Jurnal Evaluasi dan Pembelajaran
Volume 7 Nomor 2, Tahun 2025
Available online at https://jepjurnal.stkipalitb.ac.id/index.php/hepi

Development of Learning Media Android based for Increase Quality SMK OTKP Learning with ADDIE Model

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Abstract

Improving the quality of education in Vocational High Schools (SMK) is a strategic challenge in responding to the growing needs of the industrial world, especially in the Office Automation and Governance (OTKP) department. One solution that can be applied is the development of technology-based learning media, such as Android applications, to increase learner engagement and understanding. This study aims to develop and test the effectiveness of Android-based learning media using the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation) at SMK OTKP Way Kanan. The research used the Research and Development (R&D) method with qualitative and quantitative approaches. Data were collected through interviews, observations, and questionnaires. The results of material expert validation obtained an average score of 87.5% (very feasible category), and the results of media expert validation obtained a score of 85% (very feasible category). The small group trial showed an increase in the average score from 68.4 to 83.7, while the large group trial showed an increase from 66.2 to 85.1. The results of interviews and observations support these findings, showing an increase in enthusiasm, active participation, and student understanding of the material. Thus, the Android-based learning media developed proved effective in improving the quality of learning and can be used as a model for the development of similar media in other departments and levels in vocational education.

Keywords: Learning Media, Android, ADDIE, SMK, OTKP, Vocational Education

Introduction

Education in Secondary School Vocational (SMK), especially in Major Office Automation and Governance (OTK), has role strategic in prepare generation young become power competitive work in the industrial world (Aryawan 2023). In the context of this, quality effective teaching and learning media is factor the key needed be noted. First , the development technology rapid information demand vocational school to adapt with method their teaching and tools use . Research show that implementation technology like *Augmented Reality* (AR) and other digital platforms can increase experience Study students , allowing they For control relevant skills For fulfil need industry (Halim, et al. 2023 ; Maritsa et al. 2021 ; Yuniar et al. 2024). However, the challenges in implementation effective learning very much real. Many vocational schools, including OTK major, still face problem Serious like limitations access towards learning media innovative and resourceful adequate power. For example , research by Halim et al. shows existence devotion society that aims For increase teacher's ability in using AR media, but challenge implementation Still There is in matter training and accessibility (Halim, et al. 2023). In addition, research by Rahmadani and Kamaluddin revealed that Utilization of the Independent Teaching Platform (PMM) by teachers in vocational schools can increase competence they, even though challenge in old habits and dissatisfaction to old method remains There is (FB Rahmadani and Kamaluddin 2023) . Efforts in handle problem this, a different approach like blended learning can applied. According to Yuniar et al., approach This merge learning look at face to face and online, providing more

flexibility big to students, as well as allow they For Study with a better way interactive and engaging (Djamen, et al. 2021).

Innovative learning media is also necessary considered, with notice principles design effective learning For ensure that student No only understand theory but also can apply knowledge they in situation real practical (Tarihoran 2019 ; Rahmadani and Kamaluddin 2023 ; Haeruman, et al. 2021). With Thus, it is important for vocational schools, especially OTK Department, for Keep going make an effort increase quality learning they through development relevant curriculum, ongoing training for teachers, and utilization adaptive technology. Suggestions for study more carry on covering development and evaluation of more advanced learning models responsive to change fast in the world of industry and technology, as well as provision source adequate power For support implementation the (Annisa et al. 2022 ; Handoko, et al. 2020 ; Nur Islami and Imron 2023). Therefore that, education in High School Vocational, especially in the OTK Department, must directed For Not only teach skills basic, but also supports development appropriate character and attitude with demands global industry.

In the era of modern education, the use of Technology Information and Communication (ICT) has become very vital, especially in context education vocational like High School Vocational (SMK) (Waruwu et al. 2024 ; Firdaus et al. 2024) . With increasingly global competition tight , ICT integration in learning vocational No just A choice , but rather urgent need For increase readiness student in entering a dynamic and complex world of work (Rahmadani, et al. 2023 ; (Irwanto 2020) . Application Android based , with high accessibility and convenience usage, can open opportunity significant for development education , strengthening personal learning and providing chance for student For interact with content in a way more attractive and flexible (Rosidin et al. 2025 ; Pratiwi et al. 2024 ; Sahrani and Lestari 2018) . One of the a very acceptable approach in development of learning media ICT based is ADDIE method (Analysis, Design, Development, Implementation, Evaluation) (Firdaus and Firdaus 2024) . This method offer framework Work systematic For design and develop application learning, ensuring that results end in accordance with needs and goals more education wide (Anindhita, et al. 2022 ; Hidayat et al. 2023) . Research show that use ADDIE method in development Android applications can increase effectiveness of learning media , because approach This allow integration bait come back from students and teachers at every stage , so that results end between applications and needs education can aligned (Sahrani and Lestari 2018 ; Wahyuni et al. 2023) .

In education vocational, improvement skills think critical and application literacy vocational in curriculum is very important (Rahmadani, et al. 2023 ; Fauzi et al. 2021) . Use application learning Android based can support improvement skills this , with give access direct to student For content relevant interactive with field studies them . With development applications that focus on appropriate teaching materials, students expected capable understand concepts practical and theoretical support skills vocational they (Ramadhan, et al. 2024) . Common obstacles faced by vocational schools include lack of source power and lack of it training for teachers in using ICT in a effective (Effendi, et al. 2024 ; Hassan and Minggo 2022) . Therefore that , development application learning that utilizes ADDIE method does not only help in creating effective media, but also potentially in give training for teachers, so that they can facilitate use application the optimally in activity Study teaching in class (Effendi, et al. 2024). With all potential offered , development application learning Android -based at the Office OTK Department of Vocational School in Way Kanan, using approach systematic like ADDIE, it is expected No only fulfil need urgent learning , but also constructive strong foundation for student in face future challenges (Rafiola et al. 2020 ; Hidayati, et al. 2021).

Result of study this is very clear, namely for overcome limitations of learning media existing conventional and optimize utilization technology in increase effectiveness and

efficiency learning. In the middle the more rapid development technology, important for institution education, especially vocational schools, for transform and adopt approach more learning innovative and relevant with demands of the industrial world. Research This aiming For develop application learning Android based which can give solution concrete in increase quality learning at the Office OTK Department of SMK . In addition , it is expected results study This can give contribution significant for improvement quality education in the Way Kanan area and become a model that can adapted in other vocational schools in Indonesia.

Method

Study This adopt Research and Development (R&D) approach with using the ADDIE model to designing and developing learning media Android based on the Department Office Automation and Governance in SMK. ADDIE Model is chosen Because provide approach systematic consisting of of five interrelated stages integrated: Analysis , Design, Development, Implementation, and Evaluation (Umar, et al. 2023). In context education, approach This important For help researcher identify need specific in the learning process , designing suitable product with need and validate it effectiveness products that have been developed (Ediyanto et al. 2022). Research This is research and development focused on manufacturing learning media products use support student in eye lesson administration office (Wardhono et al. 2023).

Subject study consists of of 8 teachers and 55 students who participated eye lesson related . Involvement various stakeholders interest in study This ensure that the learning media developed truly fulfil need teaching and learning process students in vocational schools (Rozo and Rea 2019). Therefore that, participation power teachers and students in interview as well as observation give outlook deep about existing problems and needs.

Procedure study follow stages in the ADDIE model, it starts from analysis needs, which are carried out through interviews and observations (Umar, et al. 2023) . After need identified, stage learning media design done to be in harmony with objective learning. Development application covers making content learning, quiz interactive, and features evaluation For ensure effectiveness material in increase understanding students. At the stage implementation , application tested try in class For get bait come back from teachers and students related use of the media (Firdaus and Firdaus 2024) . Stage Lastly, evaluation aims to For evaluate extent of learning media can increase quality of learning process teaching, which is measured through questionnaire and analysis results Study student (Wang, 2024).

Visually the stages involved in the ADDIE model, namely Analysis, Design, Development, Implementation, and Evaluation, which are interrelated connected in a way systematic For reach objective effective learning. following picture channel development of learning media use The ADDIE approach is presented in Figure 1.

Figure 1. ADDIE Development Model

Source : Dick, W., & Carey, L. (1996). The systematic design of instruction (4th ed.). HarperCollins College Publishers

Study This use a number of instrument data collection, namely questionnaire, interview, and observation (Umar, et al. 2023). Questionnaire designed For measure level satisfaction user towards existing learning media developed . Interview give information more qualitative deep related hopes and needs student and teachers (Ediyanto et al. 2022) , while observation used For to obtain proof more carry on about acceptance and effectiveness of media in context classroom learning . Collected data Then analyzed in a way descriptive For give clear picture about impact use of learning media Android based . Research This contribute significant to development methodology education with emphasize importance collaboration between theory and practice in sustainable development of educational media (Cheng, et al. 2021). A systematic and comprehensive approach in the ADDIE model no only produce product practical learning, but also reflects need as well as dynamics learning in the environment education moment This.

Results and Discussion

Analysis (Analysis)

At the stage Analysis in the ADDIE model, it is done identification to characteristics participant educate, needs learning, as well as factors that can influence success development of learning media. Analysis This aiming For ensure that application developed learning can fulfil need students and facilitate the learning process in a way effective . In research this, participants students involved originate from Major Office Automation and Management in Vocational Schools, with diverse characteristics Good from aspect age and also access to technology.

Demographics participant students involved in study This show that student consists of from 27 students male (49%) and 28 students women (51%), with range age between 16 to 18 years old . Students This are in grades XI and XII, which shows that they be at the stage learning continuation in vocational school, with knowledge base about administration and technology . Most of student originate from areas that have not been fully own access easy to technology high , even though almost all in all own personal Android phone . This is become consideration important in development application learning Android based which can accessible to all students , although There is limitations in matter infrastructure technology in the area they . Demographic data Students more Details presented in Table 1.

Table 1. Demographics Learners

Subject Demographics	Description
Amount Male Students	27 people (49%)
Amount Female Students	28 people (51%)
Range Age	16 to 18 years
Class	Class XI and XII Department Office Automation and Governance
Educational background	Most of the student originate from areas that have not been fully own access easy to technology high, even though they own personal android phone.

With understanding to characteristics audience and background behind education, at the stage analysis done interview with five supervising teachers eye lesson show that application assist teachers in manage learning, improving interaction with students, and improve motivation students. Application allows teachers to monitor progress students,

improve interaction through discussion forums, and provide student chance For Study in a way independent with a better way interesting.

Design

At the Design stage, the application learning Android based designed with various Supported features interaction and engagement student in learning. Application This aiming for make it easier understanding material administration office and automation with serve content in a way interactive in form text, images, and videos. Key features in application includes :

1. Learning materials Interactive, Explanatory content concepts base in administration office and automation.
2. Quizzes and Evaluations, every chapter material accompanied by with quiz for test understanding students. Quiz This is also accompanied by bait come back direct For repair understanding student .
3. Discussion Forum, this feature allow student For discuss about material learning, which improves interaction between students and teachers as well collaboration between student.

In addition , the application This equipped with feature reports that allow teachers to monitor progress student in real-time, so that make it easier monitoring and evaluation of the learning process . Interface application designed with user-friendly, ensuring that application easy operated by all students , including those who use device with specification low . With simple and intuitive design, application This expected can increase involvement students and facilitate more learning flexible and effective. With mature design this, application learning Android based ready For tested try and use in classroom learning.

Development

At the stage Development, applications learning Android based which has designed start realized. Development team integrate material learning in text, image, and video formats, as well Features like quizzes, discussion forums, and reports progress students. Testing carried out on various Android devices for ensure application walk with good, good on device with specification tall and also low.

Testing beginning show application can accessed with smooth and functional in accordance with design. Feed come back from students and teachers are used For refinement application before implementation more continue. With Thus, the application Ready used in more learning wide. Material menu display *Management Office Automation and Governance* in applications learning Android based which has developed in Figure 2.

Figure 2. Office OTK Management Material Menu Display Android assisted

Implementation

At the stage Implementation, application learning Android based applied in class Office Automation and Governance. A total of 55 students from grades XI and XII use

application For learn material administration office and automation. Applications This used in term time four week , and during period said , students given task For finish quiz after every chapter. Following This is visual documentation of implementation stage implementation, which shows How student use application learning Android based in activity Study teaching in class Office Automation and Governance Figure 3.

Figure 3. Learning in Class with use Mobile Phone Gadgets

During implementation, data collection is carried out through observation and survey For measure involvement students, effectiveness applications, and levels satisfaction user. The result show that 92% of students finish quiz with good results, and 85% of students give evaluation positive to application. In addition, the application This succeed increase understanding students, with an average grade of exam end increase by 20% after use application compared to with mark before use.

The teacher also reported that application help increase interaction between students and teachers, as well as Motivate student For Study in a way independently. In overall, stage implementation show that application This effective in increase involvement students and understanding Material. Details involvement student in finish quiz during stage implementation presented in Table 2.

Table 2. Level of Engagement Student in Finish Quiz on Stage Implementation

Category Student	Amount Student	Percentage	Information
Finish all quiz	51 students	92%	Show involvement tall in learning Android based
Not finished all quiz	4 students	8%	Constrained understanding material or problem technical on the device
Total	55 students	100%	All over student involved in the implementation process application learning

Evaluation

After four Sunday implementation, carried out evaluation For measure effectiveness application learning Android based in increase understanding student to material administration office and automation. Evaluation done through analysis results quiz, test end, and survey about skills use technology and satisfaction user.

Improvement Understanding Student

Evaluation results show improvement significant to understanding students. Comparative data mark exam end before and after use application presented in Figure 4.

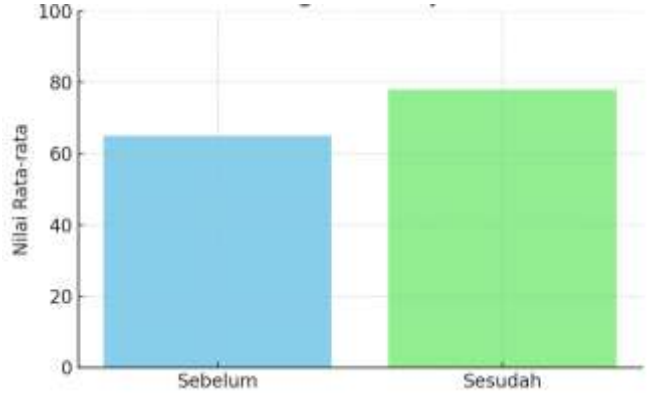

Figure 4. Comparison of Average Final Exam Scores Before and After Use Application

Based on results comparison the average test score which was previously 65 increased to 78 after four Sunday use application, with percentage improvement by 20%. Increase This reflect effectiveness application as an interactive and easy learning media Accessible . Quiz and evaluation features in application allow student for in a way direct measure understanding they as well as get bait come back fast, which drives learning independent and active.

Skills Android Technology and Use

The evaluation also includes skills student in use technology , in particular Android devices . Of the 55 students presented in Figure 5.

Figure 5. Skills Technology and Android Usage by Students

Findings This describes 82% of students who feel comfortable and accustomed use Android devices for learning . While that, 18% of students experience difficulty in operate application, which indicates that part small student need training addition For maximize use application. The results are show that majority student has own ability base in use Android devices. However, training addition can given For ensure all student can utilise application optimally.

Satisfaction Users To Application Learning

For measure experience user , done survey level satisfaction after use application . The result presented in Figure 6.

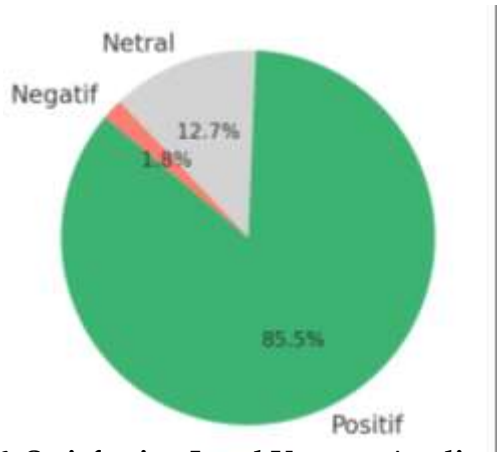

Figure 6. Satisfaction Level Users to Application Learning

In general overall chart describe results survey satisfaction users, with 85% of students give evaluation positive to application, 12% gave evaluation neutral, and 3% gave evaluation negative. Graph This give description direct about experience user with applications, including weaknesses that need to be addressed fixed. level high satisfaction reflect that application This accepted with both by students and have potential big For applied in learning based on technology.

Learning based on technology, in particular through Android application, has become approach transformative in the world of education, including at the tertiary level education vocational. Research results This prove that use application learning Android based capable increase understanding student in a way significant, as indicated by an increase in the average value exam end from 65 to 78 after implementation application during four week. Achievements This strengthen findings (Meilinda, Pasha, and Zuhriyah 2025) who stated that integration mobile technology in learning push involvement cognitive students and provide experience personal, flexible learning , and adaptive to need individual.

Developed applications in study This present Features like quiz interactive, report progress, and discussion forums, which encourage learning active, independent, and reflective. As many as 92% of students capable finish quiz with results good , reflect involvement high . This is show that media is contextual with students digital habits generation Z is capable Motivate they For participate active in the learning process . In line with (Vargas et al. 2020) , mobile learning media is able to increase motivation intrinsic Because nature flexible, interactive and easy accessed anytime and anywhere. With support multimodal content in the form of text , images , and videos. Applications This fulfil principle effective multimedia design like put forward (Segers, and Verhoeven 2020) , which can increase processing cognitive as well as Power remember student.

Aspect digital literacy , as many as 82% of students state feel comfortable use Android devices as means learning . This is in line with UNESCO report (2022) which emphasizes importance digital skills among student vocation as prerequisite readiness work , especially in field administration highly integrated office with technology information. With Thus, learning Android based not only impact on increasing results learning, but also on strengthening competence 21st century, such as digital literacy, independence learning, and ability collaborate online.

In terms of flexibility access , use Android devices allow student Study without limitation time and place , a a very relevant approach For area like Way Kanan which is still face limitations infrastructure education . It supports mobile learning principles as explained (Anggara et al. 2024) , which offers solution inclusive for public with obstacle geographical or social. Learning

No Again bound to space formal class, but can done anywhere during available devices and networks.

Interactivity application become mark significant addition. Quiz and evaluation features automatic provide bait come back direct to students, strengthening retention information and encourage the process of reflection learning. According to (Sugiarto and Farid 2023), interactivity in digital media encourages active mental engagement, strengthening understanding conceptual , as well as facilitate meaningful learning . With Thus , students No just recipient passive, but rather become participants actively involved in a way direct in construction knowledge.

Application this also works as means training relevant technology with the world of work. Department Office Automation and Governance demand mastery digital application for administration and management information, so that learning Android based no only convey material lessons, but also training student in use technology in a way productive. This is in line with UNESCO report (2022) on importance integration technology in education vocation For print power adaptive work to revolution industry 4.0.

Based on teacher perspective , use application give benefit in monitoring learning in real-time. Reporting features and discussion forums support monitoring formative and differentiation more instructions appropriate targets. Teacher support for utilization technology is very crucial. (Rahayuningsih, et al 2024) emphasize that teacher's belief in effectiveness technology become key success its integration in learning. Easy application operated, relevant with curriculum, and provide bait come back fast has proven increase effectiveness of the learning process in the classroom.

Even though Thus , the challenge still appeared . About 18% of students report obstacle technical like limitations internet access or underpowered device adequate . This fact confirm that the digital divide still exists become barrier in implementation technology in a way evenly. This is demand existence intervention from party school and government in form provision facility supporters, such as school Wi-Fi, digital training, and procurement device affordable learning. Without support strong systemic, potential technology as tool transformation education No will be optimal.

Implications from findings This is very broad. First, the application model Android based which has developed can replicated for eye other lessons and in various school with condition similar. Second, the institution education and stakeholders' policy need develop a strengthening strategy digitalization learning, good through improvement human resources capacity and strengthening infrastructure. Third, in term long, approach This potential narrow down gap education and digital, as well as prepare more vocational school graduates Ready face challenge industry based on technology.

With Thus, development application learning Android based can it is said as solution innovative and sustainable in improvement quality education vocation. In addition to supporting results students' academic and digital skills, applications this also works as bridge between system education and the needs of the industrial world. Research This open opportunity for innovation more continues, such as integration Artificial Intelligence (AI) technology for personalization content, or Augmented Reality (AR) for create experience learn more immersive and contextual.

Conclusion

Study This confirm that development of learning media Android based via ADDIE approach in significant capable answer challenge learning in vocational schools, especially in the Department Office Automation and Governance. Technology Integration in learning No only push improvement results Study students, but also foster involvement active, strengthening digital literacy, and expanding access education in a way flexible especially in areas with limitations infrastructure like Way Kanan. Based on results findings reflect that use

Android applications as learning media is solution strategic and innovative in bridge need student 21st century with the dynamics of the world of work are increasingly digitized . With positive achievement to aspect cognitive, affective, and skills technology, this media potential replicated in the eye other lessons as well level different education. As step continued, development application similar need Keep going done in a way adaptive and sustainable, with notice bait come back users, strengthen infrastructure supporters, as well as provide training adequate technology for teachers and students. Collaboration between school, developer applications, and stakeholders policy become key For ensure that digital transformation in education can walk in a way even, fair and impactful wide in the future.

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