Application of Competency Test Materials Standard Motorcycle Business Techniques with SKKNI Level II Scheme Standards for Excellent and Competitive Vocational High Schools Graduates

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Abstract. Application of Competency Test Material for Motorcycle Business Techniques with SKKNI Level II Scheme Standards for Superior and Competitive Vocational High School Graduates. 2022. M Burhan R Wijaya, Suwahyo, Adhetya Kurniawan, Mahaka Kurniawan, Ardy Yudo Nugroho, Taufan Satyawiguna. The effectiveness of the application of Competency Test Materials begins with developing, validating and testing the effectiveness of Motorcycle Business Engineering Competency Test Materials based on the Level II SKKNI Scheme for Candidate Graduates of the Motorcycle Business Engineering Skills Program who are competent, superior and relevant to the world of work in the 2020–2024 Era. The Research and Development (R&D) approach was carried out with a series of trials and validations. Limited trials through the application of the Motorcycle Business Engineering Competency Test Material with the SKKNI Level II Level II Professional Certification Institute Scheme standard. In detail, the research phase begins with a preliminary study, carried out with literature studies, field studies, and describes factual findings about the TBSM Competency Test Material with the level II SKKNI Scheme standard that exists through the LSP P1 manager in SMK. Describe the characteristics of the TBSM MUK Trial group in Vocational High Schools and the characteristics of potential stakeholders to support the development of TBSM SMK Competency Test Materials in Central Java. Based on the initial analysis, MUK TBSM was prepared according to the SKKNI Level II LSP P1 scheme. Trial and impact on the model group, intended to test the effectiveness of the TBSM Competency Test Materials developed. To improve the competencies possessed by graduates, it is necessary to carry out further analysis so that TBSM SMK graduates are ready to face the world of work. In addition, from the results of developing TBSM MUK according to the SKKNI Level II scheme standard, it is hoped that it can be a reference for LSP-LSP managers in Vocational High Schools in improving the quality of competency of SMK graduates standardized by the Level II SKKNI scheme and according to DuDi needs.

Keywords: Motorcycle Business Engineering · Competence · SKKNI Level II

A. Kusumastuti et al. (Eds.): VEIC 2022, ASSEHR 697, pp. 33–45, 2023.
https://doi.org/10.2991/978-2-494069-47-3_6

1 Introduction

The suitability of competencies that must be possessed by HR as prospective workers must be standardized and professional to enter the world of business and industry, besides that, graduates of Vocational High Schools (SMK) who are prepared to work, continue their studies, and create jobs through entrepreneurship (BMW) should also be equipped with competence of knowledge, skills and experience that is built and accumulated in a person to be able to compete in the global era. Because competencies that do not match cause they cannot be competitive, therefore one of the vehicles for competent training is accustomed since at school, so it is necessary to continuously hone skill competencies so that they match the needs of graduates in the future and continue to establish themselves to be better prepared to face various changes.

Efforts to improve the competence and competitiveness of SMK graduates are carried out with a quality and relevance development strategy of 1650 reference SMKs in 2015–2019 which can produce graduates who have national identity who are able to develop local advantages and compete in the global market with reference to the quality of education by having international competitiveness (Ministry of National Education Strategic Plan).

In addition, efforts to improve the quality of Vocational Schools in 2020 are made to improve skill competency through revitalization and strengthening programs for the Center of Excellence Vocational School (SMK-PK) which program Link and Super Match in producing future workforce candidates according to the level of industry needs. The demand that workers have the right to obtain recognition of work competence after participating in job training organized by government job training institutions, private job training institutions, or training in the workplace through work competency certification (Law RI No. 13 of 2003 concerning Manpower Chapter V Article 18 paragraph 1 and 2). Competency tests are held by educational units which must also be accredited by the BNSP standard certification body and professionals. This is in line with Presidential Instruction No. 9 of 2016 concerning Vocational Revitalization to certify SMK graduates. In line with the demands from the industry, the SMK level II certification scheme allows students to conduct competency tests since class X. After students pass UKK with cluster packaging or competency unit packaging, a competency certificate is given by the Professional Certification Institute (LSP) which is recognized by the National Professional Certification Agency (BPN). BNSP) and/or Vocational High Schools that have been declared as First Party Professional Certification Institutions (LSP-P1) by BNSP which also conducts skill competency exams independently and becomes a place for competency exams for other nearby Vocational Schools.

The Directorate of Vocational Development since 2013 has programmed the establishment of a First Party Professional Certification Institute (LSP-P1) in 1,650 SMKs that have the potential to be developed as a reference throughout Indonesia, starting with competency assessor training and training on the preparation of quality documents. As of the end of October 2019, 930 P1 LSPs have obtained licenses from BNSP (https://bnsp.go.id/information/366/Data-Bulan-October). The establishment of LSP-P1 in SMK is an effort to provide greater access to certification for SMK students to answer the challenges of meeting the demands of a competent workforce in entering the era of globalization of

trade products/services and human resources. Vocational schools are given the opportunity to carry out skills competency tests in 2019 with the following schemes: (1) skills competency tests which are usually carried out annually (conventionally) with partner institutions with standardized standard questions from the ministry; (2) competency test using LSP/PTUK, and (3) skill competency test carried out with partner industries and/or certification programs between the Ministry of Education and Culture and other institutions. To produce graduates who are ready to work must be followed by learning strategies similar to industry. Therefore, to imitate the processes and requirements of working in industry, SMKs should be encouraged to collaborate with industry. Furthermore, vocational schools and industry can jointly improve the quality of vocational schools so that the quality standards of vocational schools will increase. The final stage of the education process in SMK is competency certification for students. Certification for SMK students is proof of the competence of SMK students, so the competency test process carried out by LSP P1 SMK must meet the standards that have been set. Competency certificates obtained by students from credible institutions and the implementation process according to standards are believed to increase the employability of SMK graduates. By referring to the BNSP regulation Number 1/2017, 930 LSP-P1 SMKs that have been licensed already have a working network of 4,083 SMKs. The determination of the network is based on the similarity of competency skills based on a certification scheme that has obtained a license from BNSP. With the establishment of the network, SMKs within the scope of LSP-P1 have the same access to the competency certification system implemented.

Seeing the current condition that Indonesia has entered the MEA, it is necessary to improve education in Indonesia, especially vocational education which in a sense prepares students to be ready to work. Vocational education should be used as a flagship program to prepare the Indonesian people to face the MEA. Most unemployed are SMK graduates and BPS data shows 7.45 million unemployed in Indonesia and the unemployment percentage for SMK is 9.05%. Responding to these data, the public should be more aware that competency improvement in SMK must be carried out so that SMK graduates are not unemployed. Vocational High Schools must improve their education through good strategies, especially on Soft Skills which are very important to pay attention to in the world of work. Hard Skills became the industry's initial benchmark when recruiting workers, but more and more attention was paid to Soft Skills through various tests and interviews to measure them.

According to Abdurahman [1] competency testing is an assessment process, both technical and non-technical, through the collection of relevant evidence to determine whether a person is competent or not yet competent in a certain unit of competence or qualification. This understanding shows that the competency test aims to see evidence of students in SMK who have gone through the learning process and already have competence. This is also like the opinion of Irwanti [2] that a competency test is needed to determine a person's ability or expertise (competence) in accordance with professional standards. Vocational Competency Test is the process of implementing learning evaluation. Vocational competency tests carried out in vocational schools also require the business world/industrial world as an assessor of competency tests which later the results of this test can be used by the business/industry world to recruit workers from

vocational schools. One of the evidences of the involvement of the business/industry world in competency testing as conveyed by the research results that the implementation of competency tests for vocational students shows that: (1) 50.33% of schools collaborate with DU/DI; (2) 26.04% of schools collaborate with professional associations; (3) 18.72% of UKK are fully managed by schools; (4) 17.33% of schools collaborate with LSPs; and (5) 1.84% [1, 3–5]. After obtaining a certificate, SMK graduates sometimes still have difficulty getting a job. Even though proof of competence possessed by SMK graduates has been obtained, certificates are sometimes not taken into account by DU/DI. This may occur due to the lack of marketability of these competencies. The business/industrial world is invited together to prepare the Expertise Competency Test (UKK). After that, it needs to be seen in the field at each stage of the Expertise Competency Test (UKK) so that there are no doubts about SMK graduates.

Based on the above background, "The effectiveness of applying Competency Test Materials standardized to the Level II SKKNI Scheme can increase the achievement of Motorcycle Business Engineering Competence", which aims to (1) prepare the Motorcycle Business Engineering MUK (TBSM) according to the demands of the Level II KKNI Certification Scheme, (2) to test the effectiveness of industry-based TBSM Competency Test Materials, (3) to assist the process of standardizing TBSM competencies. The following problems were identified: 1) The competency test carried out at the final level was quite burdensome for competency achievement, especially the achievement of a number of clusters, 2) TBSM cluster competency test equipment material in the form of a competency portfolio in the form of MUK TBSM with the SKKNI Level II Scheme standard, 3) Teacher ability productive and industrial teachers (testers) in using TBSM MUK according to the level II SKKNI Scheme standard [6]. The questions that need to be discussed are:

1. How effective is the TBSM Competency Test Material according to the SKKNI level II Scheme standard?
2. To what extent is the effectiveness of the TBSM Competency Test Materials with the SKKNI Level II Scheme standard developed to improve the competence of SMK graduates?
3. Does the TBSM Competency Test Material with the SKKNI Level II Scheme standard contribute to the achievement of the competence of qualified SMK graduates?

The objectives of the discussion are [7]:

1. Develop TBSM Competency Test Materials with SKKNI Level II Scheme standards.
2. Testing the effectiveness of the TBSM Competency Test Material with the SKKNI Level II Scheme standard in accordance with the SMK curriculum and the demands of the industrial world.
3. Quality, effective and efficient TBSM Competency Test material with the SKKNI Level II Scheme standard.

Benefits of Discussion
This research can obtain TBSM Competency Test Materials with the SKKNI Level II Scheme standard which was developed in accordance with curriculum developments that can be implemented to test effectiveness [8]. The TBSM Competency Test material with the SKKNI Level II Scheme standard can be applied to improve the competence of SMK graduates according to the needs of DuDi. The model developed can be a reference for improving the quality of competencies that graduates must possess.

Operational definition
The TBSM Competency Test Materials with the SKKNI Level II Scheme standard were developed combining Competency Based and Industrial Based learning by applying test materials in a cluster so that the process of achieving competency skills for SMK graduates is in accordance with the SKKNI Scheme in the global era.

2 Theoretical Foundation and Literature Study

2.1 Industrial Revolution 4.0

Quoted from Wikipedia, the industrial revolution 4.0 has four principles that enable every company to identify and implement various industrial 4.0 scenarios, including: (1) Interoperability (compatibility); the ability of machines, devices, sensors, and humans to connect and communicate with each other through the medium of the internet for everything (IoT) or the internet for the masses (IoT). (2) Information Transparency; the ability of information systems to create virtual copies of the physical world by enriching digital factory models with sensor data. (3) Technical Assistance; The first is the ability of the help system to help humans collect data and create visualizations in order to make wise decisions. Second, the ability of cyber-physical systems to help humans perform various tasks that are difficult, unpleasant, or unsafe for humans. (4) Independent Decisions; the ability of cyber-physical systems to make decisions and perform tasks as independently as possible.

The changes are dramatic and occur at an exponential rate. A very influential change in life compared to the previous industrial revolution era. In the Industrial revolution 1.0, the growth of mechanization and energy based on steam and water became a sign. Human and animal power was replaced by the emergence of machines. The steam engine of the 18th century was one of the highest achievements. This 1.0 revolution could boost the economy tremendously. During the two centuries after the industrial revolution, the per capita income of countries in the world increased sixfold. The Industrial Revolution 2.0 was marked by the development of electric energy and motors. Manufacturing and mass production took place. Telephones, cars, and airplanes are examples of the highest achievements. Changes occurred quite quickly in the Industrial revolution 3.0. Marked by the growth of electronics-based industries, technology information, and automation. Digital technology and the internet began to be known at the end of this era. The Industrial Revolution 4.0 was marked by the development of the Internet of/for Things, its presence was so fast (Maxmanroe.com).

The results of the study show that Industry 4.0 has fourteen aspects. In terms of research methods, most of the research was conducted through descriptive and conceptual methods. Judging from the aspect, the business and technology aspects are the focus

Table 1. Industrialisation 4.0 Aspect

No	Aspect	Description
1	Standardization	Includes all efforts to develop standards and references in Industry 4.0 implementation
2	Modelling	Includes attempts to model complex systems in Industry
3	Network communication	Availability of hardware or software technology for fast and real time exchange of information and data.
4	Safety and security	All matters relating to the security of data processing systems and safe use of technology for humans.
5	Resource Human	Resource human Includes efforts to transform human resources to be ready to face changes due to Industry 4.0.
6	Law	Includes efforts to develop a legal framework in implementation of Industry 4.0 (contracts, agreements, rules, etc.).
7	Efficiency resources	Includes all efforts to make resource efficiency resources (energy, costs, etc.) due to the implementation of Industry 4.0. Technology
8	CPS Technology	All efforts related to the development of CPS technology, IoT, virtualization, which is the key to Industry 4.0 technology.
9	Smart Factory	Includes the development of a manufacturing/production system that automatic, intelligent, modular and adaptive.
10	Business	Includes the discovery of new business models or process changes business due to the implementation of Industry 4.0.
11	Work design	Includes development and research related to change work system that will be faced by workers.
12	Services Covers	all businesses in processing big data and make an application to use it.
13	Management and Organizations	Related to change and development of management models and organizations due to the implementation of Industry 4.0.
14	End to end Product Engineering	Related to Engineering Products and services that are digitized throughout their life cycle

of the researchers' research. In terms of the application industry, most of the research is carried out in the manufacturing sector. In terms of numbers, research related to Industry 4.0 experienced a significant upward trend [9]. Show in Table 1.

2.2 Vocational Education

Quality of Vocational Education is defined as "the ability to meet the requirements expected by customers, both group and individual customers as customers who receive goods and services based on the characteristics of a product. To get to good management based on the requirements of ISO Certification As a written acknowledgment statement

is given to an institution that has implemented ISO as a standard in organizing an organization after carrying out an internal and external audit process. This is intended to increase customer satisfaction through educational services, develop awareness of the need to provide excellent service to customers, educate yourself (school administrators) to obey something agreed. The benefits are increasing satisfaction, building awareness of school management in implementing excellent service, as well as educated school managers in complying with something that has been agreed upon by both internal and external customers [10].

Barriers to inequality in the output of vocational education with job demand/growth, vocational education policies have not been strong enough to lead to efforts to reduce unemployment, there is no policy that integrates education and training towards Continuing Education, there are still few opportunities for unemployed groups to take part in vocational education/training, there are still many vocational education institutions that orient their teaching and assessment. to achieve the curriculum, not towards proficiency in accordance with the competencies required by employment, outdated practical facilities and equipment, lack of opportunities for students to practice in industry, weak coordination between the Ministry of National Education and the Ministry of Manpower in handling vocational education/training, weak coordination between the National Standardization Agency Education (BSNP) with the National Professional Certification Agency (BNSP), there is weak coordination between in-school education and out-of-school education in handling vocational education.

Further policies that are needed are policies that regulate the balance between the structure of the type of expertise and the number of vocational school graduates needed with the structure provided, there needs to be a policy on the implementation of Seamless Education, transnational standards of vocational teachers (Transnational Standards), teacher training policies/vocational instructors in positions and up-to-date skills in industry, policies to modernize vocational education, policies that allow vocational education to serve all community groups including the unemployed, because unemployment data according to the Ministry of Manpower and Transmigration in 2017 was 1,360,219 people and underemployed as many as 5,129,670 which consists of the forced unemployed (2,664,689) and the unemployed 2,464,981 due to the slow completion of the economic crisis, even this unemployment is supported by the large number of layoffs.

2.3 Competency Certification

Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System Chapter XVI article 61 paragraph 3 states that a certificate of competence is given by education and training providers to students and community members as an acknowledgment of competence to do certain jobs after graduation. Competency tests are held by educational units which must also be accredited by the BNSP standard certification body and professionals. This is in line with Presidential Instruction No. 9 of 2016 concerning the Revitalization of Vocational High Schools to certify SMK graduates as potential workers who are entitled to work competency recognition after participating in job training organized by government job training institutions, private job training institutions, or training in the workplace conducted through work competency certification (UU RI). No. 13 of 2003 concerning Manpower Chapter V Article 18 paragraphs

1 and 2). Certificate of Competence is proof of written acknowledgment of the achievement of competence in certain qualifications given by an accredited educational unit or authorized certification body. A SMK graduate can have more than one competency certificate, depending on the skill program he took at the SMK. Competency certificates are given after students are declared to have passed the skill competency exam (UKK) for vocational students, which consists of a vocational theory test and a vocational practice exam. In line with the demands from the industry, the level II certification scheme allows students to conduct competency tests since class X with the TBSM Competency Test Material model with the SKKNI Level II Scheme standard.

3 Research Method

3.1 Research Approach

This research uses a research and development approach. Research and development methods are research methods used to produce certain products, and test the effectiveness of these products [11]. This research is a research to produce a product in the form of an academic paper, and to test the effectiveness of the product of an academic manuscript, therefore the research method used is the Research and Development (R&D) method.

The research model chosen in this study uses the ADDIE model. The ADDIE development model is a model that uses simple and systematic steps in developing TBSM Competency Test Materials based on the Competency Based and Industrial Based SKKNI Scheme so that the process of achieving competency skills or skills (life skills). ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). ADDIE is an instructional design model that applies to all types of education and despite the fact that ADDIE consists of components of all other design models, it is a relatively simple model [12] (Fig. 1).

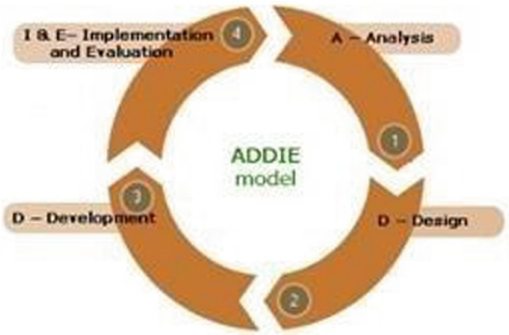

Fig. 1. ADDIE Model (Source: Muruganantham [13])

3.2 Procedures for Developing and Testing Effectiveness

The TBSM Competency Test Material with the SKKNI Level II Scheme standard was developed in accordance with the needs of the business world and industry so that the process of achieving competency skills or skills (life skills) is tested and in the implementation of competency tests since class X, in order to achieve competence.

The ADDIE model consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation [14]. The stages are described as follows:

1. Analysis (analysing), which includes needs assessment, identification, goals, analysis of knowledge, skills, and attitudes.
2. Design, namely designing/making a general description of the product, determining specific competencies, methods, evaluation materials, and strategies for implementing learning design.
3. Development, namely competency test materials for TBSM Competency Test Materials based on the Level II SKKNI Scheme that will be used in the competency test program.
4. Implementation, namely applying the TBSM Competency Test Material with the SKKNI Level II Scheme standard in testing.
5. Evaluation (evaluating), namely evaluating tests using TBSM Competency Test Materials with the SKKNI Level II Scheme standard.

Based on the flow chart of the development procedure above, the procedure for developing and testing the effectiveness of the TBSM Competency Test Material with the SKKNI Level II Scheme standard to achieve skill competence or skills (life skills) adapted to the ADDIE model, namely: Analysis/Analysis, at the analysis stage consists of two stages, namely:: 1) Competency Analysis of TBSM Competency Test Materials with SKKNI Level II LSP P1 standards, 2) Requirements analysis is a systematic procedure to determine MUK for TBSM Competency Test Materials with SKKNI Level II LSP P1 standards and in the implementation of tests carried out since class X. Analysis needs is done by looking at the curriculum and practice syllabus according to the SKKNI so that it can help students understand the units in the competency cluster, 2) Design, this stage is carried out based on the results of the needs analysis that has been carried out in the previous stage [15] revealed that, on At this stage, it is necessary to clarify skills in learning in the cluster or MUK TBSM unit with the SKKNI Level II LSP P1 standard, so that the TBSM MUK with the SKKNI Level II LSP P1 standard can achieve the goal of increasing the competence of SMK graduates as expected.

3.3 Location and Research Subject

This research was conducted in several vocational schools in Central Java, with the research subjects being a group of curriculum developers, competency assessors and managers (teachers, principals, school committees, stake holders). Thus the location and research subjects were determined purposively.

3.4 Data Collection Techniques and Tools

Data collection in this study was grouped into two stages, namely: first, preliminary and development studies; second, the trial and effect stage. In the preliminary study and development stage, questionnaire, observation, and documentation techniques were chosen, in addition to literature review. At the trial and effect stage, the main data collection techniques were observation and questionnaires. Data collection tools/instruments developed in this study relate to data collection techniques carried out at each stage of the study, namely: (a) questionnaire (question list), and checklist, used to ask questions and make observations on preliminary study and design development stage; (b) a list of questions and checklists, also used to ask questions and observations in the design and pilot test phase.

3.5 Data Analysis Techniques

The data analysis in this study is described in three stages (study), namely the preliminary stage, the results of the design development, and the results of trials and effects. At the preliminary study stage, the findings or facts about the Competency Test Materials developed according to the current Level II SKKNI Scheme standard are described in the form of data presentation (mean, median, mode, etc.), then analysed (interpreted) qualitatively. With this approach, the analysis used in this stage is called descriptive qualitative [15].

The process and results of developing TBSM Competency Test Materials based on SKKNI Level II clusters or units in the implementation of learning since class X were analysed by peer-group and expert judgment. The results of the trial and the analysis used are experimental in the form of data presentation; as well as in the measure of applicability of the design (applicability) analysed descriptively qualitatively.

The achievement of research objectives is described in a research systematic that describes the time period, scope of research, and the following outputs: identification and analysis of the development and effectiveness test of TBSM Competency Test Materials standardized by the Level II SKKNI Scheme and compiling a design for developing TBSM Competency Test Materials based on the Level II SKKNI Scheme who have been tested since class X, then validate the Competency Test Materials for the TBSM Competency Test Materials according to the Level II SKKNI Scheme. Through focused discussion groups (FGD) and testing the implementation of the development and testing of the effectiveness of the TBSM Competency Test Materials with the SKKNI Level II Scheme standard, which is presented in Table 2.

Table 2. Research Systematics

step	Scope of research	Outcome Indicators
Phase I Preliminary and Development Studies	Identification and analysis of skills (skills)	TBSM Competency Test Materials with the SKKNI Level II Scheme standard. Implementation of Competency Test using TBSM Competency Test Material with SKKNI Level II standard. It is stated in academic texts in the form of policy briefs and MUK SKKNI level II articles which are published scientifically through journals.
Stage II Developer and Validation of MUK SKKNI Level II test	Development of Competency Test Materials for TBSM SKKNI Level II validated and tested and implementation test	MUK TBSM SKKNI Level II cluster or unit validation result and FGD. As well as limited evidence of feasibility, advantages and disadvantages as well as obstacles can be obtained.

4 Conclusion of TBSM Competency Test Materials with SKKNI Level II Standards

a. The product specifications developed in this development research are: (1) The format used in compiling the TBSM Competency Test Material with the SKKNI Level II standard based on the National Professional Certification Agency (BNSP), (2) The device developed is the Level II SKKNI, (3) TBSM Competency test materials with SKKNI Level II standards which are made using a cluster and competency unit approach, (4) TBSM Competency test materials with SKKNI Level II standards, (5) TBSM Competency test materials with SKKNI Level II standards can only be used to measure TBSM competency achievement in accordance with SKKNI Level II Standards.
b. Development of TBSM Competency Test Materials with SKKNI Level II standards can be used to conduct Competency Tests. And as a useful tool to help gather easy information in an efficient way.
c. The competency test which was previously carried out in the final class (XII), so it is less effective and burdensome, then with competence it can be carried out starting from the initial level of class X so that students get enough time to master the competencies.
d. Clusters in the test scheme can be carried out starting from class X with the target of complete competency ownership.

e. Materials for the TBSM Competency test with SKKNI Level II standards as evidence of competency mastery which will be shown at the end of the learning competency test in order to get a competency certificate.

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