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Android-based learning media development with iSpring Suite application in pastry course

Febri Ananda *, Elida Elida, Kasmita Kasmita, Dedy Irfan
Universitas Negeri Padang, Indonesia.
* Corresponding Author. Email: 22138016@student.unp.ac.id

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ABSTRACT

The utilization of Information and Communication Technology (ICT) is one of the things needed in the education era for effective learning. This study aims to produce Android application-based media using iSpring Suite in feasible pastry courses based on the values and tests of validity, practicality, and effectiveness. The development research used the 4D model (Define, Design, Develop, and Disseminate). The limited trial of Android application media was conducted on 30 Department of Family Welfare Science, Concentration of Catering students at Universitas Negeri Padang who were taking pastry courses. Data collection instruments used validation sheets, evaluation questions, and student response questionnaires. The data obtained were analyzed descriptively and quantitatively. The results showed that the validation value of the material expert was 0.758 with the valid category, and the validation of the media expert was 0.833 with the valid category. The practicality value gets a score of 3.06 with a practical category. The effectiveness value is obtained from the evaluation results of the control class and the experimental class. Hypothesis testing was carried out using the t-test with the Independent Samples Test method. The t-test results show the t-count value (12.0228) > t-table (2.0167), so Ho is accepted. This means there is a difference in the value of the control and experimental classes. The effect size calculation obtained a value of 3.13, so based on the applicable criteria, this effect size value is included in the very high category. Based on these results, the application-based learning media using iSpring Suite is declared feasible based on validity, practicality, and effectiveness as a learning media.

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INTRODUCTION

In the modern world of education, students must be able to use technology to keep up with the dynamics of the times. Technology has become an increasingly important component of functional competence in education, alongside reading, writing, and arithmetic (Sarva et al., 2023). The digital age has brought revolutionary changes in the field of learning, and teachers need to improve their digital competencies and be proficient in accessing and utilizing technology for their teaching (Devi, 2023). The COVID-19 pandemic has further emphasized the importance of technology utilization in education, as offline teaching practices have many limitations, and alternatives, such as virtual learning platforms, are gaining more popularity (Joson et al., 2022).

Technology has transformed education, making it more accessible, efficient, and effective, and students must be able to utilize technological tools for their learning (Ilyas et al., 2023).

The United Nations Educational Scientific and Cultural Organization (2023) states that teachers' ability to use Information and Communication Technology (ICT) and incorporate it into the school curriculum can positively impact student learning. Students should utilize technology to learn. Therefore, learning design should be more interactive, innovative, and creative. Gilakjani et al. (2011) said that using digital technology in learning allows students to have a more varied learning environment with various sources of information and additional components. Many components can be used that can help teachers to handle students' different learning styles.

Kenney (2011) and Nursafitri et al. (2022) states that more than 87% of students prefer to learn through visual and tactile modalities. While technology can improve the learning process, it also has the potential to impact student behavior negatively (Maritsa et al., 2021). However, the strategic role of educational technology in realizing the vision of the national education system, especially in producing smart and competitive individuals, cannot be ignored (Susanti, 2013). In this context, the importance of cultural education in shaping student character is emphasized, with educators playing a crucial role in teaching and modeling positive behavior (Dewi & Muhtar, 2022).

ICT combining text, audio, and video can create engaging and dynamic learning media for students with different learning styles. Previous research utilizing Articulate Storyline 3 combining audio, images, video, games, and quizzes can motivate and actively engage students in learning (Furkan & Yanti, 2023). In addition, interactive applications are the most effective learning media for students with different learning styles (Laswadi et al., 2022). Using dynamically drawn text in learning videos can also increase engagement and learning over static PowerPoint learning media (Ram & Zhao, 2022). Effective communication technology is dominant in providing learning resources and facilitating active collaboration between teachers and students, improving the quality and quantity of teaching and learning activities (Anderson & Garrison, 1998). Therefore, using ICT with various elements of learning media can enhance the learning experience for students with different learning styles.

Learning media is anything that can help students acquire knowledge, skills, and attitudes. According to Kahar (2017), using learning media during the learning process can increase student interest and motivation and encourage learning. Android-based interactive learning media has been proven to improve student learning outcomes compared to conventional learning methods without electronic media. Research conducted by Sahruli (2023) on science education found that using Android-based learning media can significantly improve student learning outcomes in inheritance. Similarly, research on mathematics education showed that using Android-based mathematics media improved student learning outcomes, as evidenced by higher test scores and increased student motivation (Uliyandari & Sutarno, 2023).

The results showed that Android-based learning media using iSpring Suite PowerPoint on Fish material for biology students that had been developed had an average validity value of 81.8% with a valid category and had an average practicality value of 94.3% by biology students with a practical category (Ziezie et al., 2020). Microsoft PowerPoint is a program teachers use most to develop learning materials. To make it easier to use, this program can be integrated with iSpring Suite to make learning media more effective. iSpring Suite allows teachers to add multiple choice or essay practice questions into their learning media.

Several previous studies have discussed the feature of adding multiple-choice through iSpring. Pakpahan and Rajagukguk (2023) conducted research using iSpring Suite to improve mathematics learning outcomes in secondary school students. Kirillov (2021) also mentioned using iSpring Suite to create electronic tests and conduct practical exercises in distance learning. Sari and Ridwan (2020) developed interactive multimedia using iSpring Suite for learning outcomes in Natural Science subjects. Saputra and Alipia (2022) discussed using iSpring Suite as an interactive media for learning, including creating interactive quizzes. Some of these previous studies show the versatility of iSpring Suite in incorporating multiple-choice or essay question exercises into various learning contexts. Zakaria et al. (2017) showed that there are several advantages of iSpring Suite in developing learning media, namely ease of use, reduction of human error, reduction of conditions

through fast question randomization, management of work time allocation so that work can be completed on time, and the ability to immediately know the score of the answers that have been done.

There are several learning media with pastry subjects, but of the several media found, it has yet to develop using iSpring Suite. Aldera's et al. (2023) researched the development of video tutorial learning media for manatiang services in restaurant and service management courses. Agustina et al. (2023) focused on using learning resources in the learning process, including pastry subjects packaged in electronic magazines. Angraini et al. (2022) studied the effectiveness of learning media developed with Adobe Flash CS6 as a learning media for online learning in pastry subjects. From several previous studies, no one has specifically used iSpring to develop learning media, especially in pastry subjects.

Based on several previous studies and the background of the study, the researcher aims to develop Android-based learning media using the iSpring Suite platform in pastry subjects. Overall, this research contributes to developing Android-based learning media to provide innovative and effective learning media for students.

RESEARCH METHOD

This research uses a research and development model adapted into a 4-D model consisting of four stages: define, design, develop, and disseminate (Daling et al., 2022). The research was conducted at Universitas Negeri Padang. The subjects in this study were D3 students majoring in family welfare science with a concentration in culinary management who took chiffon cake pastry courses. Experts carry out media and material validation (Ananda & Usmeldi, 2023; I. F. Sari & Iswendi, 2023). The practicality of the media was assessed through questionnaires filled out by educators and students (Astuti et al., 2022; Wibawanto et al., 2022). The effectiveness of the media was evaluated by measuring learning outcomes using statistical formulas.

FINDINGS AND DISCUSSION

Definition Stage (Define)

The defining stage is carried out to get an overview of the learning conditions. At this stage, various analyses are carried out, including needs analysis, student analysis, concept analysis, and formulation of learning objectives, to determine the making of Android application-based pastry learning media in pastry courses. This needs analysis was conducted to identify problems and challenges faced during the learning process. The ultimate goal of this analysis is to create a solution that suits the lecture conditions. Student analysis is conducted to evaluate students' ability, educational background, and thinking ability. RPS analysis is used to identify the material that will be used in making Android applications. Furthermore, learning achievement analysis is carried out to evaluate student achievement results when using Android applications in pastry courses.

Planning Level (Design)

The planning stage is the design of materials to be used in the media presented in an effective and attractive display for students. This stage includes (1) making an attractive Microsoft PowerPoint display, (2) finding and designing images and learning videos that are in accordance with the chiffon cake material, and (3) making validation sheets and student response questionnaires.

In this planning step, planning is done through flow charts, making learning material designs, conducting evaluations (practice questions), and creating content that includes images, videos, and audio that will be included in the Android application-based learning media. Android application-based learning media flow charts show the sequence of processes (commands) in Android applications (Indrajani, 2011). Android application-based learning media is an operating system-based media. Figure 2 shows the flow chart of chiffon cake learning media material for Android-based applications.

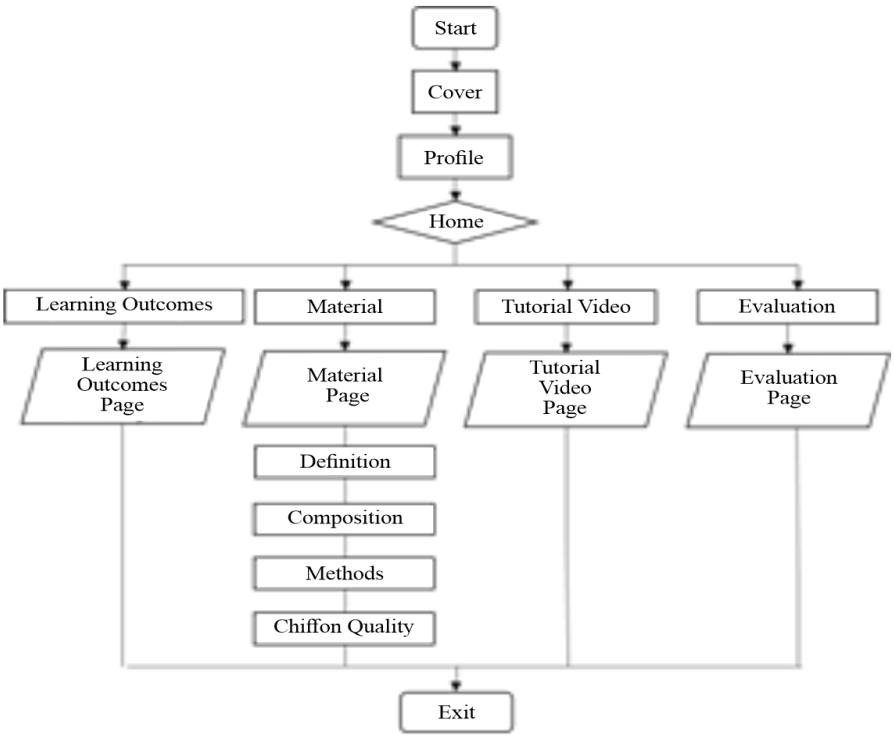

Figure 2. Research Flowchart

Organizing the text of the material to be included in the learning media is also an important part of designing effective and efficient learning media. Effective and efficient learning media is needed to help students when facing learning situations that require an understanding of alternative procedures (Zakariya & Muhtadi, 2022). To fill the material menu, it is necessary to map out what material will be explained about chiffon cake so that students can focus on material related to chiffon cake. At the design stage, the script of the evaluation menu exercise questions is compiled based on what has been previously designed.

Development Stage (Develop)

The development stage in this research includes making interactive media by considering the results of validation and expert comments. The Android application-based learning media developed in this study was designed to create this Android-based media application using Microsoft PowerPoint, iSpring Suite, and Website 2 APK Builder (Web2Apk). After making a PowerPoint design, the next step is to publish PowerPoint with iSpring Suite, which causes the .PPT file to be stored in HTML 5. After the HTML 5 file is formed, the next step is to convert HTML 5 into an application (.APK) using Website 2 APK Builder (Web2Apk) to produce the D'Pastry application. Screenshots of product development results in this study can be seen in Figure 3 to Figure 6.

Figure 3. Front Page Display

Figure 4. Homepage Display

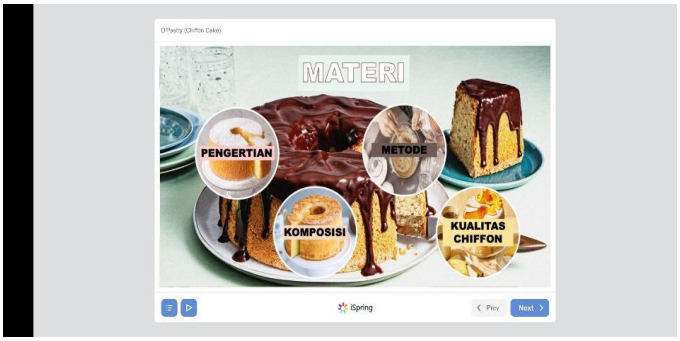

Figure 5. Material Page Display

Figure 6. Learning Outcomes Display

Validation Test

Validation in this study was carried out on the media and the content of the material presented to determine its feasibility. Validation was carried out by two media expert lecturers and two material expert lecturers. Validators assess the feasibility of the media made and provide suggestions for improvement to be used as a basis for revision. This validation aims to evaluate how well the Android-based D'Pastry learning media developed by researchers. This will be done by considering Android applications' scientific and technological standards. Validity is a measure used to measure the validity of the data collected (Hadi, 2020). In line with this opinion, validity is a measure used to measure the level of validity of an instrument so that the instrument can only be used if it produces high validity (Kamal, 2019).

Material Validation

Two expert validators of pastry learning materials carried out the material validation process. This validation aims to ensure that the learning materials in the Android application are appropriate and fulfill the learning needs. At the time of validation, the material expert examined the material in the Android application and assessed its relevance, presentation, independent practice, and grammar.

A questionnaire sheet containing statements in accordance with the assessment indicators was used as a validation tool. To assess, a rating scale of 1-5 (Likert Scale) was used. Five is the highest score value, which categorizes the material presented as very relevant and in accordance with the learning outcomes, while 1 (one) is the lowest score, which has the opposite category.

In addition, on the questionnaire sheet, there is a column that allows experts to provide comments and suggestions on the learning media being assessed. The purpose of this column is to collect input on how to improve the quality of learning media. The results of expert validation of Android application-based pastry learning materials can be seen in Table 1.

Table 1. Material Expert Validation Results

No.	Aspect	Value	Category
1	Relevance of material	0.750	Valid
2	Presentation of material	0.732	Valid
3	Independent practice and grammar	0.750	Valid
4	Influence on learning strategies	0.792	Valid
Average value		0.758	Valid

Based on Table 1, it can be seen that the results of the material validity test obtained a value of 0.758> 0.66, so the presentation of material on the Android application is categorized as valid. One important element in the presentation of material is the relevance of learning materials to the curriculum and learning outcomes that apply or have been determined. The aspect of material relevance includes the suitability of learning outcomes with learning objectives, the suitability of the material with learning objectives, and the suitability of material concepts based on the truth of scientific principles.

This is in line with the idea of Daryanto (2016), who states that learning media must be adjusted to students' learning objectives and learning needs. In addition, learning materials must be presented correctly in accordance with scientific standards so that students understand, so it is important to make the presentation of subjects fun and easy for students to understand (Abidin, 2020).

Media Validation

Two different media experts validated the developed Android application. The media experts assessed features like ease of use and navigation, visual appearance, integration, and usability. This media validation was only done once because the results showed that this Android application could be trialed with minor changes according to the recommendations. Media expert validation aims to assess the feasibility and suitability of learning media for education. Media expert validation was analyzed using Aiken's V, where the validator gave the assessment results for each element (Apriyus et al., 2020; Badu et al., 2021; Khasanah et al., 2019).

Media experts evaluate the design and functionality of the learning media that researchers develop to ensure that the developed media has fulfilled the criteria necessary for effective teaching and learning (Mann et al., 2017; Merino-Soto & Livia-Segovia, 2022). The media experts provided feedback and suggestions for improvement. Based on their expertise in media design and development. Table 2 shows the validation results based on media expert assessment.

Table 2. Media Expert Validation Results

No.	Aspect	Value	Category
1	Ease of use and navigation	0.925	Valid
2	Visual display	0.875	Valid
3	Media integration	0.875	Valid
4	Media benefits	0.750	Valid
Average value		0.833	Valid

Based on Table 2, it can be seen that the results of the media validity test obtained a validation value of 0.833 > 0.66, so the Android application is categorized as valid. Display in learning media is a very important component that needs attention. To make students interested in

achieving learning objectives, the appearance of learning media must be packed with interesting and relevant content. This is in line with the results of research conducted by Sumantika et al. (2023), which explains that interactive technology-based learning media has increased student interest in learning. This aligns with the opinion of Sitepu and Gandamana (2023) and Mulya et al. (2022), who mentioned that learning media validated by experts and practical for teachers and students have proven effective in improving the teaching process and student learning outcomes. By using interesting learning media that align with student needs, teachers can create a learning environment that fosters student motivation, concentration, and active participation in the learning process (Yuliharti, 2022).

Daryanto (2016) supports this statement by saying that students prefer and are interested in concrete things compared to abstract things. In addition, the display of learning media based on Android applications must be supported by interesting content so that students are interested and involved in the learning process. This is in line with Arsyad's (2010) statement that using interesting learning media can make students want to learn, be motivated, and be interested in the lesson.

This Android application-based pastry learning media provides learning opportunities that can be accessed anytime and anywhere when students want to learn. By using this media, students are expected to be more interested and find it easier to master skills, especially in pastry subjects. With learning media, students can access various sources of learning materials, thus enabling them to master pastry materials easily, in line with Smaldino et al. (2012) who said that learning media could help students get easier access to learning materials.

This Android application-based pastry learning media has several advantages as a learning media, including its attractive features. Many features can help students learn, such as providing material with interesting and contextual images and video tutorials that help students understand the technique or how to make the right cake. In addition, it is also equipped with a formative evaluation menu that displays student scores after working on questions. Sanchez and Plumettaz-Sieber (2019) supports the idea that learning media must meet students' needs by providing sustainable learning tools. Learning media can create diverse and focused learning activities and provide experiences that cannot be obtained from other materials.

Practicality Test

Android applications that have been declared valid are then tested for practicality. The practicality test was carried out by 30 D3 students of the Family Welfare Science Study Programme with a concentration in Catering Science, Faculty of Tourism and Hospitality, Padang State University, who were taking pastry courses. The initial practicality test was conducted by distributing Android applications to students, and then students were asked to install the application on their respective smartphone devices. After using the application, students are asked to fill out an assessment questionnaire provided through Google Forms. The results of student responses to the practicality of using Android applications in pastry courses obtained a practicality score of 3.06 or included in the practical category.

Effectiveness Test

Effectiveness testing is a test conducted to measure the success rate of using learning media based on Android applications. This can be seen from the results of evaluation scores conducted by students. The difference in evaluation results can be seen in the descriptive analysis and statistical analysis presented in Table 3.

Table 3. Evaluation Analysis Results

Class	N	Means	Std. Deviation	Std. Meaning of Error
Control	15	5.933	1.0328	0.2576
Test	30	9.167	0.7466	0.1340

A normality test was conducted using the One-Sample Kolmogorov-Smirnov Test method with a significance level of 0.05 (α = 5%) to determine whether the experimental and control classes'

posttest data were normally distributed. Based on the results of the normality test in this study, the Kolmogorov value for the control class obtained a value of 0.2076, greater than the Kolmogorov table value of 0.338 and the Kolmogorov value for the experimental class of 0.2217 greater than the Kolmogorov table value of 0.242, so it can be concluded that the posttest data for the control class and experimental class are normally distributed. Table 4 explains the results of testing the normality of data using the One-Sample Kolmogorov-Smirnov test method using the SPSS application.

Table 4. Normality Test Results

	Control Class	Experimental Class
N	15	30
Values	5.933	9.167
Std. Deviation	1.0328	0.7466
Kolmogorov value	0.2076	0.2217
Kolmogorov Table	0.338	0.242

After doing the normality test, the next step is the homogeneity test. Homogeneity testing uses One-Way ANOVA. The homogeneity test results can be seen in the descriptive analysis and statistical analysis presented in Table 5 and Table 6.

Table 5. Analysis of Variance for Control and Experimental Classes

Group	Count	Amount	Average	Difference
Control	15	89	5.93333	1.06667
Test	30	275	9.16667	0.55747

Table 6. Homogeneity Test Results

Sources of Variation	SS	df	MS	F	P-value	F critical
Between Groups	104.544	1	104.544	144.5470	2.42	4.067
In Groups	31.1	43	0.7233			
Total	135.644	43				

Based on Table 6, it is known that the F-count value (144.5470) > F-table (4.0670), so it can be concluded that H0 is accepted. Therefore, the variances of two or more data classes are the same. After the data is normally distributed and has the same variance, the last stage is hypothesis testing. Hypothesis testing is done using the Independent sample t-test method. The t-test results can be seen in Table 7.

Table 7. T-test Results (Independent Samples Test)

	Test	Control
Means	9.1667	5.9333
Difference	0,5575	1.0667
Observation	30	15
Pooled variance	0,7233	
Hypothesized mean difference	0	
df	43	
t Statistics	12.0228	T-count
P (T<=t) is one-sided	0,0000	
t One side is critical	1.6811	
P (T<=t) is two-sided	0,0000	
t Two critical edges	2.0167	T-boundary

Based on Table 7, it is known that the t-count value (12.0228) > t-table (2.0167), then H0 is accepted, so it can be concluded that there is a difference in the value of the control class and the experimental class. From the evaluation results, students can answer the problem formulation more

effectively using pastry learning media based on Android applications. Furthermore, the effect size test was conducted to determine the magnitude of the influence after treatment.

From the results of the effect size calculation, a value of 3.13 was obtained then, based on the applicable criteria, the effect size value is included in the very high category, so it can be concluded that the learning outcomes in pastry subjects using Android-based learning media developed by this researcher are more effective than the learning outcomes without using learning media. However, some students still need to utilize this learning media optimally.

CONCLUSION

Research and development has produced learning media, especially pastry subjects based on Android applications that are valid, practical and effective. The results of the validity of the Android application that researchers developed were carried out by material experts and obtained a score of 0.758 in the valid category. Media expert validation obtained a value of 0.833 with a valid category. The practicality value of using Android applications by students obtained a value of 3.06 with a practical category. The t-test results show the t-count value (12.0228) > t-table (2.0167), so Ho is accepted. This means that there is a difference in scores in the control class and experimental class. From the results of the calculation of effect size obtained a value of 3.13, which is included in the very high category. Based on the results of the data analysis, it can be concluded that the learning outcomes of pastry courses using Android-based learning media developed are more effective than learning outcomes without using Android-based learning media. In addition, learning using applications is packaged in an interesting way in accordance with aspects of independent learning. On the other hand, to improve the trend of learning technology-based learning in accordance with the times.

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