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Flipped Book Based E-Module Interactive to Develop Meat Processing Technology Learning Media

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ABSTRACT

The application of interesting learning media during the learning process is important to increase student enthusiasm which leads to increasing students' cognitive results. This study aimed to develop meat processing technology learning media using a flipped-book based e-module interactive. Meat processing technology was one of the subjects for students in class XI Agribusiness vocational high school. The learning media was developed based on the research and development method by applying the ADDIE model that consists of five steps: Analysis, Design, Development, Implementation dan Evaluation. The learning media was validated by judgment experts namely computer teacher, language teacher, and subject-related teacher. The instruments used for validation were questionnaires with a Likert scale from 1-to 4. Judgment expert validation showed the learning media was qualified based on content (95.45%), language (95.83%), and features (86.67%). Features of media had the lowest grade according to judgment experts since several improvements were needed namely repairing the media cover, changing the font color to brighter color, give different colors to the font to differentiate the menu in the e-module. The media was improved based on suggestions from judgment experts before being used as learning media for meat processing technology subjects. Flipped-book-based learning media obtained 93.38% score based on students' response. Most students reported that they like using flipped-book-based e-module as learning media since it is easy to use and interesting.

Keywords*: ADDIE, e-module, flipped-book, meat processing technology.*

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INTRODUCTION

Learning using media had helped students improve their cognitive competency (Cheung and Slavin, 2011). Moreover, multimedia learning media was developed since students learn better when visual and verbal materials were physically close (Mayer, 2017). McKnight et al. (2016) showed the use of multimedia learning generated higher scores than students who received verbal explanation alone. Nowadays, students have access to the internet since most of them own android based smartphones. Therefore, android based-smartphones can be potential devices for multimedia learning development.

Agribusiness is one of the majors in vocational high school that prepares students to be ready to work in the agricultural processing industry after they graduate. The curricula focus

on cognitive, affective, and psychomotor competencies that students' engagement during the learning process is very important. Meat processing technology is one of the subjects taught in this major. The topics include processed products of large livestock, selection of facilities and infrastructure for processing large livestock, and processing techniques of production. Several learning media, namely PowerPoint presentations and books published by the Ministry of Education were provided for the students. However, based on interviews with the subject-related teacher, problems occurred namely students' lack of interest and students' difficulties in understanding the subject.

Learning media namely pictures, audio, video, or audiovisual such as electronic modules (e-modules) can be used during the learning process (Fitria, 2014). Moreover, Mayer (2008) proposed that students' cognitive-affective competencies can be improved by applying a variety of learning media. The use of multimedia can also enhance students' motivation and engagement. One of the multimedia learning that gains interest is the e-module since it can be used anytime and anywhere. The use of an e-module could also help the student to learn independently for the purpose of student-centered learning. E-module is a learning module in digital form that contains text, images, or both containing digital electronic material accompanied by simulations that can and are suitable for use in learning (Afrilia & Yarmayani, 2018). Adding audio and video could make e-modules interesting, such as being made more interactive. An interactive e-module combines two or more directions of interactive text, graphics, audio, images, and video, to control a command, which then creates a two-way relationship between the module and its users. The integration of interactive e-modules in the learning process is expected to encourage students to be more active in learning to improve student learning outcomes (Puspita et al., 2021). Interactive e-modules can be created using the Canva design application (Mulyadi et al., 2016) and flipbooks. According to Mawarni and Hendriani (2021), flipbook is a book-like application that each page contains information and can be embedded with video links. Research showed the development of interactive e-module learning media on the Sense of Sight and Optical Instruments material can improve students' understanding and thinking skills (Puspita et al., 2021).

This research proposed to develop an e-module interactive using Flipped- Book application on the subject of Meat Processing Technology. The use of flipped book-based e-module interactive was expected to diversify types of learning media as learning sources for students. It is also expected that teachers can use flipped book-based e-module to vary the learning media that use during the learning process.

RESEARCH METHODS

Research Design

The media was developed based on the research and development method consisting of five steps namely *Analysis, Design, Development, Implementation, and Evaluation* as seen in Figure 1 (Sugiyono,

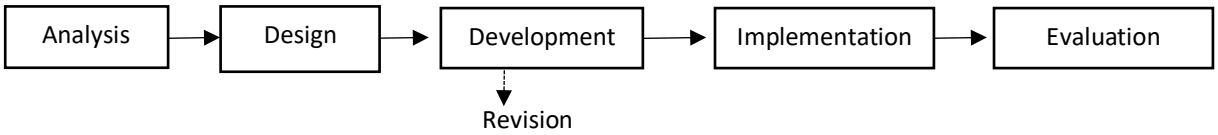

Figure 1. Research design by Sugiyono (2010)

2010). The first step was the analysis where the researcher analyzed problems that occurred during the learning, then identified difficulties faced by students regarding learning media. The second step was designing learning media by collecting content materials (figures, texts, images, backgrounds, fonts, videos by downloading from various sources), designing a layout for the e-module and, designing features available in the media, preparing validation instruments. The third stage was development where the e-module was validated by judgment experts namely language teacher, computer teacher, and subject-related teacher that taught meat processing technology. Then, the media was revised based on experts' suggestions. As the implementation method, the revised media was used as the learning media by class XI of vocational students. The students were given questionnaires to assess the learning media. The last step was evaluation to finalize the learning media based on students' assessments.

Research Subject

The research subject namely 1) language teacher, computer teacher and subject-related teacher as judgment experts; 2) 29 students of class XI major Agroindustry and Agribusiness Vocational school at Cianjur, West Java province.

Instruments

The questionnaires were used as instruments to determine the feasibility of a flipped-book-based e-module. The questionnaires were using Likert scales 1-4 ranging from definitely not good (1) to very good (4). There were three questionnaires used namely questionnaires for learning media, questionnaires for media content, and questionnaires for language appropriateness in media. The computer teacher acted as a validator for learning media while language teacher acted as language validator, and teacher of meat technology acted as a content validator. The indicators for instruments can be seen in Table 1. The data obtained from validation was then analyzed by descriptive quantitative methods and converted to a percentage scale according to Akbar (2013).

Table 1. Indicators of Flipped-book-based E-Module Validation Instruments

Assessment aspect	indicators
Content	Relevancy to the syllabus
	Language compatibility
	Content clarity
	Material quality and depth
Learning media	Easy to use
	Programming aspect
	Feature's function and benefits
	The visual aspect of media
Language	Communicative
	Interactive
	Effectiveness
	Understanding

RESULTS AND DISCUSSION

The development of the flipped-book-based e-module was started by analyzing the problem that occurred during the learning process. It was identified that only books provided by the Ministry of Education were available as learning media. However, the books were only available at the school library, so students were only able to access them during school. The author was interviewing a teacher who taught meat technology and found out that students were less motivated when only one type of learning media was used during the study. Therefore, it was assumed that a variety of learning media was expected to improve student motivation for learning. Moreover, students were asked for more interesting learning media that they can access anywhere and anytime. Flipped-book-based media was suitable to be develop as learning media for Meat Technology subject because the media contain pictures, video and considered interactive. Therefore, flipped-book-learning-media is expected to improve students' learning outcome.

The second step of media development was designing learning media. Based on the analysis result, the author was designing learning media for meat technology subjects using a flipped-book-based e-module. The design step consists of examining competencies to determine learning materials based on facts, concepts, principles, and procedures, allocation of learning time, indicators, and student assessment instruments, collecting subject material related to meat processing technology, and generating a flowchart and storyboard (Figure 2). Flowchart was important to make sure the flow of learning media while storyboard helps visualized flipped-book-based e-module that would be develop at development stage.

The media then developed based on flowchart and storyboard (Figure 3). The media was validated at the development stage. The result showed that based on media judgment expert, the flipped-book-based e-module was qualified with a score of 86.67% (Figure 3A). The suggestions were regarding the composition and accuracy of the writing colors, the use of shapes and letters and font colors need to be improved to make it easier for users to read and distinguish each text in the developed interactive e-module. Based on language validation, the flipped-book-based e-module was qualified with a score of 95.83% (Figure 3B). However, validator suggested the author considered the use of punctuation marks and avoids the use of non-standard terms, for example conjunction at the beginning of sentences. Based on media content, the flipped-book-based e-module was qualified with a score of 95.45% (Figure 3C).

The flipped-book-based e-module had adapted based on lesson plan that the content presented in depth and clearly, accompanied with pictures and animated video. The media revised based on validation result (Table 2).

The validated flipped-book-based e-module was implemented as learning media and used by 27 students. The students' responses were based on three aspects namely media content, appearance, and easy to use shown in Figure 4. On average, the validated flipped-book-based e-module score was 93.38%. Most students reported that they like using flipped-book-based e-module as learning media since it

is easy to use and interesting. Flipped-book-based learning media provide a variety of an interactive learning media that students can use anywhere and everywhere.

Development of learning media can be done using free applications although some of the features were not available namely attached video on Youtube program, attached evaluation to Quizizz application. Moreover, based on students' responses, the aspect of media content had the lowest score of 90.95%. It was assumed that although students have access to learning media, teachers still have an important role during learning activities as also proposed by Harisson (2020). It is noteworthy that improving students' self-regulated learning is also an important factor to be considered when measuring the effectiveness of learning media to improve students' cognitive aspects (Yot-Dominguez & Marcello, 2017).

CONCLUSIONS AND SUGGESTIONS

Conclusion

Development of an e-module interactive Meat Processing Technology subject could be done using the Flipped-book application. Flipped-booked-based learning media categorized "Very Feasible" based on judgement experts. Most students like to use Flipped-booked-based learning media due to its interactivity. Students can use Flipped-booked-based learning media to learn anywhere and anytime. Therefore, the use of learning media should be combined with other competencies, namely students' regulated learning.

Suggestion

It is suggested that the development of interactive e-modules should consider the characteristics of courses. Moreover, students' competencies on reading and writing literacy.

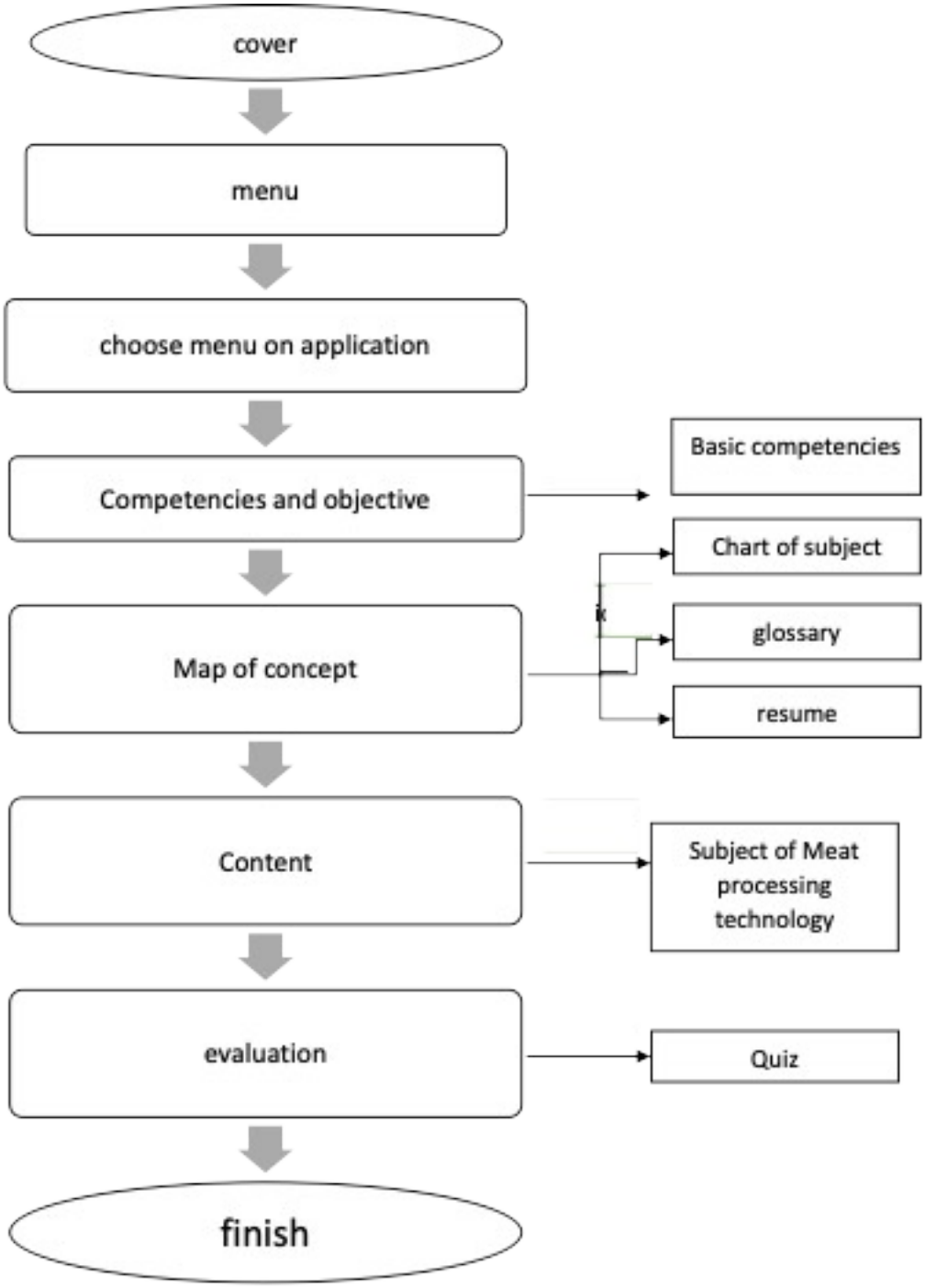

Figure 2. Flowchart of Flipped-book-based E-Module

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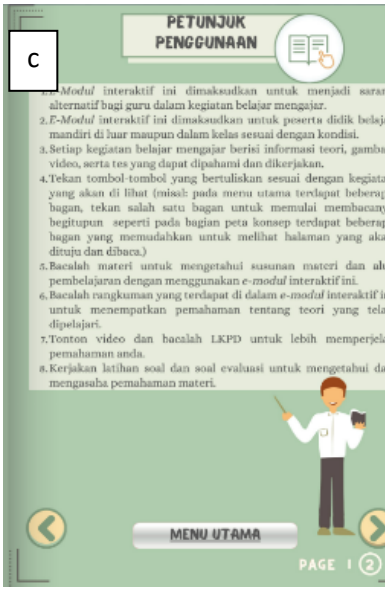
a


E-MODUL
PENGOLAHAN HASIL TERNAK BESAR
Mata Pelajaran
Produksi Pengolahan Hasil Hewani
Kelas: XI SMK
MENU

b


MENU
Petunjuk Penggunaan
KD, IPK, Tujuan Pembelajaran
Peta Konsep
Materi Materi
Latihan Soal
Lembar Kerja
Soal Evaluasi
Daftar Pustaka
PAGE 1

c


PETUNJUK PENGGUNAAN
MENU UTAMA
PAGE 2

d


KD, IPK, TUJUAN PEMBELAJARAN
KOMPETENSI DASAR
INDIKATOR PENCAPAIAN KOMPETENSI
TUJUAN PEMBELAJARAN
MENU UTAMA
PAGE 3

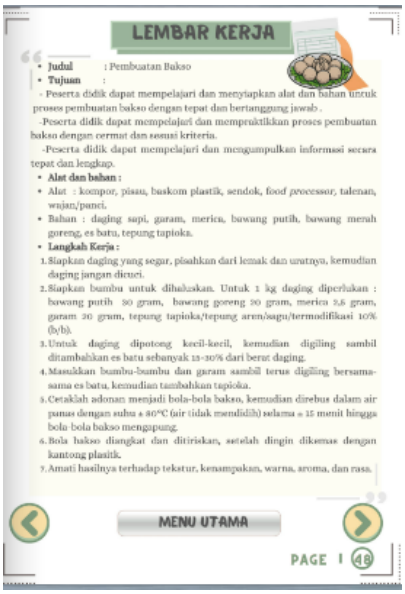
e


PETA KONSEP
GLOSARIUM
PENGOLAHAN TERNAK BESAR
HASIL UTAMA TERNAK BESAR DAN OLAHANNYA
HASIL SAMPING TERNAK BESAR DAN OLAHANNYA
Bakso
Sosis
Dendeng
Abon
Nugget
Gelatin
Tepung tulang
MENU UTAMA
PAGE 4

f


HASIL UTAMA TERNAK BESAR DAN OLAHANNYA
MENU UTAMA
PAGE 7

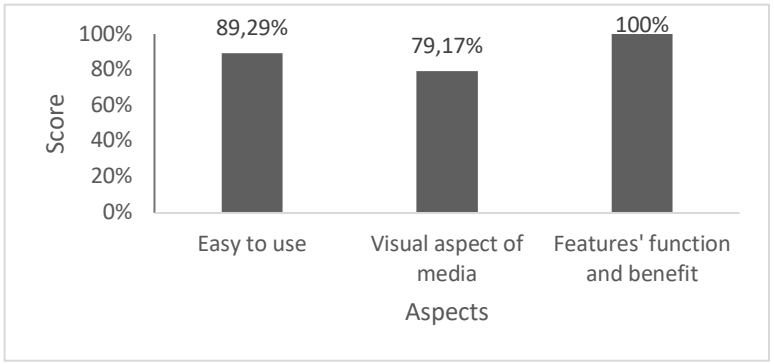
g


LEMBAR KERJA
Judul : Pembuatan Bakso
Tujuan :
Alat dan bahan :
Langkah Kerja :
MENU UTAMA
PAGE 48

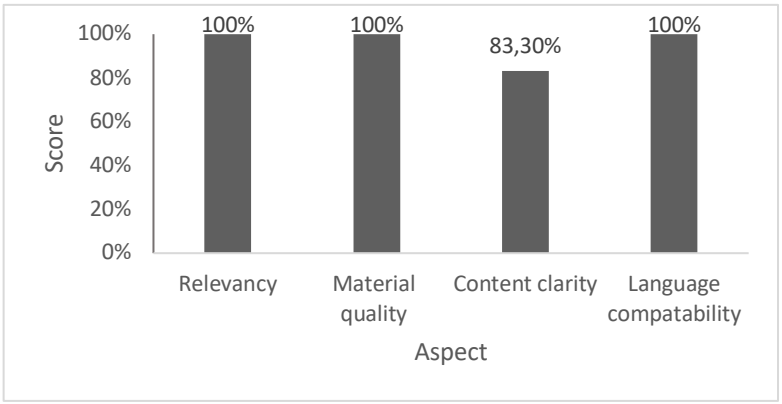
h


SOAL EVALUASI
Klik Gambar di Atas Untuk Memulai Mengerjakan Soal Evaluasi.
Selamat Mengerjakan!
MENU UTAMA
PAGE 51

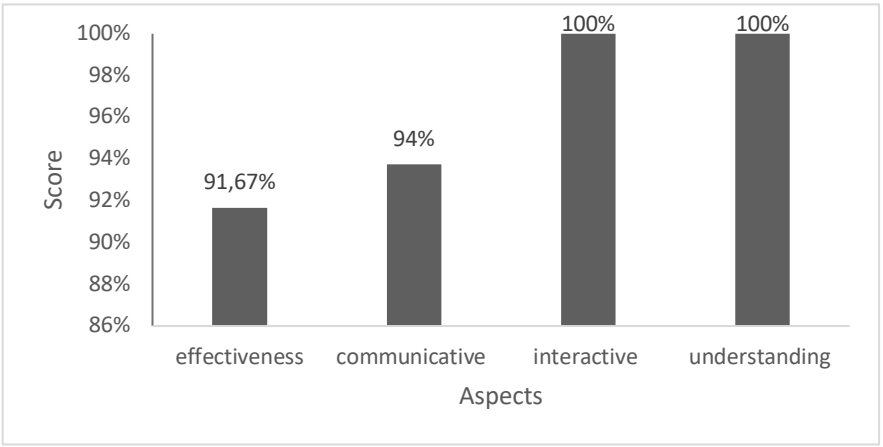
Figure 3. Features of flipped book-based e-module learning media contain (a) Cover Preview; (b) Menu Storyboard; (c) Instruction Storyboard (d) Map of concept; (e) Materials review; (f) Worksheet preview; (g) Evaluation



(a)



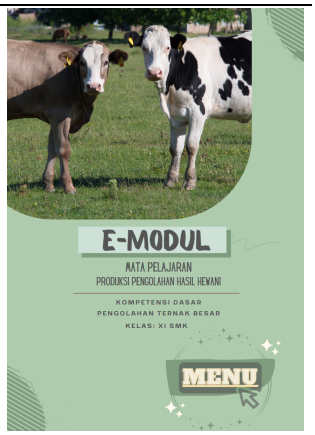
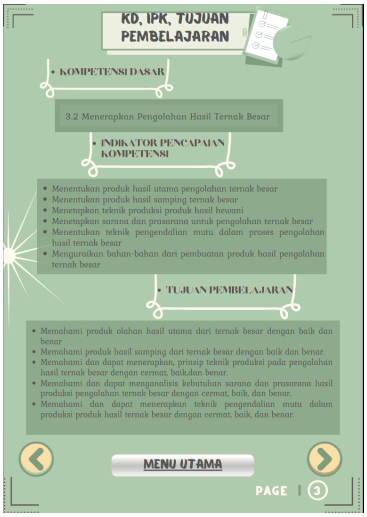
(b)



(c)

Figure 4. Validation of learning media based on (a) media features; (b) material content; (c) language

Table 2. Media Revised Based on Validation Result

No	Flipped-book Before Revision	Comment	Flipped-book After Revision
1		The front cover can be more interesting if the images did not pile up and inside the box.	
2		The menu button can be made with a lighter color to pointed Menu button.	
3		Distinguish the background of menu storyboard and the font color so the student easy to differentiate the menu	
4		Adjust the font lightness because the background was dark to create contrast.	

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No	Flipped-book Before Revision	Comment	Flipped-book After Revision
5		Give bright color on question box to avoid student confusion to click on the command to work on the question.	

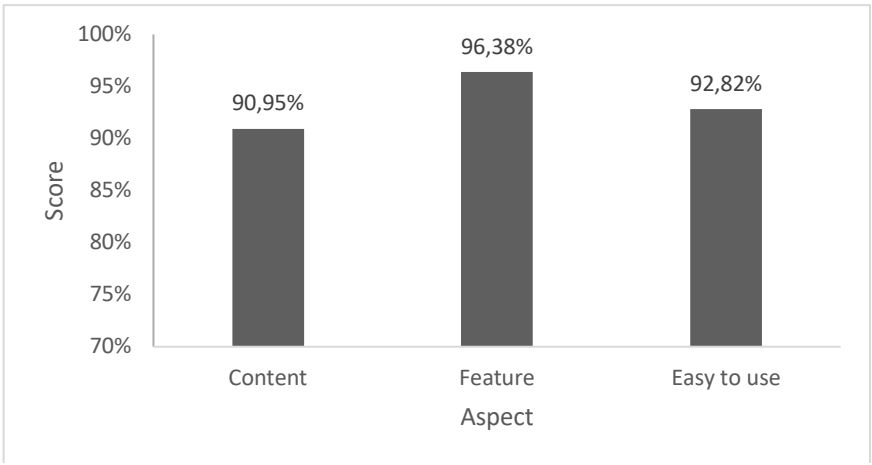

Figure 5. Students' Response to Revised Flipped-book-based E-Module