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Development of Teaching Materials for Food Processing Assisted by Heyzine Flipbook Application in Junior High School

Hasna Alifia Nazryati, Mirna Purnama Ningsih, Neni Rohaeni*

Universitas Pendidikan Indonesia, Bandung, Indonesia

*Correspondence: E-mail: hasnaalifiaa@upi.edu

ABSTRACT

This research is motivated by the need to develop teaching materials with the help of technology, because the teaching materials used are text-dominant textbooks and worksheets and cannot explain the theory being studied. This study aims to develop teaching materials for food processing assisted by the Heyzine Flipbook application in Junior High School. In addition, this study also aims to determine the feasibility of teaching materials by experts and responses from students to teaching materials that have been developed. This research uses analytical descriptive method and R&D (research and development) approach. The development model used in this research is the ADDIE model (Analysis, Development, Design, Implementation and Evaluation). The validation results from both media and material experts show that the teaching materials developed are very suitable for use. This study involved 38 students in the implementation process and the response from students stated that the teaching materials used were very practical. Overall the results showed that the teaching materials developed were very feasible to use in the learning process.

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1. INTRODUCTION

Education is very important in ensuring the survival of the nation and state, because education can improve and develop the quality of human resources. Education is also a supporting factor in development and competition in various fields. So, the success of education also automatically brings the success of a nation and the failure of education has an impact on the failure of a nation (Atiyah *et al.,* 2019). As stated in the National Education System Law No. 20 of 2003, it is written that the education path consists of formal, non-formal and informal education which can complement and enrich knowledge. Formal education is a structured and tiered education path consisting of basic education, secondary education and higher education. Article 17 of the National Education System Law states that basic education consists of primary schools (SD) and madrasah ibtidaiyah or equivalent, as well as junior high schools (SMP) and madrasah tsanawiyah or other equivalent forms.

Junior high school is a formal education level that implements the 2013 curriculum and the independent curriculum. One of the compulsory subjects in the 2013 curriculum is Workshop Subjects. Workshop is a subject that invites students to produce work or handwork through training guided by the Workshop teacher. This subject is implemented with a time duration of 2 x 40 minutes or 80 minutes per week. It consists of four aspects or scopes studied, namely Crafts, Engineering, Cultivation and Processing which aim to increase students' knowledge and skills through products produced during learning by utilizing the potential of natural resources in the surrounding environment. In the processing aspect, students learn various kinds of food processing, types, characteristics, processing and packaging techniques. In class VIII Even Semester Workshop Subjects, students will learn material about Processing Semi-finished Foodstuffs from Cereals, Tubers and Nuts into Local Regional Specialties.

Preliminary studies conducted through interviews with one of the 8th grade Workshop subject teachers at SMPN 3 Lembang obtained information that the processing theory learning activities carried out by the teacher used teaching materials only textbooks and Worksheets which were more dominant in reading text, less equipped with pictures, could not display sound and video that could complement the explanation of the theory being studied. Meanwhile, the time available to deliver theoretical material is approximately only one hour and the theoretical material that students must understand is quite a lot. So that students are less interested in learning the theory material independently.

Along with the development of Science and Technology (IPTEK), educators or teachers are required to be able to develop teaching materials appropriately (Mukarromah *et al.,* 2021). Based on this, to support a more effective and efficient learning process, teachers need to take advantage of the development of digital technology by developing innovative and interactive teaching materials that facilitate learning for both teachers and students. The use of multimedia technology provides an opportunity for teachers to be able to develop digital teaching materials so as to produce an effective and efficient learning tool. If the teacher is not innovative in facilitating the learning process, it will affect the learning outcomes of students (Dwiqi *et al.,* 2020). Not only that, interesting teaching materials can overcome boredom and motivate students in the learning process (Sari & Ahmad, 2021).

Teaching materials are learning resources that are systematically arranged for teachers to use in the learning process, teaching materials as learning support to make it easier for teachers to provide an understanding of the material that must be mastered by students (Martatiyana *et al.,* 2022). In addition, the use of interesting teaching materials can make students better understand the material provided. One application that can be used in making

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teaching materials and is expected to create an effective and efficient learning process is Heyzine Flipbook.

Teaching materials with the help of the Heyzine Flipbook application are a tool or means that functions as an additional teaching suber to make it easier for students to understand the subject matter apart from the package book, teaching materials assisted by the Heyzine Flipbook application can also facilitate and motivate students to read books anywhere and anytime. Flipbook selection is suitable for complementing existing package books, because flipbooks have several advantages, namely that they can present learning material in the form of words, sentences and images, can be equipped with colors so that they attract the attention of students, are easy to make, can be carried everywhere, and can increase students' learning activities, Susilana and Cahyani (in Prisila *et al.,* 2021). The use of these teaching materials is expected to have a positive impact during the learning process in the classroom. Research related to the development of digital-based teaching materials using the Heyzine Flipbook application has been conducted by Ramadhani *et al.* (2023) with the result that this digital-based teaching material is valid and feasible to use. Other similar research has been conducted by Manzil *et al.,* (2022) with the result that the development of Heyzine Flipbook interactive E-Modules is valid and feasible to use.

Based on the problems that have been stated that researchers are interested in developing teaching materials assisted by the Heyzine Flipbook application that are valid and feasible for use in processing semi-finished food ingredients from cereals, tubers and nuts into special foods of the local region. The material is the subject matter of class VIII Junior High School even semester. The purpose of this study is to make it easier for students to understand the theoretical material and increase the motivation of students in the learning process by compiling a study entitled Teaching Material Development for Food Processing with the help of the Heyzine Flipbook Application in Junior High School. It is hoped that this research can help students understand the theory and help teachers in the learning process.

2. METHODS

The research method used to develop teaching materials for food processing assisted by the Heyzine Flipbook application is an analytical descriptive method and an R&D (research and development) approach. The development model used in this research is the ADDIE model (Analysis, Development, Design, Implementation and Evaluation).

In the analysis stage, interviews were conducted with workshop teachers to obtain the data needed to develop teaching materials. What needs to be analyzed is the analysis of needs and the curriculum applied to proceed to the design stage.

The design stage is carried out by reviewing the syllabus, compiling materials, making storyboards that will be used in the development stage. The syllabus and materials used are in accordance with the applicable curriculum in Junior High School. Then transfer the material design to the graphic design of teaching materials. Then make a validation instrument which is then consulted with the supervisor to do the follow-up that will be done.

The next stage of developing teaching materials is developing teaching materials that have been designed into the Heyzine Flipbook application. The next stage is the validation of teaching materials for food processing assisted by the Heyzine Flipbook application to material expert validators and media experts to determine the level of feasibility. Validators provide assessments, suggestions, and comments that are used as a reference for revising

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teaching materials to improve so that the teaching materials developed become suitable for use in terms of material and appearance.

The implementation stage is to run the teaching materials that have been designed previously to find out the product is ready to use. Implementation is carried out on a limited basis at the selected research site. At this stage, researchers try out products that have been validated by material experts and media experts.

The last stage of the ADDIE development model is evaluation. At this stage, an analysis of the quality of the feasibility and practicality of the developed teaching materials is carried out, which is reviewed from the response sheets distributed to students after the implementation is carried out. The results of the data obtained from students are used to evaluate. Data analysis techniques in quantitative analysis are descriptive of the percentage of research results. Quantitative data obtained from media validation, material validation, and assessment of students on development products. The data obtained is converted into a percentage to determine the feasibility of the product using the formula.

The steps for analyzing data on the feasibility of teaching materials for food processing assisted by the Heyzine Flipbook application are as follows:

3.1. Processing expert judgment validation data using a measurement scale as in Table 1.

Table 1. Likert Scale

Criteria	Score
Very Good (A)	5
Good (B)	4
Fair (C)	3
Poor (D)	2
Very Poor (E)	1

3.2. Processing response data from students with a measurement scale as in Table 2.

Table 2. Guttman Scale

Criteria	Score
Yes/Agree	1
No/Disagree	0

3.3. Alculating the formula

The results of expert judgment validation and learner responses are processed the following formula.

$$\text{Percentage: } \frac{\text{Score obtained}}{\text{Maximun score}} \times 100\%$$

3.4. Qualitatively interpret the overall value in the form of a percentage

The results obtained aim to determine the feasibility of teaching materials developed can be seen in **Table 3**.

Table 3. Teaching Material Feasibility Criteria

Eligibility Criteria	Classification

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0% -20%	Not feasible
21% - 40%	Less feasible
41% - 60%	Feasible
61% - 80%	Feasible
81% - 100%	Very feasible

3. RESULTS AND DISCUSSION

The research conducted aims to produce products in the form of teaching materials for food processing assisted by the heyzine flipbook application in Junior High School. The results in this study are data obtained through several stages of data collection. The teaching material development process uses the ADDIE development model as the research stages, namely Analysis, Design, Development, Implementation, and Evaluation. The results and discussion of all stages are as follows.

3.1. Analysis Stages

The planning of this teaching material is based on a needs analysis conducted through interviews with 8th-grade craft teachers at SMPN 3 Lembang. The analysis revealed that current instructional resources are limited to textbooks and teacher-provided worksheets. These printed materials are largely text-heavy and lack sufficient visual aids or illustrative examples, despite the significant amount of theoretical knowledge required—particularly in the area of food processing. As a result, these materials have not effectively supported students' learning needs. Teachers expressed the need for more structured and directed teaching materials that can assist both educators and students in mastering content, especially regarding the processing of semi-finished food ingredients from cereals, legumes, and tubers into local specialty foods. As emphasized by Darling-Hammond et al. (2020), integrated and visually rich learning materials play a critical role in promoting students' engagement and conceptual understanding.

3.2. Design Stage

The design stage is a follow-up to the needs analysis. Activities at this stage include reviewing the syllabus, compiling material, making storyboards and validation instruments. Reviews the syllabus to be used in accordance with the curriculum used, namely the 2013 Curriculum. Furthermore, the contents of the teaching materials for food processing assisted by the Heyzine Flipbook application which include Basic Competencies and Learning Outcome Indicators will be a reference for researchers to compile materials.

Learning materials for processing semi-finished food ingredients from cereals, nuts and tubers into typical local food are analyzed from various sources. At the stage of collecting sources, researchers conducted a search for books on processing semi-finished food ingredients from cereals, nuts and tubers into special foods of the local region as well as reviewing literature and looking for suitable images and videos to support the results of teaching material products for food processing assisted by the Heyzine Flipbook application.

The next design stage is to design the teaching materials to be used and their components in the form of storyboards. The teaching material design is made using the canva application with A4 sized paper and then transferred to the heyzine flipbook application. The storyboard

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of teaching materials for food processing assisted by the heyzine flipbook application refers to Adabia (2022) which has been modified and can be seen at

The validation sheet consists of validation of learning media experts, material experts and student responses. The validation sheet for the development of teaching materials for food processing assisted by the Heyzine Flipbook application uses a Likert scale assessment with a 1-5 measurement scale as in and the learner response sheet uses a Guttman scale. The design of the instrument is carried out referring to the validation sheet that has been used by Prima *et al*. (2020) with modifications as needed.

3.3. Stages of Development (Development)

3.3.1. Teaching Material Development

At this stage, teaching materials are developed based on the reference storyboard that has been previously compiled. The process of developing teaching materials can be seen in **Figure 1.**

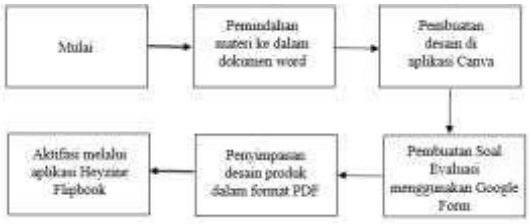

Figure 1. Teaching material development process

The material that has been prepared in a word document is then processed in the form of graphic design using the Canva application with a design that is tailored to the characteristics of junior high school students. The process of making teaching material designs on the Canva application can be seen in **Figure 2.**

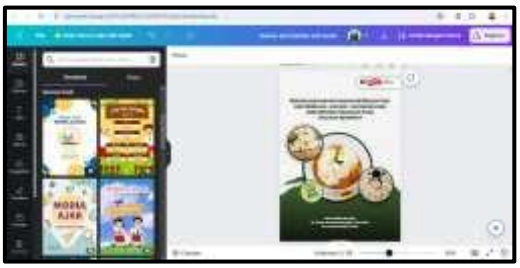

Figure 2. Teaching material design process

The process of making forms for student evaluation questions in the **Figure 3**. The use of Google Form is done to make it easier for teachers to process student evaluation results. The Google Form access link will be embedded into the teaching materials that have been made.

Figure 3. Creating evaluation questions on google from

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The process of developing teaching materials that have been carried out through the Canva and Google Form applications, continued by using the Heyzine Flipbook application to make teaching materials more attractive and interactive. The display of the process of developing teaching materials for food processing assisted by the Heyzine Flipbook application can be seen in **Figure 4.**

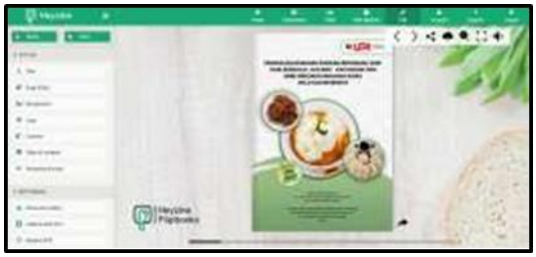

Figure 4. Display of Teaching Materials on the Heyzine Flipbook Application

3.3.2. Expert Assessment Validation

Expert assessment validation is carried out to assess the feasibility of teaching materials developed so that they can be implemented to students in junior high schools. Validation of teaching materials is carried out by media experts and material experts.

Teaching materials were validated by two media experts, who became media expert validators in the development of teaching materials for food processing assisted by the Heyzine Flipbook application, namely Dr. Mirna Purnama Ningsih, S.Pd., M.Pd. as Lecturer in ICT Literacy and PKK Learning Media Courses and Agus Juhana, S.Pd., M.T. is a Lecturer in the Multimedia Education Study Program at the University of Education Indonesia. Aspects that become media assessments include display aspects and learning aspects. Data on the results of the media expert assessment can be seen in **Table 4.**

Table 4. Media Expert Validator Assessment Results

Media Expert Validators	Score	Score Maximum
V1	70	75
V2	69	75
Interpretation (100%)	93	92
Average	92,5%	
Category	Very feasible	

Based on **Table 4**, the data recap and analysis of the media expert's assessment of food processing teaching materials assisted by the Heyzine Flipbook application can be described. From the assessment of media experts 1, an average percentage of 93% was obtained. As for the assessment of media experts 2 obtained an average percentage of 92%. Overall, the media expert assessment obtained a percentage of 92.65% which was included in the “very feasible” category. However, there are suggestions and comments for the display aspect, especially on the color selection of the cover, the color of the writing on the cover, institutional identity, margin adjustment, and frame selection on the image. The learning aspect shows the maximum score, which means that teaching materials can facilitate

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students in learning, especially in terms of clarity of use, ease of understanding the material, language, and operation of teaching materials. The results of validation by material experts show the highest score with a very feasible category.

The material experts who are validators of teaching materials for food processing assisted by the Heyzine Flipbook application are Dra. Atat Siti Nurani, M.Si. who is a Lecturer in the Cosmetology Education Study Program and Dra. Wiwi Dewi who is a Workshop Subject Teacher at SMPN 3 Lembang. Aspects that become material assessment include aspects of content standards, material aspects, language aspects, and learning aspects.

Table 5. Material Expert Validation Results

Material Expert Validator	Score	Maximum Score
V1	82	85
V2	85	85
Interpretation (100%)	96	100
Average	98%	
Category	Very feasible	

Based on **Table 5**, it can be described that from the assessment of teaching materials for food processing assisted by the Heyzine Flipbook application from material expert 1, a percentage of 96 was obtained. The assessment of material expert 2 obtained a percentage of 100%. From the assessment of material expert 2, it indicates that the material is packaged completely and clearly. Overall, the material expert's assessment obtained a percentage of 98.25% which was included in the very feasible category. Nevertheless, there were several comments and suggestions from material expert 1 related to the teaching materials that had been developed by researchers. However, there are suggestions and comments from material experts 1, namely on the aspect of content standards, namely regarding the correctness of the content, the material aspect, namely the orderliness of the delivery of the content of the material and the examples given to clarify the material, the examples should be expanded and the example images adjusted to the discussion. While validation by material expert 2 resulted in the highest score, this indicates that the teaching materials are very clear and complete because they are in accordance with the predetermined learning objectives. After the validation test assessment by media experts and material experts, teaching materials for food processing assisted by the Heyzine Flipbook application are included in the category very feasible to be implemented to students in junior high school.

3.4. Implementation Stage

The implementation stage of the developed teaching materials is carried out after being declared feasible by the validator. Researchers carried out the implementation by conducting a trial of teaching materials to students of SMP Negeri 3 Lembang on May 3, 2024 with 38 participants in class VIII H. The teacher became a companion when researchers implemented teaching materials. Before the implementation is carried out. Researchers provide links or instructions for use to access teaching materials to students one day before the implementation is carried out through the Whatsapp group. It is intended that students can learn in advance the theoretical material that will be studied at the implementation meeting.

3.5. Evaluation Stage (evaluation)

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The evaluation stage is carried out after the implementation is complete. Researchers distributed student response sheets with the aim of knowing the level of feasibility of teaching materials after completion of implementation. Student responses obtained a percentage with an average of 98.68% with that the teaching materials for food processing assisted by the Heyzine Flipbook application made are very feasible to use. However, there are some comments and suggestions from students.

There are several suggestions and comments from users, the need to summarize some of the material again and there are some users who have difficulty in accessing teaching materials for food processing assisted by the Heyzine Flipbook application because the internet signal they use is not good. Feedback and suggestions become evaluation material for the continued development of teaching materials for food processing assisted by the Heyzine Flipbook application in order to meet the needs for further development to improve the quality in the learning process by using teaching materials for food processing assisted by the Heyzine Flipbook application in Junior High School.

4. CONCLUSION

The conclusions obtained from the results of a study entitled Development of Food Processing Teaching Materials Aided by the Heyzine Flipbook Application in Junior High School are as follows.

(i) The needs analysis that has been carried out through interview activities obtained information that the processing theory learning activities carried out by the teacher use teaching materials only textbooks and Worksheets which are more dominant in reading text and cannot display sound and video that can complement the explanation of the theory being studied. Therefore, it is necessary to develop digital teaching materials on food processing materials assisted by the Heyzine Flipbook application so that learning becomes effective and efficient.

(ii) The design of teaching materials includes activities by reviewing the syllabus based on the applicable curriculum in Junior High School, compiling material based on several reference sources. The design of the material is then outlined in a storyboard framework and the creation of validation instruments that will be used in the development process.

(iii) Development is carried out by preparing teaching materials that have been designed in the Heyzine Flipbook application. The process of validation of teaching materials by experts with aspects of appearance assessment, content standards, material, language and learning. The overall validation results state that the teaching materials for processing food ingredients assisted by the Heyzine Flipbook application are very feasible to be implemented in Parakaya subjects in Junior High School.

(iv) The implementation of teaching materials for food processing assisted by the Heyzine Flipbook application was carried out with large group trials in the Prakaya subject at SMP Negeri 3 Lembang.

(v) Evaluation is carried out through the distribution of response sheets filled out by students after using the teaching materials for food processing assisted by the Heyzine Flipbook application. Based on the response sheet, it was found that the teaching materials were very feasible to use for learning as an interactive learning resource.

AUTHORS' NOTE

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The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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