Multimedia for Culinary Students: Food and Beverage Processing Subject

Cokorda Istri Raka Marsiti[1*], I Wayan Santyasa[2], I Gede Wawan Sudatha[3], I Komang Sudarma[4] (iD)

[1] Fakultas Teknik dan Kejuruan, Universitas Pendidikan Ganesha, Singaraja, Indoensia
[2] Fakultas Matematika Ilmu Pengetahuan Alam, Universitas Pendidikan Ganesha, Singaraja, Indoensia
[3,4] Fakultas Ilmu Pendidikan, Universitas Pendidikan Ganesha, Singaraja, Indoensia

A R T I C L E   I N F O

A B S T R A K

Penggunaan media pembelajaran yang kurang bervariasi, bersifat monoton, dan masih bersifat satu arah. Tujuan dari penelitian ini mengembangkan multimedia pembelajaran pada elemen pengolahan makanan dan minuman sub elemen hidangan pembuka panas dan dingin (hot and cold appetizer). Jenis penelitian ini yaitu pengembangan. Model yang digunakan untuk pengembangan produk yaitu model ADDIE. Subjek penelitian ini terdiri dari 2 orang ahli isi pembelajaran, 2 orang ahli desain pembelajaran dan 2 ahli media pembelajaran. Subjek uji coba produk berjumlah 40 siswa kelas XII. Instrumen yang digunakan dalam penelitian ini berupa kuesioner. Teknik analisis data yang digunakan pada penelitian ini adalah teknik analisis deskriptif kualitatif, kuantitatif dan statistic inferensial. Hasil penelitian ini yaitu proses pengembangan multimedia pembelajaran pada elemen pengolahan makanan dan minuman sub elemen hidangan pembuka panas dan dingin mendapatkan kualifikasi sangat baik dari para ahli dan siswa, sehingga layak digunakan dalam pembelajaran. Penggunaan pembelajaran multimedia dapat membantu siswa memahami materi karena dilengkapi dengan contoh-contoh konkrit dalam berupa gambar dan video serta dapat menciptakan interaksi siswa dalam proses pembelajaran karena siswa dapat mengoperasikan dan menanggapi pertanyaan yang diberikan dalam multimedia pembelajaran interaktif ini, tidak hanya melihat dan mendengar.

A B S T R A C T

The use of learning media is less varied, monotonous, and still one-way. This study aims to develop multimedia on food and beverage processing elements and the sub-elements of hot and cold appetizers. This type of research is development. The model used for product development is the ADDIE model. The subjects of this study consisted of 2 learning content experts, 2 learning design experts, and 2 learning media experts. The product trial subjects totaled 40 students from class XII. The instrument used in this research is a questionnaire. The data analysis technique used in this study is descriptive qualitative, quantitative, and statistical inferential analysis techniques. The results of this study are that the process of developing learning multimedia in the elements of food and beverage processing, the sub-elements of hot and cold appetizers, obtains very good qualifications from experts and students so that they are suitable for use in learning. The use of multimedia learning can help students understand the material because it is equipped with concrete examples in the form of pictures and videos and can create student interaction in the learning process because students can operate and respond to questions given in this interactive learning multimedia, not just see and hear.
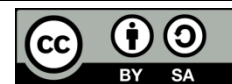
1. INTRODUCTION

The current learning process is demanded to be more flexible along with technology development in 21st century era. As a digital era, 21st century digitalizes the learning process by involving technology as a fundament role for conducting a learning process adaptable with the current situation itself (Carson, 2019; Hirschman & Wood, 2018; Sumardi et al., 2020; Yulianto et al., 2019). Technological advancements adjusted in education can improve the learning process quality leading students to competent graduates in globalization era (Hendawi & Nosair, 2020; Mutohhari et al., 2021; Rahim et al., 2020). Teachers are supposed to design the learning process with technology intervention which is flexible with the current situation for supporting students' professional development (Prasojo et al., 2020; Santos & Castro, 2021; Surayya & Asrobi, 2020). The programmed learning process is conducted efficiently and effectively relevant to technology and industrial

development in 21st century (Agustini et al., 2019; Aruan et al., 2019). Conducting a learning process with the involvement of technology relevant to the demand of this digital era or 21st century.

Undeniably, integrating technology as a sophisticated means in the learning process is perceived as a way for increasing the quality of learning and teaching process (Mutohhari et al., 2021; Piper et al., 2016). The increasing development of technology assists teachers in achieving learning objectives (Siripongdee et al., 2020; Tafonao, 2018). Technology can be used as a manifestation of various form learning elements in which those influence the learning quality leading students to achieve the learning process goals ((Citrohn & Svensson, 2020; Sulasteri et al., 2018). Teachers are able to combine technology as a learning component becoming innovative teaching and learning process for optimizing students in realizing their learning targets effectively (Putri & Rinawati, 2018; Sabrinatami, 2018). The achievement of learning objectives through the integration of technology is a way in improving the learning quality itself.

Functioning technological means as a learning media is one of innovative teaching and learning technique. An innovative learning media is important to present the learning materials as clear as possible to help students in comprehending the learning topic easily (Budiarto et al., 2020; Rejeki et al., 2020; Yusuf et al., 2018). An interesting learning media generates students' learning desire and interest including stimulating their learning motivation (F. F. Dewi & Handayani, 2021; Suprianto et al., 2019). The monotonous learning process can be transformed into a dynamic and effective learning process through the implementation of a well design learning media (Rekysika & Haryanto, 2019; Triyanto et al., 2013). Technology changes the use of traditional learning media for delivering the learning and creating fun learning activities improving students' interest in achieving the learning objectives ((Fatimah et al., 2019; Wang et al., 2020). It is important to combine technology as a learning media to provide a stimulating and interactive learning environment for students (Gilakjani, 2012; Nicolaou et al., 2019; Wungguli & Yahya, 2020).

However, not all of the teachers have integrated technology as a learning media for increasing the quality of their teaching and learning process. Other research show that a monotonous learning process is still becoming a problem in learning process where there is no an innovation conducted towards the learning models and media used in the learning process (Dwiqi et al., 2020; Pramana et al., 2020; Wulandari et al., 2020). Most of the learning process is conducted by using existing learning media in the form of books, boards, and display means due to teachers' lack competence in providing or creating technology-based learning media (Angga et al., 2020; Wulandari & Wiarta, 2022). It is relevant to the preliminary observation result conducted at SMKN 2 Singaraja. The learning process for the twelfth-grade students in culinary study program is still conducted through the use of traditional learning media such as; display and printed means. The teachers do not integrate technological means into the classroom particularly in food and beverage processing course. It can emerge a serious problem considering that the lack of concentrate learning media affects students' learning outcomes and enthusiast (Kristiyanto & Rahayu, 2020; Nanda et al., 2017; Nopiantari & Agung, 2021).

Culinary is one of majors in vocational high schools purposed to prepare its graduates to be professional resources. It is also defined as a vocational major that focuses on studying food and beverage processing whose goals for preparing students as competent, independent, and skilled graduated in this globalization era ((Muslimah & Rinawati, 2013; Prisila et al., 2021). The culinary students are declared as competent graduates if they have passed the competence examination related to their practicum and materials mastery (Wati et al., 2021). Briefly, culinary study program also deals with students' cognition and skills in which it can be achieved if the students can comprehend the learning materials well. Therefore, using learning media as a medium for presenting the learning materials in culinary study program is needed to improve students' understanding affecting their cognition and skills to be competent graduates (Ariani et al., 2014; Imany et al., 2019).

Multimedia is referred as learning instruction in the form of words and pictures through the use technology-based for promoting the learning process in which it can be added with audio, or video, as sensory modalities (F. Y. Kurniawan et al., 2020; Pravitasari & Yulianto, 2018; Septiana et al., 2022). Multimedia can be viewed as a reinforcement response used as a system of practice or information acquisition for the students to construct knowledge (Khamparia & Pandey, 2017; Khamzawi & Wiyono, 2015). Other research develop interactive multimedia for teaching vocational students in cooling system course (Amirudin & Setuju, 2018). It shows that the developed multimedia is feasible to improve students' understanding. Other research also develop multimedia as a learning media for teaching university students who took culinary course (Aruan et al, 2019).

It reveals that the multimedia achieved as a good qualification media for improving students' learning outcomes (Antal et al., 2017; Samat & Aziz, 2020). Those studies provide an overview related to the effectiveness and needs for developing multimedia to support the learning process particularly for the culinary students in vocational high schools. In addition, the previous studies focus on the development of multimedia in higher education levels and not specifically discussed the multimedia developed for culinary students in vocational high school. Therefore, this study is conducted to develop multimedia for culinary students. The developed multimedia in this study is proposed for the teaching and learning process in food and beverage

processing course related to the recent problem that have been elaborated and considering that there is no study which discusses the developed multimedia in that course.

2. METHOD

This research is a type of development research and uses the ADDIE development model. The development of this model was chosen because it has a systematic and easy-to-understand sequence of activities and applies it to developing development products such as interactive multimedia learning based on storyline articulation. The ADDIE model consists of five steps: analysis, design, development, implementation, and evaluation (Branch, 2009). Media developed using the ADDIE model, which stands for analyze, design, development or production, implementation or delivery, and evaluation has 5 procedural stages. In the analysis phase, the activities carried out include needs analysis, student characteristics analysis, curriculum analysis, and media analysis. The design stage is carried out by compiling an interactive learning multimedia design based on an articulate storyline. At the development stage, designs prepared at the design stage and in consultation with supervisors were developed to produce interactive multimedia learning based on an articulate storyline. The developed media was consulted with the supervisor to get input and suggestions for improvement. After the media was improved, an expert Trial was conducted to review the developed media. Expert tests consist of media experts, design experts, and material experts. The data obtained from the expert test results are then analysed to determine the validity of interactive multimedia learning based on the articulation storyline that has been developed and then corrected if there are suggestions or input.

Test the validity of the media that has been carried out, followed by trials with teachers and students to determine the practicality of interactive multimedia learning based on the developed articulation storylines. The test subjects in this study included two material experts, two media experts, design experts, two teachers, and 40 grade XII students of SMK N 2 Singaraja. This study uses a questionnaire method as a method of data collection. The questionnaire method is a data collection technique that provides a list of questions or statements to research subjects, which must be answered in writing. The instrument used is a questionnaire presented in Table 1, Table 2, and Table 3. The data analysis technique used in this study is a qualitative, quantitative descriptive analysis technique, and inferential statistics. Qualitative descriptive analysis techniques are used to process the advice given by experts. Qualitative descriptive analysis techniques were used to process the scores given by experts and students. Inferential statistics are used to test the effectiveness of learning multimedia.

Table 2. Material Expert Instrument Grid

No	Components	Indicator
1	Contents	1. The material presented is following what is contained in the RPS
		2. The material presented is following what is contained in the syllabus
		3. The presentation of the material is clear enough
2	Language	1. Frame by frame the media displays the content of the appropriate material
		2. The dish-making techniques have been explained properly
		3. The material presented is deep and accurate enough
		4. Materi yang disampaikan sudah cukup dalam dan akurat
3	Serving	1. The concept described in the material is systematic
		2. The general quality of this media is suitable for vocational student learning

(Adopted from Wulandari & Wiarta, 2022)

Table 2. Grid of Learning Design Expert Instruments

No	Components	Indicator
1	Curriculum	1. Clarity of subject identity
		2. Conformity of indicators with basic competencies
		3. Conformity of objectives with indicators
		4. The suitability of the material with the learning objectives
2	Method	1. Clarity of lesson plans
		2. Clarity of study instructions
		3. The suitability of the order of presentation of teaching materials
		4. multimedia helps students in learning
		5. The accuracy of the application of learning strategies
		6. Adequacy of support for learning materials in multimedia
3	Evaluation	1. Availability of assessment presented in multimedia

No	Components	Indicator
		2. Clarity of instructions for working on assignments/tests
		3. Clarity of assessment of learning outcomes
		4. Relevance of questions to learning objectives

(Adopted from Wulandari & Wiarta, 2022)

Table 3. Media Expert Instrument Grid

No	Components	Indicator
1	Screen design display	1. Composition of text color and background (background)
		2. Layout (Lay Out)
		3. Synchronize graphic illustrations with visuals and verbal
		4. Title Clarity
		5. Attractive design
2	Ease of use	1. Systematic presentation
		2. Ease of operation
		3. Navigation function
3	Consistency	1. Consistency in the use of words, terms, and sentences
		2. Consistency in the use of letter shapes and sizes
		3. Layout consistency (Lay Out)
4	Benefits	1. Ease of teaching and learning activities
		2. Ease of interaction with the media
		3. Attract students' attention
5	Graphics	1. Use of color
		2. Use of letters
		3. Use of illustrations

(Adopted from Wulandari & Wiarta, 2022)

3. RESULT AND DISCUSSION

Result

There were three main results of the present study covering the process of developing learning multimedia in the food and beverage processing element, hot and cold appetizer sub-element, its validity, and its effectiveness as follows. The development of learning multimedia in the food and beverage processing element, hot and cold appetizer sub-element was framed in ADDIE model. At the **Analysis** stage, the need analysis was conducted covering the student characteristics analysis, curriculum analysis, and media analysis. The analysis was done by conducting interview guide and document analysis to the participants of the study. The interview guide was done by asking several questions to teachers about the characteristics of students during learning process along with the media used to support the learning process. In addition, the documents analysis was done to identify the related documents used in the learning process. From the analysis stage, it was found that the characteristics of today's learning for students is the integration of technology. Besides, learning media is needed by the students to attract their attention in learning and make them easier in understanding the learning materials. Moreover, from the document analysis, it was found that the current curriculum allowed teachers and students to conduct freedom of learning in which they can access and use technology/media to support their learning. At the **Design** stage, the results of the need analysis were designed to form a product. An interactive multimedia learning based on storylines was designed based on the need of students. The design of the product involved the development of the 21st century learning in which it could be connected by internet.

At the **Develop** stage, the product was developed based on the design of the study. The development of product was also validated by some experts, namely media experts, design experts, and material experts. Initial display contains the subject title, the user enters a name to go to the menus in the interactive learning media which will later appear on the next menu. The user presses the continue button to start learning. The main menu contained in this interactive learning media consists of several more menus, including: Introduction, Materials, Evaluation and Information. Then there is a hint button, and exit. After pressing the instructions button, will be directed to the instructions page display that contains instructions for using menus and buttons on interactive learning media. The introductory menu contains the initial competencies of the material to be given. Material menu contains menus such as Hot Appetizer and Cold Appetizer. The Hot Appetizer and Cold Appetizer Material menus contain Submenus for Materials, Quiz and Video Tutorials. The Hot Appetizer and Cold Appetizer Quiz submenus contain questions covering all material. The development of product could be seen in Figure 1.

Figure 1. The results of the development of Learning Multimedia for Food and Beverage Processing Subjects

At the **Implementation** stage, the product was implemented during learning process. It involved 40 students of class XII SMK in implementing the developed product. Along the learning process, students used the developed product in learning food and beverage processing. Students were directed by the provision of the developed product from the beginning to the end of the learning process. At the **Evaluation** stage, the test was conducted to see the effectiveness of the developed product in this study. Pre-experimental study, especially one group pre-test and post-test was conducted in this study. The results of pre-test and post-test were collected to analyze the effectiveness of the developed product assisted by SPSS.

Product validity was carried out by distributing questionnaires to experts and also students. This validity test aimed to determine the validity of the developed product before it is implemented in classroom learning. The results of product validity included the results of a review of learning content experts, the results of a review of learning media experts, the results of a review of learning designs, the results of individual tests, and the results of small group tests. The detailed product validity test results were presented in the Table 4.

Table 4. Product Development Validation Results

No.	Experts	Expert I	Expert II	Category
1	Material Expert Test	100%	97.5%	Very Valid
2	Learning Design Expert Test	97.5%	92%	Very Valid
3	Media Expert Test	100%	95%	Very Valid
4	Individual Trial		93.3%	Very Valid
5	Small Group Trial		95.5%	Very Valid

Based on the assessment given by the learning content expert, the score was obtained from expert 1 (100%) and expert 2 (97.5%), so multimedia received a very valid qualification. The assessment from the learning design expert is expert 1 (97.2%) and expert 2 (92%), so multimedia gets a very valid qualification. The assessment of the learning media expert is expert 1 (100%) and expert 2 (95%), so multimedia gets a very valid qualification. The results of individual trials get a value of 93.3%, so multimedia gets a very valid qualification. The results of the small group trials obtained a score of 95.5%, so multimedia obtained a very valid qualification. It was concluded that the Learning Multimedia for Food and Beverage Processing Subjects obtained very valid qualifications, so it was suitable for learning.

The effectiveness of the developed product was conducted through one group pre-test and post-test. The research sample is 40 students. It shows that normality can be seen from the Shapiro-Wilk test of sig. Score. The data analysis results showed that the Shapiro-Wilk score was 0.107 for the pretest and 0.225 for the posttest. This value is higher than 0.05, indicating that the data is normally distributed. After the normality test was carried out, the data was tested for homogeneity. The data analysis results show that the significant value based on the average is 0.116, which is higher than 0.050. This value indicates that the data is homogeneous. The homogeneity test results are presented in Table 5.

Table 5. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Homogeneity	Based on Mean	2.570	1	78	0.116
	Based on Median	1.680	1	78	0.204
	Based on Median and with adjusted df	1.680	1	75.131	0.204
	Based on trimmed mean	2.570	1	78	0.116

After finding out the normality and homogeneity, then, the paired sample t-test was done to see its effectiveness on developing learning multimedia in the food and beverage processing element, hot and cold appetizer sub-element. The result of t-test in Table 6.

Table 6. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test	78.50	40	1.865	.618
	Post-test	90.80	40	3.611	1.250

Based on data analysis (in Table 6) showed that the mean score of the post-test was higher than pre-test. It showed that students with developed product better on the post-test. The result of paired t-test showed in Table 7. It showed that the sig. (2 tailed) was 0.002 which was lower than 0.05. It indicated that the developed product had significant effect on students' achievement.

Table 7. Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-test - Post-test	-7.300	4.190	1.541	-11.123	-4.577	-4.218	39	.002

Discussion

Based on the findings of this study, the product developed is valid and effective. The results of this study cover three main topics: the process of the product being developed, its validity, and its effectiveness. The developed multimedia is suitable for learning because the material presented is by learning. Multimedia combines various information elements such as text, graphics, images, photos, animation, and audio that clarify learning material (Damanik, 2020; Hidayati & Irmawati, 2019; Nugroho & Arrosyad, 2020). It is also supported by previous findings, which state that multimedia can display the objectives of learning (Lutfi et al., 2021; Siahaan et al., 2021; Wicaksono, 2016). Multimedia, used to make it easier for students to understand learning material to achieve specific learning goals, is often called learning multimedia. Previous research findings state that multimedia is very effective in learning (Handaru & Pujiriyanto, 2020; Herdiyanto et al., 2020). Other findings also reveal that interactive multimedia can increase student motivation in learning (Ahmadi et al., 2017; Dewi & Sujana, 2021). Based on the results of this study and previous research, valid multimedia is feasible to use in learning activities because it helps students in learning.

Multimedia has elements that can support the learning process. Elements in multimedia include text, graphics, images, video, animation, audio, and interactivity (Ginting & Sidabutar, 2022; Rubini et al., 2018; Syahputra & Maksum, 2020). Interactivity in this multimedia has a more significant influence in making it easy for students and teachers to understand the subject matter (Ariyanti, 2022; Irawan, 2021; Kurniawan & Soenarto, 2022). The magnitude of multimedia's role in education makes multimedia often used to support the learning process. Educators will find it helpful if there are multimedia in the learning process (Lindasari et al., 2019; Pratiwi & Ismaniati, 2017; Zarkasi & Taufik, 2019). In addition, multimedia in the learning process will make the learning atmosphere more interactive, effective, efficient, and fun. The interactive learning process can turn on students' learning motivation to be more active because of their interest in multimedia which can present displays in the form of text, images, video, sound, and animation. Previous research findings also state that multimedia can develop sensory organs and attract attention and interest (Kuswanto et al., 2017; Noverdika, 2021). Other research also states that multimedia is a reliable media in the learning process because multimedia has more complex elements (Geni et al., 2020; Saifudin et al., 2020). Multimedia has the function of mutually supporting one another to influence and stimulate learning objectives.

In spite of the difference, the similarity of the present study and previous studies can be seen from the results of the discussions. Both studies show that the developed product is valid and effective to be used in the learning process. It indicated that the developed interactive media gives impact to students. It is in line, which the provision of interactive can improve students' critical thinking (Djamas et al., 2018; Sandang et al., 2022). In addition also add that multimedia integrated with the inquiry learning model can improve student learning outcomes (Saputri & Estiastuti, 2018; Siregar et al., 2022). Moreover, multimedia can increase the curiosity of students (Laksana et al., 2019; Rejeki & Mukminan, 2020). Furthermore, the media can play a role in overcoming boredom in learning in the classroom. So learning media is one of the methods in overcoming all

kinds of problems in teaching, not only solving problems, but also providing various comprehensive information to students (Tafonao, 2018). The provision of multimedia can create interest in learning and reading interest for students (Dwiqi et al., 2020; Kristiyanto & Rahayu, 2020).

4. CONCLUSION

The validity of the content / material, learning design experts and media experts are very feasible. Validation results Individuals and small groups are also very feasible. Multimedia development process learning on food and beverage processing elements, sub elements of hot and cold appetizers are very relevant. Very suitable for use in class XI SMK. The use of multimedia learning can help students understand the material because it is equipped with concrete examples in in the form of pictures and videos and can create student interaction in the learning process because students can operate and respond to questions given in this interactive learning multimedia, not only seeing and listening.

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