Peer Assessment Integrated Microteaching Course with E-Learning System to Improve Vocational Teaching Quality as TVET Innovation

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Abstract. This study aimed to develop digital peer assessment for the microteaching course. ADDIE was used as the research model, including analysis, design, development, implementation, and evaluation stages. The microteaching instrument was developed from the Kampus Merdeka curriculum. The result of the content expert test showed that the instrument was valid with a Gregory score of 1.00. The instrument was integrated with a web-based to apply the peer assessment. The response analysis result showed that digital assessment was practical, with a mean of 113.25. The online learning outcome analysis result was 87.12, categorized as very good. The result of offline learning outcomes was 87.65, which was categorized as very good. Conclusively, digital peer assessment was great in supporting the microteaching learning process.

Keywords: peer assessment digital, microteaching, e-learning, TVET Innovation.

1 Introduction

In the learning process, there must always be an assessment process. The assessment process can be carried out at the beginning, middle and end of learning. The assessment process in learning aims to determine whether the learning objectives have been achieved or not. In addition, the results of the assessment also aim to test the effectiveness of the learning process, find out the benefits of using learning models, using learning methods, using learning media, ice breaking and others. Thus, the results of the learning assessment are not only useful for teachers, but also for students. The assessment plan is prepared to be a reference for teachers in organizing an assessment of the entire learning process. In planning a learning assessment, it is necessary to understand to the teacher that educational learning contains two keywords, namely, learning and educating. The word learning has an active connotation because students actively carry out learning activities in learning situations designed by the teacher. In contrast, the word educate contains the connotation of the process of becoming a student comprehensively, both

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pedagogically (academically) and personally (personally), professionally (vocational), and socially (citizenship)[1].

The COVID-19 pandemic that occurred for two years has caused the online learning process to be completed. This means that in the learning process, students and Lecturers can only meet in cyberspace through e-learning platforms, google meet, zoom and so on. The policy is contained in Circular Letter No. 4 of 2020 concerning the Implementation of Education during the Covid-19 Pandemic. No one knows when the online learning process will end. Therefore, teaching staff must prepare various learning platforms and media to accommodate online learning. Of course, online learning is considered not too problematic for some courses whose competence is only in the form of theoretical preparation. However, for courses that require competence in the form of knowledge and skills, of course, they must be prepared properly, such as microteaching courses. The microteaching course is a course that trains prospective teacher students to be skilled in teaching, namely by applying eight teaching skills. The Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia, Number 55 of 2017 concerning Teacher Education Standards, mandates that microteaching courses be given to students of diploma and bachelor of education programs with a minimum learning load of 2 credits. Teaching and learning are the core activities of the educational process. Therefore, the quality of education is highly dependent on the quality of teaching and the learning capacity of students. One of the teachers' main tasks is teaching in addition to carrying out other tasks such as educating, guiding, training, directing, assessing, and evaluating (R.I. Law No. 14 of 2005 concerning Teachers and Lecturers, Article, Paragraph 2). During the Covid-19 pandemic, microteaching lectures were also carried out online. The process of student training, review by lecturers and delivery of material on eight teaching skills is also carried out online. The process of online microteaching lectures is certainly not the same as face-to-face lectures that are usually carried out in class. Therefore, it is necessary to prepare a digital assessment system that can accommodate and provide feedback from lecturers and students. The trend is called Peer assessment. Peer assessment is one of the innovations in the learning assessment system where each student will have the opportunity to assess and be assessed by his peers.

Assessment is the application and use of various ways and tools to obtain a series of information about learning outcomes and competency achievement. Process assessment planning and learning and learning outcomes cannot be separated from the learning planning itself. The preparation of the assessment plan is a series of educational and learning programs that are complete, comprehensive and unity that cannot be separated from one another. The results of the learning assessment are the results of the analysis of several facts about students' performance in mastering the expected competencies. The facts collected, processed, analyzed, interpreted, and concluded are the expected competencies (minimal basic competencies) into a number of sub-competencies and certain indicators and descriptors. Collect facts or evidence of student performance using instruments prepared based on competency achievement indicators. Along with the development of digitalization of the learning process, especially accompanied by the Covid-19 pandemic incident, which requires all actors in the world of education to learn online, it also indirectly shifts the process of implementing assessments toward digital assessments [2]. There are several reasons why digital assessment is important to assess learning outcomes. It can save time, make the learning process more comprehensive, and friendly, provide quick feedback, and provide feedback quickly [3]. However, various obstacles are

experienced by teachers, especially those who teach productive subjects, where what must be assessed is the product and performance of students, plus the number of students in the classroom is very large. One example is in microteaching lectures where students are required to be able to bring eight teaching skills which include: questioning skills, Strengthening Skills, Variation Holding Skills, Explaining Skills, Opening Skills andUpping Lessons, Small Group Discussion Guiding Skills, Small Group and Individual Teaching Skills, Classroom Management Skills, and Individual Understanding Techniques[4][5].

The benefits of conducting a digital peer assessment for microteaching courses are; that students can provide feedback, cognition and metacognition processes, increase motivation, collaborative learning processes, self-regulated learning, and improve performance (Lalu Hasan Ashari, Wahyu Lestari, 2016). The microteaching lecture process is carried out online, causing this peer assessment to be very important to do. Based on the above problems, it is necessary to have a web-based digital assessment system (online) for microteaching lectures. This digital assessment system is packaged with a peer assessment model where each student will become a peer reviewer and integrated with UNDIKSHA e-learning. This process will cause various positive learning environments, one of which is improving each other's abilities according to other assessors' constructive comments (inputs). In addition, an independent and adult learning process will be created, where students will be directly involved in the learning process and assessment process and mutual self-introspection is one of the advantages of peer assessment.[6]

2 Literature Review

2.1 Digital Assessment and Peer Assessment

Assessment is one of the most important things to do. Because basically, this is done to achieve certain goals. For example, to find out a person's performance during this time. This assessment is carried out in school to know how far the students understand various subjects. An assessment is carried out to determine the results of a person's achievements. Thus, the next various steps can be done using the assessment results as a reference point. Robert M Smith stated that assessment is a comprehensive assessment involving several team members to find out a person's weaknesses and strengths. The results of the assessment carried out will then be the basis for the preparation of a new learning design. Meanwhile, McLoughlin and Lewis argue that assessment is a process of collecting data that is carried out systematically to see the capabilities and difficulties of a person, as well as find solutions to what he needs. According to Chittenden (1994), the assessment's purpose is "keeping track, checking-up, finding-out, and summing-up". The explanation is as follows:

1. Keeping track, is one of the activities carried out to determine whether the learning process carried out is in accordance with the initial planning or not. This activity is a reflection activity of the learning process, so that teachers can note some of the obstacles experienced in learning, time effectiveness, the benefits of using a learning model, method, and media.
2. Checking-up, is one of the techniques used to see the learning achievement of students. Achievements here can be done by giving tests or evaluations to measure whether the learning objectives have been achieved in students or not. Evaluation can be done in

the form of formative or summative tests. So that from this evaluation process, the teacher will get an overview of the learning progress of students.

3. Finding-out, is one of the evaluation activities for students. For example, analysis of student test results, whether students have achieved learning objectives or not. If not, which part of the material has not been understood by students, should enrichment, remedial and test repetitions be given. If it has been achieved, it can be continued with an analysis of which material is very liked by students.
4. Summing-up, is an activity carried out to see the evaluation of learning activities as a whole. This activity is a report of the results of the learning evaluation carried out. In addition, teachers can also carry out learning reflection activities, for example, the application of certain learning models can improve student learning outcomes. So that findings like this can be used as reporting related to an effective and efficient learning process.

Along with the development of digital media both asynchronously and synchronously, the process of conducting assessment activities has also developed. One of the assessment activities carried out in the era of the industrial revolution 4.0 is digital assessment. The form of digital assessment has many advantages that can be utilized both in the classroom with synchronous and asynchronous modes to help implement a more efficient and accurate evaluation. Digitalization in teaching and learning should accompany digitalization in the assessment process. Teachers must also apply digital assessment to assess student learning performance[1].

The advantage of developing an online-based learning assessment is that the assessment can be done anywhere, anytime, and practically. This means that anywhere it can be carried out, inside or outside school learning activities, not fixated on space. At any time, it can be interpreted as being able to do it in a specified time and not fixated on a unit of time. Practical can be construed as not requiring a lot of doubling of question sheets even though many students do it, and it's just that it takes a laptop or computer and the internet. In line with the opinion of Bates and Wulf, e-learning learning also has the following advantages. First, enhance interactivity; second, facilitate learning interactions from anywhere and anytime (time and place flexibility); third, have a wider reach (potential to reach a global audience). Fourth, making it easier to refine and store learning materials (easy updating of contents and archivable capabilities)[7].

Peer assessment is a process in which a learner assesses a friend's or other learner's learning outcomes at a level. The point of a level is if two or more people are in the same grade level or the same subject of study. Peer assessment can be used to assist learners in developing the ability to cooperate and criticize the learning processes and outcomes of others (formative assessment). Also, receiving feedback or criticism from others gives students a deep understanding of the criteria used to assess learning processes and outcomes and for summative assessment. The advantages of peer assessment are that it encourages students to have a sense of responsibility for the learning process so that students can be independent, train evaluation skills that are useful for lifelong learning and encourage deep learning. The peer assessment process begins with discussing the items and criteria for assessment by teachers and students. Then each student assesses their designated friend and also gives feedback. The results of this assessment are usually matched with the results of the teacher's assessment[8].

Race and Bostock identified several advantages of peer assessment, including (1) peer assessment could improve the learning process, (2) students can identify weaknesses and strengths they have in learning, (3) encourage students to learn more deeply and meaningfully, (4) encourage students to learn independent of others, (5) students can get to know the assessment criteria, (6) encourage students to analyze each other's performance or work results. Peer assessment is an innovation in the assessment system, in the form of students assessing other students. The benefits of peer assessment are providing feedback, cognition and metacognition processes, increasing motivation, collaborative learning processes, self-regulated learning, and performance improvement. In the microteaching learning process, participants not only need to master knowledge but also be able to perform skills well. With peer assessment, it is hoped that students will become more motivated in learning and improve their skills[9].

2.2 Headings, tables and figures

Moodle stands for Modular Object-Oriented Dynamic Learning Environment, which means a dynamic learning environment using object-oriented modules or a dynamic web-based educational environment package developed with an object-oriented concept. Moodle has various facilities that can be useful in supporting learning activities, including[10]:

a. The assignment is used to assign tasks to online learning participants. Learners can access assignment materials and collect assignments by submitting their work files.

b. Teachers and learning participants use chat to interact with each other online using text dialogue (online conversation online).

c. A forum is an online discussion forum between teachers and learning participants discussing learning materials.

d. Teachers use quizzes to conduct online exams or tests.

e. Surveys are used to conduct polls.

E-leaning in this study will be developed using Moodle software. Moodle is the best LMS application in terms of features compared to other types of LMS. In this development research, Moodle serves as a forum to place various subject matter/courses that will be studied with a user-friendly display per the needs of teachers and students. With various features and advantages of Moodle, the e-module developed not only displays material in the form of text and images but is also accompanied by CAI media assistance in the form of video tutorials, simulations, or Drill and Practice in each learning activity. Various Moodle features such as forum facilities, assignments, quizzes, chat, and several other Moodle facilities will support the learning process. The researcher developed the display of learning design in Moodle and for the stages of learning in a project-based learning-based e-module.

2.3 Characteristic of Microteaching Course

Microteaching consists of the words micro and teaching. Micro means small, so microteaching is the practice of teaching in small classes. The purpose of the Microteaching course is to provide teaching skills to students as prospective teachers. Before students practice teaching in schools, they must pass microteaching courses. There are several theoretical and practical materials given in the microteaching course. The theoretical material is related to how to develop learning plans,

the theory of eight teaching skills which include: Opening and Closing Lessons Skills, Reinforcement Skills, Questioning Skills, Variations Skills, Explaining Skills, Small Group and Individual Teaching Skills, Small Group Discussion Guiding Skills, Managing Skills Classes, and Individual Comprehension Techniques. While the practical material is that students have to practice teaching in class by bringing the eight teaching skills (Opening and Closing Lessons Skills, Reinforcement Skills, Questioning Skills, Variations Skills, Explaining Skills, Small Group and Individual Teaching Skills, Skills for Guiding Small Group Discussions , Class Management Skills).

Opening lesson skills are activities carried out at the beginning of the learning process, where teachers must prepare students to take part in learning well, for example by: creating fun learning, creating communication between teachers and students, focusing students' attention on what will be learned. Components of opening skills include: attracting the attention of students, giving references, doing apperception. While the skill to close the lesson is an activity carried out at the end of the learning process. examples of activities closing the lesson: saying closing greetings, summarizing the material, conducting evaluations that aim to find out whether the learning objectives have been achieved or not, and reflect on the learning process. The skill of giving reinforcement is a form of activity where the teacher provides feedback on the actions or responses of students. Reinforcement is important by the teacher so that the material presented to students is easy to understand and remember. Skills to provide reinforcement can be done with voice intonation, voice emphasis when explaining material or with verbal language. Questioning skill is one of the skills used to provoke students' knowledge. Questioning skills also aim to increase the interaction between teachers and students in class. Questioning skills can be done at the beginning, in the middle and at the end of the learning process. Questioning skills can be divided into two, namely basic questioning skills and advanced questioning skills. The basic questioning skill is a questioning activity carried out by the teacher at the beginning of the learning process. The ability to ask basic questions aims to determine the students' initial abilities. Meanwhile, further questioning skills are teacher asking activities that are carried out in the middle and at the end of the learning process. Advanced questioning skills are part of the cognitive level process of the material explained by the teacher to students.

Variation skills are abilities that are carried out by teachers in the learning process such as variations in the use of media, teaching styles, and variations in interaction with students when teaching in class. The skill of holding variations aims to reduce student boredom while learning. Explaining skill is the teacher's skill in conveying material to students. There are two components of explaining skills, namely planning explanations and presenting explanations. Planning to explain includes making media or material to be explained, while presenting an explanation is a teacher activity when delivering material in front of the class. Explaining can start from the concept, understanding and assisted with detailed examples. Small group and individual teaching skills. Small group teaching skills are teacher activities in teaching classes with 3-8 students. While individual teaching skills are the skills of teachers in teaching individual students. These skills enable teachers to take a personal approach, organizational skills, skills to guide and facilitate learning, and skills to plan and carry out learning activities well. Individual teaching skills, usually aimed at individual students who have very smart or very stupid characteristics. Variation skills are abilities that are carried out by teachers in the learning process such as variations in the use of media, teaching styles, and variations in

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The skill of guiding small group discussions is one of the skills that must be mastered by teachers to conduct discussions in class with students. This skill is very important to do so that the discussion activities carried out do not go out of the predetermined topic. Components of skills guiding small group discussions include: Focusing students' attention, clarifying problems, ordering opinions, analyzing students' views, increasing student attendance, spreading opportunities for participation, and closing discussions. In the learning process, discussion activities are very important in order to train students to dare to speak and express their opinions. Class management skills are the teacher's skills in keeping the class conducive during the learning process. Managing the classroom includes creating and maintaining optimal learning conditions. Efforts to maintain optimal learning conditions and maintain conducive learning conditions, can be reprimanded if a disturbance or problem occurs when the teaching and learning process takes place, such as students starting to struggle and students not focusing on learning [13].

3 Methodology

The research would be carried out using the Research and Development (R&D) method or the research and development method adapted from the ADDIE (Figure 1) development model. The ADDIE model has a focus or emphasis on iteration and reflection so that continuous improvements can be made that focus on feedback[14]. The ADDIE model is a development model popularized in the 1990s by Reiser and Molenda consisting of analysis, design, development, implementation, and evaluation[15].

Fig. 1. ADDIE Design Model

4 Result and Discussion

The results and discussions are described in accordance with the ADDIE stages: Analysis, Design, Development, Implementation, and Evaluation.

1. Analysis

An analysis of the curriculum and the needs of a web-based assessment system was conducted at the analysis stage. The curriculum mapping used as a reference for the preparation of rubrics and assessment grids is the independent curriculum of microteaching courses. There are 14 (fourteen) learning outcomes that must be mastered by students, including: Students are able to analyze the differences between microteaching and ordinary learning, students are able to explore the components of questioning skills and skills to provide reinforcement and implementation, Students are able to apply questioning skills in learning informatics engineering education, Students are able to apply the skills of providing reinforcement in learning informatics engineering education, Students are able to analyze skills using variations and skills to provide explanations and their implementation, students are able to apply skills using variations in learning informatics engineering education, Students are able to apply the skills of explaining in learning engineering education informatics, Students are able to analyze the skills of opening and closing lessons and the skills of managing classes and their implementation, Students are able to apply the skills of opening and closing lessons in learning informatics engineering education, Students are able to apply the skills of managing classes in learning informatics engineering education, Students are able to analyze the teaching skills of small groups and individuals and the skills of guiding small groups and their implementation, Students are able to apply the teaching skills of small groups and individuals in learning informatics engineering education, students are able to apply the skills of guiding small groups in learning informatics engineering education, and m students are able to analyze the basic skills of integrated teaching.

2. Design

The design stage was to carry out curriculum mapping of learning outcomes that have been carried out at the analysis stage. The learning outcomes were mapped into several 8 eight) indicators and 26 (twenty-six) sub-indicators to measure students' teaching ability offline and online. The sub-indicators were then elaborated into a digital assessment for microteaching courses. The system interface, database, and user design are also carried out at the learning stage.

This system had three levels of users: admin, lecturer, and student. Admin was the highest level of system users. Admins had full access rights to systems such as user management, rubric management, value management, and product management. Meanwhile, lecturers were at the highest level after admins. Lecturers cannot do user management. Lecturers can only do rubric management, value management, and product management. Meanwhile, students were the lowest level of system users. Students were only able to do product management and assess other student products.

3. Development

The development stage was to integrate rubric and assessment grids that have been developed analysis and design. In the development stage, expert content tests were also carried out on grids and rubric assessments, and a system was also carried out (Fig 2).

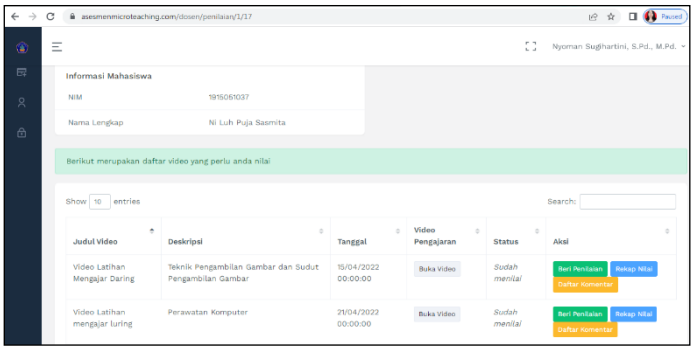

Fig 2. Assessment digital microteaching

Based on expert content tests conducted on teachers at state vocational schools in Bali, Gregory's analysis of 1.0 showed that the instrument developed has a very high validity value.

4. Implementation

At the implementation stage, activities were carried out using the system for students taking microteaching courses. The activity carried out was that students uploaded two teaching videos to the system. The first video was an offline teaching practice video, and the second was an online teaching practice video.

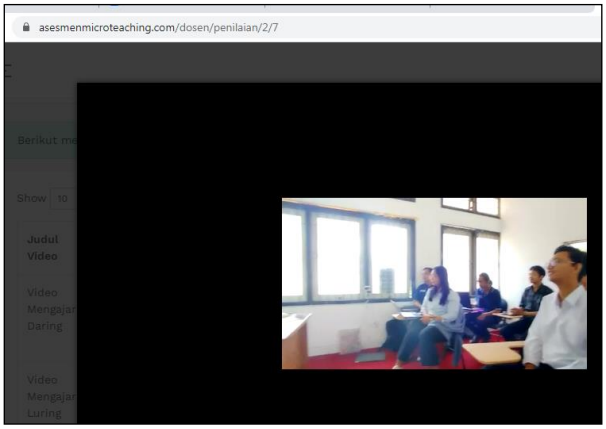

Fig 3. One of the offline teaching video products

At the implementation stage, the user response to the system was taken. The table criteria are obtained as follows for the response test analysis criteria using the standard deviation and ideal mean formulas.

Table 1. Table of response test criteria

No.	Interval	Qualification	Category
1	$103{,}95 \leq x$	Very Positive	Very Practical
2	$86{,}65 \leq x < 103{,}95$	Positive	Practical
3	$69{,}35 \leq x < 86{,}65$	Less Positive	Less Practical
4	$52{,}05 \leq x < 69{,}35$	Negative	Impractical
5	$x < 52{,}05$	Very Negative	Very Impractical

The results of the response calculation obtained a result of 113.25 with the criterion "Very Practical". The calculation results of each criterion and each question received a different average, namely: assessment criterion 1, namely regarding questioning skills. There were 3 questions, namely, question 1, namely the disclosure of questions clearly and briefly obtained an average of 4.3. Question number 2 was to transfer the turn of the questioner getting an average of 4.3. Question number 3, namely the order of the questions according to the cognitive level, obtained an average of 4.4. Assessment criterion 2, namely the skill of explaining there were 3 questions, namely question number 1 , the teacher gave an example that is sufficient to instill understanding in the teacher's explanation. The average was 4.3. Question number 2 was that the teacher used an example relevant to the explanation's nature, obtaining an average of 4.4. Problem number 3 was that the teacher avoided using dubious words, and excess obtains an average of 4.4. Assessment criterion 3 was opening skills consisting of 5 questions, namely, question number 1, namely doing attendance, obtaining an average of 4.4. Question number 2, which attracted students' attention, obtained an average of 4.3. Question number 3 was to motivate students to get an average of 4.3. Question number 4, namely doing the apperception, obtained an average of 4.3. Question number 5 conveyed the learning objectives of obtaining an average of 4.3. Assessment criterion 4 was the skill of closing the lesson, which consisted of 4 questions, namely, question 1, conducting a learning evaluation obtained an average of 4.4. Question number 2 summarized the lessons that obtained an average of 4.3. Question number 3, which was together with the student closing the lesson, obtained an average of 4.4. Question number 4 was to submit the next learning plan (next meeting) obtaining an average of 4.3. Assessment criterion 5 was the skill of holding variations consisting of 3 questions, namely, question 1 teacher making mimic changes, and movements obtaining an average of 4.3. Question number 2 was that the teacher changes the position when teaching obtaining an average of 4.3. Question number 3 was that teachers using varied media get an average of 4.4. Assessment criteria 6, namely strengthening skills consisting of 2 questions, namely, question 1 teacher doing Non-verbal Reinforcement (Reinforcement in the form of mimics and gestures / Strengthening by approaching / Strengthening with touch / Strengthening with pleasant activities / Strengthening in the form of symbols) obtained an average of 4.4. Question number 2 was that the teacher doing Verbal reinforcement (Right / Good / Right / Very good / Very good work / I am happy with your work / Your work is getting better and better) got an average of 4.4. Assessment criterion 7 was the skill of guiding small group discussions consisting of 3 questions, namely, question 1 clarifying the problem or crowdfunding obtained an average of

4.4. Question number 2 analyzed the views of students obtaining an average of 4.4. Question number 3, which was to spread the opportunity to participate in the discussion, earned an average of 4.3. Assessment criterion 8 was the ability to manage a class consisting of 3 questions; namely, question 1 showed responsiveness to obtain an average of 4.4. Question number 2, namely the attention, received an average of 4.3. Question number 3, namely, requires the responsibility of students to obtain an average of 4.4.

5. Evaluation

Following the ADDIE stage, the evaluation stage was carried out at each stage of analysis, design, development, and implementation. In addition, at the evaluation stage, data collection of learning outcomes was also carried out. A table of criteria was obtained based on the analysis of student learning outcomes for online and offline teaching videos using the standard deviation and ideal mean formulas.

Table 2. Learning Outcomes Criteria

No.	Interval	Category
1	$75 \leq N$	Very Good
2	$58{,}33 \leq N < 75$	Good
3	$41{,}67 \leq N < 58{,}33$	Enough
4	$25 \leq N < 41{,}67$	Bad
5	$N < 25$	Very Bad

a. Learning Outcomes for Online Teaching Practice

The results of the scores of each of the 53 students obtained an average score (N) of 87.12, which was classified as "Very Good" (based on table 2). The graph of learning outcomes can be seen in figure 3.

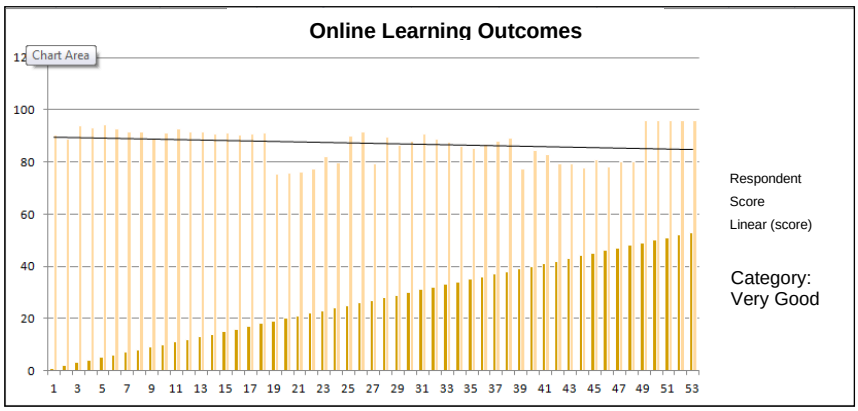

Fig 3. Online Learning Outcomes

b. Learning Outcomes for Offline Teaching Practice

The results of the score of each of the 53 students obtained an average score (N) of 87.65 with the category "Very Good". The graph of learning outcomes can be seen in figure 4.

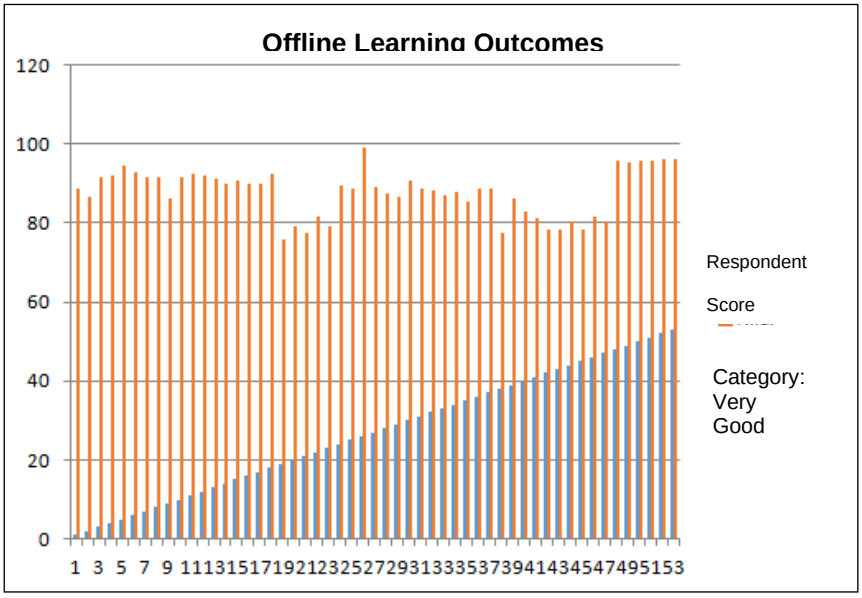

Fig 4. Offline learning outcomes

5 Conclusion

Based on the study results, it can be concluded that the digital assessment for microteaching courses has met the criteria of validity and practicality. The expert test of the microteaching instrument content showed that the instrument had been valid with a Gregory value of 1.00. The instrument is then integrated with a web-based system to implement peer assessment. The response analysis showed that the digital assessment system was efficient, with an average value of 113.25. The analysis results for student learning outcomes in online teaching practice were 87.12, which was very good. And the learning outcomes for offline teaching practice were 87.65, which was classified as very good. This showed that digital peer assessment was very well used in supporting the microteaching learning process

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