Interactive E-Book Development of Food Ingredients Cutting Methods for Vocational High School Culinary Arts Freshmen Using Flip PDF Corporate

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ABSTRACT

The output of this study is an interactive e-book created by using Flip PDF Corporate program with food ingredients cutting methods as the learning material for vocational high school culinary arts freshmen. This e-book will then be assessed for its feasibility by validators. This study used the Research and Development (R&D) method and ADDIE model to design and develop the learning material. The validation results of this e-book earned 93.1% from the learning material experts, 98.9% from media expert, and 91.67% from linguist. Small and large groups of culinary arts freshmen were evaluated after learning food ingredients cutting methods using this interactive e-book. The trial results of the small and large groups showed a percentage of 93.6% and 94% respectively. An increase in the large group trial result is due to the revision that had been conducted after the assessment of the small group trial.

Keywords: Interactive e-book, Flip PDF corporate, ADDIE, Food ingredients cutting methods.

1. INTRODUCTION

Education should be tailored according to technological advancement and globalization. One of the solutions is by conducting a learning system using e-learning. E-learning is a learning media that utilizes technologies such as devices and/or the internet [1]. The use of e-learning has the advantage of its practicality as it is more convenient and accessible at any time and in various places so students can easily learn independently. According to Al-Fraihat's research, e-learning had been evaluated to be an effective learning method, and thus warrants development [2].

The pandemic had a profound impact on the educational system as schools had to shift from face-to-face learning to online learning. Various media have been used to aid interactions between students and teachers such as Zoom, Google Meet, Google Classroom, Microsoft Teams, etc. Thus e-learning has been one of the vital learning methods as students are able to continue studying effectively and independently. As e-learning continues to be utilized in the education system, it is only necessary that learning materials should be developed and designed into a media that features interactive technology and convenient access for students. Teachers can establish learning materials in a form of a book which

is customized following students' characteristics and needs. The book can be developed in the form of an electronic book or commonly known as an e-book, which provides more interactive features to further motivate students to learn. The e-book that will then be developed is intended to be equipped with video, audio, and quiz in addition to text and pictures. This aligns with Al-Fraihat's study which states that e-learning is a resource of information that includes instructional material by means of audio, video, and text provided online [2]. There are various applications available that allow users to design their own e-book.

Flip PDF Corporate is a software designed to convert pdf files into flipbook and further facilitates users to add media such as videos, pictures, graphics, and animations. Flipbook created using Flip PDF Corporate is an html file format hence can be conveniently accessed through various electronic devices such as mobile phones, tablets, and PC regardless of the operating system used, whether it is Android, iOS, or Windows. Thus, flipbook can perform as an interactive source of e-learning material as online learning has now commonly implemented in schools. Interactive digital learning material development using Flip PDF Corporate has been considered superior to increase students' cognitive skills [3]. E-learning material created by Flip PDF Corporate

also has its own merits such as compelling display and conveniently accessible learning videos and interactive quizzes [4].

Ingredients Cutting Method is one of the basic learning materials which is included in Basic Culinary course in K.D 3.3: Implementing Food Ingredients Cutting. This material is taught to the freshmen in their first semester as it is a fundamental knowledge for the students to be able to carry out their next learning courses in food processing. This material is also a practice material in which students learn various methods of cutting.

E-book developed in this study includes 6 units of learning activities. Learning activity unit I provides the description or the outline of the e-book, the prerequisites of the e-book and user guide for both students and teachers. Learning activity unit II of the e-book discusses vegetable and potato cuts including its definition, functions, types, tools used, characteristics, cutting methods, its application in a dish and evaluation. Furthermore, learning activity unit III, IV, and V contain the same context as the learning activity unit II, except that the food ingredients discussed will differ for each unit. Learning activity unit VI consisted of evaluation questions for students as the conclusion to food ingredients cutting method learning material.

The purpose of this study is to develop an interactive e-book for food ingredients cutting methods learning material using Flip PDF Corporate that is targeted to be used for Basic Culinary course for vocational high school culinary arts freshmen. This study also aimed to analyse the feasibility of the e-book and students' response after learning food ingredients cutting methods using the e-book.

2. METHODS

This study used the research and development (R&D) method and ADDIE model is utilized as the development design guide. Referring to Sugiyono's study, a study that aims to create a new product and assess its effectivity is considered as a study with R&D as its study method [5]. ADDIE model used in research and development has systematic frameworks and can be modified and adjusted with researchers' desired steps [6].

The validation step is divided into learning material validation, media validation, and language validation. Learning material was validated by two experts: one basic culinary course lecturer and one basic culinary course teacher. Media validation was conducted by an educational technology lecturer and language validation was conducted by a lecturer from Indonesian literature. In this study, trials were carried out twice to the culinary arts freshmen of SMKN 3 Jember. First trial is a small group trial with 9 students as the subject (15% of population) which were selected using simple random

sampling conducted by the teachers. The next trial is a large group trial which used all of 56 culinary arts freshmen of SMKN 3 Jember as trial subject.
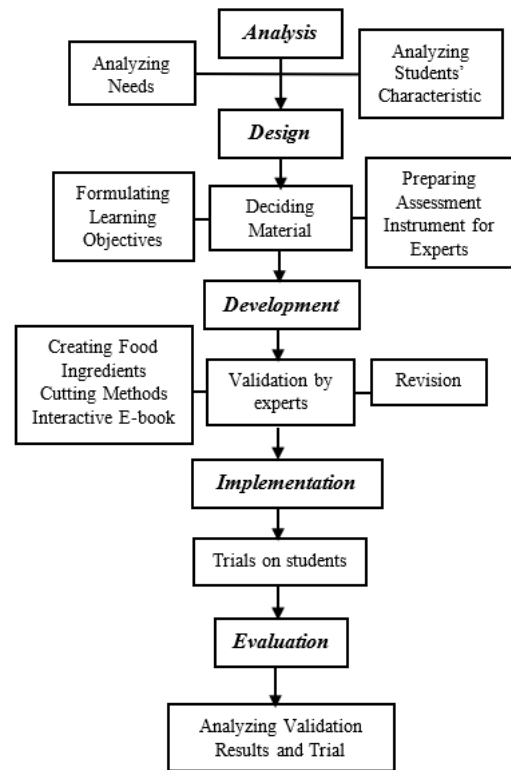

Figure 1 Food Ingredients Cutting Methods interactive e-book development procedure, in reference to Rusdi [3] and modified by researcher

This research and development study used quantitative and qualitative data. Results collected from experts' validation assessment sheets and students' response questionnaire forms are the quantitative data. Qualitative data are compiled from comments, criticism, and suggestions from validators which furthermore will be taken into consideration during the e-book revision process.

Data analysis in this study used quantitative data analysis technique and qualitative descriptive technique. Likert scale is utilized in this study for scoring and further calculated into percentages. Accumulated data were processed using the equations below which refer to Sudjana's theory [7].

Data per item

$$P = \frac{x}{x_i} \times 100\%$$

(1)

Overall data

$$P = \frac{\sum x}{\sum x_i} \times 100\%$$

(2)

P   = result percentage
x = respondent answer in a question
x_i = ideal answer in a question
$\sum x$ = total number of respondent's answers
$\sum x_i$ = total number of ideal answers

Analysed data resulted in percentages which then will be used to determine the feasibility of the data using criteria according to Sudjana that is included in Table 1 below [7].

Table 1. Feasibility level criteria.

Percentage	Feasibility Level	Score
80% - 100%	Feasible	No revision
60% - 79%	Feasible enough	No revision
50% - 59%	Not feasible enough	Revision needed
< 49%	Not feasible	Revision needed

3. RESULT

The product of this research and development study is an interactive e-book of food ingredients cutting methods that was created by using Flip PDF Corporate. The final form of the e-book is a link which then will be distributed to the students. The link can be accessed using mobile phones and laptops that are connected to the internet. This interactive e-book is equipped with pictures, audio, tutorial videos, and interactive quizzes that are linked to Google Form links.

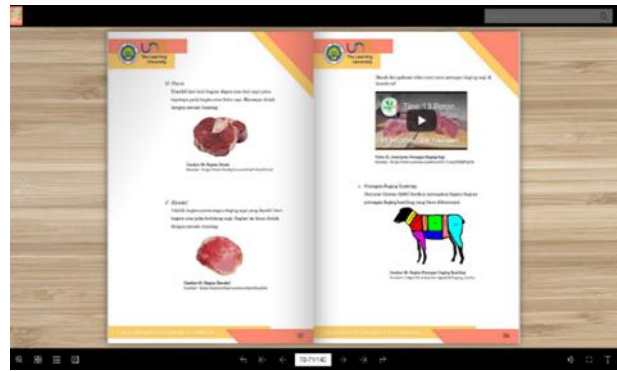**Figure 2** Cover page of Food Ingredients Cutting Methods interactive e-book.

Figure 3 Display of meat cutting methods learning material from Food Ingredients Cutting Methods interactive e-book.

3.1. *Experts' Validation Data Analysis*

Validation by the learning material experts, the media expert, and the linguist earned validation results as shown in the table below.

Table 2. Result of experts' validation data analysis.

No	Validator	Score		%	Feasibility
		x	x_i		
1	Learning material experts	164	176	93.1	Feasible/No revision
2	Media expert	91	92	98.9	Feasible/No revision
3	Linguist	55	60	91.67	Feasible/No revision
Overall analysis		310	328	94.5	Feasible/No revision

Validation aspects of learning material consisted of preface, e-book context, learning aspect, and learning tasks or evaluation. Overall score of learning material validation obtained a result of 164 out of 176 or 93.1%. Validation aspects of the media used in the e-book consisted of display aspect and learning aspect. Media validation obtained overall score of 91 out of 92 or 98.9%. Language validation obtained total score of 55 out of 60 or 91.67%. Based on overall analysis of expert validation results, Food Ingredients Cutting Methods interactive e-book earned 310 out of 328 or 94.5%. Thus, this e-book is considered feasible to be used as a learning media.

3.2. *Trial Results Data Analysis*

The trial of the e-book was conducted twice, which in this study referred as small and large group trials. Assessment aspects that were implemented in the form of

questionnaires for the students consisted of learning aspect, display aspect, and feedback aspect.

The overall analysis of the small group trial obtained a result of 674 out of 720 or 93.6% hence Food Ingredients Cutting Methods e-book is determined as feasible. On a large group trial, students' responses obtained an overall score of 4213 out of 4480 or 94% which also proved the feasibility of this e-book.

Table 3. Small group trial data analysis.

No	Aspects	Score		%	Feasibility
		x	x_i		
1	Learning	270	288	93.7	Feasible/No revision
2	Display	335	360	93	Feasible/No revision
3	Feedback	69	72	95.8	Feasible/No revision
Overall analysis		674	720	93.6	Feasible/No revision

Table 4. Large group trial data analysis.

No	Aspects	Score		%	Feasibility
		x	x_i		
1	Learning	1692	1792	94.4	Feasible/No revision
2	Display	2099	2240	93.7	Feasible/No revision
3	Feedback	422	448	94.2	Feasible/No revision
Overall analysis		4213	4480	94	Feasible/No revision

4. DISCUSSION

The ultimate product of this research is an interactive e-book on Food Ingredients Cutting Methods as the learning subject. A product is considered interactive when the said product is equipped with audio, video, picture, and text [8]. Audio included in this interactive e-book serves as a guide to pronouncing the technical terms in food ingredients cutting methods. Therefore, students will be able to use the correct pronunciation of terms used in food ingredients cutting methods as it is important to avoid misinterpretation. This is relevant to Setyowati's study where mispronunciation is more likely to lead into misinterpretation [9]. Food Ingredients Cutting Method interactive e-book also utilized pictures to improve learning experience, for example pictures of food ingredients, various tools for cutting, and types of vegetables, meat, poultry, and fish cutting. The use of pictures in learning plays a role in students' ability to get

an overview take of the learning material and further clarify students' understanding of the learning subject [10]. Videos in this interactive e-book were arranged in a form of tutorial video of cutting methods for vegetables, meat, poultry, and fish. The purpose of equipping interactive e-book with videos is to enhance students' practical skills. Video as a learning media gives a realistic model hence students will be able to actively participate in the learning process [11].

Validation of learning material was established to measure the accuracy and the quality of material inside of the interactive e-book [12]. Learning material validation consists of four aspects. The first aspect is the preface of the e-book. Research's result in this aspect has shown that students understand how to use Food Ingredients Cutting Methods interactive e-book. Learning objectives and concept maps provided inside the e-book are also considered clear and understandable. Learning objectives and concept maps are compiled with the intention to figure out which learning competence should be achieved and to perform as a fundamental stance to determine the scope of the learning material [13]. The second aspect is the context of the e-book. Referring to the validation results, the learning material in this interactive e-book is coherent with the concept maps. This further supports the feasibility of the e-book.

The third aspect of learning material validation is the learning aspect. The validation and trial results have proven that the learning material fits with the students' knowledge level. Each title and learning objective is also appropriate with the learning material. Pictures, audio, and videos addition also made the e-book more appealing, and students found it helpful in comprehending food ingredients cutting methods. This is in accordance with Purnianingsih's study which states that the utilization of audio and visual media in the learning process increase students' comprehension of the learning material [14]. The last aspect of learning material validation consisted of learning tasks, formative tests, and evaluations where all of them are linked to Google Form links. All questions in this evaluation aspect are also proved to be following students' characteristics and learning material. All the work instructions for learning tasks, tests, and evaluations are also clear and understandable. This aligns with the Ministry of Education and Culture's guide where the principle of writing questions is that the questions must within the discussed learning indicator [15].

Learning material validation results conclude that Food Ingredients Cutting Methods interactive e-book has been proven to be feasible and qualified to be implemented in the learning process. In the long run, the learning material experts had suggested that it would be better if all videos are made by the e-book developers

themselves as several videos still refer from another sources.

Media validation was conducted to measure the feasibility of the Food Ingredients Cutting Methods interactive e-book from the perspective of the media used. This validation consisted of the display aspect and the learning aspect. The display aspect itself measures the feasibility of the e-book by assessing: the font colors, types, and sizes chosen, the clarity and accessibility of the multimedia, background, cover, and navigation buttons design. Pictures, videos, color proportion, and background choice of this e-book are considered compelling by the media expert. Font type and size used in the e-book are also regarded as appropriate and the accessibility of the e-book is convenient as it is equipped with navigation buttons. These follow Alshaya and Oyaid's statement that the vital aspect in an e-book development is a simple book design with appropriate font type, color, and size, and equipped with navigation buttons [16]. The learning aspect of the media validation is used to evaluate this e-book's feasibility from a learning perspective. The conclusion that can be drawn from validation results by the media expert is that this interactive e-book has been assessed to be feasible and qualified to be implemented.

Every instruction and information in a teaching module needs to be helpful and easy to use by its users, including users' convenience in responding and accessing the module as desired. The utilization of simple language, easy to understand, and using commonly used terms are the characteristics of a user-friendly module [17]. In this study, the use of language was validated by the linguist to evaluate whether the language used in the Food Ingredients Cutting Methods interactive e-book is appropriate and follow the writing principles. The language validation results showed that this e-book is feasible and qualified to be implemented. The language in this interactive e-book used standard Indonesian and implemented the appropriate EYD. The e-book also implements various language expression which is considered to be very communicative thus avoids the rigidity of the text. The language used in the interactive e-book of Food Ingredients Cutting Methods is found to be easy to understand and can motivate and encourage students to think critically. Therefore, it can be concluded that this e-book is considered as user-friendly. Changes in some of the inappropriate use of words had been made as an improvement based on the language validation results.

Small group trial is conducted to gather information on the product's weaknesses so that when the large group trial is conducted there won't be any problem occurred [5]. Food Ingredients Cutting Methods interactive e-book goes under feasible criteria after the result from the small group trial had been assessed. Students had shown their enthusiasm and interest in using this interactive e-book during the trial because of the appealing display and various features such as audio and videos inside the e-book. This interactive e-book was perceived as interesting and helpful by the students as a learning source for food ingredients cutting methods. However, some students faced some difficulty jumping into another page and accessing the formative tests during the small group trial. Therefore, adjustments and corrections had been made, such as changing the Google Form links for the formative tests and guiding students in using the navigation buttons, before the large group trial was conducted.

Large group trial was established to proof that the developed product is feasible to use [5]. The large group trial was conducted after some improvements and revisions had been done. In the large group trial, the students' responses showed that the interactive e-book is considered feasible. The students were not showing any signs of difficulties in accessing and using the e-book during the large group trial. They were also able to easily comprehend learning material in the e-book and they did not have any difficulties with the language used. However, some students had suggested that the offline version of the Food Ingredients Cutting Methods interactive e-book needs to be made so that students can easily access it even when there is no internet available.

5. CONCLUSION

An interactive e-book of Food Ingredients Cutting Methods learning material for culinary arts freshmen in vocational high school students is the product of this study and can be accessed in a form of a link. This interactive e-book is completed with text, pictures, audio, and videos. This e-book also consisted of six learning activity units: a) Learning activity unit I E-book Description, b) Learning activity unit II Vegetables Cutting, c) Learning activity unit III Meat Cutting, d) Learning activity unit IV Poultry Cutting, e) Learning activity unit V Fish Cutting, and f) Learning activity unit VI Evaluation.

Food Ingredients Cutting Methods interactive e-book had been proven feasible and qualified to be implemented as a learning source as it had been validated by the learning material experts, the media expert, and the linguist. Validation results from the learning material experts, the media expert and the linguist earned a percentage of 93.1%, 98.9%, and 91.67% respectively. These show that this interactive e-book falls within the feasible criteria with no revision needed.

Small and large group trials were conducted to analyse the students' response after learning Food Ingredients Cutting Methods using this interactive e-

book, which resulted in a percentage of 93.6% and 94% respectively. An increase in the large group trial result is due to the revision and improvement of the e-book after the result of the small group trial was assessed.

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