



# Analysis of Giving Quizzes on Mechanics Lectures Through E-Learning

Widiasih<sup>1</sup>(✉), Zakirman<sup>1</sup>, Ratna Ekawati<sup>1</sup>, and Henny Johan<sup>2</sup>

<sup>1</sup> Physics Education, Universitas Terbuka, Jl. Pondok Cabe Raya, South Tangerang, Banten 15418, Indonesia

widiasih@ecampus.ut.ac.id

<sup>2</sup> Science Education, Universitas Bengkulu, Jl. WR. Supratman, Kandang Limun, Bengkulu 38371, Indonesia

**Abstract.** Student learning outcomes in mechanics lectures are influenced by structured activities carried out in each lecture meeting session such as giving quizzes. The purpose of this study was to describe and analyze the giving of quizzes on mechanics learning through e-learning to students of the Physics Education Study Program, Faculty of Teacher Training and Education Sciences at the Universitas Terbuka. This type of research is descriptive, and the research is conducted in semester 2021.1. The numbers of respondents involved in this study were 16 people. Data analysis was carried out by describing the quiz instrument, quiz results obtained by each student in each session, student activities accessing quizzes, comparison of student access hits on initiation materials and toolbar URL. Based on the results of data analysis, it shows that student participation in taking the quiz is quite high, but in some lecture sessions there is a decrease in quiz scores. This is influenced by student activities in accessing initiations materials. There is a linear relationship between student activities in accessing initiation materials and completing quizzes in each session. To increase students' active participation in quizzes, online tutorial tutors should encourage students to understand and access initiation materials. The completeness and coherence of the initiation material with the achievement measured in the quiz affects students' success in doing the quiz.

**Keywords:** quizzes · mechanics lectures · e-learning

## 1 Introduction

Learning is a process where there is a change in knowledge and insight. Learning can be done with various methods, and learning is not only limited to face-to-face or direct learning. Various methods, approaches, techniques, and methods have been developed to create meaningful learning concepts that can reach all levels of society [1]. Learning begins with knowledge transfer activities, transferring either through interaction or using the media as a liaison between the giver of information and the recipient of information. The concept of learning cannot be separated from two things, namely learning that can be carried out directly and learning that is carried out remotely.

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Two concepts that are carried out in learning, namely direct and distance learning do not distinguish and reduce the meaning of learning itself. Direct learning is learning in real space and concepts where students and teachers are present at the same time, are in the same place, and at the same time. This direct learning concept is a popular learning concept and almost all educational institutions apply this direct learning concept. In direct learning or more popularly with face-to-face learning, all interactions, feedback, delivery of information and receipt of information by students take place at the same time and are usually identical with a limited duration of time in the implementation of learning. Direct learning is usually carried out in a time span of 2–3 h per subject. In contrast to the concept of direct learning, in contrast distance learning has a different pattern in its implementation and application.

In theory, distance learning is identical to the physical separation between teachers and students [2, 3]. Tutoring is an important part of distance education to help students, it can be done through various patterns to overcome students' learning difficulties [4]. In distance learning, students and teachers do not meet directly but are connected by the media as an intermediary for communication. Various technology applications allow the implementation of distance learning such as online learning platforms, e-learning, video conferencing and other applications that support distance learning [5, 6]. The main target in distance learning is students who do not have full time to participate in direct learning and are still facilitated and have access to equitable and affordable education [7, 8]. Distance learning opens equal access and affordability of education for all levels of society so that the response to distance learning shows progress that is getting better from time to time.

The Open University (UT) as one of the largest campuses in Indonesia that implements the concept of distance learning becomes a piloting campus and a pilot campus in the implementation of distance learning [9]. UT students who come from various professional backgrounds, cultural backgrounds, and domicile areas [10] make UT even stronger as a distance education provider. With the motto Making Higher Education Open to All, UT is here to provide access to affordable and quality education for its students. UT's continuous innovation in providing the best quality services in distance education has proven to be able to produce graduates with quality human resources.

The mode of lectures presented by UT makes the education held more quality. One of the learning modes implemented by UT is learning with online tutorials [11]. The characteristics of online tutorials, namely, the use of multimedia, are interactive, the availability of links and the variety of media used to support learning, enabling the exchange of ideas between students [5, 12, 13]. Online tutorials are asynchronous learning concepts [14], can have an impact on increasing literacy for students, develop knowledge through the help of technology applications [15, 16] and are carried out indirectly and in one semester the lectures are carried out for 8 sessions. One of the study programs that carry out online tutorial lectures is the Physics education study program at the UT Faculty of Teacher Training and Education. Almost 90% of the courses offered every semester are carried out in an online tutorial mode, one of which is Mechanics. Mechanics is an advanced course that can be taken by students in the advanced semester.

Mechanics lectures with online tutorial mode that have taken place so far have not been carried out properly and as expected. The involvement and activeness of students in

online tutorials is still low, resulting in the low final grades of students in each semester. The scores obtained in online tutorials have a significant contribution to the final grades of students. Therefore, the implementation of online tutorials in mechanics courses must be maximized so that student scores will increase in the next semester. The low involvement and activeness of students in lectures will directly affect the understanding of the material. To make students actively involved in lectures and stimulate them to learn the material, both initiation material available on e-learning accounts and material that is explored independently, several solutions can be applied, including the use of quizzes in each lecture session.

Quizzes are one way that can be applied so that students are ready to deepen their understanding of the material and reduce students' stress levels because they already have an overview of the questions in facing the exam [17]. Quiz questions that are designed must be adjusted to the learning outcomes in each module or lecture session. Quizzes can help students be actively involved in lectures, such as in lectures that take place via online tutorials. The application of quizzes in each mechanics lecture session is expected to have a positive impact on student involvement in lectures, further increasing the activity and intensity of students accessing material and accessing other references to support understanding the material. The existence of quizzes in each lecture session will encourage students to be disciplined in accessing e-learning in tutoring, increasing student literacy skills [18], because the quizzes provided in each session have a time limit for processing. Quizzes can also be a means to see a picture of students' understanding, feedback that is immediately available helps students to improve and deepen their understanding of the material.

The questions that will be answered in this research are:

1. How is the description of the quiz used in online tutorial lectures in the Mechanics course?
2. What is the description of the student's final score in the mechanics course if it is related to his involvement in taking quizzes at each lecture session via online tutorials?

## 2 Method

The purpose of this study was to describe and analyze the giving of quizzes in mechanics lectures through e-learning to students of the Physics Education Study Program, Faculty of Teacher Training and Education at the Open University. This type of research is descriptive qualitative, focusing on the description of the application of quizzes in the Mechanics course. This research was conducted in the academic year 2021.1 involving 16 participants. The quiz questions used in this study are multiple choice and have been adapted to the learning outcomes in each session. The quiz designed has a time limit for processing in accordance with the limits of each mechanics lecture session. The quiz schedule follows the submission deadline for each lecture session each week. The instrument used is a list of student activities in online tutorials and quiz questions designed in the form of multiple choice. The research data that has been collected were analyzed descriptively by analyzing student activities, quiz scores and final grades for student online tutorials in the mechanics course.

### 3 Result and Discussion

#### 3.1 Description of Online Tutorial on Mechanics Course

Online tutorial is one of the lecture modes held at UT. Students can access lectures in online tutorials on the [elearning.ut.ac.id](http://elearning.ut.ac.id) page. After successfully entering the e-learning page, students who have chosen several courses can directly enter and access courses, one of which is mechanics.

In the online tutorial menu, such as in the Mechanics course, there are several toolbars that can be accessed by students, such as the top toolbar which shows the distribution of material for 8 lecture sessions. Each lecture session lasts for 1 week and will be closed automatically when the weekly time limit has passed. Students cannot add comments in discussions or work on quiz questions if the available time limit has been exceeded. In each session, there is a tutor greeting, these greeting guides students to understand the weekly material in each session, get an overview of what material will be studied and a synopsis and learning achievements in that session. In addition to greetings, there are also features that can be accessed by students, such as initiation materials that contain material that supports deepening students' understanding of the material. The initiation material is a complementary material to the module provided by UT (Fig. 1).

In the menu of each lecture session with online tutorials on e-learning, an OER or URL of material is also if students can click and understand to deepen their understanding of the concept. In each lecture session a discussion form is also provided, and the discussion scores for each session contribute to the final assessment of the online tutorial in mechanics courses. To increase engagement and encourage an increase in student final grades, quizzes are provided with a display like the one presented in Fig. 2.



General Sesi 1 Sesi 2 Sesi 3 Sesi 4 Sesi 5 Sesi 6 Sesi 7 Sesi 8

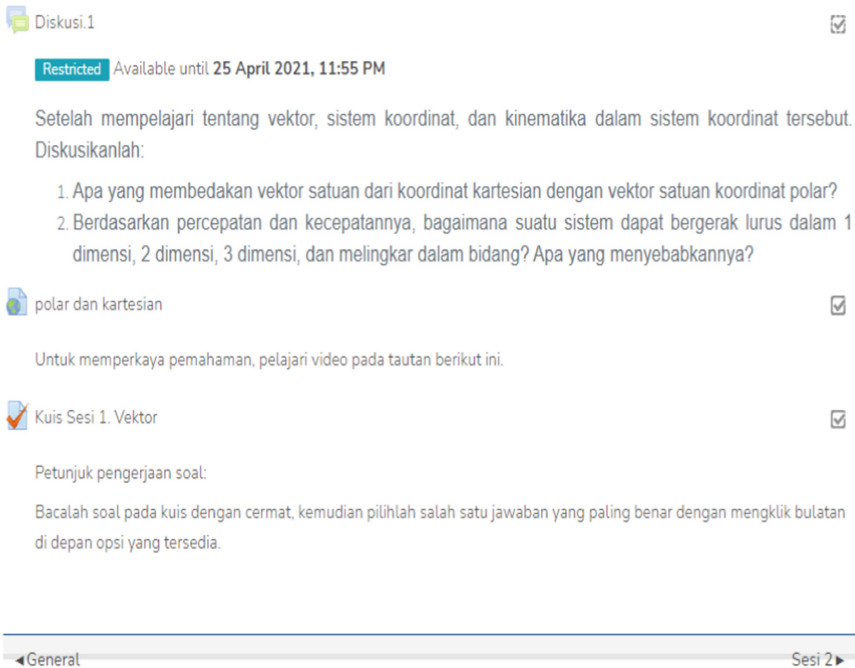
Restricted Available from 5 April 2021

SESI 1. ANALISIS VEKTOR DAN KINEMATIKA GERAK

Saudara mahasiswa, di minggu pertama tutorial online ini Anda akan mempelajari sesi 1 mengenai analisis vektor dan kinematika gerak partikel. Anda diharapkan dapat menganalisis konsep-konsep kinematika partikel dalam sistem-sistem koordinat Cartesian, polar bidang, silinder dan bola.

Completion Progress

**Fig. 1.** Display in the e-learning Application for Online Tutorials for Mechanics Courses



**Fig. 2.** Quiz Menu View Available on e-learning Application in Online Tutorial Mechanics Subjects

Quizzes contained in each online tutorial lecture session for mechanics courses are presented in the form of multiple choices, while keeping in mind the suitability of the problem with the learning achievements in each lecture session. Quizzes contained in each session have a time limit that is adjusted to the final limit of the lecture for each session.

Before the quiz is conducted, on the quiz menu in each lecture session is provided quiz work instructions to guide each student in the work of the quiz. Because the concept of learning is carried out asynchronous, students can prank quizzes at any time during the time limit of quiz work is still open. Based on the results of obesity, students tend to do quizzes at night. It is flexible and does not limit the wiggle room and time of quiz work by students. Quizzes provided in each lecture session have been set to be done only once, so that there is no repetition of quiz work at other times. Existing quiz questions will help students indirectly to be obliged to read modules and initiation materials. The problems presented have been adapted to the achievements of learning and allow students to successfully work when they have understood the module material well. Here is presented with a quiz display after being done by students (Fig. 3).

Quizzes available on the learning menu in elearning in online tutorials are equipped with feedback that immediately appears when students finish working on the whole problem. Feedback displayed aims to provide confirmation to students so that the concept that was initially still wrong can be corrected so that it is not affected by misconceptions. With the dback fee,students also become motivated in working on the problem, because

The screenshot displays a web browser window with the URL `elearningbackup.ut.ac.id/20211/mod/quiz/review.php?attempt=13691&cmid=2346149`. The main content area is divided into several sections:

- Course management:** A gear icon for settings.
- Quiz navigation:** Three numbered buttons (1, 2, 3) and a 'Start a new preview' button.
- Statistics Table:**

Started on	Friday, 12 November 2021, 1:09 PM
State	Finished
Completed on	Friday, 12 November 2021, 1:12 PM
Time taken	2 mins 58 secs
Marks	0.00/3.00
Grade	0.00 out of 10.00 (0%)
- Question 1:** A multiple-choice question in Indonesian: "Vektor p mempunyai besar 5 satuan dan vektor q besarnya 3 satuan. Kedua vektor tersebut saling membentuk sudut 60. Tentukan besar resultan kedua vektor tersebut". The selected answer is 'd. 10', which is marked as incorrect with a red 'X' and the word 'salah' (wrong). Other options are a. 20, b. 7, c. 8, and e. 15.
- Administration:** A sidebar menu with options like 'Quiz administration', 'Edit settings', 'Group overrides', 'User overrides', 'Edit quiz', and 'Preview'.

**Fig. 3.** Feedback View in Quizzes on Online Tutorials for Mechanics Courses

the feedback that appears is accompanied by the final score, and this score can be a review of the extent of understanding the student's material. Quizzes can be viewed as one of the formative evaluation methods that are usually done gradually or continuously for the assessment of a particular topic or subject. Feedback from formative assessments allows students to better understand tutor expectations, and also allows tutors to modify teaching to better address student needs [5].

### 3.2 Comparison Between Quiz Scores and Student Final Grades

It cannot be denied that the treatment of quiz giving constantly in every lecture meeting will certainly have an influence on students. The influence in question can be the influence of increasing student involvement in lectures, increasing the activeness of learning, encouraging increased learning motivation and affecting student learning outcomes [19–21]. Quizzes can also be a measure of understanding for students, so that students can independently self-check the extent of understanding their material [22].

By doing the quiz, students have an overview of the competencies that will be tested in Tasks 1, 2 or 3. Quiz questions are also designed to train students to prepare for exams, such as the Take Home Examination (THE) exam. Quiz work indirectly increases students to prepare for exams, enrich understanding of the material and increase involvement in online tutorials.

The study findings were that student activity in quiz work was still low. This is one of them because quizzes directly do not contribute to the final assessment of students in mechanics. Students only access quizzes but do not submit results/answers. The percentage of quiz work by students is still low, this is seen from 50% of students do not participate in doing quizzes available in each session. Low quiz activity is also

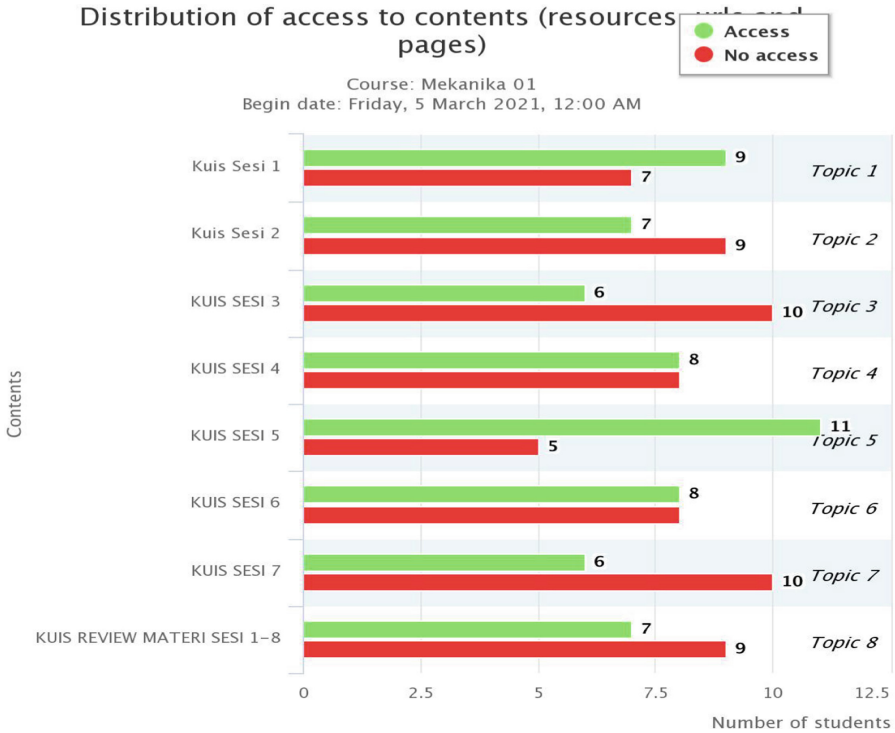


Fig. 4. Distribution of Student Involvement in Quiz Work on Mechanics Courses

influenced by unstable and even network access across students in various regions. If analyzed, not only quizzes, but initiation materials are also not completely accessible to all students. This is a major concern, as initiation material is supplementary material and supports the understanding of the material. Access to initiation materials becomes a supporting factor for students not participating in quiz questions. This is because students do not have deep knowledge, so they have obstacles to doing quiz questions. Distribution of student involvement in the work of quizzes is presented in Fig. 4.

Based on the picture, it can be observed that of the 8 lecture sessions that took place, there were 8 quiz sessions that students had to do. The involvement of students in working on quizzes according to Fig. 4, can be concluded quite low. Quizzes on session 3 and session 7 have a fairly low percentage of workmanship. This is reinforced by the low activity of students in accessing initiation materials. In addition, the elusive material also tends to make students constrained in doing quiz questions.

The quiz value obtained by students is directly proportional to the final grade of online tutorials on mechanics courses. Based on the findings and comparisons between quiz values and the final values of online tutorials of mechanics, a comparable picture is obtained. Students who are actively working on quizzes have better online tutorial final grades compared to students who are not involved in quiz work. A summary of the final value of the quiz can be seen in Table 1.

**Table 1.** Distribution of Online Tutorial Final Grades and Student Quiz Scores

Student Code	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Students' Final Grades on Mechanics Courses
xxxx73	10	5	10	10	10	10	10	10	91.64
xxxx28	10	10	10	10	10	10	10	10	88.69
xxxx99	10	10	10	10	10	10	10	10	86.52
xxxx27	10	10	10	10	10	10	10	10	83.62
xxxxx71	10	10	10	10	–	–	–	–	83.03
xxxxx29	–	–	–	0	5	–	0	8	81.05
xxxxx19	6.67	–	–	–	0	–	–	–	79.18
xxxxx01	–	–	–	–	–	–	–	–	76.1
xxxxx26	–	–	–	–	–	–	–	–	70.18
xxxxx06	–	–	–	–	–	–	–	–	69.44
042056516	–	–	–	–	–	–	–	–	60.69
042035361	–	–	–	–	–	–	–	–	59.26
043303095	–	5	–	5	5	–	–	–	40.19
031296922	–	–	–	–	–	–	–	–	30.24
022339869	–	–	–	–	–	–	–	–	27.45
030528837	–	–	–	–	–	–	–	–	16.51

\*Q = Quiz

Based on Table 1 it can be concluded that the involvement of students in working on quizzes has an impact in the final grades of online tutorials on mechanics courses. To test a significant relationship, it needs to be strengthened with follow-up research. Referring to Table 1, students who actively do quizzes and complete quizzes on time have a better online tutorial final score than other students. Quizzes designed can be a place to deepen the material and enrich students' understanding.

Quiz questions designed can train students directly to learn structured [23], discipline and review the material regularly every week. After studying the modules and initiation materials, students can test the understanding of the material by working on quizzes. By working on the quizzes available on each session, training students to strengthen understanding [24, 25]. The more often and involved students do quizzes, the higher the understanding of the student material.

Low student involvement in working on quizzes, can be a concern in the percentage share of assessments. Quiz grades can be considered to contribute to the final assessment of the course at UT. By contributing quiz scores in influencing the final value of online tutorials, of course, every student will access and work on quizzes. This foundation can be a reference in policy making for related parties at UT to consider quizzes as one of the components that contribute to the final assessment of online tutorial courses.



## 4 Conclusion

Based on the results of analysis data, it can be concluded that the percentage of participants who take the quiz is still low, this is because the quiz score has not contributed to the final assessment of the course. Students who accessed and completed quizzes for 8 sessions had a high final score. Quiz jobs can allow students to study independently thus affecting the final grades of the tutorial. Based on the results and findings of the study, follow-up policies are needed to add criteria for quiz results/values to contribute to the final assessment of students, especially in online tutorials.

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