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Effectiveness e-authentic assessment in computer network course

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Effectiveness e-authentic assessment in computer network course

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Abstract. This study aims to identify the quality and effectiveness of the application of authentic web-based assessments in computer network learning on wireless material, and to identify profiles of students' skills and knowledge competencies in learning computer networks on wireless material. The trial was conducted at the Faculty of Computer Science, University of Dharmas Indonesia. This research uses a descriptive method. The population in this study were students of the Informatics Engineering Study Program. Sampling is done using the purposive sampling method. Based on the results of the study, the quality of authentic assessments showed validity for assessment of performance of 0.94 (high) and reliability of 0.93 (very high), while the validity for the description question was 0.97 (very high) and reliability was 0.98 (very high). Based on observations on the effectiveness of the implementation of authentic assessments and student questionnaires, the level of application of authentic assessments is in categories both at the stage of assessment preparation, implementation of assessment and reflection. The skills competency profile of most students is in very good category, while the knowledge competencies of most students fall into sufficient categories for each indicator of the problem.

1. Introduction

Lecturers have the role to carry out learning based on the curriculum to students in accordance with the prescribed syllabus. One of the learning models used is problem based learning. It is expected that Problem Based Learning changes the learning conditions that are passively active and creative, from teacher oriented to student oriented [1]. This is also in accordance with the results of the research conducted [2]. which shows that learning with the PBL method is more effective in improving student learning. Savin Baden and Major [3] state a problem based learning model involves students working cooperatively in class. The main characteristic of PBL is that students focus on solving problems. Boud and Feletti [4] states that problem based learning is a learning approach that contains confrontation with students with practical problems, in the form of ill-structured, or open ended through stimulus in learning. Learning Model experts, Walker et.al[5] states that problem based learning is a learning model that involves students to solve a problem through the stages of the scientific method so that students can learn the knowledge related to the problem and simultaneously have the skills to solve problem.

The curriculum used in informatics engineering study programs applies authentic assessments to assess student learning progress which includes attitudes, knowledge, and skills. Authentic assessment teaches students about meaningful learning and can also be used to hone students' skills. This is according to what was written by Mueller [6] stating that authentic assessment is a form of assessment



where students are asked to perform real-world tasks that show meaningful applications of knowledge and skills. This research was only conducted on wireless material. The wireless ber concept is closely related to the use of internet technology in daily life, and can be taught through practical activities. The model of problem based learning is suitable to be applied to wireless material. This is because learning with problem based learning can increase students' active involvement in learning, motivate students to generate curiosity and achieve a deep understanding of the subject matter.

This is in line with the opinion of experts who stated that the application of Problem Based Learning in professional learning and training has been investigated in the past 20 years[7]–[13]. the application of the Problem Based Learning (PBL) model is important to be used to overcome the problem of low student learning achievement, this is supported by the results of research by Yusof et.al [14], which suggests that the implementation of PBL at the University of Technology Malaysia positive influence on students from aspects of student learning achievement and thinking skills. Suryawati et.al, student experience in PBL, generally shows that students are more satisfied and happy to learn from PBL compared to conventional learning. This study aims to identify the quality and effectiveness of authentic assessment applications used, and identify the profile of students' skills and knowledge abilities in learning problem based learning in wireless material.

2. Method

The research method used in this research is descriptive research method. In this study researchers only identified the effectiveness of authentic assessments used in learning computer networks on wireless material. The subjects in this study were students of Informatics Engineering Study Program, Faculty of Computer Science, University of Dharma Indonesia who were studying wireless material. The technique of selecting the subject of this study is purposive sampling, namely by selecting classes that have not or are studying wireless material on computer network courses. To analyze the data in this study used various methods as follows:

2.1. Quality of Assessment Tools

To see the validity and reliability used Giving validity values with the formula from Aiken's V [15]. High validity can be due to the determination of a score or a clear assessment rubric in assessing student student competence regarding wireless network material. Determination of the score used is by identifying the suitability of the student's answer with the specified answer criteria. The device used is a computer based test (CBT) which is available in e-learning.

2.2. Analysis of the Observation Sheet on the Effectiveness of the Application of Authentic Assessment

The data processing on the observation sheet on the effectiveness of the assessment application is done by calculating the frequency of occurrence of the effectiveness indicators for the assessment of each observer. The data obtained in the form of a checklist on the observation sheet is calculated, then devised. The percentage results were then adjusted to the category of implementation of the assessment according to Azwar [15].

2.3. Student Questionnaire Analysis

The first step in analyzing student questionnaires is to tabulate questionnaire answers from all students. Next, calculate the percentage of student answers for each aspect asked. Interpretation of the answer questionnaire refers to Arikunto[16].

2.4. Analysis of Student Ability Profile Data

It starts with giving students scores, then changes the raw score into the percentage values, followed by calculating the percentage of students in each category. For the performance capability category refers to Purwanto[17], while the knowledge category refers to Arikunto dkk.[16].

3. Result and Discussion

3.1. Quality of Authentic Assessment Tools in Learning Computer Networks in Wireless Materials.

Authentic assessment online has several advantages and disadvantages. The advantages of learning evaluation include learning evaluation wherever and whenever, web-based evaluation also provides convenience in its assessment, because it has been integrated automatically with programming applications, and can make students motivated to learn computer networks while learning information technology and communication. In this study web-based assessment tools (e-assessment) for performance appraisal look like Figure 1.



NO	KOMPONEN KETERAMPILAN	SKOR
		1 2 3 4 5
PERSIAPAN		
1	Mengumpulkan Informasi	
2	Mempersiapkan Bahan dan Peralatan Praktik	
PRAKTIK		
3	Memperhatikan Keselamatan Kerja	
4	Kerjasama Tim dan Individu Dalam Pengerjaan	
5	Memperhatikan Standar dan Sikap Kerja	
6	Keterampilan Dalam Praktik	

Figure 1. Interface Performance Assessment

In this study the quality of e-authentic assessment tools is seen from empirical validity and reliability. The results of the validity and reliability analysis are listed in table 1.

Table 1. Validity and Reability of Autentic Asesment.

Assesment Quality	Type of Authentic Assessment	
	Performance	Description Tes
Validity	0.93	0.94
Interpretation	High	High
Reliability	0.98	0.97
Interpretation	Very High	Very High

The high validity figures show that the performance appraisal used in the research is able to perform the function of the measuring appropriately, namely measuring the competency of students' skills in carrying out problem-based learning based on wireless material, from the practicum preparation stage, paying attention to work harmony, teamwork and individuals in workmanship and practical skills .

Student cognitive assessment is done by using computer based facilities. The Online Examination Menu on Competency Based Learning based e-learning was developed to minimize cheating or leakage of questions that often occur during exams, prevent the limitations of the problem, damage the questions so that the results are not released after being examined. The CBT system will also reduce implementation costs because of course there is no need to print questions and answer sheets with paper. In addition to the CBT system exam, it is more practical, easier and makes the exam participants more focused. There is a time feature on the screen like Figure 4.10 so that you can maximize the time available. The more effective the problem is, the more questions can be answered, so the possibility of graduating is also getting bigger.

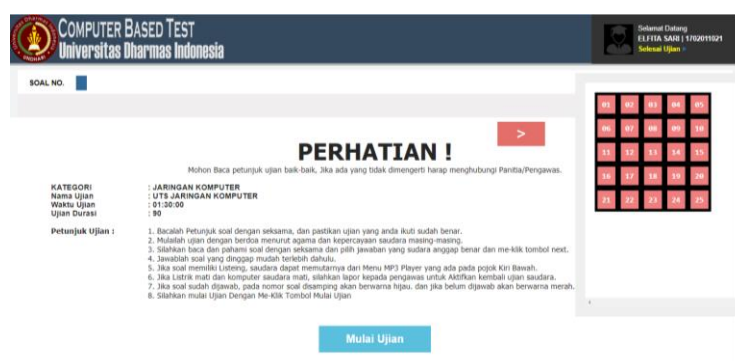


Figure 2. Main Menu Computer Based Test (CBT)

The results of computer based test not only show the total value obtained by students, but also have described the competency based they get according to the competencies they get. The competency analysis obtained by students looked like Figure 2.

3.2. Effectiveness Implementation of Assessment

3.2.1. Preparation of Assessment. The lecturer informs the assessment criteria the day before the learning activities take place, this can be seen from the results of observations in Figure 3 above which show 100% implementation or included in the excellent category. In addition students also agreed on the assessment criteria given by the lecturer, this can be seen from the results of observations in Figure 3 which showed that implementation was in a very good category (100%) and supported by the results of student questionnaire answers, almost all students (97%) answered that the lecturer has informed the assessment criteria and is accompanied by a 75 graduation score limit. The results of student responses regarding the clarity of the assessment criteria submitted by the lecturer, namely almost all (97%) students answered that the criteria given by the lecturer were clear.

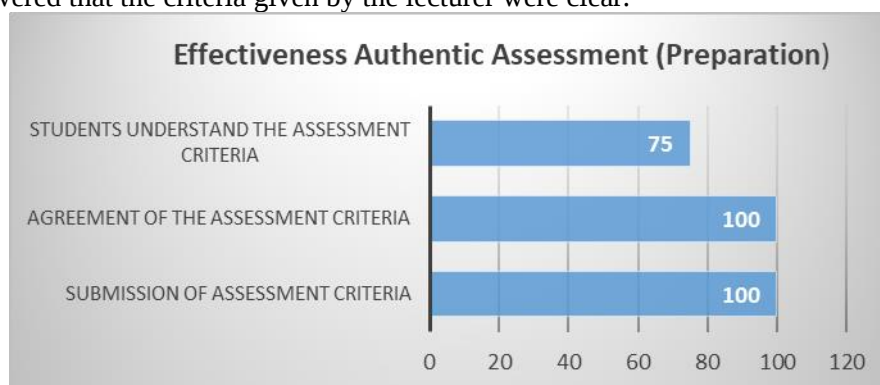


Figure 3. Observation on the Effectiveness Authentic Assessment (Preparation)

Students' understanding of assessment criteria is important in the learning process, so students are motivated in carrying out learning. In addition, transparency regarding assessment criteria can spur students to prepare themselves before carrying out learning. Transparency of assessment criteria to students is important so students know the competencies that will be assessed by the lecturer, so students are motivated to give the best effort during learning.

3.2.2. Implementation of Assessment. The level of implementation in the second indicator only reached 84%. But the level of implementation is quite good. The level of implementation in the fifth indicator reaches 100%, this means that evidence of student learning outcomes is collected and processed through various relevant assessment techniques. The sixth indicator reaches 100%, this means that student

performance is assessed based on a predetermined reference. After obtaining proof of learning outcomes, the lecturer performs the processing of values. The assessment results are processed from various sources and then categorized based on the type of competency. In processing the results of student performance the lecturer uses a reference in the form of a predetermined rubric. The use of the assessment rubric is intended so that the assessment is carried out objectively and makes it easier for the lecturer to determine the scores obtained by students.

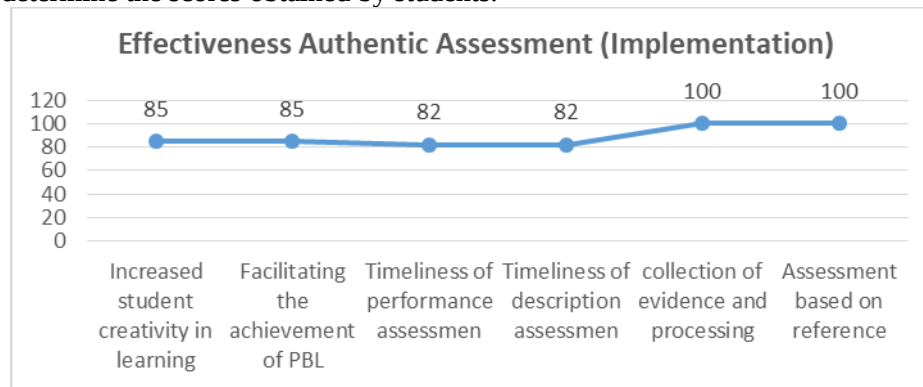


Figure 4. Observation on the Effectiveness Assessment (Implementation)

3.3. Reflection

The implementation of the first indicator belongs to the good category, which is equal to 85%. Assessment by students is intended to train their ability to assess the results of their performance. Giving students the opportunity to evaluate their own work is one effort to improve their learning, so students are able to be motivated to plan the business they will do to develop their abilities. One important aspect of implementing effective assessments is providing feedback to students. Before giving feedback, the lecturer conveys the results of student evaluations conducted at the next meeting.

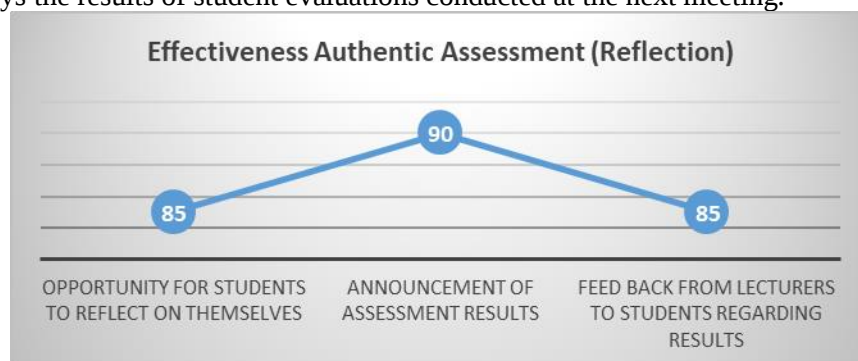


Figure 5. Observation on the Effectiveness Authentic Assessment (Reflection)

Transparency of assessment results is done so students know the abilities they have and are motivated to improve their abilities. This is supported by the answers of the student questionnaire, namely all students (100%) stated that the lecturer informed the results of the assessment that had been carried out and the results of observations on the effectiveness of the assessment (figure 5) showed that the second indicator reached 100% (very good). The level of implementation in the third indicator belongs to the good category, which is 85%. This is supported by the answers to student questionnaires, that is, almost all students (92%) agreed that the lecturer had provided suggestions on how to improve the results of the assessment. This shows there is feedback from the lecturer to students regarding the results of the assessment.

3.4. Profile of Students' Ability to Problem Based Learning in Wireless material

3.4.1. Results of Performance Assessment in the Implementation Phase

3.4.1.1. Student Performance at the Phase of Designing Experiments. In task 1 there are some students included in the excellent category in formulating the problem correctly. In task 2, there are a small number of students who are included in the excellent category, but most of the students fall into the good category because they make the experimental hypothesis by only mentioning the relationship between the experiments that have been done. In task 3 there are a small number of students who are included in the category very well in determining the experimental variable. However, most students include independent variables incorrectly. In task 4, most students are categorized as very good in determining the tools and materials used in the experiment. This is because in the jobsheet there is a choice of tools and materials to be used, making it easier for students to determine wireless devices and their numbers according to the experiment.

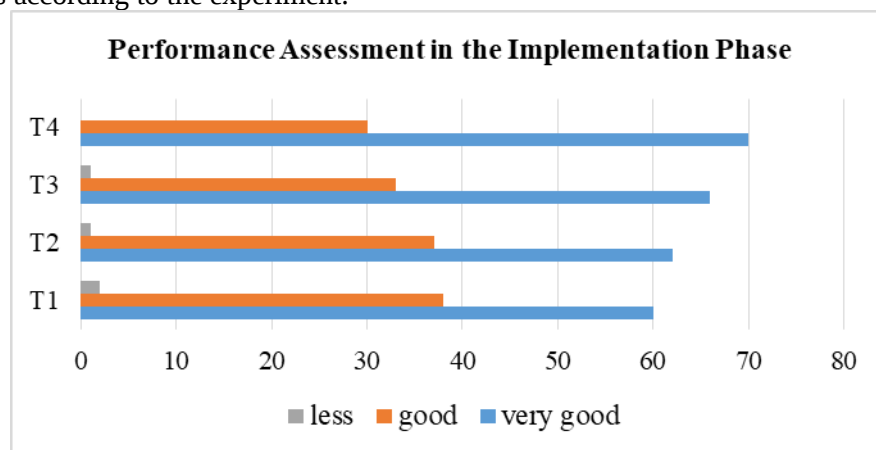


Figure 6. Results of Student Performance Assessment on the Designing Stage

In task 5 almost all students have been able to arrange the experimental steps according to the experimental and systematic goals. This is because lecturers provide guidance questions that guide students in determining the experimental steps. However, students who belong to the excellent category use clear command sentences, while students who fall into the good category use obscure command sentences.

3.4.1.2. Students Performance at the wireless experiment. In task 1 there are most students able to install wireless devices correctly, but there are still some students who cannot install wireless equipment. This is because students rarely carry out lab work and have never seen and tried equipment. In task 2, most students are able to use the device and are good at configuring properly and correctly. In task 3 most students are able to observe the data input very well. However, it has not been able to overcome troubleshooting. In task 4, most students fall into the very good category in carrying out this performance, and only a small percentage of students fall into the good category, namely some students carry out less skilled experiments

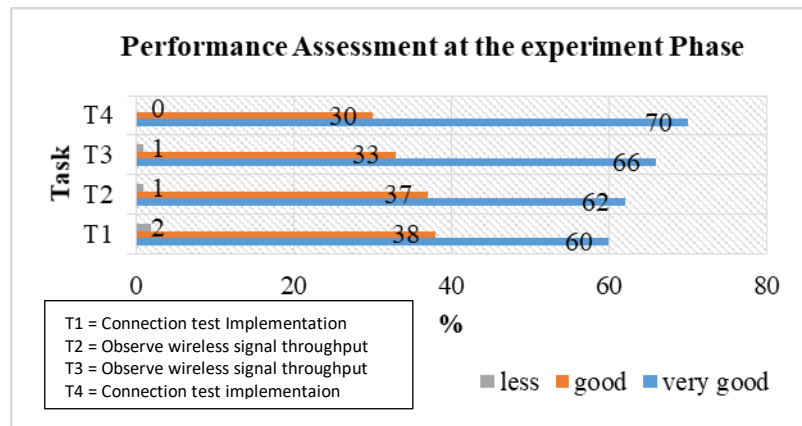


Figure 7. Results of Performance Assessment at the experime

3.4.1.3. Students Performance at the processing experimental data. In task 1 and task 2 almost all students belong to a very good category, this is because students are able to process experimental data into tables and can display experimental results in graphical form correctly along with the data in accordance with the experimental results. While students belonging to the good category are students who do not include table and graph titles. In task 3, most students have excellent performance in making relationships between variables according to the experiment. A small number of students did not give a detailed explanation of the relationship between experimental variables. As shown in figure 6, In task 4, most students have very good performance in making conclusions, namely conclusions that are made according to the results of the experiment, linking with experimental analogies, and conclusions made answer the problem statement. But there are some conclusions made by students not to answer the formulation of the problem that has been made.

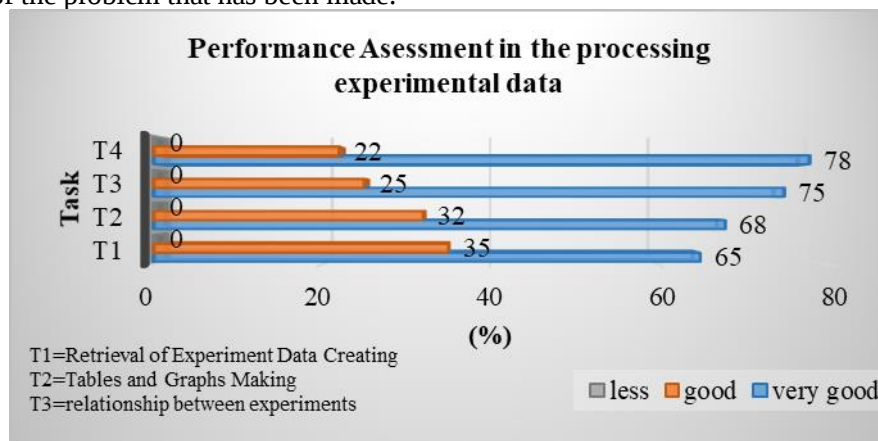


Figure 8. Results of Performance Assessment in the Processing Experiment Data

3.4.1.4. Students Performance at the practicum completion process. In task 1 most students are included in the excellent category. But some students still leave some equipment scattered in the laboratory or not clean the laboratory. This is due to the lack of cooperation in the group which only relies on a few friends to tidy up the laboratory. As shown in Figure 8, the task 2 shows that most students are included in the excellent category of cleaning and tidying up the laboratory room. In task 3 most students are able to carry out this performance very well. However, there are some students who do not double-check and count the number of devices that have been used, and immediately put the tool that has been used to its original place. This is due to the limited time the students have, so they are in a hurry to complete the practicum so they can take part in class presentations and discussions.

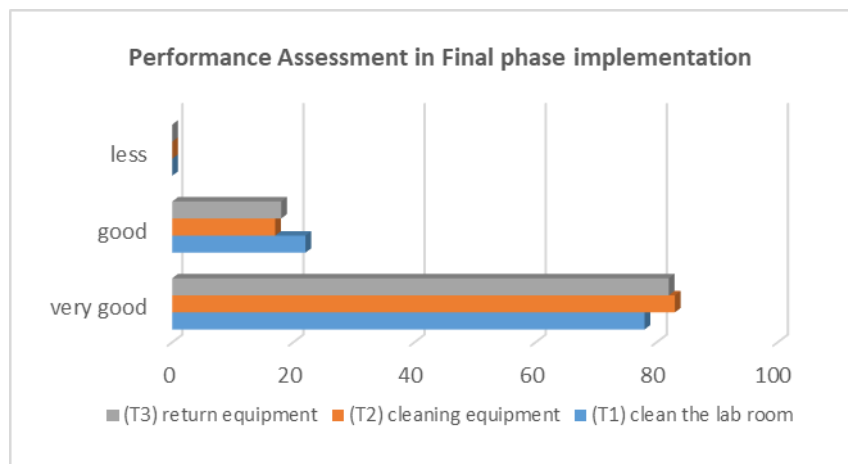


Figure 9. The result of performance assesment in final phase implementation

3.4.1.5. Results of Description test in the Implementation Authentic Assessment. Based on Figure 10, most of the students' knowledge on wireless material is in a sufficient category for each problem indicator. In the first indicator, most students are in the good category. This is because many students are theoretically capable of the concept of frequency and wireless channel usage, but students have difficulty applying how to implement good frequency settings when interference occurs. In the second indicator, the number of students in the sufficient category does not differ too far in either category. This is because some students are unable to distinguish between the frequency and width of the channel. This can be seen from the answers of the students who answered the two questions with the same answer. In the third indicator, most students are in the sufficient category, because some students are not able to explain completely the use of frequency. Some students only explain the results of experiments that have been carried out and do not associate them with the process of decreasing throughput resulting from interference interference.

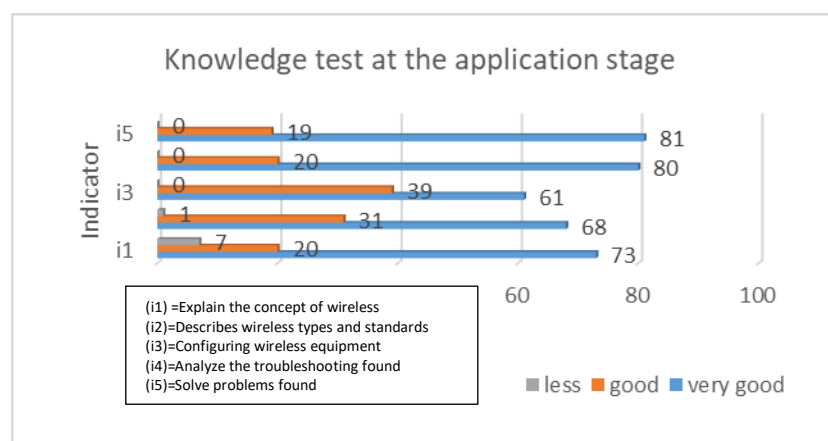


Figure 10. The result of performance assesment in final phase implementation

In the fifth indicator most students are included in the sufficient category. This is because most students have been able to provide an explanation of the relationship between frequency use and the need for data transfer. In this indicator most students are included in a sufficient category to describe interference interference in conditions that are dense using wireless networks. This can be seen from some students who have been able to hypothesize wireless network disturbances which are characterized by declining characteristics of the equipment in transferring large data described in the problem. In addition, some students have been able to explain the effect of frequency and data width settings.

4. Conclusion

Performance assessment tools and description tests are of good quality with high levels of validity and reliability. The level of implementation of authentic assessments falls into the category both at the stage of assessment preparation, implementation of assessment and reflection. Based on the results of observations assessing the competency performance of students' skills during the implementation of problem-based learning practice in wireless material, most students are in the good category at the experimental planning stage, and very well at the stage of conducting experiments, processing experimental data, and the final stages of the experiment. Based on the results of the test description, the competency of students' knowledge regarding wireless material, most of the students belong to enough categories for each indicator of the problem.

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