# Analysis of Learning Quality through Video-Based eLMA Learning in Department Mathematics of Education

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| Article Info | Abstract |
|---|---|
| | The use of ICT became important after the government through a circular letter from the Minister of Education and Culture regarding the call for the implementation of online learning to prevent the transmission of Covid-19. Each educational institution including Universitas PGRI Madiun (UNIPMA) also issued a policy to conduct online learning in providing educational services. This research is descriptive qualitative because it is used to analyze the quality of learning in mathematics education study program through video-based eLMA. Data was collected by means of learning evaluation questionnaires and learning observations of basic mathematics studies, introduction to education, field geometry, and numerical methods. Data analysis was carried out by reducing, presenting and drawing conclusions about the quality of learning in mathematics education study programs through video-based eLMA. The results of the study quality research showed that the results of the learning evaluation conducted by 4 lecturers who were in charge of basic mathematics studies, introduction to education, field geometry, and numerical methods were categorized as very good with successive scores of 3.65; 3.74; 3.64 and 3.68. The results of the observations of the internal quality assurance team also stated that the learning quality of the four courses was included in good criteria with recommendations maintained. |

## INTRODUCTION

The Industrial Revolution Era 4.0 (RI 4.0) has made changes in all aspects of life [1][2]. In the economic and industrial fields, virtual markets and online services have emerged that can be accessed via smartphones and gadgets. In the field of education, the use of Information and Communication technology (ICT) for learning is developing which is packaged in the form of a Learning Management System (LMS) in a network (online) [3]. Preparations related to the use of ICT have also been widely trained by educational institutions to educators to prepare Human Resources (HR) in facing RI 4.0. Discussions about the possibility of educators (teachers/lecturers) being disrupted as a result of RI 4.0 have been carried out in many seminars. Two important points that need to be considered are that educators must master data and technology literacy (digital literacy) and fulfill digital infrastructure facilities. This digital literacy aims to improve critical, creative, and positive thinking skills in using digital media in everyday learning [4].

The use of ICT became important after the government through a circular letter from the Minister of Education and Culture regarding the call for the implementation of online learning to prevent the transmission of Covid-19 [4][5]. Each educational institution including Universitas PGRI Madiun (UNIPMA) also issued a policy to conduct online learning in providing educational services. UNIPMA previously had an online learning policy that required lecturers to do online learning at least 3 and a maximum of 5. From the results of Monitoring and Evaluation of online learning, all lecturers had implemented online learning, but most of them used WhatsApp because

it was easy to use and information was quickly conveyed. The use of LMS based e-learning (eLMA/E-Learning UNIPMA) is not as big as the use of WhatsApp media. In the mathematics education study program, all mathematics lecturers have used eLMA, but only attach materials and assignments without providing pedagogic elements in learning.

There are several obstacles experienced by lecturers in using e-learning, including: lecturers have difficulty using eLMA related to making quizzes and giving assessments, entering equations, and other technical matters related to e-learning operations. There are also not many mathematics education lecturers who attach videos in learning, even if they include videos, they are not the result of their own products but taken from YouTube. The materials uploaded on eLMA are also not the product of the teaching lecturer. Based on these problems, it is necessary to innovate to improve the quality of online learning in mathematics education study programs, both material content and lecturer mastery in operating e-learning.

The innovation that will be made to overcome this is by using e-learning based on video learning [6][7][8][9]. This is done so that mathematics education lecturers develop their competencies, namely being able to take advantage of the features that exist in eLMA. Thus, lecturers can present various kinds of content by utilizing the features available on eLMA and integrating learning videos [10][11]. This innovation is very important to improve the quality of online learning, especially during the COVID-19 pandemic [12][13].

Research on learning innovations using e-learning has been widely carried out [14][15][16][11][17]. The role of technology integration in modern learning is very important to optimize the acceleration process in Higher Order Thinking Skills (HOTS) according to[14]. In identifying the roles and competencies of faculty working in a virtual environment it is very important for higher education institutions to establish a common framework for teaching and training initiatives [15]. E-learning has been introduced to ensure the wide dissemination of these fundamental content and skills, even outside of school [16][18]. Previous researchers have developed an interactive e-learning model using the Edmodo program in instructional design courses [19][11][18].

The results of these studies indicate that learning by using e-learning is important to do to face the progress of the times. Some researchers have also developed learning using e-learning in certain subjects. Previous researchers have not examined the quality of learning in the mathematics education study program with several courses that represent the characteristics of the subject for prospective mathematics teachers. Thus, it is important to conduct research on the analysis of the quality of learning in the Mathematics Education Study Program through video-based eLMA.

## RESEARCH METHOD

This research is a qualitative descriptive study that reveals the quality of learning in the mathematics education study program at UNIPMA. This study uses the subject of lecturers in the mathematics education study program who uses learning using eLMA based on video learning. The research subjects were chosen by 4 lecturers who represent the characteristics of the courses in the mathematics education study program, namely lecturers who teach basic mathematics studies, field geometry, introduction to education and numerical methods. The quality of learning in this study was seen from the results of 2 learning evaluation questionnaires filled out by students and observations made by the internal quality assurance team. Data was collected by distributing learning evaluation questionnaires and observations. The learning evaluation aspect is based on a

questionnaire made by the UNIPMA internal quality assurance team. The aspects contained in the questionnaire are presented in Table 1 below.

Table 1. Learning Evaluation Aspects

| Aspects | Statement |
|---|---|
| Implementation of lectures | 1. At the beginning of the lecture, the lecturer submits a lecture contract (lecture materials, evaluations, and reference books)<br>2. Lecture presentations are easy to accept and understand by students<br>3. Lecturers are able to motivate students to study harder |
| Use of e-Learning in lectures | 1. E-Learning is used to distribute lecture materials in the form of pdf, ppt, video, or website links<br>2. E-Learning can be used to conduct face-to-face learning via webmeeting<br>3. Assignments from lecturers and answers from students are uploaded on e-learning<br>4. Discussion forums between lecturers and students or students and other students are carried out using e-learning<br>5. The lecturer gives a Quiz using one/some of the features: multiple choice, tru-false, matching, short answer, etc. |
| Compatibility with teaching materials | 1. Lecture materials are in accordance with the RPS<br>2. Quiz, UTS, and UAS questions, appropriate and relevant to lecture materials |

The observation sheet instrument used covers several aspects, including: (1) supporting infrastructure, (2) course design, (3) course development, (4) implementation, and (5) evaluation on eLMA. Furthermore, data analysis was carried out in several steps, including [20]: (1) reducing questionnaire data and observations regarding lectures in the mathematics education study program through video-based eLMA, (2) presenting questionnaire data and observations about lectures in the mathematics education study program. through video-based eLMA learning, (3) verification or drawing conclusions to determine the quality of learning in mathematics education study programs through video-based eLMA. The results of the data analysis obtained can describe the quality of learning in the mathematics education study program through video-based eLMA in the subjects of basic mathematics studies, field geometry, introduction to education and numerical methods.

**RESULT DAN DISCUSSION**

The research was conducted in 4 subjects in the mathematics education study program, namely basic mathematics studies, field geometry, introduction to education and numerical methods. Each course is conducted using the PGRI Madiun University E-Learning (eLMA) which is a platform developed from Moodle. In addition to using eLMA, learning also uses learning videos specially designed by the lecturers who support each course. The following shows in Figures 1, 2, 3 and 4 the use of learning videos on eLMA for each subject used in this study.
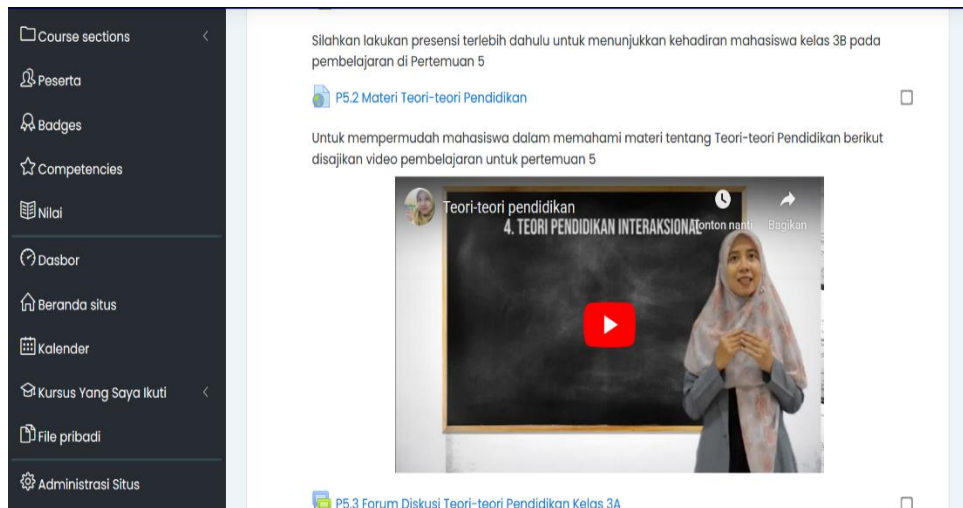
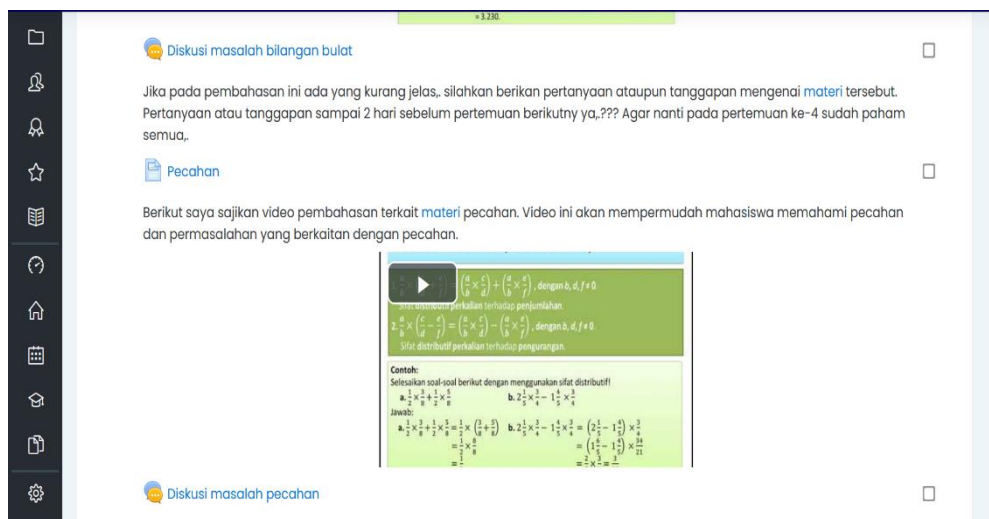Figure 1. Learning Videos for Introductory Education Courses on eLMA



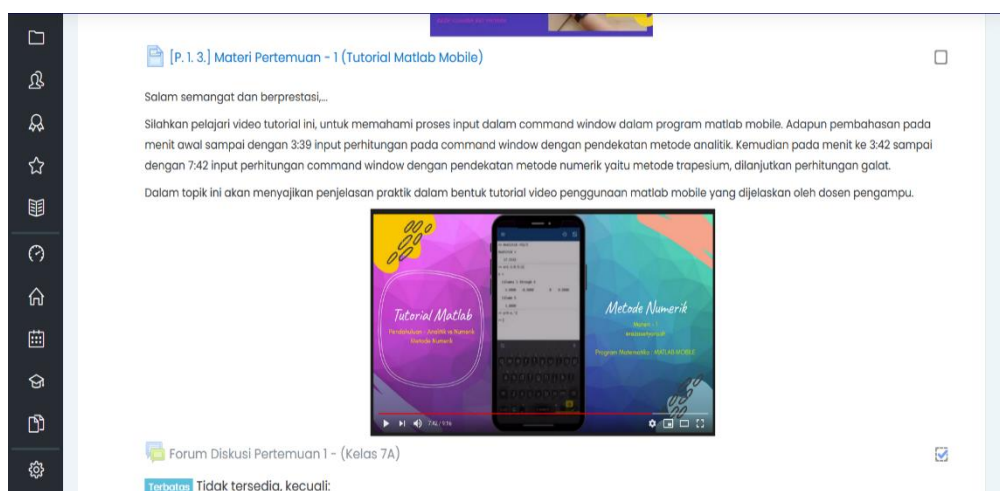Figure 2. Video Learning of Basic Mathematics Studies at eLMA



Figure 3. Video Learning of the Numerical Method Course on eLMA
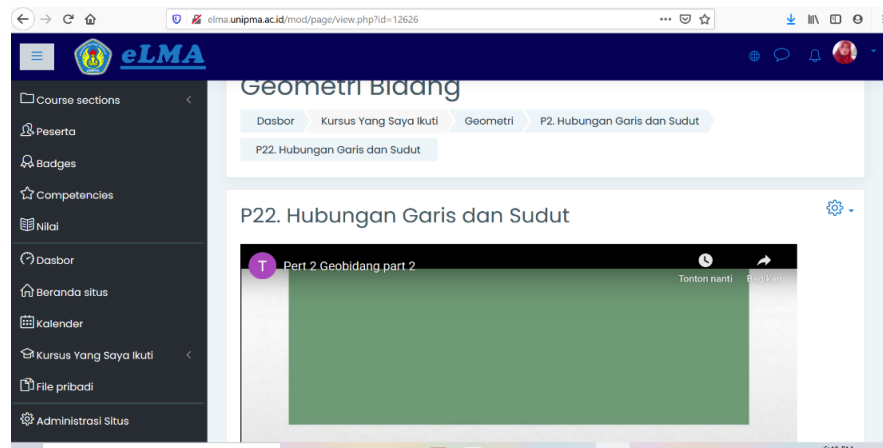
Figure 4. Video of Field Geometry Course on eLMA

Furthermore, the evaluation is carried out by distributing learning evaluation questionnaires to students. Based on the results of the learning evaluation on the application of the learning videos listed in the eLMA, it showed good results in learning to students, especially in the UNIPMA Mathematics Education study program. This is in line with his research [21], that the application of instructional video media can increase student learning outcomes by 79%. In addition, the development of learning videos is one of the students' teaching materials in digital learning [7][22].

**Learning Evaluation Questionnaire Results**

The evaluation includes (1) the implementation of lectures, (2) the use of e-learning in lectures, (3) compatibility with teaching materials. The implementation of lectures includes (1) At the beginning of the lecture the lecturer submits a lecture contract (lecture materials, evaluations, and reference books), (2) Lecture presentations are easily accepted and understood by students, (3) Lecturers are able to motivate students to study harder; while the use of e-learning in lectures includes (4) e-Learning is used to distribute lecture materials in the form of pdf, ppt, video, or website links, (5) e-learning can be used to conduct face-to-face learning with web meetings, ( 6) Assignments from lecturers and answers from students are uploaded to die-learning, (7) Discussion forums between lecturers and students or students and other students are carried out using e-learning, (8) Lecturers give Quiz by using one/some of the features: multiple choice, true-false, matching, short answer, etc; while conformity with teaching materials includes (9) Lecture materials in accordance with RPS, (10) Quiz, UTS, and UAS questions, appropriate and relevant to lecture materials.
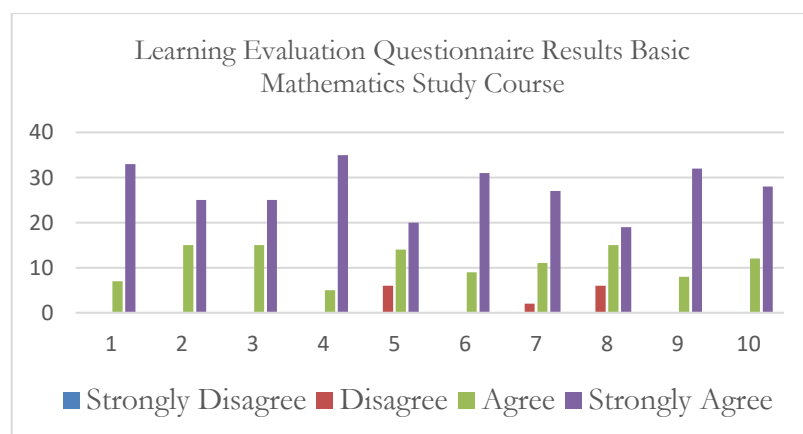


Figure 5. Evaluation Results of Basic Mathematics Study Courses

Figure 5. shows that the evaluation of learning for basic mathematics studies includes very good criteria with an average of 3.65 from a scale of 4. This is evidenced by the readiness of lecturers to carry out online lectures through eLMA very well and student responses are very good.
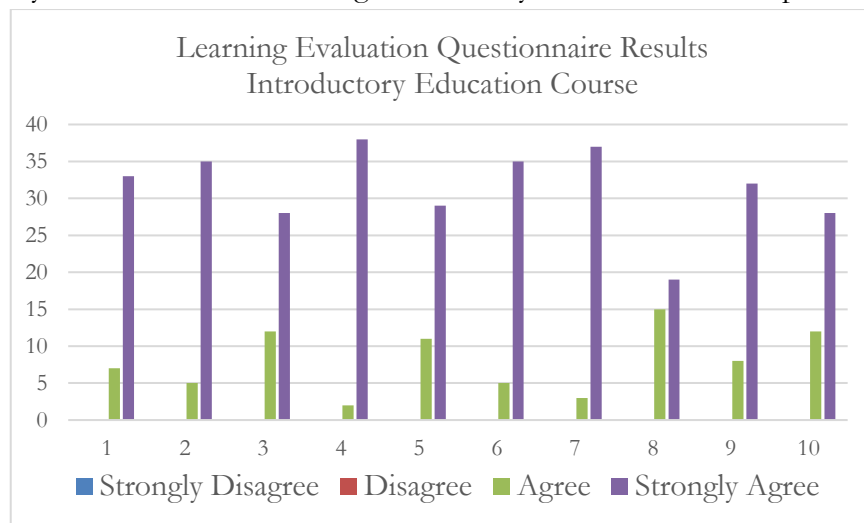


Figure 6. Evaluation Results of Introductory Education Courses

Figure 6. shows that the evaluation of learning introductory education courses includes very good criteria with an average of 3.74 out of a scale of 4. It can be concluded that the readiness of lecturers to carry out online lectures through eLMA is very good and student responses are very good.
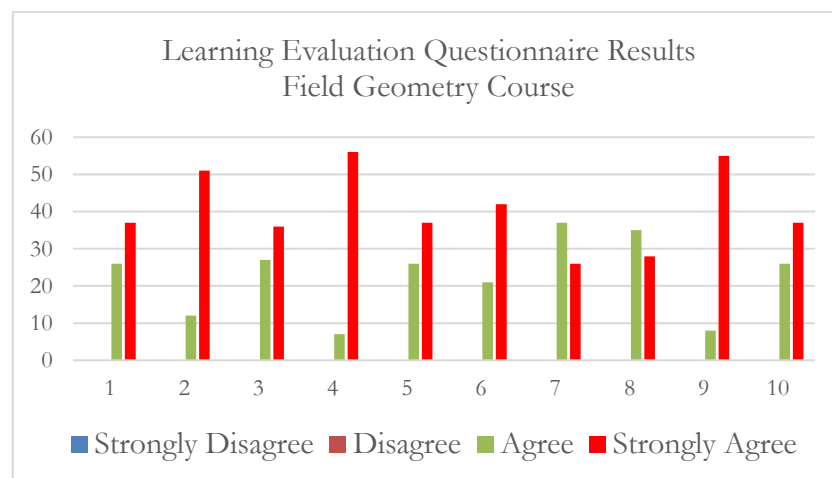


Figure 7. Learning Evaluation Results of Field Geometry Course

Figure 7. shows that the evaluation of learning for field geometry courses is included in the very good criteria with an average of 3.64 from a scale of 4. It can be concluded that the readiness of lecturers to carry out online lectures through eLMA is very good and student responses are very good.
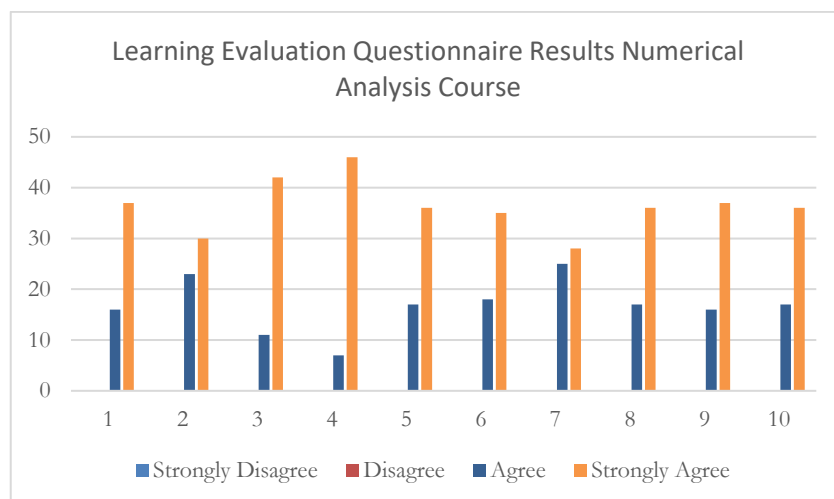
Figure 8. Evaluation Results of Numerical Method Course Learning

Figure 8. shows that the evaluation of the field geometry course learning is included in the very good criteria with an average of 3.68 from a scale of 4. It can be concluded that the readiness of lecturers to carry out online lectures through eLMA is very good and student responses are very good. The results of the evaluation of learning for these four subjects (introduction to education, basic mathematics studies, numerical methods, field geometry) show very good criteria, so that the quality of learning in the Mathematics Education study program is very good with the help of eLMA. This shows that the implementation of lectures, the use of e-learning, and the suitability of teaching materials in lectures in the Mathematics Education study program are very good. Based on previous research related to innovative realistic e-learning Edmodo can improve the quality of learning [19].

**Learning Observation Results by Internal Quality Assurance Team**

The evaluation of the use of eLMA is carried out by the quality assurance team of the Universitas PGRI Madiun. The eLMA assessment refers to the standard e-learning process from the internal quality assurance team. The evaluation of the use of eLMA uses instruments that cover aspects including: (1) supporting infrastructure, (2) course design, (3) course development, (4) implementation, (5) evaluation of eLMA. The results of the audit of the implementation of the eLMA implementation in the Mathematics Education study program are shown in table 1. In general, the use of eLMA in lectures, especially in the Mathematics Education study program, is in good criteria. However, there needs to be improvements and developments on aspects that are still weak.

Table 2. Audit Results from Internal Quality Assurance Team

| No | Assessment Aspect | Introductory Education Course | Numerical Method Course | Field Geometry Course | Basic Mathematics study course |
|---|---|---|---|---|---|
| 1 | Supporting facilities and infrastructure | 17 | 18 | 17 | 18 |
| 2 | Course design | 15 | 15 | 15 | 14 |
| 3 | Course development | 19 | 18 | 18 | 18 |
| 4 | Implementation | 14 | 14 | 14 | 14 |
| 5 | Evaluation | 15 | 13 | 14 | 14 |
| Total score | | 80 | 78 | 79 | 78 |
| Criteria | | Good | Good | Good | Good |
| Recommendation | | keep it | keep it | keep it | keep it |

Table 2. shows the results of observations by the internal quality assurance team on the standard of the learning process by lecturers who teach Introduction to Education, Numerical Methods, Field Geometry, and Basic Mathematics Studies. The results of the audit by the internal quality assurance team showed that the standard of the learning process by the four lecturers was in good criteria with an average of 78.75 out of a scale of 100. The audit results for each of the lecturers are visualized as in Figure 5.
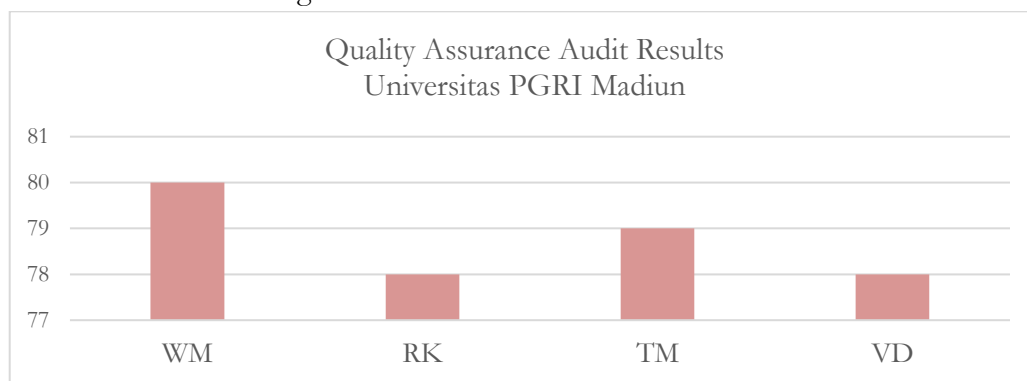


Figure 9. Results of Observations by the Quality Assurance Team

From the observations, the internal quality assurance audit team also provides recommendations for each lecturer in the subject of Introduction to Education, Numerical Methods, Field Geometry, and Basic Mathematical Studies in order to maintain the quality of the learning that has been carried out. The four teaching lecturers have fulfilled the learning aspects which include: appropriate learning supporting infrastructure, designing courses according to the objectives, developing courses through the use of video-based eLMA, implementing online learning and evaluating learning through eLMA.

**CONCLUSIONS AND SUGGESTIONS**

The results of the study quality research showed that the results of the learning evaluation conducted by 4 lecturers who were in charge of basic mathematics studies, introduction to education, field geometry, and numerical methods were categorized as very good with successive scores of 3.65; 3.74; 3.64 and 3.68. The results of the observations of the internal quality assurance team also stated that the learning quality of the four subjects was included in good criteria with a total score in the subjects of basic mathematics studies, introductory education, field geometry, and numerical methods, respectively 78, 80, 79, and 78. Fourth course instructors also received recommendations to maintain the quality of learning that had been carried out through video-based eLMA.

**ACKNOWLEGMENT**

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