

Development of Android-Based Mobile Learning for Audio Video System Installation Planning in Vocational Education

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Abstract - Due to difficulties, especially with the delivery of technical and abstract material, students' understanding and learning outcomes in the Audio Video System Setup Preparation (PISAV) initiative at SMK Negeri 1 Koto XI Tarusan is not meeting adequate standards. This challenge hinders students from grasping complex topics such as ear structure, sound behavior in different spaces, and the setup of audio-visual systems. Therefore, the assessment results show that almost 43% of students failed to achieve the KKTP (Learning Objective Competency Criteria) from a practical sample of 14 students.. The study technique used is the 4D development model, which includes the procedures of requirements analysis, designing, creating, and evaluating media in addition to the processes of defining, designing, developing, and disseminating. By delivering PISAV knowledge as animations that are interactive and available on Android devices smartphones, the developed instructional tools enable flexible and self-directed learning. Through validation by media experts, a feasibility level of "Very Valid" and an overall score of 93.85% were obtained. Validation by subject matter specialists resulted in a total score of 91.54%, receiving a "Highly Valid" assessment for feasibility. Meanwhile, a feasibility rating of "Very Practical" and an overall score of 89% were obtained from the practicality test or user (student) testing. This shows that the medium is interesting and motivates students to actively participate in their education in addition to being feasible in terms of look and content.

Keywords: Adobe Animate, Mobile Learning, Audio Video System Installation Planning, Interactive Learning.

I. INTRODUCTION

Technology plays a crucial role in education because it can make the learning process more effective, interactive, and engaging for students. Utilizing technology helps teachers deliver material more clearly through various digital media, thereby improving student understanding and motivation. At SMK Negeri 1 Koto XI Tarusan, the use of technology in learning also supports student competency development, ensuring they are better prepared for technological advancements in the workplace. (Syahputra et al., 2024).

Learning at SMK Negeri 1 Koto XI Tarusan, the TAV department still faces various challenges, especially in delivering material in the Audio Video System Installation Planning (PISAV) subject. The material cannot be explained using only static images and text; explanations in the form of videos/animations are needed so that students can understand this material. Because students do not understand the material taught by the teacher, as a result, students quickly feel bored in the learning process, causing students' interest in learning to decrease.

Mobile learning is an innovation in education that allows students to access learning materials flexibly, anytime,

anywhere. Through Android devices, students can participate in the learning process without being bound by the constraints of space and time. This approach perfectly aligns with the characteristics of learning that emphasize mobility, independence, and accessibility. Furthermore, the majority of students today use Android devices that support various mobile learning applications, making it easier for them to learn independently or in a directed manner through the available interactive features.

Research by Nugroho & Sari (2021) shows that the use of Adobe Animate in vocational high school learning can improve students' conceptual understanding and learning interest. Another study by Yusuf & Handayani (2022) found that Adobe Animate-based learning media helps students improve their visual and interactive skills in multimedia learning. Dwicahya & Lutfi (2024) showed that the use of Adobe Animate also improves the digital literacy of teachers and students, as they learn to integrate multimedia (images, sound, animation) into the learning process.

Based on the potential and benefits offered, SMK Negeri 1 Koto XI Tarusan needs to consider implementing Adobe Animate as part of its interactive learning media. With this technology integration, it is hoped that the learning process will be more engaging, students will have an easier time understanding the engineering concepts being taught, and they will be better prepared to face the challenges of the rapidly evolving industrial world. To achieve this, strategic steps are needed such as training for teachers, developing animation-based teaching materials, and gradually implementing it in the learning process in the Audio Video Engineering (TAV) department.

This study aims to develop and evaluate Mobile Learning using Adobe Animate, design and build Mobile Learning using Adobe Animate that can be used as a valid and practical learning tool in the TAV Department and test the effectiveness

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of the developed learning media in improving students' conceptual understanding and learning motivation at SMK Negeri 1 Koto XI Tarusan, especially in the Audio Video Engineering (TAV) Department.

II. METHOD

In this study, the research and development procedure used was the 4D model (Define, Design, Develop, Disseminate). This model was developed by Thiagarajan, Semmel, and Semmel, with the aim of producing valid and effective learning products. (Wulandari Wangi Ni Kadek, 2024). The following presents the stages of the Four-D (4-D) model development procedure in Figure 1.

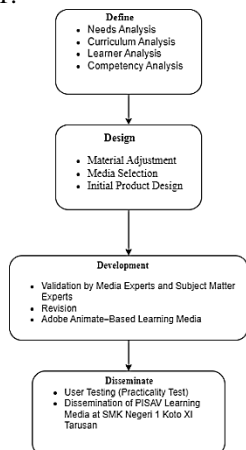


Fig 1. 4D development model

III. RESULT AND DISCUSSION

A. Result

This study developed an Android-based mobile learning application for the Audio Video System Installation Planning (PISAV) subject using the 4D development model. The feasibility of the developed learning media was evaluated through expert validation and student practicality tests.

1) Media Expert Validation

Media expert validation was conducted to assess the feasibility of the developed mobile learning media. The assessment covered several aspects, including educational media elements, display organization, interactivity, and evaluation summary. The results of the media expert validation are presented in Table 1.

Table 1. Results from the Assessment of Media Professionals

No	Aspect	Indicator	V1	V2
1	Elements of Educational Media	The initial visual appeal	5	5
		The relevance of the title for engaging media	5	5
		The guidelines for engaging media are straightforward.	3	4
		Interactive media identity completeness	4	4
		Interactive media design's attractiveness	5	5
2	Show Organization	Usability of the buttons	5	5
		Font size and type readability	5	5
		Appealing color scheme	5	5
		An appealing and suitable arrangement	5	5

No	Aspect	Indicator	V1	V2
3	Interactivity	Communication is fascinating and easy to understand.	5	5
		Media grabs learners' interest.	4	5
4	Summary of Evaluation	Ability to involve media as a teaching resource	4	5
		Media alignment with learners' requirements	4	5
		Media design fosters educational goals	5	5
Overall Score			64	68
Highest Score			70	70
Proportion (%)			91%	98%
Mean Proportion			95%	
Media Verification Group			Very Valid	

Based on Table 1, Media Expert 1 gave a score of 64 out of 70 (91%), while Media Expert 2 gave 68 out of 70 (98%). The average validation score was 95%, which falls into the Very Valid category. These results indicate that the developed mobile learning media meets the feasibility criteria in terms of design, interactivity, and suitability with learning objectives.

2) Validator Suggestions

After the validation process, several suggestions were provided by media experts and subject matter experts to improve the developed learning media. These suggestions are summarized in Table 2.

Table 2. Media Expert Evaluation Outcomes

Validator	Role	Comments
V1	Media Expert	Include usage guidelines for the application.
		Add developer identity
		Incorporate WebView within the app
		Utilize multimedia components in content descriptions
		Include an online lab (V-Lab) if feasible.
V2	Subject-Matter Specialist	Enhance the app icon and release
	Media Specialist	Introduce educational resources
V2	Content Authority	The instructional resources are currently successful
		Expand the assortment of reference resource

Based on these suggestions, several improvements were made to the mobile learning media before it was tested on students.

3) Student Practicality Test

The practicality test was conducted with 14 students of class XI TAV at SMK Negeri 1 Koto XI Tarusan. Students used the developed mobile learning media and then filled out a practicality questionnaire. The results of the student practicality test are shown in Table 3.

Table 3. Outcomes of the Student Practicality Assessment

No	User	Score Obtained	Maximum Score
1	1-n	98	105
2	2-n	94	105
3	3-n	89	105
4	4-n	105	105
5	5-n	99	105
6	6-n	86	105
7	7-n	81	105
8	8-n	92	105
9	9-n	105	105
10	10-n	85	105
11	11-n	105	105

No	User	Score Obtained	Maximum Score
12	12-n	87	105
13	13-n	100	105
14	14-n	87	105
Total		1.313	1.47
89%			

The practicality percentage was calculated using the formula:

$$\text{Practicality} = \frac{\text{Total Score Obtained}}{\text{Maximum Score}} \times 100\%$$

The calculation resulted in a practicality score of 89%, which falls into the Very Practical category. This indicates that the developed mobile learning media is easy to use, attractive, and useful for supporting the learning process.

B. Discussion

Android Mobile Learning Application Design and Creation for Audio Video System Installation Planning (PISAV) The mobile learning app for Android examined in this research was created through the 4D framework (Define, Design, Develop, and Disseminate). The results of this study indicate that the Android-based mobile learning media developed for the Audio Video System Installation Planning (PISAV) subject is both valid and practical for use in vocational education learning environments.

The validation results from media experts obtained an average score of 95%, categorized as *Very Valid*. This result indicates that the developed learning media meets the criteria of effective instructional media in terms of visual design, navigation structure, interactivity, and alignment with learning objectives. According to multimedia learning theory, learning materials that combine visual, audio, and interactive elements can enhance students' cognitive processing and improve understanding of complex concepts. Interactive multimedia allows information to be delivered through multiple representations, which helps learners build stronger mental models of the subject matter.

The findings of this study are consistent with previous research on mobile learning and interactive multimedia in vocational education. Nugroho and Prasetyo reported that mobile learning applications significantly improve students' conceptual understanding and learning engagement because they provide flexible access to learning materials and interactive content. Similarly, Wahyuningtiyas and Bachri found that mobile learning-based multimedia can increase students' motivation and learning outcomes because it presents learning materials in a more engaging and student-centered format.

In addition, the practicality test conducted with 14 students produced a score of 89%, categorized as *Very Practical*. This result indicates that the developed application is easy to use and effectively supports the learning process. From the perspective of usability theory, learning media that have clear navigation, readable typography, and interactive elements tend to increase user satisfaction and learning engagement. The positive responses from students suggest that the application interface and learning structure successfully facilitate independent learning.

The use of Android-based mobile learning developed using Adobe Animate also supports the concept of mobile learning which emphasizes accessibility, mobility, and flexibility in the learning process. Mobile learning allows students to access instructional materials anytime and anywhere, which is particularly beneficial for vocational education where students need repeated exposure to technical concepts and procedures.

Furthermore, the integration of animation and multimedia elements in the developed learning media helps students visualize abstract technical concepts related to audio-video system installation planning. Previous studies have shown that animation-based learning media can significantly improve students' understanding of complex technical topics because animations provide dynamic representations that are difficult to explain using static images or text alone.

Overall, the findings of this study confirm that the integration of mobile learning technology and interactive multimedia can provide an effective learning solution in vocational education, particularly for subjects that involve technical and procedural knowledge such as Audio Video System Installation Planning (PISAV). The developed learning media not only meets feasibility standards but also contributes to improving students' learning engagement and accessibility to learning resources.

1) Define

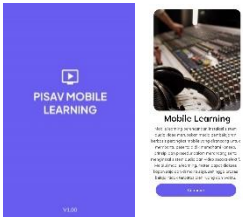
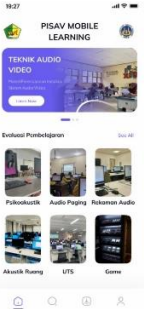


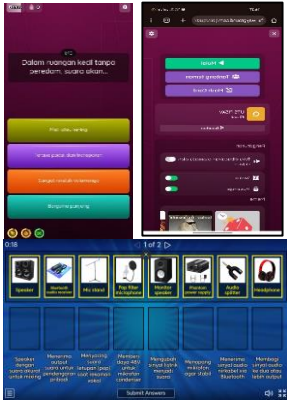
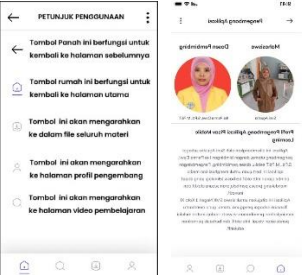
An initial investigation into the learning environment at SM K Negeri 1 Koto XI Tarusan served to finalize the first phase, referred to as the define stage. According to insights gathered from observations and discussions with the faculty of Audio Video Engineering at the school, the educational approach still heavily depends on tools such as printed textbooks or PDFs, along with teaching methods that limit student involvement in the learning process. Among the 14 students who participated in the assessment, 6 students (43%) did not achieve scores in line with the KKTP requirement (≥ 75), highlighting the necessity for improvements in the learning experience. methodologies, according to summative assessment data for class XI TAV pupils.

2) Design

During the design phase, the results of the previous inquiry are used to produce the initial product design. The process of designing involves developing a plan or initial version of the educational resources that will undergo further evaluation. The goal of this design phase is to produce a preliminary version of the end product. Typically, this phase is represented through a flowchart or storyboard serves as a framework for the media design stage, illustrating the sequence of content delivery, the relationships amongst its component, and the ways in which students engage with the media. The logical design of this mobile learning is expected to increase students' motivation to study and enhance their understanding of PISAV subject.

3) Development

Mobile Learning tools for the Audio Video System Installation Planning program involves constructing a framework for the media's content. Each page features a cover (landing page), Learning Components and Outcomes (CP), Resources, Learning Evaluation, Modules and Profiles, and Guidelines.

Appearance	Contents
	<p>The app's name, logo, start button, and subject line are all shown on the landing page.</p>
	<p>A card named "Audio Video Techniques" is shown in the main menu section, providing information about the planning materials for installing audio and video systems.</p>
	<p>The learning module of the Merdeka curriculum provides the foundation for the components (CP and ATP).</p>
	<p>The primary approach for learners to access study resources for the Audio Video System Installation Planning (PISAV) class is through the Learning Materials segment on the PISAV Mobile Learning application.</p>
	<p>Formative tests, games, and summative tests are all part of the assessment.</p>
	<p>Mobile User Guide and Profile Data are included in this view.</p>

4) Disseminate

In order to complete the study, Fourteen students from the XI grade in SMK Negeri 1 Koto XI Tarusan's Audio Video Engineering took part in a restricted trial after the validation phase. To find out how desirable and user-friendly mobile learning is for supporting the learning process, students were given a practicality questionnaire to fill out. The following is a picture of table 4 of the practicality data calculations.

Table 4. Practicality Data Tabulation

Nama Siswa	Aspek Penilaian						Total		Kategori		
	Komponen Media Pembelajaran		Peroganisasi Tampilan		Keinteraktifan		Penilaian secara keseluruhan	Skor		Persentase	
Dava Akbar	15	75%	19	95%	30	100%	34	97%	98	93%	Sangat Praktis
Dika Julian	18	90%	17	85%	26	87%	33	94%	94	90%	Sangat Praktis
Fabli Alandra	17	85%	19	95%	22	73%	31	89%	89	85%	Sangat Praktis
Gina Gumaira	20	100%	20	100%	30	100%	35	100%	105	100%	Sangat Praktis
Laura Agusfinancil	18	90%	19	95%	29	97%	33	94%	99	94%	Sangat Praktis
Mardina Safitri	16	80%	15	75%	23	77%	32	91%	86	82%	Sangat Praktis
Marvelio	12	60%	16	80%	24	80%	29	83%	81	77%	Praktis
Muhammad Refan	17	85%	18	90%	26	87%	31	89%	92	88%	Sangat Praktis
Nendri	20	100%	20	100%	30	100%	35	100%	105	100%	Sangat Praktis
Nur Annisa	16	80%	15	75%	23	77%	31	89%	85	81%	Praktis
Putri Wulandari	20	100%	20	100%	30	100%	35	100%	105	100%	Sangat Praktis
Sriwahyuni	15	75%	17	85%	27	90%	28	80%	87	83%	Sangat Praktis
Tio Firmansyah	19	95%	18	90%	30	100%	33	94%	100	95%	Sangat Praktis
Vieri Fernandes	16	80%	16	80%	25	83%	30	86%	87	83%	Sangat Praktis

Students need learning materials that can improve conceptual comprehension and learning motivation, according to the define stage outcomes. This result is in line with Nurrita's (2018) assertion that educational media serve as auxiliary elements of the educational system and can boost pupils' drive during the course of their education. Additionally, the Android platform was taken into consideration when creating the educational resources. By connecting academic content to students' real-world experiences, Android-based learning can produce relevant learning experiences. The produced media makes it possible students to better understand the concepts of Audio Video System Installation Planning (PISAV) in a more contextual and meaningful way entertaining way through captivating visual narratives and methodically arranged information.. An attractive and interactive user interface was also made possible by the usage of Figma and Adobe Animate during the development phase, which improved learner engagement and visual appeal.

Mobile Learning's Viability Based on Expert Validation Both content specialists and media professionals rated the learning materials as "Very Valid," according the confirmation outcomes. Content experts provided an average feasibility percentage of 91.54%, while media experts gave an average of 93.85%. These findings show that the media satisfies the requirements for viability in terms of interactivity, visual design, language clarity, and content accuracy. To make sure that educational media follow pedagogical and technological principles, professional validation is crucial. The validators' high ratings for elements like clarity of the content, arrangement of the layout, interface appearance, and navigation system are indicative of this. Furthermore, [7] highlights that efficient educational Materials should be presented in a methodical, interesting way while yet being pertinent to the needs of the learners. The generated medium is in line with contemporary learning methods that encourage active student participation, as seen by the excellent ratings for interactivity [8].

Media Practicality Based on Student Experiments The educational materials reached a significant level of usability, receiving an average rating of 89%, which is categorized as "Highly Usable," based based on the practicality evaluation involving 14 students. These results indicate that the

developed materials are not only appropriate in terms of design but also functional and effective when implemented in real classroom settings. Students' favorable comments about the media's usability, clarity of instructions, and general value in aiding the learning process are reflected in the high practicality score [9].

IV. CONCLUSION

The findings from the study and the subsequent discussions show that integrating Android-based educational tools in the Eleventh-Grade Audio Video System Installation Planning course during the odd semester is quite effective. This assertion is backed by the results outlined below. This investigation effectively created mobile learning teaching materials for the Audio Video System Installation Planning (PISAV) course at SMK Negeri 1 Koto XI Tarusan by utilizing the 4D development approach (Define, Design, Develop, and Disseminate). The learning media developed using the Figma platform and Adobe Animate consists of Learning Outcomes (CP), Learning Objective Flow (ATP), learning materials, instructional videos, evaluation sections, and user guidelines

It has been demonstrated that the developed mobile learning materials are dependable and beneficial for instruction. The validation by topic specialists resulted in a total score of 91.54%, deemed "Very Valid," whereas the assessment by media professionals achieved a score of 93,85%. In addition, the results of the practicality evaluation involving students showed an overall score of 90,16%, classified as "Very Practical." These findings indicate that the educational resource is not only viable in terms of its visual presentation and content quality, but it is also stimulating and can inspire students to take part actively in their learning journey.

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