The Preparation of Modules for the Development of Competence Based Training Models on the Competence of Sawdust Briquette Molding Skills for Vocational Education

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Abstract. The competency of special work skills for prospective graduates of vocational tertiary education is a special problem that needs to get the right answers and of course with good training management through the preparation of good training tools the problems that are the aim of this research can be answered. Training modules in the form of module books, information books, and workbooks were prepared with Focus Group Discussion (FGD) stages to get validation from experts in the field of training management and the new energy field and were tested on student groups with 5 groups consisting of 3 students each. the group. The instrument test results obtained from experts stated that the sawdust charcoal briquette printing training module for sawdust charcoal briquettes was "Valid" with an Aiken's-V value above 0.677, namely 0.863. It was concluded that the training module is valid and can be continued for the development of a Competence Based Training (CBT) training model to produce new job skills in the form of sawdust briquette printing skills and for basic completeness of industrial engineering training management.

Keywords: Competence Based Training, Sawdust Briquette Molding, sawdust of wood charcoal.

1 Introduction

The are problem that is still ongoing and is a challenge for higher education, especially vocational higher education, is the low uptake of the job market in industry and the lack of interest in opening new businesses or ventures, this is still due to the low competency of graduates, especially special competency in responding to job market needs and opening up opportunities new venture. This weakness is felt especially strongly by graduates of the Diploma Three in Mechanical Engineering in mechanical engineering and special skills in industrial engineering, where several factors that influence it are 1) a curriculum that does not yet address technological work or innovation produced by students in the Independent

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Learning and Independent Campus (MBKM) curriculum. as well as plans for implementing the Outcome Based Education (OBE) curriculum, 2) The work produced is still limited to fulfilling the requirements for obtaining an Associate Expert degree as a Final Project and has not yet reached the level of application to society, and 3) Has not been tested functionally or product productivity or technological work produced by students [1].

The low level of competence in certain fields and special skills possessed by vocational higher education graduates is caused by several factors, namely the relationship between training models and training management which supports the effectiveness of training. This has not been optimally implemented in tertiary institutions, especially vocational higher education in the curriculum and implementation of practical courses in particular. [2]. The relationship between training management and the expected model is one that can produce job competencies for prospective vocational higher education graduates in responding to the needs of the industrial job market and skills to open businesses that produce products needed by society and industry [1], [2], [3].

Training management that can produce competent skills is supported by several aspects of identifying training needs, readiness of training participants, planning training models, determining training methods, preparing training tools, instructor expertise, training implementation, training evaluation, and determining training follow-up. Training needs are closely related to the training modules offered, where there are areas of material to be implemented and the length of time for implementation to obtain specific competencies [4], [5], [6].

The development of effective training management in vocational higher education is based on the Kirkpatrick training model framework which is structured in which there is a large role of instructors as stated by S. Sujatha, 2017 that effective training cannot be separated from the role of instructors, training instructors must have competency standards of expertise according to the field being trained [7]. The skill standard for instructors is at least a competency certificate according to requirements, but according to Muhd Khaizer Omar, at. al. In 2021, the standard skills possessed by training instructors include practical ethics and professionalism, the ability to develop knowledge, professional skills, effective management skills, and teaching skills [8].

Minister of Manpower and Transmigration Regulation Number 8 of 2014 concerning Guidelines for Implementing Competency-Based Training indicates that the implementation of competency-based training must fulfill competency-based training components, one of which is the strategy and learning materials contained in the training module. The training module based on SKKNI consists of a material book, participant handbook and instructor's book. Training will be carried out effectively if learning uses competency-based modules, as stated by Abdul Muin Sibuea, et al. (2020) that with good modules trainees can be more interactive, productive and achieve higher entrepreneurial competence [9]. In line with what was said by Leovigildo Lito D. Mallillin, (2021) that competency-based learning is very flexible for any skill using structured modules, so that students can be controlled in learning their skills and can develop them for real world competencies [10].

The problem studied is the preparation of training equipment as part of Competency-Based Training Management (CBT) in the form of Training Modules that are relevant to the competency area of wood sawdust charcoal sawdust briquette printing skills for vocational

higher education students in the development of training models in realizing management competency-based training.

2 Methodology

This research was carried out using development research methods for new products or improvements to existing products based on applicable regulations and rules. Where this research was carried out to test the effectiveness and practicality of research products to support the development of competency-based training management, this research focused more on testing the validity of research products in the form of module books. The intended training module adopts SKKNI standard rules, where in the module book which is a single unit in the form of a material book, trainee handbook, and instructor handbook.

The training module is designed to be as effective as possible and practical or easy to use in training, where the module contains the competency elements to be achieved which are stated in the syllabus, time, implementation method and evaluation. The material book contains knowledge about wood sawdust, charcoal and briquettes which can be formed to be used as fuel and new energy sources. The trainee handbook contains guidelines or stages that trainees must carry out with direction and guidance from the instructor. The instructor's handbook is an instructor's assessment book on trainee activities which contains pre-test and post-test questions.

The validity test of the module book was carried out using the expert judgment method through Focus Group Discussion (FGD) and assessment of instruments that had been prepared to provide assessments and suggestions from 11 experts or experts according to each expert's field of expertise. This was done to get recognition from experts as to whether the research product in the form of a training module could or was suitable for use in competency-based training for wood charcoal sawdust briquette molding work skills.

The assessments, suggestions, opinions and input from experts were tested using the Aikens'V formula which was used as a revision stage to perfect the research product before implementation. Suggestions from experts are used as a step in perfecting research products, experts can also provide assessments regarding the validity of the content of the developed book. This stage is part of ensuring that the product developed is valid and can be used in large-scale classroom training trials.

The instrument grid for training material needs is shown in **Table 1.** and the results of the questionnaire are used to describe material needs in training. The data description carried out in the analysis of training material needs is using the % Index Formula Likert Scale. Meanwhile, validation of the appropriateness of the content, language, and graphics of material books, trainee handbooks, and instructor handbooks is carried out by distributing assessment questionnaires containing grids as shown in **Table 2.**, **Table 3.**, and **Table 4.** The assessment results obtained are then analyzed with Aiken's V formula.

Table 1. Needs Analysis Instrument Grid for Training Materials

Variable	Indicator	Statement Items	Item Number	Aiken's-V Average
Material needs analysis (trainee and instructor handbook)	Preparation of basic materials and tools	7	1, 2, 3, 4, 5, 6, 7	0,883
	Mixing and Treatment of basic ingredients	6	8, 9, 10, 11, 12, 13.	0,879
	Moulding of wood sawdust charcoal briquettes	12	14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25.	0,882
	Total Items	25		0,881

Table 2. Instrument Grid for Validation of Training Material Books

Variable	Indicator	Statement Items	Item Number	Aiken's-V Average
Validity of training material books	Content Eligibility	8	1, 2, 3, 4, 5, 6, 7, 8.	0,857
	Language	6	9, 10, 11, 12, 13, 14.	0,863
	Graphics	7	15, 16, 17, 18, 19, 20, 21.	0,878
	Total Items	21		0,866

Table 3. Validation Instrument Grid for Trainee Handbook

Variable	Indicator	Statement Items	Item Number	Aiken's-V Average
Validity of the trainee handbook	Content Eligibility	8	1, 2, 3, 4, 5, 6, 7, 8.	0,868
	Language	6	9, 10, 11, 12, 13, 14.	0,864
	Graphics	7	15, 16, 17, 18, 19, 20, 21.	0,859
	Total Items	21		0,864

Table 4. Instructor Book Validation Instrument Grid

Variable	Indicator	Statement Items	Item Number	Aiken's-V Average
Validity of the	Content	8	1, 2, 3, 4, 5, 6, 7, 8.	0,865

instructor's handbook	Eligibility			
	Language	6	9, 10, 11, 12, 13, 14.	0,861
	Graphics	7	15, 16, 17, 18, 19, 20, 21.	0,852
	Total Items	21		0,859

3 Result and Discusion

The training module, which consists of a training material book, trainee handbook, and instructor handbook, has been validated by an expert or experts with validation carried out on training material requirements, validation of the training material book, validation of the trainee handbook, and validation of the instructor handbook. . Based on the subject matter and aspects assessed by experts to validate training material needs, they are 1) preparation of basic materials and tools, 2) mixing and treatment of basic materials, and 3) moulding of wood charcoal sawdust briquettes with 25 statement items. Meanwhile, validation of training material books, trainee handbooks, and instructor handbooks is based on 3 indicators and 21 statement items assessed by experts, namely: 1) suitability of content, 2) linguistics, and 3) graphics. The results of expert validation of the training module book used in wood charcoal sawdust briquette printing training from the four variable qualifications had an average Aiken's V value of 0.863.

Table 5. shows the results of validation of material needs by experts with the average Aiken's V value for the three subjects assessed, declared "Valid" and required with an Aiken's V value of 0.881, as seen in **Figure 1.**

Table 5. Results of validation of training material requirements

Variable	The subject matter being assessed	Statement Items	Aiken's-V Average	Results Aspects of assessment
Material needs analysis (trainee and instructor handbook)	Preparation of basic materials and tools	7	0,883	Valid
	Mixing and Treatment of basic ingredients	7	0,879	Valid
	Moulding of wood sawdust charcoal briquettes	7	0,882	Valid
	Total Items	21	0,881	Valid

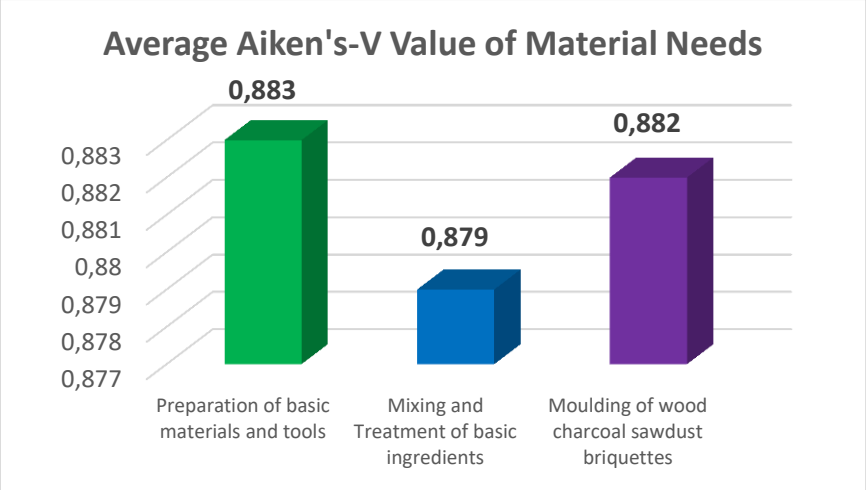

Fig. 1. Average value of Aiken's V validation of training material needs

Table 6. shows the results of the validation of the training material book as a guide for participants and training instructors which has been assessed by experts, obtaining the average Aiken's V value from the three aspects and 10 indicators assessed with 21 statement items, declared "Valid" with the Aiken's value. V is 0.866, as seen in **Figure 2.**.

Table 6. Results of validation of training material books

Variable	The subject matter being assessed	Statement Items	Aiken's-V Average	Results Aspects of assessment
Validity of training material books	Content Eligibility	8	0,857	Valid
	Language	6	0,863	Valid
	Graphics	7	0,878	Valid
	Total Items	21	0,866	Valid

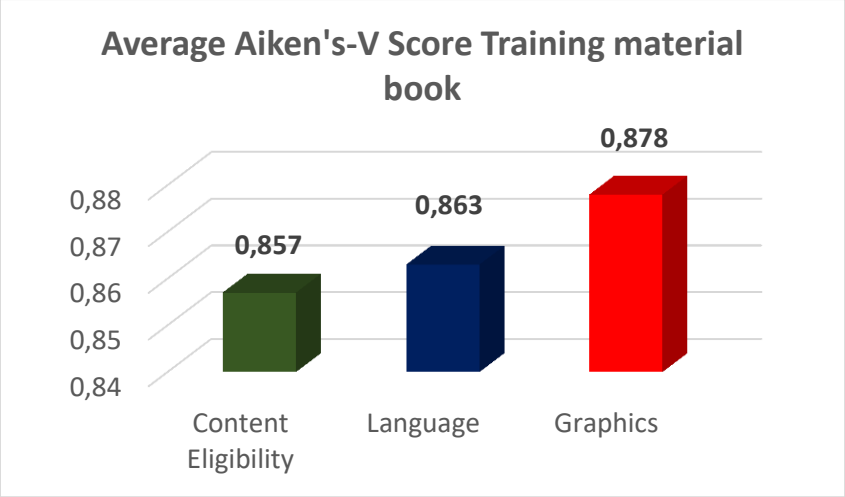

Fig. 2. Average value of Aiken's V validation of training material books

Table 7. shows the validation results of the trainee handbook which has been assessed by experts. The average Aiken's V value for the three aspects and 10 indicators assessed with 21 statement items is declared "Valid" with an Aiken's V value of 0.864, as follows. seen in **Figure 3.**

Table 7. Results of validation of the trainee handbook

Variable	The subject matter being assessed	Statement Items	Aiken's-V Average	Results Aspects of assessment
Validity of training material books	Content Eligibility	8	0,868	Valid
	Language	6	0,864	Valid
	Graphics	7	0,859	Valid
	Total Items	**21**	**0,864**	**Valid**

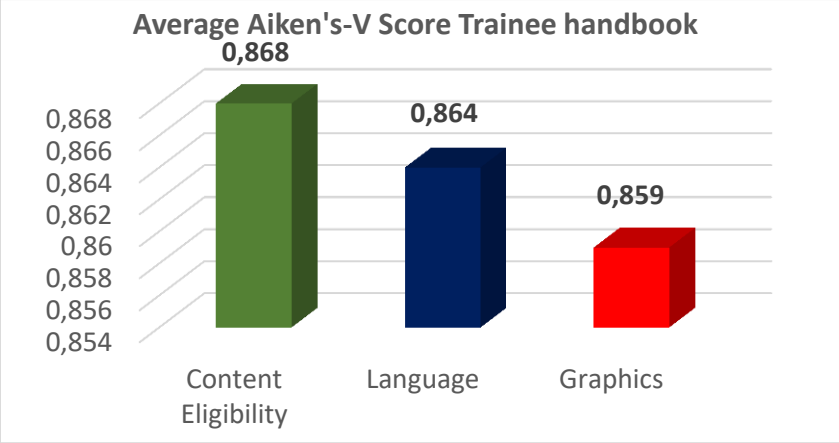

Fig. 3. Mean value of Aiken's V validation of the trainee handbook

Table 8. shows the validation results of the instructor's handbook which has been assessed by experts. The average Aiken's V value for the three aspects and 10 indicators assessed with 21 statement items is declared "Valid" with an Aiken's V value of 0.859, as shown in **Figure 4.**

Table 8. Validation results of instructor handbook

Variable	The subject matter being assessed	Statement Items	Aiken's-V Average	Results Aspects of assessment
Validity of the instructor's handbook	Content Eligibility	8	0,865	Valid
	Language	6	0,861	Valid
	Graphics	7	0,852	Valid
	Total Items	21	0,859	Valid

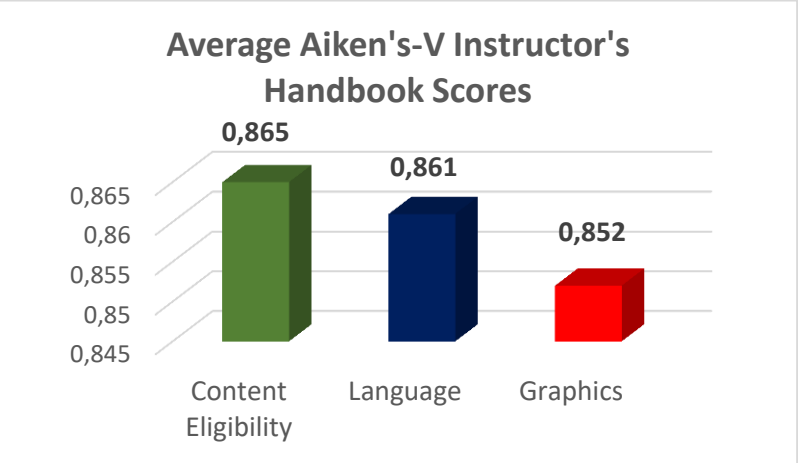

Fig. 4. Mean value of Aiken's V validation of the instructor's handbook

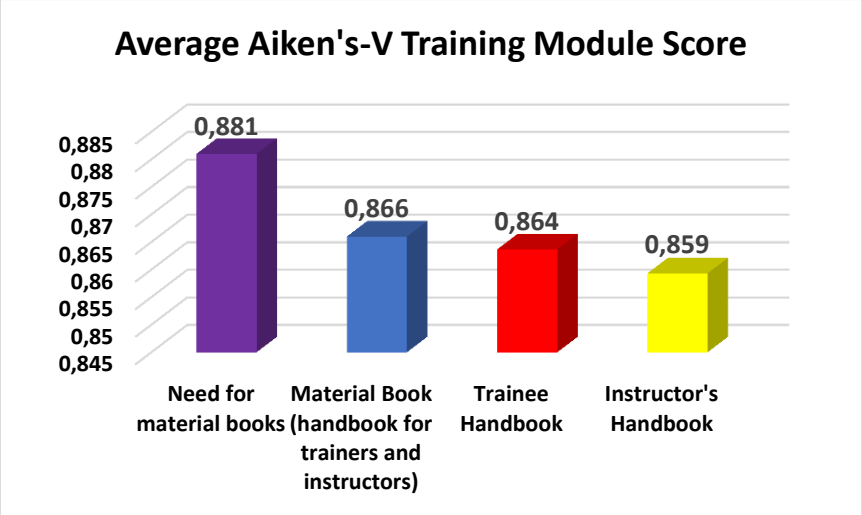

Fig. 5. Average value of Aiken's V validation of training module research products

Figure 5. provides information that the expert assessment of the training module shows an average Aiken's V = 0.863 above 0.677 and is declared valid. Based on the results of validation carried out by 9 (nine) experts using the expert judgment method, the training module is suitable for use in Competency Based Training for Wood Charcoal Sawdust Briquette Moulding Training and can be used as a complete basis for industrial engineering training management. This is supported by the statement of Abdul Muin Sibuea, et al., (2020) [9] that training will be carried out effectively if learning uses competency-based modules and trainees can also be more interactive and productive, as stated by Leovigildo Lito D. Mallillin , et al., (2021) [10] that competency-based learning is very flexible for any skill using structured modules, so that students can be controlled in learning their skills and can develop them for real world competencies, and the statement of the two previous researchers is supported by Frisda Agriani Ambarita, et al., (2022) [4] that training needs are closely related to the training modules offered, where there are areas of material to be implemented and the length of time for implementation to obtain specific competencies and training will be carried out effectively if learning uses competency-based modules.

4. Conclusion

It was concluded that the research product in the form of a competency-based training module for training in work skills for wood charcoal sawdust sawdust briquette moulding as part of training management development was declared suitable to be continued in testing on a large class scale to obtain a value for its effectiveness and practicality after being declared valid from the results of the expert assessment. The training module that was built proves that it meets the requirements for training management with testing carried out using instruments assessed by experts and the Aiken's validation method shows that the results of the validation

of the training module book are declared valid with an average Aiken's-V value > 0.677, namely 0.863.

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