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DEVELOPMENT OF INTERNSHIP INSTRUMENTS IN IMPLEMENTATION OF KKNI CURRICULUM, FACULTY OF ENGINEERING – UNIMED

Harun Sitompul[1], Zulkifli Matondang[2], Rosnelli[3], Eka Daryanto[4]

[1] **Engineering Faculty-Unimed, W. Iskandar Street, Medan Estate, Nort Sumatera, Indonesia, 20371, prof_runsit@yahoo.co.id**
[2] **Engineering Faculty-Unimed, W. Iskandar Street, Medan Estate, Nort Sumatera, Indonesia, 20371, zulkiflimato@gmail.com**
[3] **Engineering Faculty-Unimed, W. Iskandar Street, Medan Estate, Nort Sumatera, Indonesia, 20371, rosejitu62@gmail.com**
[4] **Engineering Faculty-Unimed, W. Iskandar Street, Medan Estate, Nort Sumatera, Indonesia, 20371, ekadaryanto@unimed.ac.id**

Abstract

Engineering Faculty (EF) Unimed is a vocational faculty consisting of education and engineering study programs (pure). EF Unimed uses a KKNI-based curriculum, one of which is an Internship. The engineering internship course is conducted in the business and industrial world (BIW). The competency assessment of the apprenticeship course uses instruments prepared by the lecturer. The purpose of this study was to produce a competency assessment instrument for apprenticeship subjects for EF Unimed students. An assessment instrument that can measure the competence of an apprenticeship in the competitive domain accurately and accountably The research approach is in the form of development. The development of an apprenticeship appraisal instrument is carried out through the Borg and Gall approach. Research respondents were the head of the study program, the apprentice supervisor, and the supervisor at BIW. The result of the research is the arrangement of the apprenticeship subject competency assessment instrument in the cognitive domain. The assessment instrument has met the requirements for validity and reliability and is suitable to be used to assess student competencies in taking internship courses. Development of instruments with data sources from EF Unimed and BIW. The instrument developed can be used to measure the competence of students who take internships at BIW. The research produced a standard cognitive apprenticeship competency assessment instrument by the course competency formulation. These instruments can be used in general with the same competence in other areas of expertise.

Keywords

Instrument Development, Competence, Cognitive Domain, Internships.

Introduction

The Engineering Faculty (EF) is one of the faculties at Unimed and consists of 13 study programs. Each study program uses a curriculum based on the Indonesian National Qualifications Framework (INQF) which is oriented to the business and industrial word (BIW). In implementing the INQF curriculum, one of the compulsory subjects in each study program is the Apprenticeship course. The apprenticeship course aims to forge student knowledge and skills according to market needs, based on theoretical material obtained in lectures. The apprenticeship course is an effort to equip students with field experience (both knowledge, attitudes, and skills) as a form of learning in the world of work.

The implementation of the apprenticeship course is carried out in semester 6 or semester 7. Based on the results of the researcher's observations, there are several obstacles and weaknesses in the implementation of the internship, including 1) difficulty in choosing a place to carry out the internship, 2) The system for implementing the internship at BIW is not standard, 3) The location of the internship which is relatively far from EF Unimed, 4) there is no written agreement between EF Unimed and BIW in terms of apprenticeship implementation techniques, 5) there is no proper apprenticeship appraisal system and it has been agreed between EF Unimed and BIW, 6) there is no measuring instrument) the standard/standard for measuring student competence after carrying out an internship, and 7) students do not understand enough in compiling reports and maintaining the contents of the

internship report.

The results of the research by Dika Ayu A and Ali Wafa (2016) found that the obstacles in implementing the internship were: lack of provision or orientation, administrative constraints, difficulty finding agencies, and inaccurate reasons for choosing agencies. The problems faced by students in carrying out apprenticeships are there is no clear work schedule, work is not as expected, the appraisal system for apprenticeship implementation is not standard. Problems after the implementation of the apprenticeship are unclear guidelines and systematics for the preparation of the final report, and performance/competency tests are not carried out in the implementation of the internship.

Catur A and Bambang S (2016) suggest that apprenticeship activities are quality control of students, whether they meet the competencies required by the industry, whether they meet the principles of link and match program with the industry. The implementation of apprenticeship is to carry out the function of public relations (public relations) for educational institutions, will provide a positive view through students who have good attitudes and abilities during the internship, or vice versa there is a negative view of the attitudes and abilities of students are not good. Internships can also play a role as graduate marketing, or other partnership activities with industries such as research, community service, and so on, all of which must provide mutual benefits for both parties. Ismail (2018) The most important aspect of the apprenticeship program for education study programs is that preparing professional graduate candidates for educators requires phases from their ability to recognize, observe schools be able to stand teaching in class as a person who is longed for and longed for by their students.

The assessment has goals, functions, and principles so that the assessment must be made with quality assessment instruments, namely valid, reliable, relevant, representative, practical, discriminatory, specific, and proportional. A good assessment instrument must meet the requirements of a quality assessment instrument so that the objectives, functions, and principles of assessment can be achieved.

The results of observations found that the objectives of the apprenticeship course had not been maximally achieved and the competence had not been well measured. To be able to find out the root of the problem and the solution to solving the internship problem at the EF Unimed, it is necessary to do in-depth research.

To find out student competence after doing an internship, an instrument is needed to measure it. Furthermore, the instrument used to measure student competence must have adequate validity and reliability. Instrument experts argue that valid and valid instruments are called standard instruments because the process is through standardization activities in a study.

According to Ebel (1991), standard instruments are instruments that: (1) are prepared by experts who compile instruments and are calibrated, analyzed, and corrected, (2) have clear implementation and scoring instructions, and (3) have reference norms to interpret a score. Standard instruments are instruments that are developed empirically through several tests. Standard instruments have several limitations, both regarding the content, implementation of measurements, and measurement results. Standardization of a measuring instrument involves several issues. Gronlund (1990) describes the characteristics of standard instruments, namely: (1) technical quality items, (2) clear administration and assessment, (3) the existence of definite norms and interpretations, (4) the existence of instructions and other instrument equipment. . In general, two things are important in standardizing the instrument, namely it's content and administration. According to Aiken (1994), apart from looking at the validity and reliability, the standardization of the instrument also concerns the administration of the instrument and its scoring. Based on the above theories, it can be said that standard instruments are instruments obtained from the process of developing instruments through theoretical and empirical procedures with several tests.

The development of apprenticeship instruments that will be carried out in this study aims to produce a policy to reduce various obstacles to the implementation and assessment of apprenticeship activities for EF Unimed students. With the policies and guidelines prepared, they will be able to achieve the objectives of the internship optimally, so that students have knowledge and skills (competencies) that are by market needs and BIW Thus EF Unimed graduates become graduates who are ready to work and professionals according to their fields of expertise.

Methods

The research was conducted at EF Unimed and BIW from May to November 2020. This type of research is development research by adopting eight R&D research steps according to Sugiyono (2014). The steps are: (1) The stage of seeing potential and problems, (2) The stage of gathering information and literature studies, (3) Designing the product stage, (4) Validating the design stage, (5) Revising the design stage, (6) The stage of conducting product trials, (7) The stage of revising products that have been tested (8) The testing phase of using products that have been revised. Research product development in the form of an assessment instrument is used to measure student competence after internships at BIW. Development of an apprenticeship assessment instrument to measure the dimensions of knowledge, attitudes, and skills.

The data obtained in this study are qualitative and quantitative. Qualitative data is in the form of information about the process and implementation of internships in each study program at Unimed EF, such as the formulation of apprenticeship competencies, the assessment system, and the assessment report. Quantitative data in the form of descriptive about the process of the validity of the instrument, testing the quality of the instrument and determining the testing of the apprenticeship competency factor in the cognitive domain.

The subjects and sources of data in this study were all people and agencies involved in the implementation of student internships at EF Unimed. The research subjects were students, supervisors, the head of the study program, and BIW. To obtain data from research subjects, several methods, and data collection tools were used. Research data collection methods are carried out such as observation, interviews, and questionnaires.

The data analysis performed was qualitative and quantitative. The quantitative data analysis in this study is

divided into 2 (two), namely: the feasibility test of the apprenticeship competency assessment instrument and the quality test of the INQF curriculum-based assessment instrument. Qualitative analysis was carried out through the results of a questionnaire, namely, analysis of the study to determine the feasibility through the content validity of the test instruments. This data includes qualitative data in the form of criticism, suggestions, and responses from the validator to be analyzed descriptively regarding the feasibility of the resulting product. The product feasibility data produced is determined through the analysis of the validation results of material experts, linguists, and evaluation experts.

Results

The research data were obtained from the field supervisors, the head of the study program, and the BIW. The number of respondents in the study was 96 people, consisting of 13 study programs with the distribution as shown in the following figure

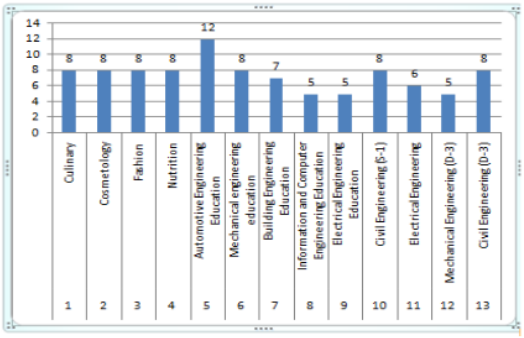

Figure 1. Number of Respondents Based on Study Program.

The EF Unimed student internships based on the majors are presented in the following table.

Table 1. Internship Places for EF Unimed Students by Department.

No	Jurusan	Tempat Magang
1	Mechanical Engineering Education	Workshop and Manufacturing
		Machining Workshop
		Service Vehicles, Spare Parts
		Factories (Plantation)
2	Building Engineering Education	Building Construction
		Road Construction
		Planning consultant
		Supervising consultants
		Darmaga Development / Water Building
3	Electrical Engineering Education	State Electricity Company
		Power Generation Companies
		Network Installation (Telkom)
		Workshop and Housing (Network)
4	Family Welfare Education	Salon, Wedding make-up business
		Boutique, Production House
		Hospital, Polyclinic
		Hotel, Restaurant, Bakery

The stages of developing an apprenticeship competency test for EF Unimed students started from the stage of compiling competency formulation, determining the type and shape of the instrument, determining dimensions, developing indicators, preparing grids, developing question items, and filling publications. Before testing the instrument, the content validity test is conducted first through an expert.

The results of rational testing through expert judgment are carried out to determine content validity and reliability. The results of the assessment of the suitability of competence with dimensions, dimensions with indicators, and indicators with question items in the cognitive domain are presented in the following table.

Table 2. Expert Judgment on the suitability of content in the cognitive domain.

Construct / Content Validity	Median (min)	Ket
Domain suitability with competence	7	Valid
Conformity of competence with indicators	7,5	Valid
Suitability of indicators with question items	7,5	Valid

The data used in the calculation of the reliability index is the data from the judgment of the experts regarding the suitability between the domain and the apprenticeship competency which has also been used to calculate construct validity. The summary data of the results of the reliability calculation (interrater consistency) regarding the suitability of competencies, dimensions, indicators, and question items in the cognitive domain are presented in Table 3.

Table 3. Expert Assessment Between Conformity of Competencies, Dimensions, Indicators and Question Items in the Cognitive Domain.

Rated aspect	Reliability Coef.	Ket.
Domain suitability with competence	0,844	reliable
Conformity of competence with indicators	0,806	reliable
Suitability of indicators with question items	0,803	reliable

1

Based on the results of data analysis, it obtained that the inter-rater reliability for the cognitive competence in the apprenticeship domain is 0.844. The means of competence is trusted enough to measure the cognitive competence of an intern student because it has fairly good reliability. This is in Naga's opinion that the reliability coefficient that exceeds 0.75 is quite good. With a reliability coefficient of 0.844, it is expected that the test will have consistency or consistency in measuring the cognitive competence of interns. Likewise, other competency domains, such as the affective domain have a reliability coefficient of 0.922, and the psychomotor domain with a reliability coefficient of 0.918. The value of the reliability coefficient of all competency domains is above 0.75, so it is suitable to be used to measure the apprenticeship competence of EF Unimed students.

The empirical test is based on data provided by respondents as many as 96 people. The analysis process was carried out using SPSS Version 24.0. To determine the size of the sample adequacy, the Kaiser-Meyer-Olkin (KMO) formula was used by comparing the observed correlation coefficient with the partial correlation coefficient. If the value of the partial correlation coefficient approaches zero, then the KMO value approaches the opposite. If the KMO value is 0.90, it is in a perfect category; value 0.80 is good; a value of 0.70 is sufficient, and below 0.50 is not acceptable. The results of the analysis using SPSS 24.0 are as follows:

Table 4. KMO and Barlett's Test from the Internship Competency Test.

KMO	Bartlett's Test Sphericity	Df	Signifikansi
0.868	2.230.331	153	0.000

From the results of the analysis, it shows that KMO is classified as sufficient (above 0.60), therefore a factor analysis can be carried out. From the Bartlett test about the form of the correlation matrix (Bartlett's test of sphericity) obtained Chi-Square = 2230.331 with Df = 153 and a significant value = 0.00, which means the correlation matrix is not an identity matrix so that factor analysis can be used.

The confirmatory approach is carried out through computation with the maximum likelihood method, to test whether the estimated factor is normally distributed. In this case, to test the suitability (goodness of fit test) it is calculated by the chi-square formula. From the calculation results obtained an index of 277.739 with 191 degrees of freedom and a probability of 0.000. The calculation results areas in the following table:

Table 5. The goodness of fit Test from the Competency Test.

Chi-Square	Df	Signifikansi
277.739	191	0.000

Discussion

The results of the expert's review of the competency test kits, namely, in general, the apprenticeship competency test kits are quite adequate when viewed from their content, language, and writing. Most of the contents and instructions for filling out the test are by the realm of competence so that it is suitable for measuring the apprenticeship competence of EF Unimed students. The test material needs to be scrutinized. However, according to the experts' judgment, the layout and order of the materials as well as the filling guidelines for participants still need to be improved.

The language used in the preparation of the competency test kits is considered by experts to be quite communicative. However, there are several sentences on the test that are suggested to be corrected because they allow misinterpretation. Besides that, the use of terms should be made uniform and still use terms that are well known.

Based on input from the results of rational assessments by experts, the following improvements were made:

a. The layout and arrangement of the filling instructions have been improved so that they are more systematic.

b. Considering that there are several inputs related to sentences and the use of technical terms, improvements are made to aspects of language or certain sentences that cause misinterpretation. The terms are made consistent with the original terms for easy understanding.

c. Sentences on the competency test were perfected to be more operational and the writing on the competency test was revised so that the sentences were more concise, concise, clear, and comprehensive so that they were easy to understand.

The results of the repair and refinement of the performance test were reviewed by two experts who were involved in rational assessments, especially those who had provided input.

Based on the results of calculations with factor analysis, there are no items whose AIC MSA value is smaller than 0.50, so there are no items that are dropped, so the number of internship competency tests in the cognitive domain is 18 items. Based on the results of construct validity analysis through factor analysis, the results show that 3 factors have eigenvalues of more than 1.00. After adjusting it to the factors developed theoretically, it turns out that fifteen factors have not been included in the instrument. However, the factors developed in the test instrument are representative enough to measure what should be measured. From the analysis, it was found that the items developed were able to measure the construct of apprenticeship competence by 81.790%, which had exceeded the cumulative standard of 60%. So it can be concluded that from the results of the factor analysis, it was found that the instrument developed had met the construct validity requirements.

Table 6. Total Variance Explained Competency Tests.

Factor/ Component	Extraction Sum of Square Loading		
	Total	% of Variance	% of Comulative
1	11.643	64.683	64.683
2	1.913	10.628	75.312
3	1.166	6.479	81.790

The total variance is explained in the graphic form shown in the scree diagram (scree plot) in the following figure.

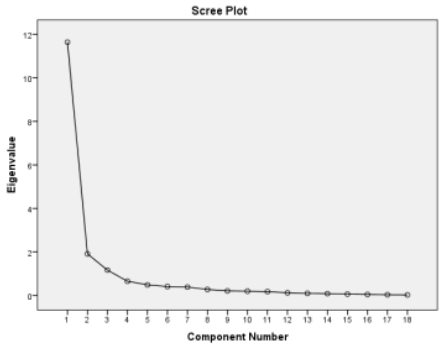

Figure 2. Scree Plot of the Cognitive Domains Competency Test.

A Scree plot is a plot of eigenvalue as a function of the number of factors in the extraction effort. The picture above is evidence that shows the screen starts to occur at eigenvalue 2, while at eigenvalue 1, scree is at number 10. This number shows the number of factors formed after being rotated. After the varimax rotation of 25 repetitions (interaction), all items have above 0.30 so all items are valid.

To see the suitability of the theoretically developed indicator items with the grouping of test items obtained through data analysis, it can be seen through the factor matrix rotation technique. Based on the results of this analysis, it can be seen that in general, the construct of the

apprenticeship competency test instrument from the empirical trial results is in accordance with theoretical/ rational studies. However, there are several test items that are not located according to the original factor. Likewise, several other test items were swapped in place as shown in the copy of the rotational factor matrix result above. So that the distribution of items developed changes.

Table 7. Distribution of Cognitive Competency Test Items After Rotation.

Factor	Question Distribution	Factor Name
Factor 1	K13, K,14, K15, K21, K22, K23, K24, K25, K26, K36	Opportunities to Open a Business
Factor 2	K31, K32, K33, K34, K35	Behavior To Open A Business
Factor 3	K11, K12, K16	Type of Business Field

The Component Plot in Rated Space in graphic form can be seen in Figure 3 below:

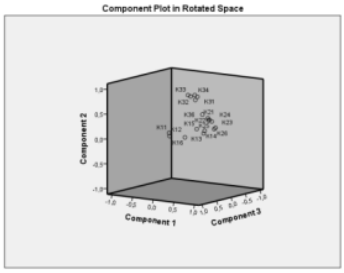

Figure 3. Component Plot in Ratated Space Competency Test.

The results of the research with factor analysis are presented in Table 6 and Table 7, showing that the 18 questions in the cognitive domain to measure apprenticeship competence are grouped into 3 main factors. Factor 1 can explain 64.683% of the apprenticeship competence with the name of the opportunity to open a business. Factor 2 can explain 10.628% of the apprenticeship competency with the name of the behavior to open a business and factor 3 can explain 6.479% of the apprenticeship competency with the name of the factor of the type of business. Cumulatively, factors 1, 2, and 3 can explain the apprenticeship competency of 81,790%. This shows that to find out the apprenticeship competence of students can be explained by knowledge of the ability to see opportunities to open a business, knowledge of behavior to open a business, and knowledge of the types of business fields that can be done.

Conclusions

Based on the results of data analysis, several conclusions can be drawn, namely: 1) the development of an apprenticeship competency assessment instrument, especially in the cognitive domain, 2) the instrument compiled has met the requirements for content validity and test reliability, 3) Apprenticeship competence in the cognitive domain is formed of 3 main factors from 16 questions with a total variance can be explained by 81.790%. Thus the developed instrument can be used to measure the cognitive domain in the EF Unimed student internship course. This instrument can also be adapted in general to measure the competence of internships in other fields.

Competing interests

This article is the result of research involving the study program at Unimed and BIW by the study program. This research resulted in the development of an apprenticeship instrument to measure competence in the cognitive realm of interns at EF Unimed.

Grant information

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