



Development of Learning Multimedia to Make Digital Tunic Patterns Based on SAC (Smart App Creator) for Vocational High School Students

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ARTICLE INFO

Keywords:

Multimedia
Tunic patterns
SAC (Smart App Creator)
CAD Richpeace

ABSTRACT

Purpose - This research aims to (1) Develop multimedia learning for making digital tunic patterns based on SAC (Smart App Creator) and (2) Determine the feasibility of learning multimedia for making digital tunic patterns based on SAC (Smart App Creator).

Methodology - This research is R&D (Research & Development) development research using the ADDIE development model. The media developed before being tested on users is first validated by media and material experts. The test subjects for this research were 20 students and 19 teachers who were digital pattern-making training participants. The data analysis technique used is quantitative descriptive analysis.

Findings - The results of the research show that: (1) multimedia learners in making digital tunic patterns based on SAC were developed in the form of an Android application and WEB with specifications a) Application size 98MB, b) portrait screen display c) screen resolution 1080 x1920 pixels d) Android system Lollipop 5.0 and later; The results of the research show that: (1) multimedia learners in making digital tunic patterns based on SAC were developed in the form of an Android application which can also be accessed via WEB with specifications a) Application size 98MB, b) portrait screen display c) screen resolution 1080 x1920 pixels d) Android system Lollipop 5.0 and later ; (2) the feasibility of the material aspect obtained a percentage of 94% in the "Very Appropriate" category; (b) the media aspect obtained a percentage of 85% in the "Very Appropriate" category; (c) Student trials obtained an 88% rating in the "Very Appropriate" category. The trials have been declared reliable.

Significance - The results of this study provide multimedia references for learning to make digital tunic patterns for fashion design vocational school students that can be accessed anywhere and anytime.

Received 06 December 2024; Received in revised form 10 December 2024; Accepted 12 February 2025

Jurnal Eduscience (JES) Volume 12 No. 1 (2025)

Available online xx February 2025

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INTRODUCTION

Indonesia has entered the era of the Industrial Revolution 4.0. The Industrial Revolution 4.0 dramatically influences the development of science and technology, especially in education (Delipiter Lase, 2019). In the digital era, an educator is expected to be able to apply information and communication technology-based learning to adapt and create graduates who meet the demands of the times. (Nuryani, 2020). The COVID-19 pandemic has made us realize that changes in the field of education, where everything uses digital means, are inevitable (Shonfeld et al., 2021).

The development of multimedia learning technology has become essential in vocational education. Vocational education in fashion design faces significant challenges in integrating digital technology with traditional practical skills. The Mulyatiningsih study (2019) Shows that interactive multimedia can increase students' motivation and understanding of fashion expertise competencies. Various studies show that technology is beneficial for learning. Technology also makes teaching and learning more efficient and supports innovative learning. (Lewin et al., 2019).

As a multimedia development platform, Smart App Creator (SAC) has great potential to overcome these various obstacles. According to a study by Setiawan (2021), SAC can produce responsive multimedia applications that are easy to develop and can be accessed through multiple digital devices. This is very relevant to the needs of Generation Z, which is familiar with technology and needs innovative learning methods. Teenagers in Indonesia are the most internet users among other age groups. This is based on a survey from the Indonesian Internet Service Providers Association, which found that the number of internet users in the age group of 13-18 years reached 99.16% in 2021-2022 (Pahlevi, 2022). Therefore, at this time, it is called the digital generation, or Gen Z, which uses technology more to communicate, play, and socialize. Using smartphones as a learning medium is a learning style in the all-digital Industrial Revolution 4.0 era.

Multimedia that can be accessed using smartphones is an innovation in delivering learning materials displayed attractively to help users learn independently without direct direction and guidance. (Tabrani, Mohamad Bayi, Puput Puspito Rini, 2021). The advantages of multimedia learning that can be accessed with smartphones include the presentation of material consisting of various multimedia elements (text, images, sounds, videos, and interactivity), multimedia files in the form of applications, there is two-way communication, or there is feedback in it, helping to visualize the material, learning activities can be controlled, and learning materials can be repeated without space and time limitations (Surjono et al., 2019).

Fashion design is one of the areas of expertise at Vocational High School. The Decree of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology Number: 033/H/KR/2022 states that one of the subjects in the fashion expertise program is Fashion Design and Production. The subject contains elements related to mastering fashion design and production development, including preparing fashion making. Pattern making is one of the things I learned in preparation for fashion making. Pattern-making is done manually using pencil and paper and can be done digitally. Pattern creation can be done with several CAD software applications. According to Sholikhah et al. (2021), the fashion design industry currently uses CAD software to meet the demands of 21st-century skills to utilize ICT technology, so educational institutions of fashion expertise programs integrate CAD into the teaching curriculum.

Based on the results of the literature study, there is the development of learning media for making patterns manually and digitally, including making shirt patterns, skirt patterns, children's skirts, and manual tunic pattern-making (Gandini et al., 2023; Mutia & Suprihatin, 2020; Putri & Kharnolis, 2021; Sari, Inda, 2021)Based on the above analysis, it is evident that learning media, especially multimedia learning, have not been developed sufficiently to create digital tunic patterns.

Multimedia consists of several types of media to convey messages or information to users according to their purpose and function (Aris Doyan et al., 2020), one of which is video media. Based on a search on the YouTube application, several video learning media tutorials for making a tunic with CAD were found, including a video by BNF Tutorial (https://youtu.be/Iz4iD7xl_vg?si=5mul0eMznTkzOOpW) published in 2020 with a duration of 33.18 minutes without being accompanied by text explanations, descriptions of points

on patterns, and in the video there are no design drawings and analysis of the tunic design. In addition, the tutorial video by Jessica Vera (https://youtu.be/bZtUSJB_TiM?si=uiuJVnoR-6GEhTLU), published in 2023, is 10.11 long and accompanied by voice explanations but does not include text explanations and point descriptions on patterns. Based on the video tutorial by Mutiara Rizki (https://youtu.be/HkbN4ZilBOI?si=rXVVfq_obphXziSc) published in 2023, it has a duration of 12.40 minutes which is equipped with a voice explanation but is not accompanied by an explanation of the text and a description of the points on the pattern made. The tutorial video by Alya Azzahra, published in 2023, lasts 8.15 minutes and is equipped with a tunic design. Still, without analysis of the design and size of the tunic, it is displayed too quickly, which is only 2 seconds. In addition, the tutorial video is not accompanied by voice or text explanations and point descriptions of patterns. Based on the description of some of the tutorial videos on making a tunic pattern with CAD above, it can be known that each has several shortcomings in supporting learning. Compelling learning videos provide a good influence to support learning. The main challenge in the development of learning multimedia on the competence of making tunic patterns is to create media that is not only informative but also interactive and easy to use. This is supported by Purnomo's (2017) findings, which emphasize the importance of user-friendly interfaces in digital learning media, especially for vocational students who need practical and systematic guidance.

Based on these conditions, this study focuses on the development of digital learning multimedia for making tunic patterns based on SAC, which is expected to improve the quality of the learning process of creating patterns, make it easier for students to understand the concepts and techniques of making tunic patterns, and optimize the use of digital technology in vocational education. This is expected to answer the need for engaging and supportive learning media to achieve competence. This research's significance lies in transforming conventional learning methods into more interactive, efficient, and following the demands of the development of the modern fashion industry.

METHODOLOGY

The Type of Research

Research and development (Research and Development) is the type of research used. Researchers use research and development (Research and Development) because the research aims to develop a product and determine its feasibility. The feasibility of the product is known after going through the validation stage by experts and user trials. In this case, researchers are developing multimedia learning based on Smart App Creator (SAC) to make tunic patterns digitally with CAD Richpeace.

Development Procedure

The research procedure is adapted from the ADDIE development model, which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. In this study, it is limited to the development stage. The process of developing learning multimedia based on Smart App Creator (SAC) with the ADDIE approach model is described as follows:

Analysis Stage

The analysis stage is carried out to analyze a problem that is the basis for the need for new media development. Several things need to be analyzed, including needs analysis and material analysis.

Design Stage

At the design stage, a design for the future product, namely Smart App-based learning multimedia Creator (SAC), must be created. At this stage, the researcher will create an initial description from the media developed in the form of a flowchart that contains a material framework for viewing interconnectedness of the material as a whole, making a storyboard containing an explanation of the product flow learning multimedia, collection of material about making tunic patterns digitally with Richpeace CAD, creation of

design assets in the form of images, logos, navigation buttons using the Canva application which can be accessed and downloaded online free, collection of audio from several downloadable sources for free.

Development Stage

At the development stage, the researcher begins to compile the material, compile the prepared materials into Smart Apps Creator (SAC), and make video tutorials about pattern-making tunics digitally with richpeace CAD software that will linked to media products. The preparation of materials and ingredients is based on the design created so that the product is produced systematically after the product preparation process. Once completed, the product is exported in .apk and WEB format to be used and operated on a smartphone. Smart App Creator (SAC) based learning multimedia products that have been developed, followed by a validation stage by experts in material and media to determine the product's suitability. Media that has been improved by suggestions and input from the validator, followed by a user testing phase.

Product Trial Design

The product developed is SAC Smart App Creator (SAC)-based learning multimedia. The trial was carried out after the media was validated by experts and refined by the suggestions and inputs given. The trial was conducted in a small group to determine the feasibility of SAC (Smart App Creator)-based learning multimedia by users. The trial was conducted online by providing a questionnaire through a Google form and via the media sent through a WhatsApp group.

The subjects of this study consist of two media experts, two material experts, and students for individual and extensive group large-group testing. The population in this study is students of SMK Negeri 1 Karanganyar, with a total of 1,033 students divided into 37 groups from several fields of expertise. The technique used for sampling in this study is purposive sampling, with specific considerations. The researcher took samples based on certain criteria: vocational schools implementing the Independent Curriculum and receiving materials for making digital patterns. Therefore, the researcher chose Fashion Design students in grade XII of SMK Negeri 1 Karanganyar as the trial subject, which amounted to 20 students. This is the opinion of Sugiyono. (2013), Which states that the sample in a small-scale test involves at least 5-8 respondents.

Data Collection Techniques and Instruments

The data collection methods used in this study are interviews, questionnaires, and literature studies. The instrument used the Uwes Chaeruman media evaluation sheet (2019) to assess the feasibility of media in the form of questionnaires given to media experts, material experts, and users (students). Instrument sheets for media experts, materials, and users (students) are checklists using a Likert scale (Safitri, 2024; Safitri, Lestarani, et al., 2024). The data analysis used was a percentage descriptive analysis technique, describing multimedia development results, learning to make digital tunic patterns based on SAC (Smart App Creator), and conducting a product feasibility test. The formula for obtaining the average score is as follows:

$$Score\ average = \frac{\sum x}{n}$$

Information:

$\sum x$ = The total score of each response

n = Number of Response Items

The average score results that have been calculated are converted into the percentage value of media eligibility with the following formula:

$$Eligibility\ level = \frac{\sum score}{\sum maximal\ score} \times 100\%$$

The next step is to categorize the feasibility of learning media. According to Arikunto (2018), the eligibility level categories are as follows:

Table 1 Media eligibility categories

Score In Percentage	Category
<21%	Very unworthy
21-40%	Not eligible
41-60%	Quite decent
61%-80%	Proper
81-100%	Very worthy

FINDINGS

Learning Multimedia Development Results

The research results in the form of learning media developed on making digital tunic patterns are SAC (Smart App Creator)-based learning multimedia in the form of Android and WEB applications. Multimedia learning based on Smart App Creator (SAC) consists of 6 main menus, including competencies, materials, tutorial videos, quizzes, references, and developer profiles. The following is a sampling of the learning multimedia display:



Figure 1. Media display

There are two additional menus on the main menu display: the instruction menu, which contains an explanation of each icon used, and the information menu, which includes a description of the main menu. In each main menu, there are several sub-menus. On the sub-menu, there is a material page that contains an explanation of the meaning of a tunic, various types of tunics, tools used when making patterns, equipment and needs used when making patterns digitally, occupational health and safety during the work process, and steps to create a tunic pattern with Richpeace CAD. Each material is equipped with explanatory audio, images, and videos to make it easier for users to understand.

At the end of the development stage, the developed media is validated by material and media experts to determine the product's feasibility. The following is an SAC (Smart App Creator)-based learning multimedia assessment by experts.

Table 2. Subject matter expert assessment

Material Expert	Score	Percentage	Category
Expert 1	24	96%	Very worthy
Expert 2	23	92%	Very worthy
Average	23,5	94%	Very worthy

The feasibility study results by the material experts obtained an average score of 23.5, with a percentage of 94% included in the "Very Feasible" category.

Table 3. Media expert assessment

Material Expert	Score	Percentage	Category
Expert 1	39	78%	Proper
Expert 2	46	92%	Very worthy
Average	42,5	85%	Very worthy

The feasibility study's results by media experts obtained an average score of 42.5, with 85% included in the "Very Feasible" category.

Media Trial Results

The media trial was conducted on a small scale with 20 fashion design students of class XII of SMK Negeri 1 Karanganyar. Students undertook a user trial to determine the users' response regarding the media developed. Students were given a questionnaire comprising 15 questions containing aspects of assessment regarding media and media function. The results of the user trial by students regarding learning multimedia and making digital tunic patterns are presented in the following table.

Table 4. Results of user trials by student

Aspects	Total Score
Media	885
Media function	448
Total score	1.333
Average score	66.65
Percentage	88%
Category	Highly Worthy

The results of the trial on users by students obtained an average score of 66.65 with a percentage of 88%, so the feasibility of SAC-based learning multimedia is included in the category of "Very Feasible" to be used. The trial was conducted on SMK Negeri 1 Karanganyar fashion students, grade XII. The total number of respondents was 20 students. The questionnaire given to students contains 15 questions assessed from the aspect of media and the function of media. The outstanding assessment in the functional aspect of the media obtained a percentage of 89% with the category "Very Feasible."

DISCUSSION

The research on the development of learning multimedia based on SAC (Smart App Creator) has not gone through all the development procedures because it is limited to the product development stage and small-scale trials. This was done because of the limited time available. Based on the study results, the development of learning multimedia was declared feasible for use. The feasibility of learning multimedia in making digital tunic patterns based on SAC (Smart App Creator) can be determined by questionnaires to material experts, media experts, and users. The users were 20 fashion design students in class XII of SMK Negeri and 1 Karanganyar.

Material Experts

The data on the feasibility of the material was obtained from an assessment by two experts in the learning material. The evaluation consists of 5 aspects: the truth of the material content, free from conceptual errors; the current and up-to-dateness of the material; the scope and depth of the material; and the adequacy of the references used and in assessing the truth of the material content obtained a score of 5 from material expert 1 and 5 from material expert 2 with a maximum score of 5. This shows that the material presented has elements of truth that experts have assessed before being delivered to students. The results obtained follow the opinion of Kemp & Dayton (1985), who state that information or material is delivered in a manner that meets standards.

The assessment aspect of being free from conceptual errors obtained a score of 4 from material expert 1 and 4 from material expert 2, with a maximum score of 5. The assessment results show that the material presented is worthy of being said to be free from conceptual errors. This follows Sujana's (2010) opinion regarding the criteria for selecting good learning media, namely the adequacy to support learning content that is factual, conceptual, principle, and generalization.

The assessment aspect of the current and up-to-date material received a score of 5 from material expert 1 and 5 from material expert 2, with a maximum score of 5 in the category "Very Appropriate." From these results, it is known that the material in the learning media is current and up-to-date. This is the opinion of Nurdyansyah (2019, p. 85), who stated that the accuracy and up-to-dateness of the learning material characterize innovative learning media.

The assessment aspect of the scope and depth of the material obtained a score of 5 from material expert 1 and a score of 4 from material expert 2, with a maximum score of 5 in the "Very Appropriate" category. This shows that the material in the learning media has sufficient scope and depth as learning material for students. The results obtained are the opinion of Hasan et al. (2021), Who stated that media is a source of learning material for students because it contains material that needs to be studied.

The assessment aspect of the adequacy of the reference references used obtained a score of 5 from material expert one and five from material expert 2, with a maximum score of 5 in the "Very Appropriate" category. These results show that the material compiled in the learning media is based on sufficient and explicit references. This is based on Harjanto's (1997, p. 4) statement that learning materials come from standard sources, such as books, expert teachers, and the community.

Media Expert

Media suitability data was obtained from an assessment conducted by two experts in learning media. The assessment includes four components: clarity of narration, audio, video, and animation and suitability of language style and communication with user characteristics; accuracy of selection of narration, audio, and animation; attractiveness of packaging of learning multimedia; and accuracy and attractiveness of teaching multimedia as a whole.

The assessment of the clarity of narration, audio, video, and animation and the appropriateness of language and communication style obtained a score of 20 from Media Expert 1 and 23 from Media Expert 2, with a maximum score of 25. This shows that learning multimedia involves clearly described material and language appropriate to the target users. These results follow the opinion of Sadiman et al. (2014), who stated that the usefulness of learning media is in clarifying the presentation of messages so that they are not too monotonous by only displaying written or spoken words. The assessment aspect of the accuracy of the narration, audio, and animation selection obtained a score of 11 from Media Expert 1 and 13 from Media Expert 2, with a maximum score of 15 in the "Decent" category.

The assessment aspect of the attractiveness of multimedia packaging received a score of 4 from Media Expert 1 and 5 from Media Expert 2, with a maximum score of 5 in the "Very Decent" category. Overall assessment of the accuracy and attractiveness of learning multimedia obtained a score of 4 from Media Expert 1 and 5 from Media Expert 2, with a maximum score of 5 in the "Very Appropriate" category. The results of the media expert assessment showed that multimedia was organized and structured so that it was said to be appropriate and packaged attractively to be used as a learning medium. This is in line with the opinion of Sukiman (2012, p. 47), who stated that a teacher selects a media based on considerations of being able to attract the interest and attention of students, as well as presenting more structured and organized material.

Student User Trial

The trial was conducted on class XII fashion design students of SMK Negeri 1 Karanganyar. The total number of respondents was 20 students. The questionnaire given to students contained 15 questions assessed from the media and media function aspects. The prominent assessment is in the function aspect of the media aspect, obtaining a percentage of 89% in the category "Very Feasible." The function consists of ease of use of

the media, the ability to increase interest and motivation to learn, the ability to be used as a learning aid, and the ability to encourage critical thinking and use in today's digital era.

The results obtained regarding media quality were 88%, with the category "Very Feasible." Based on the data from the user feasibility test by students, it can be concluded that learning multimedia to make tunic patterns digitally based on SAC (Smart App Creator) is included in the category "Very Feasible."

Based on the trial results, learning multimedia needs to be improved based on constraints, suggestions, and input from experts and users. The obstacles experienced during the user trial were during the application installation process, which was relatively complicated and constrained by the whole storage space (Istiqlal et al., 2024; Safitri et al., 2023; Safitri, Rosnawati et al., 2024; Safitri & Ansyari, 2024). Then, the researcher created a web version to overcome these problems. In addition, revisions were given to the media aspect in the musical instrument, navigation, and layout arrangement sections. The media has several advantages, disadvantages, and limitations. Among the disadvantages and limitations are (1) Access to SAC (Smart App Creator)-based learning multimedia stored in web format requires an internet connection, (2) the WEB version of Learning Multimedia can only be displayed in portrait form.

A Smart Apps Creator is a multimedia-based application that can be used to design and create learning media that can be used on Android and iOS devices without having to code first (Fahlevi & Aminatun, 2023). The app can save files in HTML5, .exe, and app formats. SAC can be used for offline learning because it does not require an internet quota (Azizah, 2020). Various media development research using Smart Apps Creator has a positive influence on learning – research by Jannah et al. (2022) shows that Smart Apps Creator learning media is effectively used in the science learning process of grade IX students of UPT SMP Negeri 2 Kelara, Jeneponto Regency. This is because teaching media is easily accessible anywhere and anytime by presenting attractive images, videos, and animations to increase students' interest in learning.

Meanwhile, research by Wahyuni et al. (2024) showed that the SAC application has proven effective in improving the cognitive achievement of grade VI students at SDN Cimasuk in Social Sciences (IPS) subjects. Other research shows that using Smart Apps Creator (SAC) as a media innovation shows excellent results, with the advantages of SAC, and encourages SMAIT Insan Mulia Boarding School students to be more enthusiastic and active in learning history. (Fahri, 2022) The advantages of the media developed with Smart Apps Creator, accompanied by several findings on the effectiveness of the media created with the learning application, indicate that the selection of Smart Apps Creator (SAC) to develop media in this study is appropriate. To see the effectiveness of digital tunic pattern-making media developed using Smart Apps Creator, the suggestion for further research is to implement this media in learning to make digital patterns.

CONCLUSION

The research resulted in a product in the form of multimedia learning to digitally make tunic patterns based on SAC (Smart App Creator). Based on the trial of the research product obtained, it was stated that this research product was "Very Feasible" to be used as a learning medium. The learning multimedia on making digital tunic patterns based on SAC (Smart App Creator) is stored in APK format for Android and web versions so that it can be easily accessed. Moreover, in the learning multimedia, there is a tutorial video for making a tunic with Richpeace CAD equipped with text and audio explanations that are packaged attractively, making it easier for students to understand the steps to make a tunic pattern digitally. The limitations in this development have also not measured the long-term effectiveness and evaluation of the impact on learning outcomes.

Meanwhile, from the user side, the results of this study do not consider the needs of students with special needs who may not be following various learning styles. For future research suggestions, it is necessary to conduct larger-scale trials. To see the effectiveness of e-modules, we can apply a mixed-method research method. One example is adding a control group for effectiveness comparison. Suggestions for the development aspect include integrating the latest technology (AR/VR, AI) with more varied content to accommodate various learning styles.

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