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DEVELOPMENT OF LEARNING MEDIA TO IMPROVE STUDENT LEARNING OUTCOMES ON PRODUCT BRANDING MATERIALS IN VOCATIONAL HIGH SCHOOLS

Rangga Dino Alfian[1*],Fahmy Zuhda Bahtiar[1], Fathur Rahman[2],Nurul Burhan[3]

[1] Automotive Technology Vocational Education, Ivet University, Semarang, Jawa Tengah, Indonesia.
[2] Mechanical Engineering Vocational Education, Ivet University, Semarang, Jawa Tengah, Indonesia.
[3] Distance Education Vocational Education in Mechanical Engineering, Ivet University, Semarang, Jawa Tengah, Indonesia.

Email: ranggadino1@students.unnes.ac.id

Abstract

The purpose of this study is to analyze the needs of teachers and students for learning media, to determine the feasibility of learning media, and to measure the effectiveness of this learning media on Shiva learning outcomes. This type of research is Research and Development (R&D). With the validation of the research instrument, it is then continued with the research procedure using 10 stages, and quantitative descriptive data analysis techniques. The results of the media feasibility test obtained a percentage of 95% for the media assessment so that the product was categorized as "very feasible", and 93% for the assessment of material experts so that the product was also categorized as "very feasible". Student learning outcomes at n-gain value get an average score of 0.8547, meaning that the increase in student learning outcomes is in the "high" category. The researcher suggested that the use of android-based learning media to improve student learning outcomes on product branding materials could be an alternative and reference for learning media.

Keywords: Learning Media, Android, Product Branding

INTRODUCTION

Vocational High Schools (SMK) are educational institutions aimed at providing specialized knowledge and skills and preparing students to enter the workforce. SMK graduates are expected to become ready-to-use professionals who can adapt to industry needs. As an integral part of the National Education System, SMK prioritize developing students skills to work in specific fields, adapt to the work environment, and identify opportunities for future self-development (Ganing et al., 2013). Vocational education, including SMK, plays a strategic role in creating a skilled workforce capable of meeting the challenges of the ever-evolving industry (Prianto et al., 2022).

Self-development can begin with the learning process, with the most frequently used learning resource being Student Worksheets (LKS). However, the availability of learning resources is often limited and can only be accessed in libraries. However, the abundance of learning resources would facilitate students search for materials and help teachers optimize the learning process. This is increasingly crucial in the digital era, which demands digitalization in various aspects of life, including education, particularly in the development of information and communication technology-based learning media. The current education system is facing the rapid flow of information technology, which is changing people's ways of thinking and behaving (Sugiyanto et al., 2020). Technological developments are forcing the world of education to adapt, so the development of learning quality must keep pace with the times, including supporting components such as media, methods, and learning models. Roemintoyo and Budiarto (2025) emphasized that the use of smartphone-based interactive media can significantly increase the effectiveness of learning in vocational schools, particularly in developing students communication skills, a crucial competency in the 21st century.

Learning media is an essential component of the learning process. With technological advancements, conventional learning media is slowly shifting to technology-based media. Today's learning environments increasingly utilize information and communication technology, including the increasingly popular use of smartphones. Jaya et al. (2020) stated that today's mobile applications are more flexible and capable of integrating various services using web-based integration. According to Statista data, the number of smartphone users worldwide increased to over three billion in February 2020. Of the various operating systems available, Android holds the most favored position among the public because it supports a wide range of smartphone and tablet

brands and has reached all corners of the globe (Setuju et al., 2022). This makes it easier for teachers and students to support classroom learning tasks. In designing learning media interfaces, Fransisca et al. (2019) explain that the design process must consider human and computer characteristics, with design principles including user compatibility, task compatibility, consistency, familiarity, and simplicity.

Research shows that the development of Android-based learning media has received a positive response from vocational school students. This media is able to present material in a more engaging and interactive manner than conventional methods, and makes it easier for students to understand subject matter such as computer systems. Furthermore, Anar et al. (2025) revealed that the use of Android applications in learning allows for varied material delivery and supports more flexible, independent learning for students. Learning media is also expected to address the concerns of students, teachers, and parents. The development of Information and Communication Technology (ICT) in recent decades has experienced rapid progress in line with the development of telecommunications technology, including computer networks and mobile phones, which aims to facilitate human activities, including the teaching and learning process (Mustadi et al., 2022). One solution to overcome the problem of limited media is the development of Android-based learning media, characterized by flexibility, ease of use, and a variety of functions that support daily life. These characteristics are highly relevant to the needs of learning in the modern era, which demands flexible media with fast access.

Arifah et al. (2025) provided a concrete example that the introduction of Android-based digital learning media using the iSpring Suite application was proven to improve students' understanding of abstract concepts while increasing their motivation and engagement. A similar innovation was also carried out through the development of gamification-based interactive multimedia for vocational high school students, demonstrating that the media is feasible and effective in improving student learning outcomes Hafshah and Dewi (2025). Recent research by Alfian et al. (2024) developed Android-based AR-Card learning media for starter motor material in vocational high schools. The results of this study demonstrated that the media was not only feasible but also more effective than conventional methods in improving student learning outcomes and motivation, with the main advantage being the integrated 3D visualization of starter motor components. These findings suggest that developing similar media for other subjects, such as Creative Products and Entrepreneurship (PKKWU), has great potential.

In line with global progress, knowledge, innovation, and entrepreneurship remain crucial pillars for economic and societal development. Tretyakova et al. (2021) emphasize that the decreasing number of jobs and the need for more creative education are driving increased demand for entrepreneurship education. Businesses need to implement various strategies to increase sales, including: (1) enhancing brand strength, (2) focusing on product quality, (3) significantly expanding their target market, (4) providing excellent service, and (5) keeping up with the times. These strategies align with the essence of entrepreneurship itself.

Ulfa and Suharsono (2023), in their research at SMK Negeri 1 Boyolangu, emphasized that in the digital era, vocational school graduates are required not only to be work-ready but also to possess creative and independent skills, including digital entrepreneurship. This is crucial due to the imbalance between the number of job seekers and available jobs. Therefore, fostering an entrepreneurial spirit from an early age is a solution to creating new, innovative jobs. Furthermore, Ulfa and Suharsono (2023) demonstrated that digital literacy and entrepreneurial attitudes have a positive and significant impact on students' readiness for digital entrepreneurship. These findings indicate that strengthening digital literacy and fostering positive entrepreneurial attitudes through structured programs in schools, such as digital entrepreneurship programs, is crucial for preparing vocational high school graduates who are both technically competent and adaptable to business opportunities in the digital era.

The implementation of entrepreneurial programs in vocational high schools, such as the Entrepreneurship Development School Program (SPW), trains students to create their own businesses and develop an entrepreneurial spirit through hands-on practice, both online and offline. Lestari et al. (2023) found that the SPW program, implemented through six learning stages, combining theory and practice, effectively enhanced students' entrepreneurial soft and hard skills. These included forming interest-based groups, industrial visits, guided training, character building, independent group entrepreneurship, and business strengthening.

Based on an interview conducted by the researcher on January 24, 2023, with the Head of the Mechanical Engineering Department and Creative Products and Entrepreneurship (PKKWU) teacher at SMK Negeri 4 Semarang, Mr. Ruly, it was found that during the learning process, students tended to feel bored and lacked enthusiasm. The learning media used were still limited to whiteboards and PowerPoint presentations. He also acknowledged the desire to develop Android-based learning, but was hampered by limited time and expertise in designing learning media. This condition reflects the urgent need for training in the development of Android-based learning media for teachers, as has been done by Alfian et al. (2026) in community service activities at Ivet University. The activity aimed to improve the digital competence of lecturers in designing and developing interactive Android application prototypes integrated with the values of the Sustainable Development Goals (SDGs), as well as encouraging a shift in learning approaches from conventional to technology-based learning. This indicates that efforts to increase teacher capacity in developing Android media are very possible and necessary. On the other hand, in the context of entrepreneurship, some students have tried selling within the school environment, especially through the canteen. However, students capabilities are still limited to unbranded products with unattractive designs.

All Mechanical Engineering students at SMK Negeri 4 Semarang own Android smartphones. The popularity of Android among students prompted researchers to create Android-based learning media specifically for Mechanical Engineering students. Although students own Android smartphones, their use in the learning process is not optimal, as most use them only for communication, playing games, and accessing social media. With Android-based learning media, it is hoped that students will be able to more practically and easily understand the Creative Products and Entrepreneurship (PKKWU) material. Thus, the learning process is expected to be more engaging and effective because students can access the material anytime and anywhere as long as they have an Android smartphone.

RESEARCH METHODS

The research and development method used refers to the modified Borg and Gall development model from Sugiyono (2017). With the validation of research instruments, it is then carried out in several stages to facilitate and clarify research including potentials and problems, data collection, product design, design validation, design revision, product trial, product revision, usage trial, product revision, and final product, as shown in figure 1 as follows :

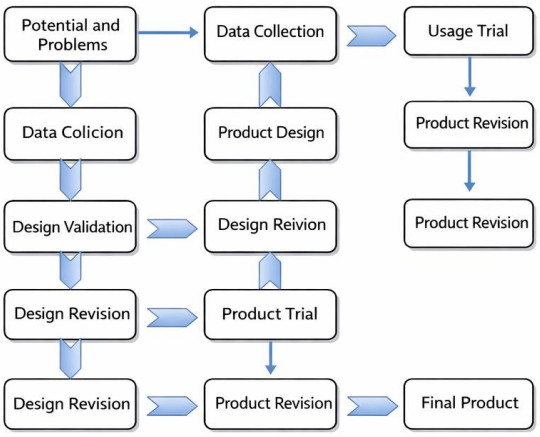

Figure 1. Product Development Procedure

Furthermore, the application design in the field uses Pre-Experimental Design with the type of One Group Posttest-Pretest where this design is used to find the effect of the treatment given by comparing before and after the treatment.

$$O_1 \; X \; O_2$$

O1 is the pretest value in the initial condition before the experimental group is given treatment, X is the learning process using android-based learning media, and O2 is the posttest value in the final state after the experimental group is given treatment.

RESULT AND DISCUSSION

1. Results of Learning Media Needs Analysis

The first step taken by the researcher for the development of android-based learning media to improve student learning outcomes on product branding materials in Vocational High Schools is to analyze the needs of teachers and students for these learning media. This needs analysis is carried out through three stages, namely: (1) validation of the research questionnaire by the supervisor first before the research questionnaire validation process by experts (2) through the stage of direct interviews with Indonesian subject teachers and (3) distributing the needs questionnaire to students.

a. Research Questionnaire Instrument Validation Results

The results of the validation of research instruments by taking assessments for research questionnaire instrument experts were carried out by 2 experts, namely Mr. Adhetya Kurniawan, S.Pd.,

M.Pd. as a lecturer from the automotive engineering education study program and Mr. Febrian Arif Budiman, S.Pd., M.Pd. as a lecturer in automotive engineering education. The following are the results of the validation of the research questionnaire instrument by experts.

Table 1. Results of Research Questionnaire Validation Analysis

Research Questionnaire Expert	Total Score
Total Score	74
Maximum Score Amount	88
Percentage %	84%
Category	Proper

Based on the data in table 1, the assessment of media experts obtained a feasibility percentage of 84% so that it was categorized as "Decent".

b. Interview Results

Interviews were conducted with 2 teachers of creative products and entrepreneurship subjects in grade XII at SMK Negeri 4 Semarang, namely Pak Dwi, S.Pd., and Pak Naryo, S.Pd., The interview aimed to find out the opinions of teachers regarding PKKWU learning that has been taking place in schools and opinions on the development of android-based learning media on product branding materials. From the results of the interview, it can be drawn that PKKWU learning is quite good, but in learning product branding, teachers have not used varied learning media so that it becomes an obstacle for teachers in delivering learning and students also feel bored in learning. Then the researcher offers android-based learning media to be developed into android-based learning media on product branding materials. Regarding the development of the media, the teacher stated that he agreed because the media developed was in accordance with the needs and developments of the times so that it could attract the interest and enthusiasm of students in learning.

c. Results of Needs Survey

Table 2. A Survey of Students Needs

No	Question	Criterion	Student	(%)
1.	Do you have a smartphone?	yes	36	100%
2.	Do you always use your smartphone?	often	27	75%
3.	How important is the use of smartphones in learning?	Very important	25	69%
4.	In a day how long do you use a smartphone?	3-6 hours/day	21	58%
5.	Have you used smartphones in school learning?	Already	36	100%
6.	Has your teacher ever used an android smartphone in the learning process?	Ever	36	100%
7.	How often does your teacher use an android phone as a learning medium in the learning process?	Sometimes	23	64%
8.	Is using an android smartphone already a necessity for you?	Yes	34	94%
9.	Does the school have an internet/wi-fi network?	Yes	36	100%
10.	What do you need to use a smartphone?	Study	19	52%
11.	Does an android smartphone make it easier for you in the learning process?	yes	36	100%
12.	What types of media are suitable for use in learning creative products and entrepreneurship?	Audio Visual	26	72%
13.	Do you need a learning medium that is easy to operate?	Sangat Butuh	19	52%
14.	Do you want an attractive learning media design?	want	26	72%
15.	How has learning creative products and entrepreneurship been so far without using android-based learning media?	Boring	19	52%
16.	Do you often find it difficult to learn Creative Products and Entrepreneurship?	Often	24	67%
17.	17. Do you agree if in the learning process of Crea-	Agree	32	89%

	tive Products and Entrepreneurship use android smartphone-based learning media to help you in the learning process?			

2. Results of Android-based Learning Media Development

Figure 2. Learning Media Home Page

Validation of media experts and subject matter experts is carried out after the product design is completed. Media expert validators to test the quality and suitability of android-based learning media. Meanwhile, the validator is a material expert to test the quality and suitability of material on android-based learning media. There are 2 media expert lecturers, namely Mr. Prof. Dr. Wirawan Sumbodo, M.T., as a lecturer in the Automotive Engineering Education study program, and Mrs. Uswatun Hasanah, S.Kom., M.Eng., as a lecturer in the Computer Engineering study program. Meanwhile, there are 1 lecturer and 1 teacher, namely Mr. Andri Setiawan, S.Pd., M.Pd., as a lecturer in the Automotive Engineering Education study program, and Mr. Dwi Yulianto, S.Pd., as a teacher of SMK Negeri 4 Semarang. The following are the results of the analysis of product feasibility test data by media validators.

Tabel 2. Hasil Analisis Validasi Ahli Media.

Media Member	Total Score
Total Score	137
Maximum Score Amount	144
Percentage %	95%
Category	Highly Worth It

Based on the data in table 2, the media expert's assessment obtained a feasibility percentage of 95% so that it can be categorized as "Very Feasible".

Table 3. Results of Material Expert Validation Analysis

Material Expert	Total Score
Total Score	126
Maximum Score Amount	136
Percentage %	93%
Category	Highly Worth It

Based on the data in table 3, the assessment of material experts obtained a feasibility percentage of 93% so that it can be categorized as "Very Feasible".

Products that have been validated by media experts and subject matter experts are then tested on a small scope. This test was carried out in class XII Mechanical Engineering 1 with a small scope of 6 students. The following are the results of students responses to the scope trial obtained a feasibility percentage of 92.7% so that it can be categorized as "Very Good".

The learning media developed can be said to be practical if users say that android-based learning media can be used without revision or little revision. The students responses were obtained from the questionnaire given at the end of the lesson. The results of student responses can be seen in the following table 4:

Tabel 4. Hasil Tanggapan Peserta Didik

Student	Total Score
Total Score	2411
Maximum Score Amount	2880
Percentage %	83,73%
Category	Sangat Baik

Based on the results of the analysis of students responses regarding android-based learning media on product branding materials, the percentage of 83.73% was in the category of "Very Good".

Table 5. Test Results t

Paired Differences					*t*	*df*	*Sig. (2-tailed)*
Mean	*Std. Deviation*	*Std. Error Mean*	*95% Confidence Interval of the Difference*				
			Lower	*Upper*			
-46,66667	8,38025	1,39671	-49,50213	-43,83120	-33,412	35	,000

Based on The results of the t-test in Table 3.7 obtained a pretest and posttest have significant differences. Then, by looking at the Sig.(2 tailed) value according to the table above the value of 0.000 < 0.05, it can be said that there is a significant difference in the chance of 0.05 between the pretest and posttest values of product branding material.

Table 6. N-Gain Test Results

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_Scrore	36	,66	1,00	,8547	,10815
Ngain_Persen	36	65,96	100,00	85,4733	10,81508
Valid N (listwise)	36				

Based on table 3.8, it can be seen that the average value of N-Gain is 0.85, so the acquisition of the n-gain score is included in the "High" category.

The results of this research are supported by several research results that have been carried out previously. The research conducted by Handoyono & Rabiman (2020) in their research explains the design and performance analysis of android-based learning applications in EFI service materials. The results of the study show that the use of android mobile learning can make learning effective, meaning that learning systems that use smartphones can make learning more fun and interactive. Then the research conducted by Siregar et al. (2021) with the research title "Android-Based Learning Media for Vocational High School Students" explained that online learning has an impact on decreasing student interest and learning outcomes, so students need media that can help the learning process. The research aims to produce an android-based learning application for vocational school students. The results of the study show that the learning application media developed has a high validity value, so as to develop and teach vocational school students. In addition to having a high validity value, the learning application media has increased student motivation and learning outcomes.

Furthermore, the research conducted by Mustadi et al. (2022) with the title "Pancalis: Android-based learning media for early-reading innew normal" which develops Android-based learning media with the Adobe Flash application program in the form of interactive and innovative learning media for early reading. This research uses a Research and Development (R&D) approach using the ADDIE model. The research subjects in this study are two experts as well as 18 teachers and five elementary school students. They were established using purposive sampling techniques. The data collection technique uses questionnaires and scales. Data analysis uses descriptive statistics.

CONCLUSIONS AND SUGGESTIONS

Conclusion

1. The results of the analysis of teacher and student needs obtained from interviews with teachers and students in the form of a questionnaire of student needs for android-based learning media provide several results. The results of the teacher's interview stated the need for android-based learning media for product branding materials, and the results of the student questionnaire in the form of media characteristics used by the researcher as a reference and basis in the development of android-based learning media. Some of these aspects are a combination of several indicators that contain the number of respondents as a percentage are as follows: 1) aspect of class situation by 83.6%, 2) aspect of feasibility of content and media materials by 78%, 3) aspect of media presentation by 58.6%, 4) aspect of expectations and suggestions for the development of learning media by 78%. The results of these four aspects will be the reference and basis for researchers to develop android-based learning media to improve student learning outcomes on product branding materials in Vocational High Schools.
2. This android-based learning media is very suitable for use in learning on product branding materials, because based on the results of the feasibility test on android-based learning media, after testing by 2 media experts, a percentage result of 95% was obtained with the category "Very Feasible" to be used in the learning process, while the results of the feasibility of the material after testing by 2 material experts, obtained a percentage result of 93% with the category "Very Feasible".
3. The learning outcomes of students obtained an n-gain score of 0.8547, based on the distribution of n-gain scores, the increase in learning outcomes is included in the "High" category"

Suggestion

Based on the discussion of the research, the researcher can provide suggestions on the use and development of media. The suggestions from the researcher are as follows

Teoretis Advice

Android-based learning media to improve student learning outcomes in product branding materials at Vocational High Schools is also expected to be further developed in the content of the material so that it can cover all chapters in the subject of creative products and entrepreneurship

Based on the results of the discussion, the fol

Practical Advice

a. Android-based learning media to improve student learning outcomes on product branding materials in Vocational High

Schools that have been developed by researchers can be used as a medium in learning creative and entrepreneurial products. This media can be used as a learning medium that can improve learning outcomes and student interest so that learning at school is not boring and makes it easier for teachers to deliver product branding materials..

b. Android-based learning media to improve student learning outcomes on product branding materials in Vocational High Schools that have been developed by researchers can be used for students because this android-based learning media can be opened anytime and anywhere and is easy to access. In addition, with this android-based learning media, the function of smartphones in students that was previously only for entertainment can now also function as a support for the student learning process.

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