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The Development of Self and Peer Assessment Instruments for the Meat Processing Practicum

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***Abstract*—This study was conducted to know the validity of the developed self and peer assessment instrument for meat processing practicum and to know the instrument results in assessing students discipline on meat processing practicum. The method used in this study is the method of development and validation with planning, development, validation testing, and testing as the stages. This study was conducted at a meat processing practicum with 48 students as participants and 5 observers. All of the data used in this study, in the form of self-assessment scores, peer assessment, and observer assessment, were analyzed by looking at their similarities. The developed instrument has been declared valid by the experts. The results of the use indicate that there are 17 students with very good discipline, 8 students with good discipline, and 6 students with enough discipline. The validity is not only adapting the literature related to this instrument, but has been declared valid by experts (expert judgment), and can be used based on the results of the trial analysis. The more similarities of scores obtained indicate that the developed instrument can not only be used but also good enough for assessing student discipline in the meat processing practicum.**

Keywords—peer assessment, practicum, self-assessment

I. INTRODUCTION

Strengthening Character Education (PPK) is implemented by implementing Pancasila values in character education which includes religious attitudes, honesty, tolerance, hard work, creative, independent, democratic, curiosity, national spirit, love the country, respect achievement, communicative, love peace, love to read, care for the environment, care about socially, take responsibility, and discipline [1].

The principle of learning must improve and balance physical skills (hard skills) and mental skills (soft skills) [2]. This is supported by the results of research [3] that there is a positive contribution between character education and soft skills. Good character education for students is followed by good soft skills.

Learning with practicum can increase knowledge, hone the abilities and skills of students, and also be able to contribute to building the character of students. Through practicum that applies a scientific process, students can get value and character education in the form of scientific attitudes that can shape student's personalities. These scientific attitudes include honesty, rational thinking, cooperation, thoroughness, not easily giving up, being careful, creative, caring for the environment, responsible, and disciplined [4,5].

Discipline is an important thing to note to build a person's character. Armed with disciplined character values, it will encourage the growth of other good values such as responsibility, honesty, cooperation, and so on [6]. In learning, disciplinary behavior is shown by orderliness in doing what must be done and compliance with various rules and regulations [7]. In practicum activities, discipline is shown by complying with all practicum rules or regulations, carrying out all processes or stages of practicum, and working together in carrying out practicum. The disciplinary attitude of students in practicum can be measured by performance appraisal [8]. Performance appraisal in practicum plays an important role in determining the success of learning because the ability of students can be seen during the learning process without having to wait until the learning process ends [9,10]. That is, performance appraisal can not only be used to assess students 'abilities but also to assess students' discipline in practicum.

Performance appraisal conducted by teacher assessment has limitations in the assessment process because the number of students observed is too large, so the performance appraisal is not optimal [11,12]. Therefore, an assessment technique is needed that can be used to assess the performance of students when carrying out practicum activities and to help make it easier for assessors to observe. Reference [13] found that self-assessment techniques can be used to assess student's disciplinary attitudes. However, according to Mania [14], disciplinary attitude can be measured by an assessment between students. Thus, in this study, an assessment was carried out using a self-assessment technique and peer assessment (assessment between friends) simultaneously.

The use of peer assessment and self-assessment together provides many advantages. Rahmi [15] and Nurohmah [16] argue that self-assessment and peer assessment need to be combined to obtain optimal results in assessing student

performance. When students assess their friends, students also compare with themselves. This is in line with the findings of Wijayanti [17], self and peer assessment which is part of the assessment in the 2013 curriculum is the most effective assessment technique in shaping the character of students. The characters that are formed will have a positive impact on the personal formation of students, so that intellectual development (knowledge and skills) will also increase.

One of the practicums carried out in the Agro-industrial Technology Education Study Program is in the Meat, Fish, and Seafood Processing Technology course. This elective course that has just been applied in the Agro-industry Technology Education Study Program does not yet have a performance appraisal instrument to assess student discipline when carrying out practicum. Meanwhile, assessments during practicum implementation are needed to achieve effective and efficient learning activities [9].

Based on the previous description, it is necessary to research the development of self and peer assessment instruments in the meat processing practicum. This is because no research has developed a performance appraisal instrument using self and peer assessment techniques to assess student discipline in the meat processing practicum. Therefore, this study aims to determine the validity of the self and peer assessment instruments in the developed meat processing practicum and the results of their use in assessing student discipline in the meat processing practicum.

II. METHODS

This research uses the development and validation methods conducted by Adams and Wieman [18]. Determination of the sample using a saturated sampling type Nonprobability Sampling technique. Sampling saturated a sampling technique where members of the population used as a sample [19]. Thus, the population and sample in this study were 48 students of the UPI Agro-industrial Technology Education Study Program who contracted the Meat, Fish, and Seafood Processing Technology course. The instruments used for data collection in this study were validation sheets and observation sheets.

A. Research Procedure

This research was conducted in four stages, namely the stages of planning, development, validity testing, and testing. The planning stage is carried out, namely a preliminary study and literature review on similar research and material for developing self and peer assessment instruments. Thus, the purpose and scope of the instrument being developed are described. In the development stage, the assessment instrument indicators were determined, the assessment instrument development included the assessed aspects and the assessment rubric until the initial design of the self and peer assessment instruments was produced in the meat processing practicum.

At the validity test stage, validation is carried out using the expert judgment method. Validation is carried out by lecturers who teach Meat, Fish, and Seafood Processing Technology courses and laboratory assistants. The results obtained are in the form of suggestions for improvement from experts, which are then used as material for improving the developed instrument. Thus, a valid self and peer assessment instrument was obtained in the meat processing practicum, which was then tested. In the trial phase, a disciplinary assessment of students in the meat processing practicum was carried out using self and peer assessment instruments that had been developed, to ensure that the instruments could be used. The trial was conducted on 48 students who were divided into two shifts of practicum, shift A (practicum in the morning) and shift B (practicum in the afternoon).

B. Data Analysis

The data analyzed in this study were the results of testing the self and peer assessment instruments that had been developed and validated to assess student discipline in the meat processing practicum. The trial data obtained were in the form of self-assessment, peer assessment, and observer assessment. The assessment given by students and observers is "Yes" if the student carries out the aspect being assessed or "No" if the student does not carry out the aspect being assessed. The value obtained is "1" for the answer choice "Yes" and the value "0" for the answer option "No". After the answer choices are converted into numbers/scores, the number of scores obtained from each assessment is calculated and analyzed. The number of scores obtained can show student discipline when carrying out practicum.

III. RESULTS AND DISCUSSION

A. The validity of Self and Peer Assessment Instruments for Meat Processing Practicum

1) Assessment planning: At the initial stage of the research, namely the assessment planning stage, a preliminary study and literature review were carried out. A preliminary study was carried out to get a general picture of the world of education, especially disciplinary character education and performance assessment of students in practicum activities. From the preliminary studies conducted, it is known that discipline is the spearhead of character building for students. This was stated by Mangesti [6], that discipline will encourage the growth of other good characters, it will also form a dignified national character and civilization to educate the nation's life.

Discipline is a very important factor in everyday life. Discipline is an action that shows orderly behavior and obeying various provisions and regulations [20]. Students attending lectures will not be separated from the various rules and regulations that have been established. Every student is required to be able to behave following the rules and regulations of the institution. Student obedience and obedience

to various rules and regulations that apply on campus is called student discipline. Meanwhile, regulations, rules, and various other provisions that attempt to regulate student behavior are called school discipline. Discipline is the right way to help students learn to live with good habits and be beneficial for themselves and their environment [7].

The demands for the use of Occupational Safety and Health (K3) and practicum procedures that are packaged in the practicum guide must be applied at the time of practicum activities because they prioritize learning. Students are expected to be willing to follow certain rules and stay away from certain restrictions. The main experience in implementing discipline will provide a framework for the orderliness of the next life [7]. Thus, habituation is needed so that discipline has a positive influence on the lives of students, in addition to being applied in learning activities with practicum. Behavior in learning with practical discipline demonstrated by complying with all regulations, carry out all the procedures specified lab, and work together with the group in carrying out the practicum [7,8]. To find out the existence of student discipline in practicum activities, an assessment instrument is needed as a measuring tool.

The next literature review is carried out to deepen knowledge about self and peer assessment, study-related theories, and deepen knowledge about the development of self and peer assessment instruments as the basis for the research conducted. Self-assessment techniques and peer assessment were chosen in this study because according to Wicaksono [13] in their research found that self-assessment techniques can be used to assess students' disciplinary attitudes. However, according to Mania [14], disciplined behavior can be measured by ratings among friends (peer assessment). Thus, in this study, an assessment was carried out using a self-assessment technique (self-assessment) and peer assessment (assessment between friends) simultaneously, using a developed assessment instrument, to assess student discipline in the meat processing practicum.

2) Development of self and peer assessment instruments for meat processing practicum: Performance appraisal is based on student performance in completing given assignments [11]. The performance appraisal instrument developed in this study consists of two components, namely the assessed aspect and the assessment rubric. This is based on Usodoningtyas [21] which states that performance appraisal consists of two components, namely assignments and rubrics. In this study, assignments were developed from four performance indicators that refer to disciplinary indicators according to Rahmansyah [22] and Azzizzah [8], Semester Learning Design (RPS), and Practical Guidelines for Meat, Fish, and Seafood Processing Technology in meat processing materials.

The disciplinary indicators chosen are self-discipline and group discipline. In addition to the indicators presented in Table 2, indicators of self-discipline include being not late, being obedient in wearing clothes and attributes as well as lab rules, being on time in carrying out practicum, obeying the teacher, and not being noisy during practicum. While group discipline includes completing individual tasks for group goals and working (carrying out practicum) with the group. Without the implementation of disciplinary indicators, students cannot carry out practicum properly. These disciplinary indicators are then used as a reference in developing the instrument.

The performance indicators in this study are: 1) preparation of practicum, which is determined based on disciplinary indicators of obedience and compliance with applicable rules and regulations; 2) carry out practicum of meat processing, based on disciplinary indicators of knowledge of the work to be done, work order, initiative in presenting what must be done, as well as initiatives that support the smooth implementation of tasks; 3) observation of work results; and 4) sanitation during practicum which is also determined based on the same indicators as the previous indicators. But broadly speaking, these performance indicators refer to the practicum guidelines and RPS for the subject of Meat, Fish, and Seafood Processing Technology. Based on the performance indicators, a total of ten tasks are obtained, in this case, the aspects being assessed. According to Cody [9,23] in developing the assessed aspect there are six steps, namely determining focus, creating context, writing down the flow, identifying who will be assessed, developing scoring guidelines, and reviewing the aspects being assessed.

Aspects that are assessed are determined by referring to the Practical Guidelines for Processing of Meat, Fish, and Seafood Processing Technology and adjusting to the practicum rules. The assessed aspects developed from skills indicators include the preparation stage of the practicum being developed into one assessed aspect, the implementation stage of the meat processing practicum into five assessed aspects, the observation stage of work results into three assessed aspects, and the sanitation stage being one aspect that is assessed. rated.

In the early stages of instrument development, there are four indicators with a total of ten aspects being assessed and an assessment rubric. Discipline indicators according to Rahmansyah [22], Semester Learning Design (RPS), and Practical Guidelines for Meat Processing materials are references in developing instruments. Each of the assessed aspects is equipped with a performance appraisal rubric. According to Wolf and Stevens [9], there are three steps in developing a rubric, namely identifying criteria in defining performance, determining levels of performance, and making performance descriptions. The assessment rubric developed in this study is in the form of a checklist with "Yes" and "No" options for all assessment stages. This assessment rubric is used because the performance appraisal to determine the mastery of competencies of students requires clear answers, namely whether to carry out performance or not. This is following the objectives of the Guttman scale, which is an assessment if you want to get a clear and clear answer to the problem being asked [24].

3) Expert judgement: The validity test phase begins with validating the experts (expert judgment) on the initial design of the self-instrument and peer assessment in the meat processing practicum. The validity of a measuring instrument is seen in terms of the content of the learning material covered by the measuring instrument [25]. The content validation is carried out by asking for expert judgment. As stated by Firman [25] and Hendryadi [26] that content validity is the validity of an important measuring instrument, which is estimated through testing the appropriateness or relevance of the test content through rational analysis by a competent panel or expert judgment. Experts who do the validation or what is called the validator in this study are lecturers who teach Meat, Fish and Seafood Processing Technology courses, and laboratory assistants.

The validation process is done by way of assessing the suitability of the aspects assessed and sections that have been developed with reference namely Practical Guidelines for Meat Processing Technology, Fish, and Marine Product. The instrument validation sheet is in the form of a suitability checklist between the aspects being assessed and the assessment rubric. In the validation sheet format, a column for suggestions for improvement is also provided to be input for the instrument to be developed. Experts who do the validation assess that the self and peer assessment instruments in the meat processing practicum are valid with suggestions for improvement. The results of this validation are then used as input for the improvement of the self and peer assessment instruments in the developed meat processing practicum.

The results of the validation stage, namely the self and peer assessment instruments developed were valid, but several improvements needed to be made before the instrument was used. These improvements include the separation of equipment and materials based on production requirements per product, tools used in meatball processing, and observations made on the results of each product. Revision of the instrument is carried out based on suggestions for improvement from experts, so the self and peer assessment instrument has four indicators with twelve aspects being assessed and there is an assessment rubric on each aspect. With this revision, the self and peer assessment instruments in the meat processing practicum can be tested for use.

The extent to which the validity of the developed self and peer assessment instruments can be seen by testing and analyzing the results. This is based on Sugiyono [19], that an instrument is said to be valid if it has been consulted with an expert (expert judgment), tested, and analyzed. Therefore, after a revision was made based on the opinion of the experts, the self and peer assessment instruments in the meat processing practicum developed were valid and could be tested for use to determine the extent of their validity.

B. Use of Self and Peer Assessment Instruments for Meat Processing Practicum

At this stage, trials of the use of self and peer assessment instruments are carried out on meat processing practicums that have been developed, validated by experts, and have been improved based on expert opinion. This stage aims to ensure that the self and peer assessment instruments in the meat processing practicum can be used properly. This stage is carried out for students who do meat processing practicum, both practicum which is held in the morning (shift A) and during the day (shift B). Practice on shift A as many as 25 students and shift B as many as 23 students.

The instruments used were self and peer assessment instruments in meat processing practicum that had been developed, validated by experts, and improved based on expert considerations. The data obtained were in the form of observer assessment scores in assessing students and student assessments in assessing themselves (self-assessment) and their friends (peer assessment) in the meat processing practicum. The recapitulation of data obtained from the use of instruments can be seen in Table 1.

TABLE I. RECAPITULATION OF DATA ON RESULTS OF USING SELF AND PEER ASSESSMENT INSTRUMENTS IN MEAT PROCESSING PRACTICUM

Students	Assessment	Groups									
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
A	Observer	9	10	8	11	9	10	12	10	10	11
	Self Assessment	9	10	9	11	11	11	12	9	10	11
	Peer Assessment	9	10	10	11	9	10	12	10	10	11
B	Observer	8	9	12	10	8	10	11	12	7	12
	Self Assessment	8	9	12	9	9	10	11	12	7	12
	Peer Assessment	10	9	12	10	8	10	11	12	8	12
C	Observer	12	11	10	11	9	10	10	9	11	11
	Self Assessment	12	11	10	11	8	10	11	9	10	11
	Peer Assessment	12	11	11	11	11	10	11	9	11	11
D	Observer	12	10	10	12	11	10	10	11	11	9
	Self Assessment	12	10	10	12	11	10	10	11	11	9
	Peer Assessment	12	11	11	12	11	10	10	10	10	9
E	Observer	8	9	10	11	11	10	11	9	-	-
	Self Assessment	8	9	10	11	11	10	11	8	-	-
	Peer Assessment	8	9	10	11	11	10	11	9	-	-

The highest score that can be obtained from the self and peer assessment instrument in the meat processing practicum is 12, the same number for each assessment carried out, both observer and self-assessment and peer assessment. The total score is obtained if the student is disciplined, through doing or implementing all the aspects that are assessed on the assessment instrument. Discipline is an attitude that can be seen from the obedience in students and obedience when interacting in groups while carrying out practicum activities [8].

Budiarti [7] argues that in learning, disciplinary behavior is shown by orderliness in carrying out what must be done and compliance with various rules and regulations. This is supported by Azzizzah [8] through his research which shows that self-discipline can be assessed from the aspects that are assessed which require students to comply with practicum rules. In this study, the obligation to comply with practicum rules is the basis for the existence of indicators (1) preparation of practicum with aspects assessed 1.1, namely using practicum equipment. Meanwhile, the order in carrying out what must be done is the basis for indicators (2) carrying out meat processing lab work, (3) observing work results, and (4) sanitation during practicum and the aspects that are assessed.

The results of the assessment presented in Table 1 show that based on the similarity in scores between assessments, there were 7 students with a perfect score (100%), 10 students with a grade of 11 (92%), 18 students with a grade of 10 (83%), 5 students with a grade 9 (75%), and 1 student with a grade of 8 (67%). This value shows student discipline as seen from their performance when carrying out meat processing lab work and students' ability to do self and peer assessment. If interpreted by the scale of the assessment category, there are 17 students with very good discipline (86% - 100%), 8 students with good discipline (76% - 85%), and 6 students with fairly good discipline (60 % - 75%). Thus, 31 out of 48 students were able to do self and peer assessments quite well.

Overall, 27 out of a total of 48 students can carry out self and peer assessments simultaneously. If analyzed separately, the ability of students to conduct self-assessment is seen from the comparison between self-assessment and observer assessment, namely, 36 out of 48 students made the same assessment as the observer. Meanwhile, in conducting peer assessment, 35 out of 48 students made the same assessment as the observer.

The similarity of the assessment scores obtained between the self- assessment and peer assessment with the observer's assessment indicates that the performance appraisal using the developed self and peer assessment instruments can be used properly to assess student discipline in meat processing practicum. In the research of Nurhayati [9] and Tresna [23], it was found that to find out the extent to which self and peer assessment instruments can be used to assess performance can be seen from the similarity of assessment scores between observers and rater. This is supported by Sriyati [27] who examined the effectiveness of peer assessments to assess student performance, the more similar the scores given by students to the assessments given by lecturers, the higher the level of effectiveness of the assessments.

The difference in assessment scores from both the observer's assessment, self-assessment, and peer assessment is caused by the lack of student performance and/or the lack of accuracy of the assessors in assessing student performance. As the findings of Salama [28], Tresna [23], and Fatah [10] in their research, the difference in assessment scores is not only because students are not honest in making assessments, but also due to a lack of observation/focus on the performance of their friends. According to Sriyati [27], the difference in assessment between observers and students through self and peer-assessment can be caused by (1) students are not experienced in carrying out assessments; (2) there are differences in the interpretation of the criteria and indicators of the performance appraisal rubric; and (3) the factor of honesty or objectivity in the assessment. In this study, the lack of student performance was due to the implementation of practicum in groups, so that there were aspects that were assessed which were not carried out by all members in the group, but carried out by group representatives.

Based on the use of self and peer assessment instruments in the meat processing practicum, the developed instruments can be used to assess student discipline. This is shown by the presence of 17 students with very good discipline, 8 students with good discipline, and 6 students with good enough discipline. Thus, there are 31 out of 48 students who can do self and peer assessment quite well.

IV. CONCLUSION

- The self and peer assessment instruments for the meat processing practicum developed in this study have met the valid requirements. The validity is not only adapting the literature related to this instrument but has been declared valid by experts and can be used based on the results of the trial analysis.
- The developed self and peer assessment instruments can be used to assess student discipline in the meat processing practicum. The results of its use showed that there were 17 students with very good discipline, 8 students with good discipline, and 6 students with good enough discipline. The number of similarities in the scores obtained indicates that the instrument developed is not only usable but also good enough to assess student discipline in the meat processing practicum.

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