Journal for Lesson and Learning Studies
Volume 5, Number 3, 2022 pp. 480-486
P-ISSN: 2615-6148 E-ISSN : 2615-7330
Open Access: https://doi.org/10.23887/jlls.v5i3.57186

Flipbook Based E-Module With Case Method In Vehicle Testing Course

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ARTICLE INFO

Article history:
Received September 02, 2022
Accepted October 19, 2022
Available online October 25, 2022

Kata Kunci:
E-Modul, Flipbook, Teknik Otomotif

Keywords:
E-Module, Flipbook, Automotive Engineering

ABSTRAK

Pesatnya perkembangan TIK (Teknologi Informasi dan Komunikasi) mempengaruhi berbagai aspek kehidupan manusia termasuk pendidikan. Pemanfaatan teknologi informasi ini dapat mendukung proses belajar mandiri menjadi lebih baik. E-modul dengan model metode kasus merupakan media yang cocok diterapkan di Pendidikan Teknologi dan Kejuruan. Penelitian ini bertujuan untuk menganalisis kevalidan E-modul dengan metode kasus dalam uji kendaraan mata kuliah pakar sebelum diimplementasikan dalam proses pembelajaran. Penelitian ini menggunakan penelitian kuantitatif dalam bentuk survey. Validitas penelitian ini terbagi menjadi dua kategori, yaitu validitas desain dan validitas material. Pengumpulan data menggunakan angket dalam bentuk skala Likert dengan lima kemungkinan jawaban yang digunakan dalam angket validasi media ini. Analisis data dalam penelitian ini menggunakan tingkat validitas menurut Formula V Aiken. Berdasarkan hasil penelitian dapat disimpulkan bahwa desain media valid ditinjau dari aspek didaktis, konstruksi dan teknis. Sedangkan hasil validasi materi juga menunjukkan bahwa materi pada media tersebut valid ditinjau dari kualitas materi dan kualitas pembelajaran. Dapat disimpulkan bahwa e-modul berbasis flipbook dengan metode kasus yang digunakan dalam mata kuliah ini efektif sebagai media pembelajaran di kelas selama proses pembelajaran berlangsung.

ABSTRACT

The rapid development of ICT (Information and Communication Technology) affects various aspects of human life including education. Utilizing this information technology can support the independent learning process for the better. E-module with the case method model is suitable media implementing in Technology and Vocational Education. This study aims to analyse the validity of E-module with case method in vehicle testing course the expert before being implemented in the learning process. This study used a quantitative research in the form of a survey. The validity of this research is divided into two categories, namely design validity and material validity. Data collection is using questionnaire in a form of Likert scale with five possible answers is used in this media validation questionnaire. The data analysis in this study is use level of validity according to Formula V Aiken. Based on the results of the study, it can be concluded that media design is valid in terms of didactic, construction and technical aspects. While the results of material validation also show that the material in the media is valid in terms of the quality of the material and the quality of learning. It can be concluded that the flipbook-based e-module with the case method used in this course is effective as a learning medium in the classroom during the learning process.

1. INTRODUCTION

The rapid development of ICT (Information and Communication Technology) has an impact on many aspects of human life, including education. The need for IT-based teaching and learning strategies and methods is unavoidable given this development, especially considering the Covid-19 pandemic (Pujilestari, 2020; Qekaj-Thaqi & Thaqi, 2021; Yang et al., 2020). To promote student learning, educators must apply their knowledge of learning strategies, learning methodologies, and technology. To really prepare students to face the realities of the twenty-first century, lecturers as educators must provide

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collaborative learning tools that focus on the four 4Cs (communication, collaboration, critical thinking and problem solving, as well as creativity and innovation) (Anas & Mujahidin, 2022; Hidayatullah et al., 2021; Tarihoran, 2019).

Conceptually, educators are seen as qualified experts to handle all the demands and difficulties of education. The professional requirements of lecturers in the 21st century lie not in their ability to know and be good at everything, but rather in their ability to learn with their students and be an example of perseverance, openness, and trust in interactions with them (Mardiana, 2020; Prayogi, Rayinda Dwi; Estetika, 2019). Lecturers must be able to create a personality that fits the teacher's profile in the twenty-first century in this information technology era. The first profile focuses on knowledge or intellectual abilities possessed by an educator, such as subject matter expertise, knowledge of learning strategies, understanding of individual differences in learning styles and behavior, knowledge of guidance and counseling techniques, knowledge of society, and general knowledge (Junedi et al., 2020; Munawarah, 2019; Prayogi, Rayinda Dwi; Estetika, 2019).

Technology and Vocational Education is very suitable for implementing learning with the case method model. The case method is part of the learning model that refers to real-world examples from society. Students have the opportunity to develop self-actualization abilities, self-potential, and creative problem solving using the case method learning paradigm (Mendenhall & Sincich, 2016; Verner et al., 2013; Widiastuti et al., 2022). Traditional teaching and learning methods can be replaced by a case approach. Case studies are used to show how course material is applied to problems that may arise in the internal and external environment of organizations as well as systems and techniques. With the emergence of issues and problems in case studies, a forum is created for students to take positions as decision makers on issues contained in the case objects displayed, so that students not only know or understand the issues that have been discussed and discussed but also consider seeking solution regarding this problem (Nilsook et al., 2021; Nurtanto et al., 2020).

The development of IT and its relation to the world of PTK requires independence for students in learning (Ritonga, 2022; Winangun, 2017). Modules are the right media to be used to support independent learning and based on CAE methods. Designing more effective and interesting modules can be a tactic to increase students' interest in reading modules. Electronic modules often feature various interactive components such as animation, video, photos and audio (Fahmi et al., 2019; Logan et al., 2020; Yulando et al., 2019). The development of science and technology in the twenty-first century has driven the interactive learning approach used today. Modules are a collection of programs that are divided into separate parts and are made with the aim of enhancing student learnin. The teaching and learning activities of the module aim to achieve the following objectives: (1) A greater desire to learn as a whole; (2) More innovation on the part of lecturers in creating the necessary resources and materials as well as more reliable individual services; (3) Ability to realize the concept of endless progress; and (4) being able to apply student learning systems quickly and efficiently (Arthur et al., 2020; Riyanda, A. R. & Suana, 2019).

E-module is a type of independent learning material that is arranged digitally with the intention of realizing the learning abilities to be achieved and increasing student interaction through the use of applications. E-module is a type of media used in independent teaching and learning activities with the aim of acquiring the desired learning skills (Rahmi, 2018; Sugianto et al., 2013). Learning is carried out in electronic form, which includes, among others, animation, audio and navigation, which encourages student involvement in using the application (Mulyadi, M., Atmazaki, A., & Syahrul, 2019; Sujanem et al., 2020). Flipbook is a type of sheet of paper that can double as an album or calendar and measures. According to this definition, flipbook-based E-Modules can be described as a comprehensive learning package that contains various learning activities that must be carried out so that a student can achieve the set goals (Maharcika et al., 2021; Riyanto et al., 2020; Wijaya, 2021). This digital format has a three-dimensional layout and includes animated GIFs, music, videos, photos, text and graphics.

It is known that there are several obstacles or obstacles in studying Vehicle Testing based on initial observations and conversations with the professor of the Department of Automotive Engineering, Faculty of Engineering, Padang State University. Vehicle Testing material is fairly comprehensive and requires extensive discussion must be stated briefly for 1 credit theory (50 minutes). The Vehicle Testing Lecturer cannot fully explain it to students in the limited time for face-to-face teaching. This time limit is also reduced when lecturers are required to prioritize lecture time as well as have other assignments that must be completed at the same time. It will be easier for students to learn if the current lecture material books are updated following advances in science and technology and changed to suit the existing university curriculum. Therefore, the flipbook-based e-module with the case method for vehicle testing courses needs to be developed as a solution. This will give students access to self-study materials they can

use wherever they are, as well as enable them to actively participate and apply scientific thinking to their learning.

Therefore base on those problem the researcher are interested in created a flipbook-based E-module using the Case Method because it is supported by the use of digital devices owned by students and the use of the internet connection provided by Padang State University. Flipbook-based electronic modules that use the Case Method offer convenience without making it difficult for lecturers and students to bring rather large modules to each lesson. This study aims to analyses the reliability of experts before being used in the teaching and learning process.

2. METHOD

This study used a quantitative research technique in the form of a survey. The expert validity of the developed e-module is explained in this research. The validity of this research is divided into two categories, namely design validity and material validity. Flipbook-based e-module with the case technique was validated by experts using a questionnaire. The purpose of the validation sheet is for a specialist to evaluate the reliability of the media. A Likert scale with five possible answers is used in this media validation questionnaire. In the E-module there are two components that need to be validated using a validation questionnaire, namely media design validation and material validation. After obtaining approval from the experts, the media will be used to apply the validation results based on the validation questionnaire that has been filled out by the experts. The media and material validation questionnaire grids can be seen in Table 1 and Table 2.

Table 1. Media Questionnaire Grid Design

No.	Validation Aspect	Indicator
1	Didactic Requirements	a. Suitability of the material with basic competencies
		b. Ease of understanding material
		c. Truth concept
2	Construction Requirements	a. Use the correct spelling
		b. Use the correct sentences
		c. Consistency in the use of terms, symbols, scientific names/foreign languages
3	Technical Requirements	a. Navigation
		b. Display Clarity
		c. Text readability
		d. Audio quality
		e. Video Quality

Table 2. Material Questionnaire Grid

No.	Validation Aspect	Indicator
1	Material Quality	a. Material equipment
		b. Systematic preparation of material
		c. The language used in writing the material
2	Learning Quality	a. Fits the purpose
		b. Increase motivation
		c. Increase the independence of learning

The data obtained from the flipbook-based e-module validation results with material validation and media design validation are analyzed by level of validity as shown in Table 3.

Table 3. Level of Validity of Flipbook-Based E-module

No.	Achievement level	Category
1	0.667 – 1.00	Valid
2	< 0.667	Invalid

The range of V values that will be generated will be obtained between 0 and 1.00 to assess the level of validity according to Formula V Aiken. So it can be concluded that the media is included in the

"valid" category if the value of V is close to 1 which is read as a fairly high coefficient. Material is considered invalid or included in the low valid category if the validity value is 0 or very close to 0.

3. RESULTS AND DISCUSSION

Results

Flipbook-based e-modules with the case method must have valid status by following the validation test before starting learning activities. The purpose of the media validation test phase is to evaluate the flipbook-based E-module design with the case method and determine its feasibility using the opinions of informatics, computers, vocational education, and technology experts. To obtain valid status from experts, validation activities were held in this study. The validation process will be repeated if the flipbook-based E-module with a case method is not valid until a flipbook-based E-module with a valid case method is obtained. If the validator has determined that the flipbook-based E-module with the case method in this study is valid and there are no further changes to the e-module, then it is considered valid.

Validity test data were obtained from instrument data filled in by informatics or computer expert validators and technology and vocational education. Until the flipbook-based E-module with the case method is finally deemed valid and feasible to study, the input validator results can be used as a revision. The result of product design validation is media design validation. Media design validation was carried out by three validators consisting of validator 1, validator 2, and validator 3. The validator assessed the media by incorporating three didactic, constructional, and technical assessment standards. Media design validation was carried out once and the expected results were obtained. Table 4 displays the findings of the expert design media validation assessment data.

Table 4. Media Validation Assessment Results

No.	Validator	V Score	Average	Category
1	Validators 1	0.944		
2	Validators 2	0.935	0.929	Valid
3	Validators 3	0.907		

Base on Table 4 show the validation results that indicate the flipbook-based E-module with the case method is valid. This can be seen from the calculation results obtained from the questionnaire from media experts. The calculation results from the validator 1 questionnaire get a value of 0.944 with a valid category, validator 2 with a value of 0.935 has a valid category, and validator 3 with a value of 0.907 is in the valid category. Based on the results of this assessment, an average value of 0.929 was obtained, so that the flipbook-based e-module was included in the valid category. Thus, it can be said that flipbook-based E-module media design with the case method is valid for didactic, construction, and technical aspects.

Material validation in the vehicle testing course was carried out by three automotive engineering lecturers. The purpose of material validation is to ascertain whether the learning resources used in the flipbook-based E-module with the case method are accurate, appropriate, and meet student learning needs. The material is validated by experts in terms of the quality of the material and the quality of learning. To apply its validity, the experts evaluate the learning resources used in flipped classrooms, after which the validator gives a value to the resources used in flipbook-based E-modules with case methods. After that the validity value is calculated using the evaluation findings provided by the validator. Table 5 displays the results of material validation.

Table 5. Material Validation Assessment Results

No.	Validator	V Score	Average	Category
1	Validators 1	0.972		
2	Validators 2	0.931	0.945	Valid
3	Validators 3	0.931		

Based on Table 5, it can be seen that the flipbook-based E-module material with the case method has been validated. The results of the validation show that the content in the flipbook-based E-module with the case method is valid based on the assessment of validator 1 (0.972), validator 2 (0.931) and validator 3 (0.931) with an average value of 0.945 in the valid category. Therefore, media content can be said to be valid in terms of the quality of the material and the quality of learning.

Discussion

The experts will validate the flipbook-based E-module with the case method after development and obtaining a flipbook-based E-module with a valid case method is the goal of the validation stage. There are two actions performed at the validation stage. There are validation activities for the CBE-flipped class, which are evaluated by a number of professionals, where flipbook-based E-module validation with the case method is carried out in two areas of assessment, namely evaluating the validity of the material and evaluating the validity of the media design (Saraswati et al., 2019; Wibowo & Pratiwi, 2018).

Validity questionnaires completed by each expert were used to collect data. Flipbook-based e-modules with the case method have been proven valid by experts where validator 1 with a value of 0.944 is in the valid category, validator 2 with a value of 0.935 has a valid category, and validator 3 with a value of 0.907 is in the valid category, and the average of the three validators is 0.929 so that it can be said that this media design is valid in terms of didactic, construction, and technology. In flipbook-based E-module material with a case method that has been validated and score calculated, the findings show that the material is valid where validator 1 (0.972), validator 2 (0.931) and validator 3 (0.931) with an average value of 0.945 with Thus, the developed e-module is included in the valid category. Therefore, it can be said that information in the media has an advantage in terms of the quality of the material and the quality of learning (Suarsana & Mahayukti, 2013; Widayanti, 2020).

The findings of this evaluation are consistent with previous research conducted by previous study which found that the validation results for the media developed were in the very valid category (average score 0.91), as well as research conducted by Firmansyah Putra (2018) which shows validation results with an average value of 0.89 (Valid) (Sa'diyah, 2021). Similar with other study that determine the feasibility and the responses of students and educators to the development of e-modules using flip pdf professional on temperature and heat material (Komikesari et al., 2020). The result reveal that validation product of e-modules using flip pdf professional as learning media have fulfilled very good criteria with a percentage of material expert evaluations of 92,08%, media experts of 89,1%. Based on the results, the development of e-module using flip pdf professional can be used as a learning media.

The implications of this study provide the results of an analysis of the reliability of experts from flipbook-based electronic modules that use the case method before being used in the teaching and learning process. Flipbook-based electronic modules that use the case method expected able to offer convenience without making it difficult for lecturers and students to carry large enough modules for each lesson. The limitation of this research is limited to the scope which only includes the stages of analysis of the reliability of experts. It is hoped that future research will be able to deepen and broaden the scope of research related to flipbook-based electronic modules that use the case method.

4. CONCLUSION

From the results of the study it can be concluded that the media design is good in terms of didactic, construction and technical so that it has been declared valid. Furthermore, the results of the material validation process also show that the media content is very good in terms of material quality and learning quality. Based on the results of the research, it was concluded that the flipbook-based E-module with the case method would make a useful contribution, especially in implementing the learning process for teachers and students, as well as introducing scientific references about vehicle testing as a teaching tool.

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