training needs analysis is the process used to determine the training needs of individuals, teams, and organizations [7],[8].

The analysis of needs analysis results from observations that can be developed for new work skills in the form of briquette printing skills, which obtained information on problems in the charcoal burning process at UKM Charcoal Partners fostered by PKBL PT. KIM, there are many waste products that can be utilized, both solid waste and liquid waste. One of the solid wastes is sawdust, wood charcoal (sawdust), which still requires a touch of technology for processing so that it has commercial value and training management is needed to produce new work skills [6].

The training management is the management of training programs that include aspects of identifying training needs, planning training models, and determining training methods, preparing training tools, implementing training, evaluating training, and determining training follow-ups, these are aspects of standard training management that are common in training activities [6],[9].

As emphasized in Permenakertrans number 8 of 2014 concerning guidelines for the implementation of competency-based training[1]. The stages of preparation for PBK as referred to in Article 5 letter a are the process of preparing and planning training activities that will serve as guidelines for implementing PBK to achieve training objectives. The preparation stage as referred to in paragraph (1) point (f) is to prepare training facilities. Prepare training facilities, consisting of: equipment, training materials, training venues, modules and references. From this it is needed in this research in the form of equipment consisting of: a. prepare all the equipment needed in order to achieve competence as specified in the training curriculum. b. equipment consists of: machines, hand tools, equipment and other supporting facilities as well as work safety tools. c. Before being used in training, all equipment is ensured to function properly and in accordance with the training program to be implemented.

The success of the training implementation cannot be separated from several aspects, namely the curriculum, education and training staff, and training facilities. This is supported by setting the training schedule, developing training materials, developing learning methods, developing learning media, benchmarking activities to best practice, and implementing laboratories [10].

An specific and professional competencies as a sweet global labor market requirement in the long term are obtained by developing a training model for new job competencies based on a holistic and multidimensional approach, integrative basic principles, practice-oriented, in accordance with each level of the higher education system [11].

The problem to be studied is the preparation of training tools as part of Competency-Based Training (CBT) in actualizing the design for industrial engineering to answer problems in industry and training to produce diversified products from industrial production. It was concluded that in order to open a new scheme at LSP-Unimed in producing special work skills, it was necessary to prepare training tools in the form of a competency test place with proper use of tools that are part of Training Management..

[1] Permenakertrans nomor 8 tahun 2014 tentang pedoman penyelenggaraan pelatihan berbasis kompetensi.

2 Methodology

This study uses a descriptive research method, where the implementation of the validation for the sawdust charcoal briquette molding machine as a competency-based training tool. Validation of training equipment is referred to as qualification as an activity to prove that the equipment to be used in training will always work according to the desired and consistent criteria and produce products according to predetermined specifications. The machine qualification in this study consisted of 4 (four) levels, namely qualification; design, installation, operation and performance.

The product resulting from previous research is a wood charcoal sawdust charcoal briquette molding machine design as shown in Figure 1. The product of this research is also a wood charcoal sawdust charcoal briquette molding machine unit which will be used as a palitan device as shown in Figure 2. Second This product was further validated by several experts in their field using the expert judgment method through Focus Group Discussion (FGD) activities and expert assessments through questionnaires.

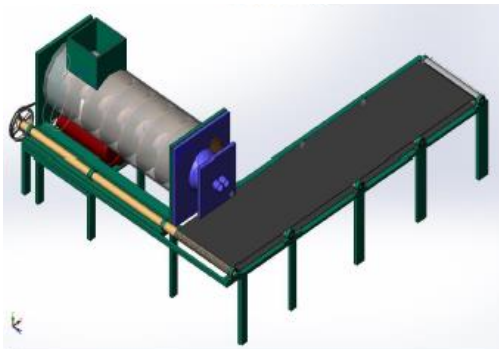

Fig. 1. Wood charcoal sawdust charcoal briquette molding machine design

Fig. 2. Wood charcoal sawdust charcoal briquette molding machine.

The availability of training equipment and appropriate use of tools is part of research preparation and for that validation is carried out through expert judgment or experts in their fields consisting of academics, technicians, laboratory assistants, and industry. The assessment is carried out by experts and experts by looking directly at and also using the video media that is presented, the experts provide assessments, input, and suggestions on training tools (innovation/technology products) that are designed to build. From the results of the expert judgment on the instruments that have been distributed and then analyzed using the expert judgment method, it is stated Agree and can be used with slight revisions.

The validity of using the training tools is tested through the assessment of experts or experts on the competency units and competency elements of the wood charcoal sawdust charcoal briquette molding training tool with a questionnaire instrument for the item assessment section of the competency unit. The instruments are arranged according to the aspects to be measured, namely design qualifications, installation qualifications, operational qualifications, and performance qualifications. The language used in the description of the contents of each grammatical statement item is also part of the expert consultation to determine language suitability. Through expert judgment, namely design experts, tool engineering, and practitioners. This is evaluated or assessed by providing content validation instruments that are suitable for use in the training of sawdust charcoal briquette molding.

The validation of the sawdust charcoal briquette molding machine training tool was carried out by 9 (nine) validators based on the needs and objectives to be achieved. Tool validation assessment grid with 4 (four) assessment aspects consisting of Design Qualification (DQ), Installation Qualification (IQ), Operational Qualification (OQ), and Performance Qualification (PQ). The evaluation grid for the validation of the training tools is shown in Table 1. Furthermore, the data were analyzed using the Aiken's V formula, provided that if the value of V > 0.677 the research product was declared valid.

Table 1. Validation instrument grid suitable for training tools

Variable	Aspect	Statement Items	Item Number	Aiken's-V Average	
Wood charcoal sawdust charcoal briquette molding machine validation	Design Qualification (DQ)	15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.	**0,889**	**0,883**
	Installation Qualification (IQ)	15	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.	**0,896**	
	Operational Qualification (OQ)	15	31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45	**0,878**	
	Performance Qualification (PQ)	15	46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60.	**0,867**	
Total Items			**60**	**0,883**	

3 Result and Discusion

The results of the validation of the suitability of using sawdust charcoal briquette molding machines were tabulated based on variables assessed by experts, for: a) validation of Design Qualifications (QD) from 15 statement items declared valid and suitable for use with an average Aiken's V value of 0.889, b) Installation Qualification (IQ) validation of 15 statement

items declared valid and suitable for use with an average Aiken's V value of 0.896, c) Operational Qualification (OQ) validation of 15 statement items declared valid and suitable for use with an average Aiken's V value of 0.878 , and d) the validation of the Performance Qualifications (PQ) of the 15 statement items is declared valid and feasible to use with an average Aiken's V value of 0.867. The results of expert validation on the suitability of the sawdust charcoal briquette molding machine tool used in wood charcoal sawdust charcoal briquette molding training from the four variable qualifications the average Aiken's V value is 0.883, as shown in Table 2.

Table 2. Validation results are suitable for using training tools

Variable	Aspect	Statement Items	Average Aspect Value of Aiken's V	Assessment Aspect Results
Wood charcoal sawdust charcoal briquette molding machine validation	Design Qualification (DQ)	15	**0,889**	**Valid**
	Installation Qualification (IQ)	15	**0,896**	**Valid**
	Operational Qualification (OQ)	15	**0,878**	**Valid**
	Performance Qualification (PQ)	15	**0,867**	**Valid**
Total Items		**60**	**0,883**	**Valid**

The results of the validation of the use of sawdust charcoal briquette molding machines with 4 (four) qualifications from 60 (sixty) statement items were assessed, declared "Valid" and "Worthy to Use" with an Aiken's V value of 0.883 as shown in Figure 3

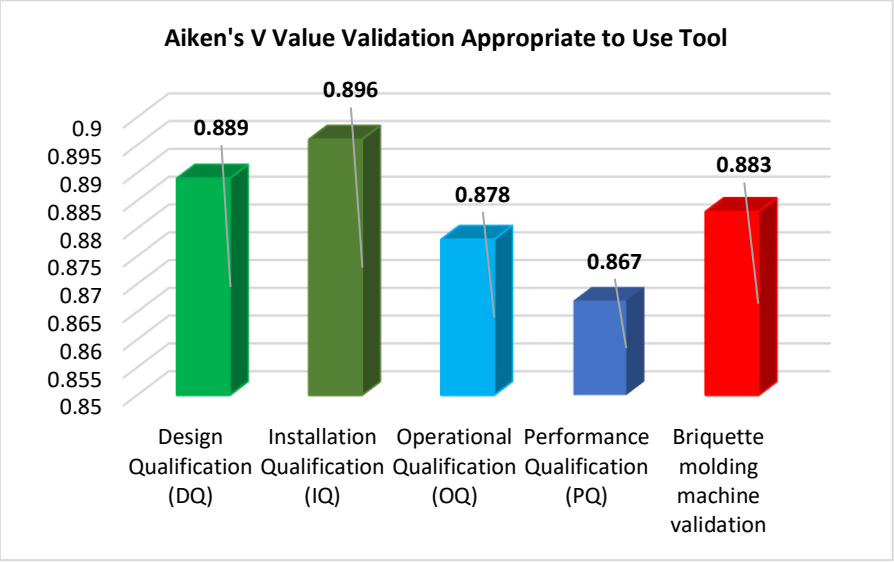

Fig. 3. The average value of Aiken's V validation is suitable for using the tool

The design and printing machine for sawdust charcoal briquettes made of wood charcoal that will be used as a competency-based training tool for vocational education based on the validation results using the expert judgment method by 8 (eight) as shown in Figure 3 and declared "Appropriate to Use" in line with the statement Agrawal. T., (2013) [2] that the implementation of training for vocational education should use training tools that have been validated by experts from the relevant field of expertise and this is also in line with the statement of Siregar B., et al., (2019) [5] in his research states that training tools must be in accordance with the training model applied to vocational education.

4. Conclusion

The results of the design prove that the production equipment meets the requirements in training management with tests carried out using instruments assessed by experts and the Aiken's validation method shows the validation results of design qualifications 0.889, installation qualifications = 0.896, operational qualifications = 0.878, and performance qualifications = 0.867 and after being tested The variable of sawdust charcoal briquette molding machine was declared valid with Aiken's-V value > 0.677 of 0.883. So it was concluded that the sawdust charcoal briquette printing machine was suitable for use as production equipment and a means of supporting competency-based training to produce new work competencies in the form of sawdust charcoal briquette molding competencies.

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References

[1] Wijanarka, B.S.: Sosok Ideal Lulusan Pendidikan Vokasi Indonesia Generasi 2045, Paper Konaspi 7, (2012).
[2] Agrawal. T.: Vocational education and training programs (VET): An Asian perspective, Asia-Pacific Journal of Cooperative Education, 14 (1), pp. 15-26 (2013).
[3] Badan Pusat Statistik (BPS): Tingkat Pengagguran Terbuka Menurut Pendidikan Tertinggi. (2020).
[4] Rahmawati, Anastasia, R.S., dan Asri L.R.: The Entrepreneurship Training Model for Bamboo Waste Handycraft Product with Batik Design for School Dropouts in Klaten District. Indonesia, Proceeding International Conference on Vocational Education and Training (ICTVET) Universitas Negeri Yogyakarta, pp. 195-200, (2011).
[5] Batumahadi Siregar, Nizwardi Jalinus, and Sumarno: Design for Devices of Training Producing Oil Palm Empty Fruit Bunch (OPEFB) Fiber. International Journal of Scientific & Technology Research (IJSTR), Vol. 8, Issue 07, pp. 839-843, (2019).
[6] Eka Daryanto, dkk.: Model Manajemen Pelatihan Pendidikan Vokasi. UMSU-Press. pp. 105-107 (2022).
[7] Bradford S. B.: Autonomous Learning in The Workplace. Routledge, pp. 117-134, (2017).
[8] Daryanto, E., Siregar, B., & Januariyansah, S.: A meta-analysis of the e-learning influence on Vocational Education and Training (VET): Preliminary study of virtual to actualization. International Journal of Education in Mathematics, Science, and Technology, Vol. 10, Issue 3, pp. 710-721, (2022).

[9] Batumahadi Siregar, dkk.: Model Pelatihan Rekayasa Komposit Papan Serat Penguat Serat S-TKKS. LPPM UNIMED Press. pp. 27-30 (2022).
[10] Muslihin: Evaluasi Program Pendidikan dan Pelatihan Kepemimpinan Tingkat IV Pemerintah Provinsi Nusa Tenggara Barat, *Jurnal Teknologi Pendidikan* 18 (1), pp. 22-32, (2016).
[11] Makulova A.T., et.al.: Theory and Practice of Competency-Based Approach in Education, *International Education Studies*; 8 (8), pp.183-192, [2015].