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# Development of Material Technology Practice Assessment Instruments in Material Testing Laboratory FT Unimed

Zulkifli Matondang*, Kinanti Wijaya, Harun Sitompul

*Engineering Faculty, Universitas Negeri Medan, Indonesia*
* *Email: zulkiflimato@gmail.com*

**ABSTRACT**

This study aims to develop a material technology practice assessment instrument that is valid, practical and effective. The instruments developed are focused on measuring competence in the form of psychomotor and affective. This research is an R&D research with a 4D approach, namely define, design, develop and disseminate. The research data is in the form of qualitative and quantitative data obtained through assessment sheets. The data analysis technique used is descriptive statistics. Data analysis was performed with the help of SPSS. The research subjects were lecturers and students who took part in material technology practices at FT Unimed. The instruments developed were validated by experts and users, then revised according to suggestions and input. The results of this study are in the form of an assessment instrument for material technology practice in the affective and psychomotor domains as well as an assessment rubric. The validation of the contents of the instrument is based on expert judgment and is analyzed using the Aiken coefficient formula. The practicality of the instrument is based on the response from the user. The assessment instrument developed is based on fulfilling student competence in following material technology practices at the materials testing laboratory FT Unimed

***Keywords:*** *Instrument development, Practice, Afective, Psychomotor.*

## 1. INTRODUCTION

Education aims to develop the maximum potential of students through learning activities. Learning activities are designed in such a way based on the curriculum used. To find out the potential development of students, in learning activities evaluation of learning outcomes is carried out. Evaluation of learning outcomes is carried out to convince teachers whether learning activities have reached the goals set in the curriculum or not. Learning outcomes are changes in student behaviour after participating in learning activities.

According to Bloom in Ina Magdalena, the classification of learning outcomes includes three domains, namely: cognitive, affective, and psychomotor [1]. The cognitive domain includes learning objectives related to retrieving knowledge and developing intellectual abilities. The affective domain includes learning objectives that explain changes in attitudes, interests, values, and the development of appreciation to adjustments. Meanwhile, the psychomotor domain includes changes in behaviours indicating that students have learned certain physical manipulative skills.

Courses that aim to be able to change students' behaviours in the three domains of learning outcomes are practicum courses. One of the practicum courses in the Department of Building Engineering Education, FT Unimed, is Material Technology Practicum. Material technology practicum activities are carried out in material testing laboratories, so that in learning activities behaviour will emerge in the cognitive, affective and psychomotor domains. Based on the results of observations on materials technology practicum activities, there is no assessment sheet that is used to measure student learning outcomes in the cognitive, affective and psychomotor domains that are used systematically and validly.

Munthe describes that assessment (assessment) is a method used to assess individual or group performance [2]. Assessment in the context of education is defined as an attempt to formally determine the status of students with respect to various educational interests. So, to carry out an assessment of learning activities, an assessment sheet (instrument) is needed that meets the requirements and can be accounted for. This paper aims to describe the process of developing an assessment instrument for materials technology practicum that can measure the cognitive, affective and psychomotor domains. With the existence of a valid assessment instrument will be able to reveal student learning outcomes in accordance with the facts in learning.

Learning outcomes are processes of changes in behaviour in a person that can be observed and measured in the form of knowledge, attitudes and skills. This change is interpreted as an increase and better development before those who did not know became known [3].

Learning outcomes in the cognitive domain, Anderson revised Bloom's taxonomy by changing keywords, in categories from nouns to verbs. Anderson did not change the number in the cognitive category but only included a new category, namely creating which did not exist before, so that Bloom's taxonomy which was revised by Anderson in Rusman is as follows: a. remembers, b. understands, c. applies, d. analyse, e. evaluate, and f. create [4].

The purpose of the materials technology practicum course presented in the educational building department; FT Unimed is that students have a cognitive domain starting from the level of remembering to the level of evaluating. The indicators for achieving competence from material technology practicum courses in the cognitive domain are: 1) knowing and understanding the test materials used, 2) knowing and understanding the equipment used, 3) Using equipment according to procedures in material testing, 4) Understanding standards and criteria in material testing, 5) Describe the process and results of material testing, 6) Analyze and evaluate the results of material testing and can provide conclusions or recommendations based on the results of the analysis carried out. In measuring the cognitive domain in materials technology practicum courses, instruments can be used in the form of assessment sheets in the form of tests (closed and open).

In Thobroni, suggests that learning outcomes in the affective domain include receiving, responding, valuing, organization, and characterization [5]. The description of the scope of the affective domain is as follows: a. receiving or attending, that is students have the desire to pay attention to a phenomenon or stimulus in doing practicum. b. Responding is an active participation by students during practicum. c. valuing which involves determining the value of beliefs or attitudes that show the degree of internalization and commitment to follow the rules. Learning outcomes at this level are related to consistent and stable behavior so that values are clearly recognized. d. organization, values are associated with each other, conflicts between values are resolved. Learning outcomes at this level are in the form of value conceptualization or value system organization. e. characterization, students have a value system that controls behaviour up to a certain time so that a student lifestyle is formed. Learning outcomes in the form of effective related to personal, emotional and social students. In the implementation of materials technology practicum, many values and attitudes are formed in students starting from the preparation process to the preparation of practicum reports. In this paper, the attitudes observed in the material technology practicum process include attitudes in the form of: 1) responsibility, 2) honesty, 3) cooperation, 4) discipline, and 5) activity. To measure learning outcomes in the form of affective use observation sheets with closed answers. The observation sheet uses a rubric so that it is more practical in filling it out.

Learning outcomes according to Dave in Suyono & Hariyanto suggest that the psychomotor domain includes several categories [6]. The psychomotor domain categories are: a. imitation, i.e., imitating, observing, and then imitating. b. Manipulation is behaviour in the form of producing activities from instructions or memories. c. accuracy (precision) namely behaviour by carrying out skills that are reliable, independently without assistance. d. emphasis (articulation), namely adapting and integrating expertise to meet non-standard goals. e. naturalization, namely the behaviour of automatically, subconsciously mastering related activities and skills at a strategic level. Then Bloom in Sudjana suggests that psychomotor learning outcomes are shown in the form of a person's skills and abilities to act [7]. The six skills are as follows: a. reflex movements (skills on involuntary movements). b. Basic movement skills. c. perceptual abilities, including visual discrimination, auditory, motor, and others d. abilities in the physical field such as strength, harmony, and accuracy e. skill movements, ranging from simple skills to complex skills f. abilities related to non-decursive communication such as expressive and interpretive movements.

Learning outcomes in the prometric domain are measured in material technology practicum learning activities, namely: a) ability to provide test materials, b) accuracy in using equipment in material testing, c) accuracy in collecting initial data, d) accuracy in analysing test results data, e) accuracy in preparing practicum reports and the ability to make conclusions, and f) the ability to make alternative solutions from the conclusions of material testing results. Learning outcomes in the psychomotor domain are measured based on students' ability to practice when testing materials along with the quality of reports prepared by students. The measuring instrument used to measure the psychomotor domain is in the form of an observation sheet used during practicum and an assessment sheet to assess the quality of practicum reports. Each observation sheet and assessment sheet developed is accompanied by a usage rubric.

In measuring learning outcomes, not all fields or courses have instruments to measure them. Especially for materials technology practice courses in materials testing laboratories, they do not yet have instruments in the affective and psychomotor domains. In order to carry out an objective assessment, it is necessary to develop the instrument. The steps for developing an assessment instrument: 1) Develop dimensions and indicators of research variables, 2) Make instrument grids, 3) Determine magnitudes or parameters, 4) Write instrument items which can be in the form of questions or statements, 5) Expert validation stage, 6) Revision or improvement based on expert advice, 7) Limited duplication of the instrument for trial purposes, 8) Field testing of the instrument, 9) Determining the validity and reliability of the instrument, and 10) Assembling performance valid instrument items to be used as the final instrument [8]. In this paper, the instrument development process is carried out using the 4D approach, which consists of 7 steps.

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## 2. RESEARCH METHODOLOGY

This research was conducted in the Department of Building Engineering Education, FT Unimed. The research target is students who take the Materials Technology Practicum course. The product developed is a material technology practice assessment instrument that can be used by students. The research subjects were students who took materials technology practice courses and lecturers as experts in assessing the developed instruments.

The assessment instrument made was an assessment instrument for material technology practice in the affective and psychomotor domains. This type of research is development research (R&D). The development research carried out is the 4D approach, including: define, design, develop and disseminate. The procedures carried out in the development of materials technology practice assessment instruments are as shown in figure 1.

Test preparation steps among other things, establishing test specifications, writing test items, reviewing test items, conducting test trials, analyzing items, improving test items, assembling tests, conducting tests, and analyzing test results [9]. The data analysis carried out in this study was a qualitative descriptive analysis. All collected data were analyzed using descriptive statistical techniques. The data collected focuses on the feasibility of the instrument developed in the materials technology practice course. The quantitative descriptive data analyzed were: a) Expert validation data/Expert Judgment b) Small group trial data [10]. Analysis of the validity of the assessment instrument and rubric used the Aiken formula in Azwar [11], namely:

$$V = \sum S / [N(C-1)];$$

which: V = Item validity; S = R – Lo; N = Number of experts; Lo = lowest validity rating score (eg. 1); C = the highest validity rating score (eg. 5); and R = the number given by the assessor/expert.

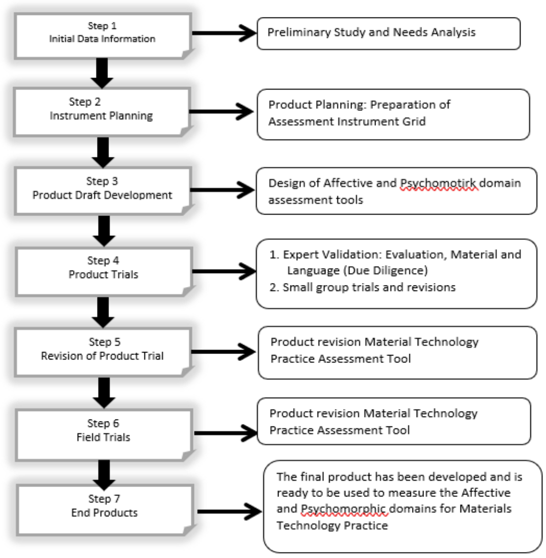


Figure 1. Instrument Development Procedure

The calculation results are compared with the Aiken Internal V index coefficient [12], [13], namely:

**Table 1**. Interpretation of Internal Aiken Index Coefficient V

| No | Coefficient (V) | Criteria/Category |
|---|---|---|
| 1 | $V \geq 0,8$ | Tall |
| 2 | $0,4 < V < 0,8$ | Currently |
| 3 | $V \leq 0,4$ | Not enough |

The practicality test of the instrument is carried out by asking for opinions from users, namely students who take courses. To calculate the practicality coefficient of the instrument, the following formula is used.

$$VR = \sum RA_i / n$$

which: VR=Average of total practicality of the instrument; RAi = average of the nth aspect and n=number of aspects. The practicality category of evaluating a development product is presented in the following table [14].

**Table 2**. Practicality Category of a Development Product

| No | Intervals score VR | Category |
|---|---|---|
| 1 | $1 \leq VR < 2$ | Impractical |
| 2 | $2 \leq VR < 3$ | Less Practical |
| 3 | $3 \leq VR < 4$ | Practical |
| 4 | $4 \leq VR < 5$ | Very Practical |

Qualitative data in the form of input provided by experts, supporting lecturers and students became the basis for revising the instrument [15].

## 3. RESULTS AND DISCUSSION

### *3.1. Research Result*

The results of the initial study carried out in lecture activities in materials technology practice courses were that an instrument for assessing attitudes and skills had not been developed properly which could be for accounted. While lecture activities in the laboratory require an appropriate attitude so that practical activities can run well. For this reason, an instrument is needed that can assess the attitudes and skills of students in following material technology practices. This is necessary, so that the assessment of material technology practice activities is carried out objectively and can be for accounted.

The process of developing assessment instruments in the affective and psychomotor domains is carried out or based on student achievements after attending material technology practice lectures. The beginning of the development of the instrument is the preparation of the instrument grid, both in the realm of attitude and in the realm of skills. The activity of developing an attitude assessment instrument that can be observed in the dominant material technology practice process is in the aspects of: responsibility, honesty, cooperation, discipline and activity. From every aspect of the attitude domain, the indicators that shape it are formulated and developed. These indicators serve as guides in assessing each behavioral domain. The indicators for each aspect of the attitude domain are as follows.

**Table 3**. Aspects and Indicators for Assessing the Attitude of Material Technology Practices

| No | Aspect | Indicator |
|---|---|---|
| 1 | Responsibility | Do the job well |
| | | Responsibility for every action |
| | | Complete assignments on schedule |
| | | Doing assignments in groups |
| 2 | Honesty | Do something with the truth |
| | | Said not lying |
| | | There is a similarity in the heart with deeds |
| 3 | Cooperation | Willing to accept responsibility |
| | | Light hands helping group friends |
| | | Respect the opinion of group mates |
| | | Appreciate the work of group mates |
| 4 | Discipline | Punctuality |
| | | Compliance with regulations |
| | | Responsibility for carrying out tasks |
| 5 | Activation | Participate in doing learning assignments |
| | | Engage in problem solving |
| | | Want to ask a friend |

The development of skills assessment instruments is based on the processes and products produced by students in materials technology practice. The skills to be measured are concrete and abstract skills. Concrete skills can be observed from the practice process and results, while abstract skills can be assessed from the results of the analysis as outlined in the practice report. The aspects developed in the assessment of material technology practice skills are shown in the following table.

**Table 4**. Aspects of Skills Assessment in Material Technology Practices

| No | Aspect |
|---|---|
| 1 | ability to supply test materials |
| 2 | the accuracy of the use of equipment in the testing of materials |
| 3 | accuracy in the initial data collection |
| 4 | ketepatan dalam melakukan analisis data hasil pengujianaccuracy in analyzing the test results data |
| 5 | accuracy in preparing practicum reports and the ability to draw conclusions |
| 6 | the ability to make alternative solutions from the conclusions of material testing results |

Based on the aspects and indicators of assessment in the realm of attitude, an instrument draft was prepared in the form of an attitude assessment sheet. Likewise in the realm of skills, based on these aspects as outlined in the observation sheet. The draft instrument was asked for the opinion of experts regarding the content or contents of the assessment sheet and the observation sheet. As many as 6 psychological measurement experts were asked for opinions about the feasibility of aspects and indicators of attitude assessment. Each expert (rater) gave responses with a score range of 1 – 5. Score 1 indicated not appropriate and score 5 indicated very appropriate. From the results of the responses of the experts (raters) in the form of a score, it is analyzed using the Aiken formula. The results of the feasibility test (content validity) for the attitude assessment sheet are presented in the following table.

**Table 5**. Expert test results on aspects and indicators of attitude assessment

| Responsibility | | Honesty | | Cooperation | | Discipline | | Activation | |
|---|---|---|---|---|---|---|---|---|---|
| Indicator | Result | Indicator | Result | Indicator | Result | Indicator | Result | Indicator | Result |
| 1 | 0,79 | 1 | 0,88 | 1 | 0,83 | 1 | 0,83 | 1 | 0,79 |
| 2 | 0,79 | 2 | 0,83 | 2 | 0,88 | 2 | 0,88 | 2 | 0,83 |
| 3 | 0,83 | 3 | 0,88 | 3 | 0,83 | 3 | 0,88 | 3 | 0,88 |
| 4 | 0,88 | | | 4 | 0,88 | | | | |
| Average | 0,82 | | 0,86 | | 0,86 | | 0,86 | | 0,83 |
| Total Average | | | | | 0,85 | | | | |

Based on table 5, it shows that the coefficient value of the content validity of the aspect of responsibility has 2 indicators that have a minimum coefficient of validity of 0.79. In the liveliness aspect, there is 1 indicator which has a validity coefficient of 0.79. In addition to these three indicators, the content validity coefficient was obtained above 0.80. Thus, all indicators of attitude assessment of material technology practices are feasible to use. Overall content validity based on expert responses (raters) for attitude assessment obtained an average validity coefficient of 0.85.

The results of the assessment and expert opinion show that the aspects of honesty, cooperation and discipline are more important attitudes in the practice of materials technology. The validation results obtained for each validation were 0.86 in the high category. This shows that honesty is very important in lectures, especially during practice. The indicators of an honest attitude include: doing things right, not lying and according to what is in the heart with what is said. In attending lectures, including practical courses, honest attitude should continue to be considered and improved. Honesty is needed in various aspects of life, both in lectures, life on campus, life in the family, life in the world of work and community life. There are several benefits of honest behavior, including: increasing self-confidence, being trustworthy, having lots of friends, and being able to increase achievement.

In following the practice of material technology, the attitude of cooperation is also very important to improve. Practical activities in the laboratory will be better done in groups. Many positive values are obtained by students by working in groups compared to working individually. For successful practical work in groups, each individual in the group must be able to work together to complete the assigned task. Then by working together, the students will communicate with each other and discuss the practical material being carried out. This will increase understanding.

An important attitude that needs to be considered in material technology practice is discipline. Discipline is a sense of obedience and adherence to specified values or rules. In following material technology practice courses, discipline is very important for students. Discipline is the right attitude in all aspects and activities of life, be it in lectures, at school, at work, in society and even within oneself.

The results of the responses of the experts (raters) regarding the observation sheet for the assessment of material technology practice skills based on the aspects developed are presented in the following table.

**Table 6**. Results of expert test (rater) on aspects of skills assessment

| Penilai | Aspect 1 | | Aspect 2 | | Aspect 3 | | Aspect 4 | | Aspect 5 | | Aspect 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Score | S | Score | S | Score | S | Score | S | Score | S | Score | S |
| A | 4 | 3 | 5 | 4 | 5 | 4 | 5 | 4 | 3 | 2 | 5 | 5 |
| B | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 3 |
| C | 4 | 3 | 4 | 3 | 3 | 2 | 5 | 4 | 4 | 4 | 4 | 3 |
| D | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 5 | 4 |
| E | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 4 |
| F | 4 | 3 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 3 | 2 |
| ∑ S | 18 | | 20 | | 19 | | 21 | | 20 | | 21 | |
| V | 0,75 | | 0,83 | | 0,79 | | 0,88 | | 0,83 | | 0,88 | |
| Average | | | | | | | 0,83 | | | | | |

Table 6 shows the average content validity coefficient values of skills assessment for materials technology practice. There are 6 aspects that form the basis for assessing practical skills, the aspect of providing materials (aspect 1) gets the lowest score, namely 0.75. The aspect that gets the highest score is the aspect of the results of analysis (aspect 4) and alternative solutions (aspect 6) each of 0.88.

Overall, the results of expert responses, obtained a content validity score of the assessment of materials technology practice skills of 0.83. This shows that the aspects analyzed by the expert on psychomotor assessment in the material testing practice course are very good.

Based on the results of expert responses, a content validity score of 0.83 was obtained for the assessment of material technology practice skills. This shows that the aspects analyzed by the expert on psychomotor assessment in the material testing practice course are very good.

The material technology practice assessment instrument was developed after fulfilling content validity, and users' opinions were then asked about its practicality. The results of the responses of 20 student users about the practicality of the affective domain assessment sheet instrument obtained an average score for each aspect as shown in the following figure.

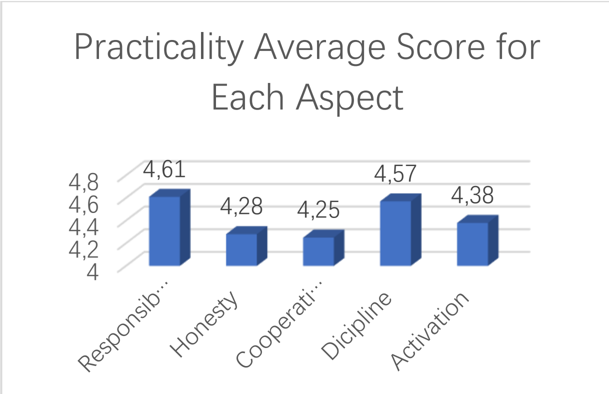


**Figure 2**. Average Practicality Score for Each Aspect of the Affective Domain

The results of the responses regarding the affective domain assessment instrument, obtained an average score for each aspect above 4, so it is very practical. This shows that the instruments developed in the affective domain are very practical to be used in materials technology practice. From the results of user responses regarding the practicality of attitude assessment, the aspect of responsibility is the highest average score of 4.61 and the aspect of cooperation is the lowest average score of 4.25. Overall, the affective domain assessment aspect obtained an average of 4.42 and is included in the very practical category. This shows that all aspects of attitude assessment developed starting from the aspects of: responsibility, honesty, cooperation, discipline and activity are very practical to be able to measure students' attitudes towards material technology practice in the FT Unimed materials testing laboratory.

The results of the analysis of the practicality of the psychomotor domain assessment instrument, the average score for each aspect is presented in the following figure.

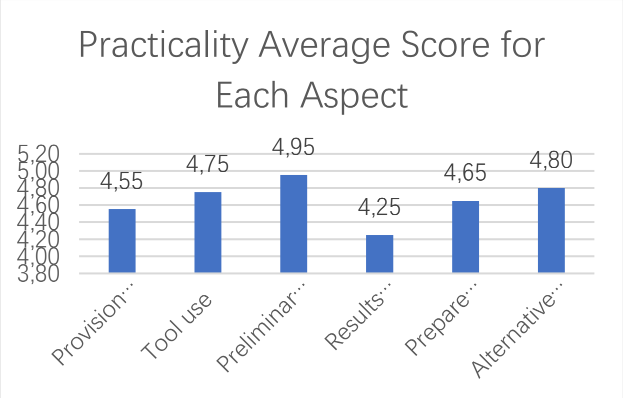


Figure 3. Average Practicality Score for Each Aspect of the Psychomotor Domain

Based on the results of the responses regarding the assessment of the psychomotor domain, an average score of practicality was obtained for each aspect above the value of 4. This indicates that the instrument for assessing the psychomotor domain is very practical to use in material technology practice in the FT Unimed material testing laboratory. From the results of the user's opinion that the aspect of the results of the analysis is the aspect that has the smallest average score, which is equal to 4.25, while the highest average score is the aspect of initial data collection. Overall, the psychomotor aspects of the assessment obtained an average of 4.66 and are included in the very practical category. This shows that based on the responses of instrument users it is suggested that all aspects of skills assessment in material technology practice are very practical to use.

### *3.2. Discussion*

In developing the attitude and skills assessment instrument in the material technology practice course, there were several obstacles that occurred including describing the various activities that appeared in practice. Different types and materials practiced will be different activities and steps taken. This is a concern in preparing the instrument, especially in the realm of attitudes and skills. In compiling the skills instrument on the practice of testing materials, the skills are categorized into abstract skills and concrete skills. Abstract skills can occur when students carry out analyzes and provide solutions from the analysis carried out based on the results of material testing practices. This can be seen or observed from practice reports prepared by students. While concrete skills can be observed from the process or implementation of practices carried out by students. So the assessment in the realm of skills is carried out to measure student competence in materials technology practice based on practical activities that can be observed directly by the assessor (lecturer) and on practicum reports prepared by students. Likewise with the student attitude assessment instrument, based on the implementation of practice and reports written by students.

The research that produced the final product in the form of an attitude and skills assessment instrument used the 4-D development model (Four-D Models). The steps taken are define, design, develop, and disseminate. In the definition stage (Define) identification and analysis of the problem is carried out in the form of: student competency analysis, practice material analysis, equipment and practice material analysis, task analysis and practice reports. The results obtained from this definition stage found problems that required the development of a competency measurement tool, especially in the realm of attitudes and skills. The instruments developed in the form of assessment sheets and observation sheets are in the form of non-tests. At the design stage there are several steps, namely compiling competency maps, developing aspects and indicators, compiling assessment grids, determining the form or format of assessment and measurement scales, and compiling questions or statements. Each step at the design stage is carried out in detail to produce instrument products that can measure student competence in carrying out material testing practices.

The development stage (develop) aims to produce a finished product in the form of an assessment instrument that has gone through revisions from material experts and users. Validation was carried out by material experts and psychological measurement experts to find out the deficiencies or weaknesses of the instrument. After the assessment instrument was validated and commented on by material experts, psychology measurement experts then carried out the revision stage. Revisions are made for product refinement and improvement. After the revision phase was completed, the instrument was tested on students. Development trials are carried out to find out student responses or responses to the assessment instruments that have been developed.

Furthermore, to find out the content validity of the assessment instrument, it was carried out by 6 experts. Each expert expert gives a score for the suitability of each aspect with the purpose and realm of assessment. The results of the scores given by the experts were then analyzed using the Aiken formula. The results of the analysis with the Aiken formula show that the attitude assessment instrument with 5 aspects, obtained an average validity score of 0.85. This shows that the attitude assessment instrument developed is in a very valid category in accordance with the competencies that arise in materials technology practice. The results of expert analysis for the skills assessment instrument consist of 6 assessment aspects. Based on the score given by the expert on the suitability of the content with the assessment instrument, an average validity score of 0.83 was obtained. These results can be interpreted that the skills assessment instrument developed is quite in accordance with the competencies that appear in materials technology practice.

The results of student responses regarding the practicality of the developed attitude assessment instrument yield an average score for all aspects of 4.42 out of a maximum score of 5. This indicates that the attitude assessment instrument is practical enough according to students to be used in the assessment of material technology practices in materials testing laboratories. Likewise, the skills assessment instrument obtained an average score for all aspects, namely 4.66 out of a maximum score of 5. This shows that all aspects of skills assessment in the implementation of material technology practices are quite practical to use. Based on the results of the analysis and input provided by experts and students regarding the instrument being developed, it is assembled into an assessment instrument in the form of assessment sheets and observation sheets that can be used as development objectives in materials technology practice courses. With the fulfillment of the requirements for developing an assessment instrument in the realm of attitudes and skills and having assembled them into assessment sheets and observation sheets, the next step is dissemination (use) to users.

## 4. CLOSING

The results of research and development of attitude assessment instruments for material technology practices consist of 5 aspects, namely: responsibility, honesty, cooperation, discipline and activity. In developing the attitude assessment instrument, a lot of input was obtained from experts, both in terms of content, construct and language used. Based on the results of the analysis of the scores given by 6 experts, it can be stated that all aspects of the attitude assessment developed have an average content validity score of 0.85. This shows that the attitude assessment instrument is very valid to be used to measure students' attitudes in materials technology practice. The results of the practicality analysis of the instrument based on the opinions of 20 students obtained an average score of 4.42 with a maximum score of 5. This indicates that the attitude assessment instrument developed is very practical for use in materials technology practice.

The results of the research and development of materials technology practice skill assessment instruments consist of 6 aspects, namely: provision of materials, use of equipment, initial data collection, analysis of practice results, compiling practice reports and making alternative solutions based on practice results. The development of skills assessment instruments in practice received a lot of input from lecturers and evaluation or psychology experts. The input includes the dimensions of the skills construct (abstract and concrete), in terms of the material being practiced and in terms of the language used. The content validity of the skills assessment instrument was obtained by 6 experts. Experts give scores for each aspect that measures student skills. The results of the analysis carried out showed that all aspects of the skills assessment developed had an average content validity score of 0.83. This shows that the skills assessment instrument is very valid to be used to measure students' psychomotor skills in material technology practice. The results of the practicality analysis of the instrument based on the opinions of 20 students obtained an average score of 4.66 with a maximum score of 5. This indicates that the skills assessment instrument developed is very practical for use in materials technology practice.

So, the developed material technology practice assessment instrument meets the requirements for use in material technology practice. By using the developed instrument, it will be easier and objective to measure student competence, both in the realm of attitudes and skills.

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