P-ISSN: 1693-1246
E-ISSN: 2355-3812
June 2023

Jurnal Pendidikan Fisika Indonesia 19 (1) (2023) 76-88
DOI: 10.15294/jpfi.v19i1.37176

http://journal.unnes.ac.id/nju/index.php/jpfi

E-Module Implementation by Using Feature-Lesson-Based of Moodle in Physics Learning Multimedia Practices for Students of Prospective Physics Teacher

B. R. Kurniawan[1]*, I. Rahmawati[2], S. Fawaiz[3]

[1]Universitas Negeri Malang, Indonesia
[2]Universitas Islam Negeri Antasari Banjarmasin, Indonesia
[3]SMP Negeri 4 Malang, Indonesia
*Corresponding author: bakhrul.rizky.fmipa@um.ac.id

Received: 20 June 2022. Accepted: 02 March 2023. Published: 10 June 2023

Abstract

The rapid development of Information and Communication Technology (ICT) allows tertiary institutions to hold lectures offline, blended, and online. Nonetheless, findings in the field show that online lectures cannot guarantee whether students follow lecture material properly or not. Therefore, this study aimed to implement an e-module of the feature-lesson-based developed by Moodle for physics learning multimedia practice course. This e-module was developed using the ADDIE model which includes analysis, design, development, implementation, and evaluation stages. The developed e-module in this study used the feature-lesson to ensure students follow the material properly and coherently. Students can access the next material if they have mastered the material that has been presented. The data in this study were collected through the responses of prospective physics teacher students who had used the e-module for one semester. Student responses included the use of the feature-lesson to support coherent mastery of the material, the application of the feature-lesson in presenting the learning process through e-modules, the use of quizzes on the feature-lesson to ensure achievement of learning outcomes, and the interest of prospective teacher students in developing online learning using the feature-lesson on Moodle. The results of student responses showed that the e-module implementation of the feature-lesson-based of Moodle in physics learning multimedia practice were in very good criteria. Students liked the feature-lesson because they should follow the order in which the material was given so that it helped them understand the material properly and coherently. In addition, students can understand the material better because when they choosed the wrong answer in a quiz, students would be directed to review material that they have not understood. Students can continue to the next material if they have been able to complete the quiz correctly

Keywords: e-module, feature-lesson, Moodle, online learning

INTRODUCTION

Technological developments are increasing rapidly from year to year, encouraging people to innovate and integrate life activities with technology. The influence of technological developments in the world of education cannot be avoided and has even increased since the coronavirus disease hit Indonesia (Maharcika, Suarni, & Gunamantha, 2021). The application and adaptation of technology in education is a necessity in an era of increasingly rapid ICT development (Effendi & Wahidy, 2019). The development of ICT currently allows Higher Education to hold lectures offline, blended, and online.

Online lectures are lectures that are carried out using an internet network with connectivity, accessibility, flexibility, and the ability to present various types of learning interactions (Onyema et al., 2020). Interaction in online learning can be built by utilizing multimedia and internet technology (Jayul & Irwanto, 2020; Sobri, Nursaptini, & Novitasari, 2020) The availability of technology such as smartphones, tablets, and laptops can support the implementation of online lectures

(Chen, 2021; Pallavi, Ramachandran, & Chinnasamy, 2022). In addition, there are online class services such as google classroom, Edmodo, Schoology (Haeruman, Wijayanti, & Meidianingsih, 2021; Iftakhar, 2016; Nurhayati, Az-Zahra, & Herlambang, 2019; Sicat & Ed, 2015), and instant messaging applications such as WhatsApp (So, 2016), as well as social media such as Facebook and Instagram (Kumar & Nanda, 2018) can support online lectures.

Even though there are many conveniences offered through online learning, in practice there are several obstacles such as limited wireless fidelity (WiFi). WiFi limitations make students take part in online learning using cellular services. Students reveal that to be able to take part in online learning, a fee is required to keep the connectivity (Sadikin & Hamidah, 2020). These costs will increase if online lectures are frequently held synchronously. Based on its implementation, online lectures are divided into two, namely synchronous and asynchronous online lectures (Firman, Sari, & Firdaus, 2021).

In synchronous online lectures, lecturers and students are present online at the same time. The interactions that occur in synchronous online lectures are real-time, lecturers and students can communicate in two directions at the same time using video conferencing platforms such as Zoom (Singhal, 2020), google meet (Al-Maroof, Salloum, Hassanien, & Shaalan, 2023), and cisco Webex (Brady & Pradhan, 2020). Even though the communication is two-way in real-time, synchronous online lectures do not guarantee that students are attending lectures. The findings of Firman et al., (2021) show that students tend to do other activities during synchronous online lectures. These activities include eating and drinking (83%), daydreaming (72%), and playing social media (82%). This situation certainly interferes with students achieving lecture goals.

In asynchronous online lectures, lecturers provide teaching materials that can be accessed by students anytime and anywhere online. This teaching material can be in the form of e-module. E-module is computer-based learning media that can display text, graphics, images, audio, video, and animation (Nugraha, 2015). The use of e-module equipped with multimedia can add the learning experience using the module (Smeets & Bus, 2015). Along with the rapid development of technology and the internet, many e-modules have been developed in formats that can be accessed offline or online. The development of e-modules that can be accessed offline is presented in pdf and flipbook formats. While e-modules that can be accessed online are presented via Android, web, and Moodle.

The utilization of Moodle in online learning can provide information space, speed of access, and specific information. Lecturers can take advantage of the information space in Moodle to present learning resources that can be accessed by students. Moodle makes it easy for students to interact with learning resources anytime and anywhere via the Internet. The use of Moodle also helps lecturers in providing access to exam problems which can only be accessed once by certain students within a certain period.

The availability of learning resources on Moodle makes students free to access all available learning resources, assignments, and problems. The results of investigations in the field show that students often access learning resources in a disorderly manner. There are also students who access assignments and problems without first following the related learning resources. In addition, the freedom of students in accessing learning resources allows students who do not understand one material to be able to access further material. This situation is not in accordance to the principles of learning, namely coherence in the delivery of learning resources (Rosyada, Atmojo, & Saputri, 2021).

Moodle provides various features that can support learning activities (Herayanti, Fuaddunnazmi, & Habibi, 2017). One of the features in Moodle is the lessons feature. The lessons feature can be used to create learning activities that contain interesting content and can be used flexibly. The lesson feature consists of several pages that can be filled with material and problems. The user's chosen answer can determine which page to display. Using the lesson

feature in online learning can increase engagement and ensure user understanding through the given problems (Mlotshwa, Tunjera, & Chigona, 2020; Petrovici & Ciobanu, 2016; Widodo, Musyarofah, & Slamet, 2022).

The physics learning multimedia practice was a subject of expertise in 2020 curriculum that must be taken by students as prospective physics teachers at Malang State University. This course provided students with skills in producing learning multimedia. In addition, this course also provided opportunities for students to express creative ideas, ideas, and concepts in digital media (multimedia). Mastery of concepts, learning, and skills in using technology in this course will greatly determine the quality of students in applying it in the world of work. Mishra and Kohler conceptualized this knowledge as Technological Content Knowledge (TPACK) (Mishra, 2019; Mishra & Warr, 2021). This framework was a lens, commonly used by researchers to develop the professionalism of teachers and prospective teachers in the 21st century. The professional development of teachers and prospective teachers in developing multimedia learning requires coherent mastery of knowledge and skills. Student-teacher candidates need to master the skills of developing learning multimedia from the simplest to the most complex.

Based on the problems and needs in online learning, this study aimed to develop e-module by utilizing the feature-lesson of Moodle in physics learning multimedia practice for prospective physics teacher. The use of the feature-lesson of Moodle was an effort to ensure that knowledge and skills were achieved in a complete and coherent manner.

METHOD

The method used in this research and development was ADDIE model which included analysis, design, development, implementation, and evaluation stages. The stages of the ADDIE model used in this study were presented in Figure 1.

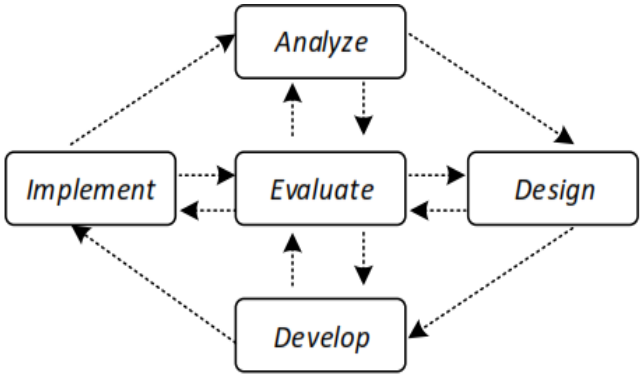

Figure 1. ADDIE model research and development flowchart

The first stage in the ADDIE model was the analysis stage. In the analysis stage, two things were carried out, namely content needs analysis and software analysis. Analysis needs was carried out by reviewing the characteristics of the courses through the Semester Learning Plan and Topics Learning Plan for the course of physics learning multimedia practical. Software analysis was carried out by reviewing functional, and non-functional, system requirements, and an analysis of Moodle's learning management system (LMS) capabilities.

The second stage was the design stage (design). At this design stage, module, e-module, and multimedia were designed to be used as e-module content. The design produced at the design stage was then followed up at the third stage, namely the development stage. At this development stage, materials, projects and evaluations, multimedia development, and

supporting features were carried out. At the end of this stage, learning content was produced which was packaged in structured e-module according to the competency targets to be achieved.

The e-module that has been produced at the development stage was then used in the physics learning multimedia practice class. The application of the e-module was carried out for one semester until students were able to produce a project in the form of a complete physics learning multimedia. After students use the e-module, an evaluation was carried out regarding the application of the feature-lesson to the e-module. Evaluations were given by prospective physics teacher who have used the e-module for one semester.

Data analysis in this study was conducted to determine user responses to the e-module implementation of feature-lesson-based of Moodle for physics learning multimedia practice. User's response data was obtained through a questionnaire in the form of quantitative and qualitative data. The quantitative data included the use of the lesson feature to support coherent mastery of the material, the application of the lesson feature in presenting the learning process through e-module, the use of quizzes in the lesson feature to ensure achievement of learning outcomes, and the interest of prospective teacher to develop online learning using features lessons on Moodle. The quantitative data obtained was then processed to obtain a percentage score. The percentage score obtained was then converted using score interpretation criteria (Nur'aini, Lestari, & Kurniawan, 2020) in Table 1.

Table 1. Score interpretation criteria

Rating Level (%)	Category
0 – 25	Very less
26 – 50	Less
51 – 75	Good
76 – 100	Very good

The qualitative data was in the form of student comments. The qualitative data grid included comparisons of online learning in general with online learning using lesson feature-based e-module, online learning flows, student activities, and the benefits of using quizzes and feature-lesson in online learning.

The qualitative data was then analyzed as follows: reducing data by carrying out a process of selecting, simplifying, focusing, and abstracting data to make it more organized and directed, presenting data in a narrative and systematic way, and drawing conclusions.

RESULT AND DISCUSSION

The development design of this Multimedia E-Module has followed the ADDIE research and development design. The needs analysis stage was divided into two stages, namely the analysis of the course characteristics of the physics learning multimedia practice and software analysis. Targets of this subject are mastering the software to build physics learning multimedia accurately, to plan, to design, and to produce innovative and creative physics learning multimedia. The material included drawing techniques, object modification, animation techniques, buttons and scripts, multi-scenes, operational design, and storyboards. At the end of the lecture, students produce a product in the form of multimedia physics learning which was developed using Macromedia swishmax4.

The physics learning multimedia practice course is a project-based and case method-based course that is carried out for 16 weeks. Lectures are usually held offline with the lecturer first explaining multimedia development techniques, then students trying to master and apply these techniques in multimedia development. The obstacle faced in this lecture is that students have different speeds in mastering multimedia development techniques. This obstacle causes students to not be optimal in developing multimedia and lecturers often have to repeatedly teach these techniques to students. Efforts to overcome differences in learning speed can be done by delivering material through learning resources such as android-based multimedia (Putri & Muhtadi, 2018), flash-based multimedia (Juraman, 2014), and learning videos (Febriani, 2017).

Analysis of the situation in the field shows that the availability of learning resources does not guarantee the optimal implementation of lectures. Students often access material in an uncoordinated manner. In fact, students tend to access assignments without first accessing the material related to the task. It was also found that students often skip material they are not mastered and immediately continue with the next material. This situation causes lectures to take place that is not in accordance with learning principles, namely confusion in the delivery of learning resources (Rosyada et al., 2021).

Moodle is a popular e-learning platform used by many educational institutions in the world. Moodle has one excellent feature, namely the lesson feature. The lesson feature allows teachers to create structured e-modules with clear steps, and students can follow these e-modules easily and with direction. The feature-lesson on Moodle is very flexible and easy to use and can present multimedia content such as text, images, video, audio, and quizzes. The use of quizzes in the lesson feature can ensure user understanding through the questions given (Mlotshwa et al., 2020; Petrovici & Ciobanu, 2016; Widodo et al., 2022)

At the design stage, the e-module was developed using the feature-lesson in Moodle. At this stage, every sequence of presentation of material and quizzes has been designed. The material was presented first then students answer the quiz. Giving quizzes aimed to test students' understanding of the material presented. If students have not been able to answer the quiz correctly, then students were directed back to the presentation of the material to review the material that has been given. However, if the student has been able to answer the quiz correctly, then the student can proceed to the next material. Can be seen in the Figure 2.

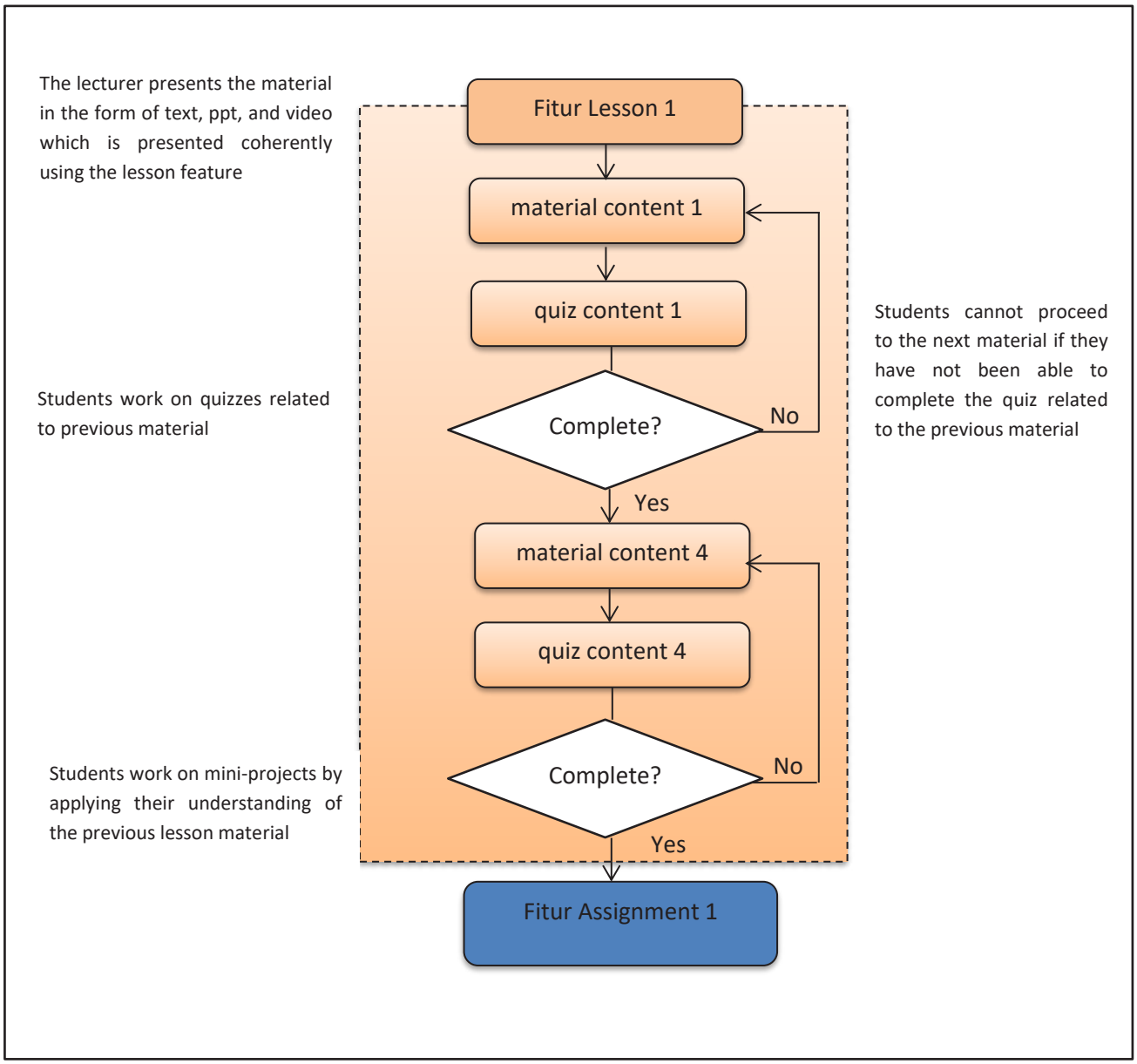

Figure 2. Lesson scheme on e-module

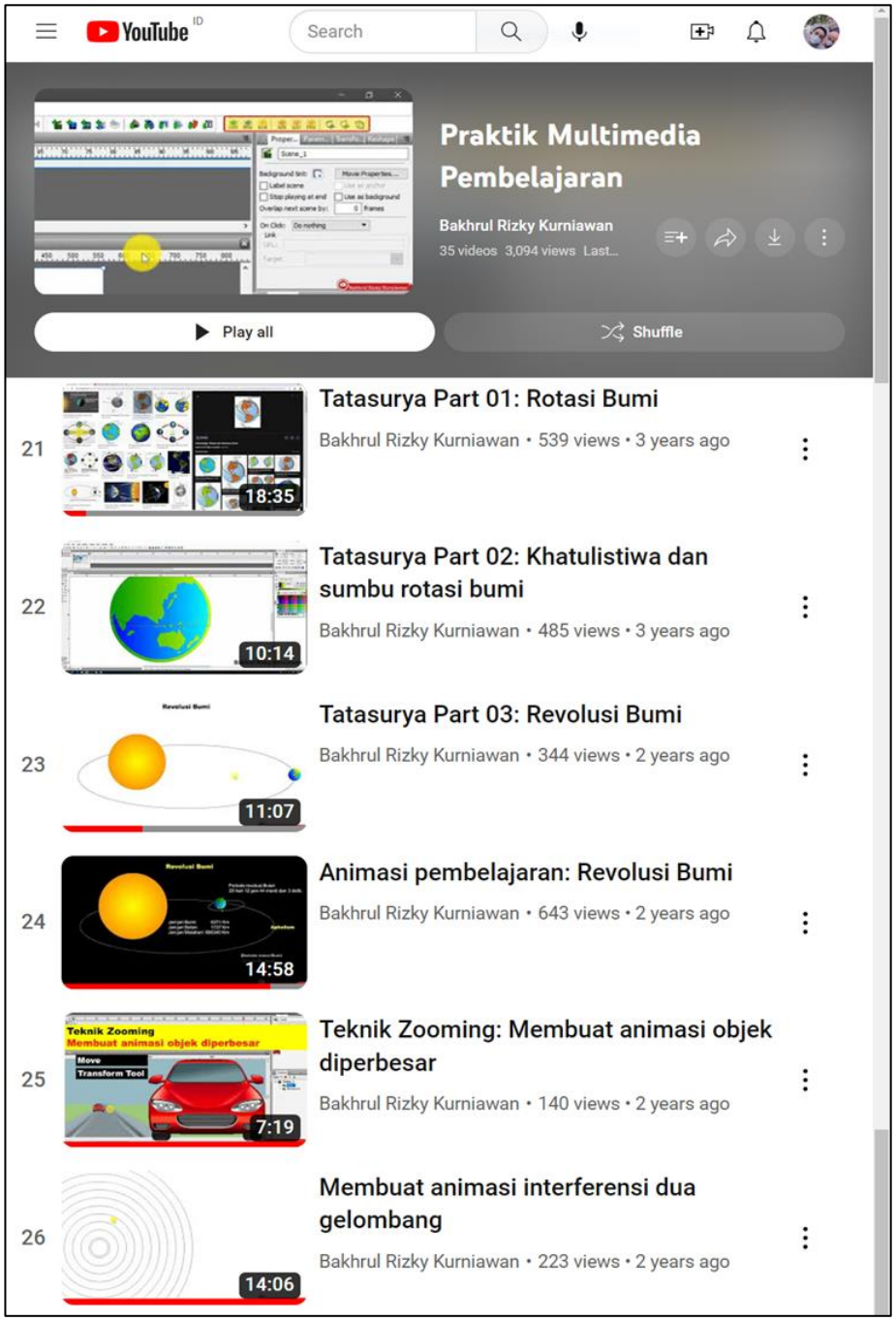

Figure 3. Video material on Youtube

At the development stage, e-module were arranged in the Moodle LMS using the feature-lesson. The video material was developed using the Camtasia application and uploaded to Youtube as shown in Figure 3. Uploading videos to Youtube was done to facilitate the presentation of videos on the lesson feature.

Using the feature-lesson in Moodle was done in the following way:

1. Lecture material was presented using the lesson feature with page type: content as shown in Figure 4. The content presented can be in the form of text and video.

2. The quiz was presented using the lesson feature with page type: multiple-choice as shown in Figure 4, and page type: essay as shown in Figure 5.

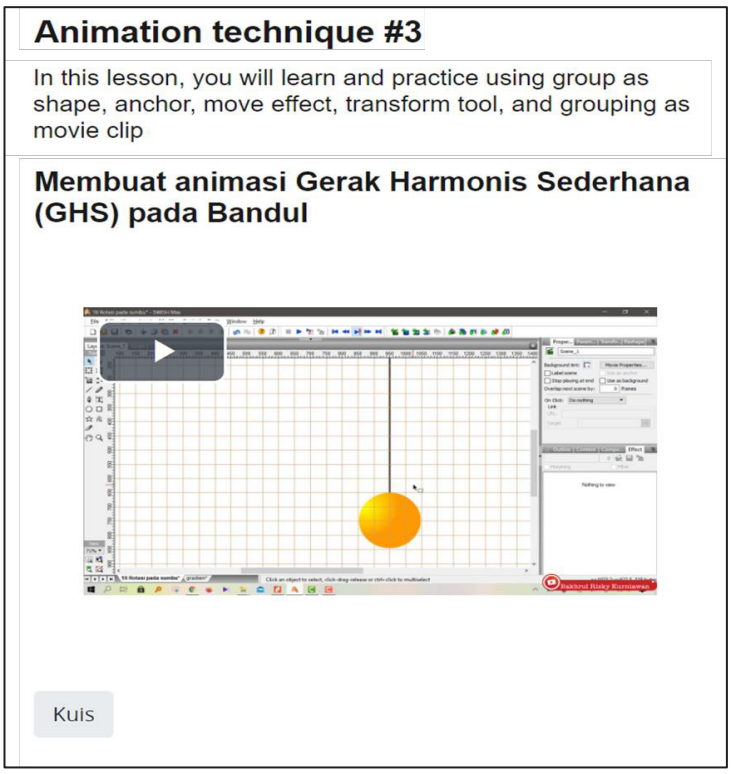

Figure 4. Using the feature-lesson to present material

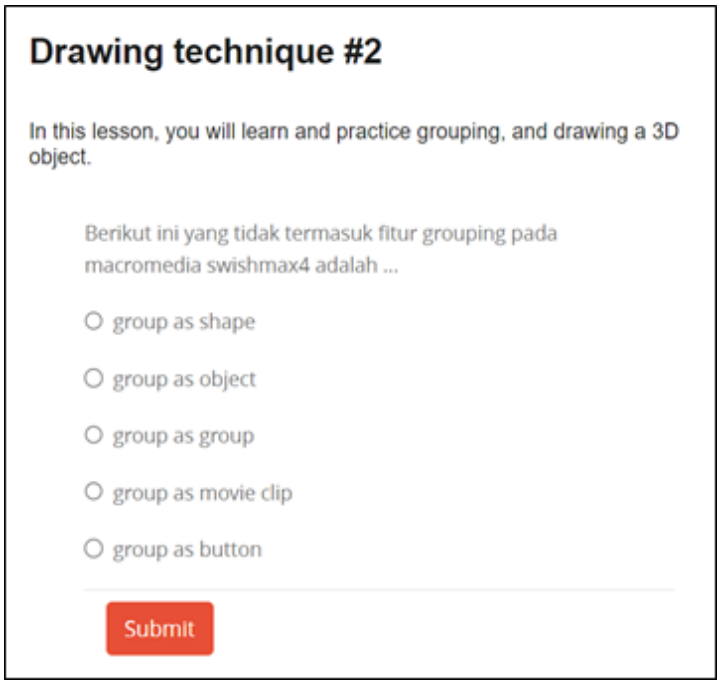

Figure 5. Using the feature-lesson to present a multiple-choice quiz

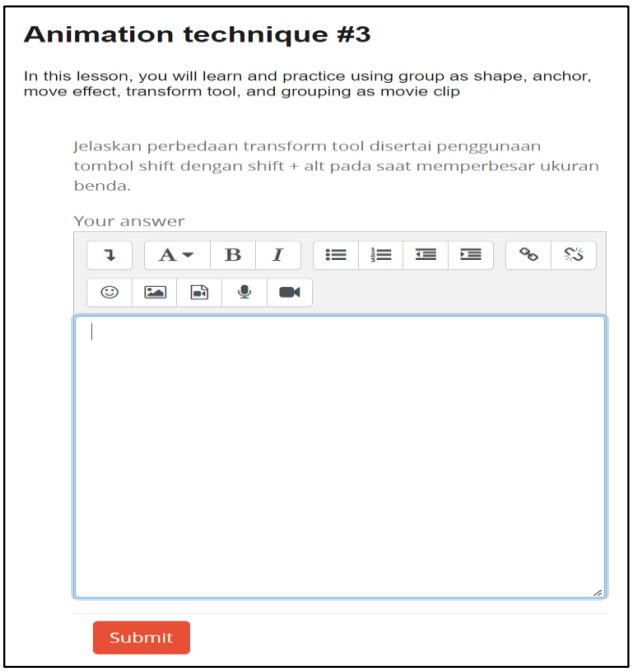

Figure 6. Using the feature-lesson to present an essay quiz

At the implementation stage, the e-module was tested limited to the Physics Learning Multimedia Practice in the Physics Education Study Program. The subject of the trial was consisted of 19 prospective physics teacher student offerings. The test subjects were in the fourth semester and have taken basic physics courses I, II, and III. At the end of the lecture, students made physics learning multimedia as their final lecture assignment as presented in Figure 7.

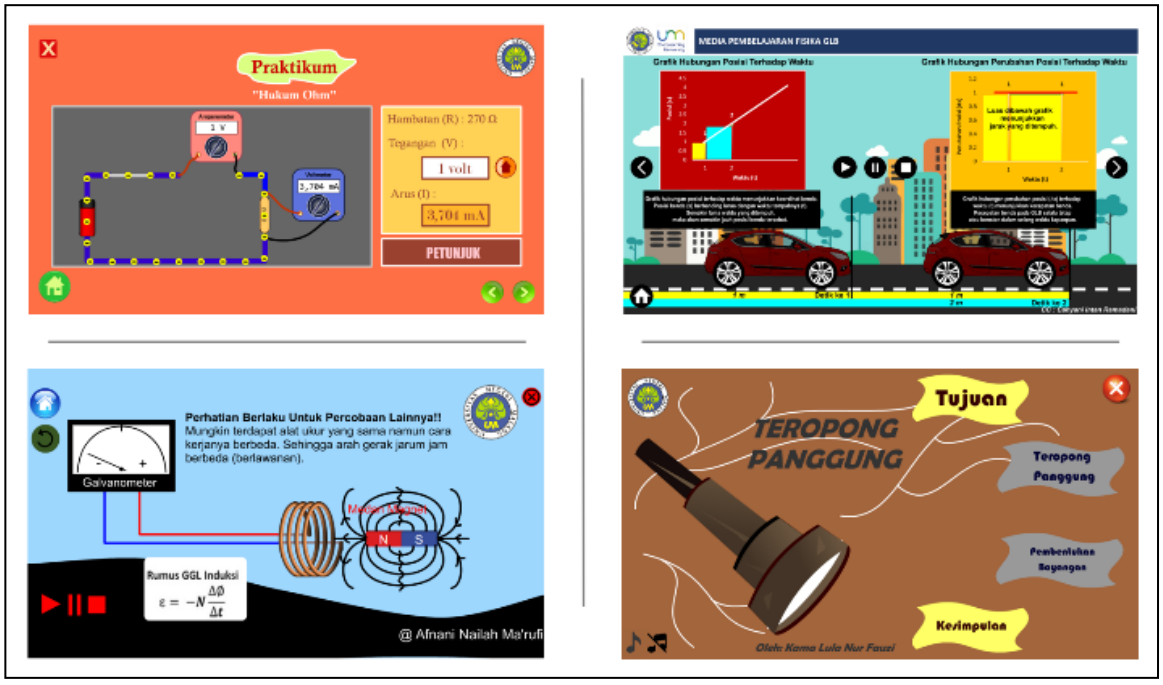

Figure 7. Display of the final project results of prospective physics teacher

At the evaluation stage, prospective physics teacher responded to the e-module that had been used for one semester. The responses were given by students included the use of the lesson feature to support coherent mastery of the material, the application of the lesson feature in presenting the learning process through e-module, the use of quizzes on the lesson feature to ensure achievement of learning outcomes and the interest of prospective teacher students to develop online learning using the lesson feature on Moodle. The results of response are presented in Table 2.

Table 2. Limited trial results

Aspect	Percentage (%)	Category
Use of the feature-lesson on the e-module to support coherent mastery of the material	89.4	Very good
Use of the feature-lesson in the e-module to apply the learning process (flow) to online learning	89.4	Very good
The use of the feature-lesson for quizzes on e-module guarantees the achievement of learning outcomes	89.4	Very good
The interest of prospective teacher students in developing online learning using the feature-lesson on Moodle	89.4	Very good

Based on the responses, the use of the feature-lesson-based e-module implementation in Moodle was considered very good in supporting coherent mastery of the material, implementing the learning process in online learning, and ensuring the achievement of learning outcomes. Using the lesson feature in Moodle allows lecturers to automatically direct students to other pages based on the answers given by students (Simarmata, Santyadiputra, & Divayana, 2017). The advantage of using the feature-lesson was that prospective teacher student who have used the e-module for one semester were very interested in developing online learning using the feature-lesson.

Comments from students on the implementation of the feature-lesson-based e-module when compared to online lectures often attended were presented in Table 3.

Table 3. User comments

Respondents	Comment
Respondent 1	The use of feature-lesson-based e-module was better than the online lectures that I usually take. Online learning using the feature-lesson-based e-module makes me coherent in paying attention to the material to strengthen the material. Other online lectures only use Zoom without giving quizzes at the end of the lecture, so I often don't pay attention to explanations. With the sequence in the lesson feature, I find it helpful to understand the material, and again the explanation in the video material is very easy to accept.
Respondent 2	In my opinion, the use of the feature-lesson-based e-module for multimedia learning practice courses helps participants understand the material in online lectures like this because in this lesson feature the material cannot be skipped and carried out in a coherent manner accompanied by quizzes which are very helpful student understanding.
Respondent 3	In my opinion, the feature-lesson is better applied to online lectures because apart from helping students in lectures, the lesson feature is also very interesting in lectures. There is an interaction between students and their learning media, and lecturers can also monitor whether their students pay attention to the material in lectures or not.
Respondent 4	By using the feature-lesson on the physics learning multimedia practice e-module I can better understand the material presented. Other online learning that I take part in is often only given material, then explained through a Zoom meeting. This is what makes students bored.
Respondent 5	Learning becomes more interesting and focused. Because we weren't immediately given a stack of material, but in a step-by-step manner and interspersed with quizzes at the end of each material. This can make it easier for me to follow the lesson.

Comments given by students showed a positive response to the implementation of lesson feature-based e-modules in Moodle. Students liked the use of the feature-lesson because they have to follow the material provided in a coherent manner, and there was a quiz feature after the material. The material presented was clearer, more interesting, and interactive. Students also feel that they can understand better because when they choose the wrong answer in doing the quiz they would be directed to review material that students have not understood.

Good perceptions based on students' experiences using the lesson feature are in line with the research of Guillen-Gamez, Garcia-Magarino, & Prieto-Preboste (2014). Instructors can provide material to students in parts, assess patterns of lesson use, and can determine the level of knowledge of each student through activity history. The feedback feature is also crucial in making e-modules (Tazkiyah et al., 2020). Both presented qualitatively and quantitatively, students will feel guided in their learning process. However, broader testing of the effectiveness of using lessons in this course needs to be done. S. Wisniewski and Hortman have proven that between providing video recordings of learning and using lessons in Moodle, there is no significant difference in the achievement of pharmacy students (Wisniewski & Hortman, 2019). The need to prove the suitability of the content with the lesson format is very important before the research is carried out (Wisniewski & Hortman, 2019).

CONCLUSION

The application of feature-lesson-based e-module in Moodle for physics learning multimedia practice to prospective physics teacher was in very good criteria with a percentage of 89.4%. Students liked the feature-lesson because they have to follow the material provided in a coherent manner. The material presented was clearer, more interesting, and interactive. In addition, students can take quizzes after studying the material. Students can understand the material better because when they choose the wrong answer in quiz work, students will be directed to study again material that they have not understood. Students can continue to the next material if they have been able to complete the quiz correctly. There were many things in this study that can be used as suggestions in conducting further research and development. Future researchers are expected to be able to conduct broader testing of the effectiveness of using the lesson feature. In addition, future researchers can also develop other subjects with different characteristics, such as courses involving calculations or mathematics.

ACKNOWLEDGMENTS

This research and development was a part of a learning innovation entitled Development of an e-module for Physics learning multimedia practice courses to improve the multimedia skills of prospective physics teachers and was carried out with the help of 2021 State University of Malang PNBP funding, with contract number 4.3.13 / UN32 / KP / 2021.

REFERENCES

Al-Maroof, R. S., Salloum, S. A., Hassanien, A. E., & Shaalan, K. (2023). Fear from COVID-19 and technology adoption: The impact of Google Meet during Coronavirus pandemic. Interactive Learning Environments, 1(3), 1–16.

Brady, A. K., & Pradhan, D. (2020). Learning without borders: Asynchronous and Distance Learning in the Age of COVID-19 and Beyond. ATS Scholar, 1(3), 233–242.

Chen, F. H. (2021). Sustainable education through e-learning: The case study of ilearn2. 0. Sustainability, 13(18), 10186.

Effendi, D., & Wahidy, A. (2019). Pemanfaatan teknologi dalam proses pembelajaran menuju pembelajaran abad 21. Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang.

Febriani, C. (2017). Pengaruh media video terhadap motivasi belajar dan hasil belajar kognitif pembelajaran ipa kelas V sekolah dasar. *Jurnal Prima Edukasia*, 5(1), 11–21.

Firman, F., Sari, A. P., & Firdaus, F. (2021). Aktivitas Mahasiswa dalam Pembelajaran Daring Berbasis Konferensi Video: Refleksi Pembelajaran Menggunakan Zoom dan Google Meet. *Indonesian Journal of Educational Science* (IJES), 3(2), 130–137.

Guillen-Gamez, F. D., Garcia-Magarino, I., & Prieto-Preboste, S. (2014). Facial authentication within Moodle lessons. Contemporary Engineering Sciences, 7, 391–395. https://doi.org/10.12988/ces.2014.4216

Haeruman, L. D., Wijayanti, D. A., & Meidianingsih, Q. (2021). Efektivitas Blended Learning Berbasis LMS dalam Pembelajaran Matematika. *Jurnal Riset Pembelajaran Matematika Sekolah*, 5(1), 80–84.

Herayanti, L., Fuaddunnazmi, M., & Habibi, H. (2017). Pengembangan perangkat pembelajaran fisika berbasis moodle. *Jurnal Pendidikan Fisika Dan Teknologi*, 3(2), 197–206.

Iftakhar, S. (2016). Google Classroom: What works and how. *Journal of Education and Social Sciences*, 3(1), 12–18.

Jayul, A., & Irwanto, E. (2020). Model pembelajaran daring sebagai alternatif proses kegiatan belajar pendidikan jasmani di tengah pandemi covid-19. *Jurnal Pendidikan Kesehatan Rekreasi*, 6(2), 190-199.

Juraman, S. R. (2014). Pemanfaatan smartphone android oleh mahasiswa ilmu komunikasi dalam mengakses informasi edukatif. Acta Diurna Komunikasi, 3(1).

Kumar, V., & Nanda, P. (2018). Social media in higher education. *International Journal of Information and Communication Technology Education*. Https://Doi. Org/10.4018/Ijicte, 2019010107.

Maharcika, A. A. M., Suarni, N. K., & Gunamantha, I. M. (2021). Pengembangan Modul Elektronik (E-Modul) Berbasis Flipbook Maker untuk Subtema Pekerjaan di Sekitarku Kelas IV SD/MI. PENDASI: *Jurnal Pendidikan Dasar Indonesia*, 5(2), 165–174.

Mishra, P. (2019). Considering contextual knowledge: The TPACK diagram gets an upgrade. In *Journal of Digital Learning in Teacher Education* 35(2), pp. 76–78. Taylor & Francis.

Mishra, P., & Warr, M. (2021). Contextualizing TPACK within systems and cultures of practice. Computers in Human Behavior, 117, 106673. https://doi.org/10.1016/j.chb.2020.106673

Mlotshwa, N., Tunjera, N., & Chigona, A. (2020). Integration of MOODLE into the classroom for better conceptual understanding of functions in Mathematics. *South African Journal of Education*, 40(3), 1-14.

Nugraha, A. (2015). Penggunaan e-module pembelajaran pada konsep sifat koligatif larutan untuk mengembangkan kemampuan literasi kimia siswa: Penelitian kelas terhadap siswa kelas XI F 2 SMK Farmasi As-shifa Ciparay [PhD Thesis]. UIN Sunan Gunung Djati Bandung.

Nur'aini, D. A., Lestari, P. D., & Kurniawan, B. R. (2020). Pengembangan Asesmen Formatif Berbasis Komputer untuk Mengetahui Penguasaan Konsep Siswa pada Materi Hukum Bernoulli. *Jurnal Riset Pendidikan Fisika,* 5(2), 106–112.

Nurhayati, D., Az-Zahra, H. M., & Herlambang, A. D. (2019). Evaluasi user experience pada Edmodo dan google classroom using the technique for user experience evaluation in e-learning (TUXEL)(Studi Pada SMKN 5 Malang). *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, 3(4), 3771-3780.

Onyema, E. M., Eucheria, N. C., Obafemi, F. A., Sen, S., Atonye, F. G., Sharma, A., & Alsayed, A. O. (2020). Impact of Coronavirus pandemic on education. Journal of Education and Practice, 11(13), 108–121.

Pallavi, D. R., Ramachandran, M., & Chinnasamy, S. (2022). An empirical study on the effectiveness of e-learning over conventional classroom learning–a case study with respect to online degree programs in higher education. Recent Trends in Management and Commerce, 3(1), 25–33.

Petrovici, A., & Ciobanu, E. P. (2016). The Lesson, Moodle Teaching-Learning Resource With Interactive Content. ELearning & Software for Education, 3, 110-119.

Putri, D. P. E., & Muhtadi, A. (2018). Pengembangan multimedia pembelajaran interaktif kimia berbasis android menggunakan prinsip mayer pada materi laju reaksi. Jurnal Inovasi Teknologi Pendidikan, 5(1), 38–47.

Rosyada, M. I., Atmojo, I. R. W., & Saputri, D. Y. (2021). Dampak implementasi pembelajaran dalam jaringan (daring) mengenai kualitas pembelajaran ipa di sekolah dasar pada masa pandemi covid-19. Didaktika Dwija Indria, 9(4), 1-5.

Sadikin, A., & Hamidah, A. (2020). Pembelajaran Daring di Tengah Wabah Covid-19:(Online Learning in the Middle of the Covid-19 Pandemic). Biodik, 6(2), 214–224.

Sicat, A. S., & Ed, M. A. (2015). Enhancing college students' proficiency in business writing via Schoology. International Journal of Education and Research, 3(1), 159–178.

Simarmata, E. A., Santyadiputra, G. S., ST, M. C., & Divayana, D. G. H. (2017). Pengembangan E-Modul berbasis model pembelajaran Project Based Learning pada mata pelajaran pemrograman desktop kelas XI rekayasa perangkat lunak di SMK Negeri 2 Tabanan. KARMAPATI (Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika), 6(1), 93–102.

Singhal, M. K. (2020). Facilitating Virtual Medicinal Chemistry Active Learning Assignments Using Advanced Zoom Features during COVID-19 Campus Closure. Journal of Chemical Education, 97(9), 2711–2714.

Smeets, D. J., & Bus, A. G. (2015). The interactive animated e-book is a word-learning device for kindergartners. Applied Psycholinguistics, 36(4), 899.

So, S. (2016). Mobile instant messaging support for teaching and learning in higher education. The Internet and Higher Education, 31, 32–42.

Sobri, M., Nursaptini, N., & Novitasari, S. (2020). Mewujudkan kemandirian belajar melalui pembelajaran berbasis daring diperguruan tinggi pada era industri 4.0. Jurnal Pendidikan Glasser, 4(1), 64–71.

Tazkiyah, A., Sulur, S., & Fawaiz, S. (2020). Pengembangan Modul Elektronik Dengan Feedback Berbasis Android Materi Suhu Dan Kalor Untuk Siswa SMA/MA. Jurnal Pendidikan Fisika dan Teknologi, 6(1), 31. https://doi.org/10.29303/jpft.v6i1.1731

Widodo, J. P., Musyarofah, L., & Slamet, J. (2022). Developing a Moodle-based learning management system (LMS) for slow learners. Jurnal Inspirasi Pendidikan, 12(1), 1–10.

Wisniewski, C. S., & Hortman, M. B. (2019). Comparison of pharmacy students randomized to receive drug information reference education via recording or interactive Moodle lesson. International Journal of Educational Technology in Higher Education, 16(1), 8. https://doi.org/10.1186/s41239-019-0138-1