



Modeling Measuring Instrument Learning Media (MILM) in Block System Practicum for Engineering Education Students

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ABSTRACT

Motorcycle practical skills are an essential competency for vocational teachers' candidate. Students start practicing by using measuring tools used when overhauling machines. So, it is necessary to have learning media that support this learning. This study aims to produce learning media modeling measuring tools based on Android. This study employed the Research and Development method with the ADDIE model. This article focuses on the modeling stage during the media development process. The developed learning media can be used among Automotive Vocational Teacher Candidates by visualizing measuring instruments. The design of the developed learning media contained User Interface design and assessment by media experts. MILM is designed for practical block system learning as an introduction to the initial material before carrying out the practice.

Keywords: Vocational, Practicum, Media, Learning.

1. INTRODUCTION

During the Covid-19 epidemic, using modern technology became a necessity[1,2]. Teachers needed to reconsider their techniques and use a range of technology to build a new learning environment for their pupils[3]. The strategy of learning must be change to keep learning activity.[4] The teaching and learning process is the main effort for students to acquire skills and knowledge at school. A quality and effective teaching and learning process is needed so that students can gain competency. The purpose of learning is to realize the efficiency and effectiveness of learning activities carried out by students. One aspect of supporting competent education is learning using a medium in learning activities. The media itself is a learning tool that helps students in learning activities. Learning media can be used as a learning resource that is broader in scope because, in these learning media, students are expected to be actively involved in teaching and learning activities in class. Multimedia can present information that we can see and

hear and later use as the basis for practice so that multimedia is more effectively used in learning. Learning multimedia in the field still needs incredibly interactive multimedia types. Learning activities, as an integral part of the educational activity system, is a phenomenon that must be improved and developed by related and interested parties[5,6].

Educating prospective technical teachers in Indonesia is crucial in developing vocational school resources. Vocational high school (VHS) graduates are expected to be ready to enter the world of work[7]. The VHS is a form of secondary education[8,9]. According to Bruri's research findings, vocational education still needs to be implemented in Indonesia with several flaws, including the teacher's inventiveness in creating lessons[7,10,11]. The habit of thinking and working has been instilled through recurrent instruction in vocational education[12]. The issue is that prospective automotive engineering teachers' students must gain proficiency with measuring devices before implementing motorcycle practice. Future automotive vocational teachers must have a fundamental

knowledge of automotive measuring instruments. Motorcycle analysis requires the interpretation and application of automotive measuring tools.

Student can boost engagement by choosing the best instructional media for each student's needs [13]. Since conventional methods were difficult for children to comprehend, their learning outcomes were poor [14]. Learning media, primarily those modified and specially created to support ease and understanding of the learning process, are needed to assist all students in learning effectively and realizing their full potential[15,16]. Information and communication technology (ICT) has transformed educational systems and improved the learning process as a result of its exponential expansion[17,18].

Management of learning, significantly higher education, must prepare itself to form alums based on competencies expected to equip itself for graduates. Competence is something mastery of one's ability in activities[6]. The automotive learning management model is a competency-based block valuable system for improving skills. Practices for students of the Automotive Engineering Education study program, as prospective teachers, need to be carefully designed with the hope of being able to answer the challenges at this time. The automotive practice learning management model with a competency-based block system will be able to condense the activities carried out. MILM is expected to reduce the learning load of students each semester. The time used in practice can also be adjusted according to working hours in the industry or company.

The activity process can train students to work in industry and stand as teaching staff in the relay of passing on the knowledge they have. Implementing the development of block system practical learning management can also be considered a planned training and service activity[6]. Training is a practical learning activity carried out repeatedly using equipment and services. This article focuses on the modeling stage during the media development process.

2. METHOD

This study uses the ADDIE approach for research and development. The analysis, design, development, implementation, and evaluation stages of the ADDIE paradigm are appropriate for creating learning material[19]. The graphic below shows the ADDIE model diagram.

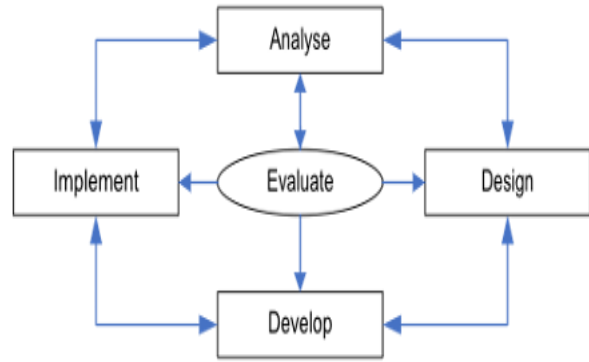


Figure 1. ADDIE Model [20]

By adapting to various scenarios, interactions within contexts, and interactions between contexts, the application of ADDIE to instructional systems design simplifies the complexity of purposeful learning settings[20]. The study sample takes the form of an upcoming application layout design.

3. RESULT AND DISCUSSION

This research is currently only in the design phase. The analysis phase of the development process is used to identify the needs. Based on the findings of the investigation in the preceding step, the design phase is completed. Next, make preparations for the materials that will be used in the learning media, including a timeframe for implementation. In the process of learning, the research starts with an analysis phase. Future teachers of vocational education work in the field to develop the abilities that will eventually be taught in vocational schools.

No	Design Model	Explanation
1		"Menu Display" 1. Welcome Text 2. Menu Bar 3. Search Box 4. Module Title 5. List of Module

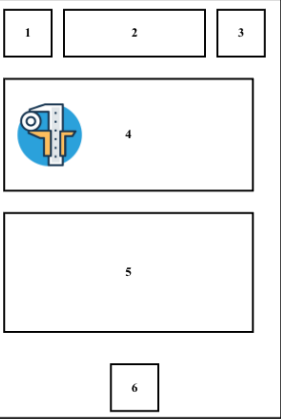
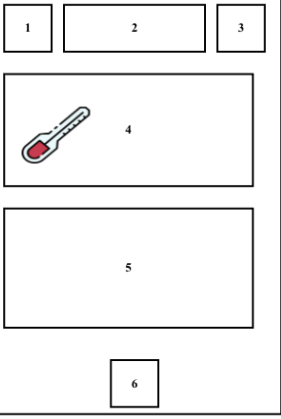
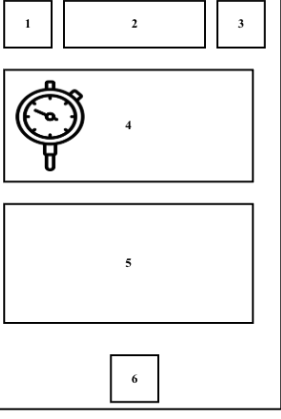
2		<p>“List of Module”</p> <ol style="list-style-type: none"> 1. Back Button 2. Menu bar 3. List of Module 4. Module 1 5. Module 2 6. Module 3
3		<p>“List of Checked Module”</p> <ol style="list-style-type: none"> 1. Back Button 2. Menu Bar 3. List of Module 4. Module Name 1 5. Check Box 6. Module Name 2 7. Check Box 8. Module Name 3 9. Check Box
4		<p>“Module 1”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Module Figure 5. Explanation 6. Troubleshoot 7. Page

5		<p>“Module 2”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Module Figure 5. Explanation 6. Modul Figure 2 7. Explanation 8. Page
6		<p>“Module 3”</p> <ol style="list-style-type: none"> 1. Back Button 2. 2 name of Module 3. Menu Bar 4. Module Figure 5. Explanation 6. Video Explanation 7. Page

Animation of Measuring Instruments

Animation of the use of measuring instruments will help students understand learning. The following is an animated measuring instrument design.

No	Design Animation	Explanation
1		<p>“Animation Module 1”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Animation 5. Explanation 6. Page

<p>2</p>		<p>“Animation Module 1”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Animation 5. Explanation 6. Page
<p>3</p>		<p>“Animation Module 1”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Animation 5. Explanation 6. Page
<p>4</p>		<p>“Animation Module 1”</p> <ol style="list-style-type: none"> 1. Back Button 2. Name of Module 3. Menu Bar 4. Animation 5. Explanation 6. Page

4. CONCLUSION

The design model of Measuring Instrument Learning Media (MILM) in Block System Practicum can be developed to support practical learning. The design of this learning media is in the form of application display storyboards. The designed storyboard will be used as a reference for the following stage. Further research is the development stage of the Android-based learning media.

REFERENCES

- [1] Wahyu Kusuma Wati I, Sekar Sari A And Setyaningsih R 2020 Media Need Analysis Of Learning Practicum In The Covid-19 Pandemic VANOS Journal Of Mechanical Engineering Education)
- [2] B. Békési, T. Houghton And Z. Lavicza. Collaborative Creative Tasks With I pads Proceedings Of The 13th ERME Topic Conference (ETC13) Ed H-G Weigand, A Donevska-Todorova, E Faggiano, P I J Medová, M Tabach And M Turgut (Slovakia: Mathematics Education In Digital Age 3 (MEDA3)) 2022
- [3] B. Haas, Z. Lavicza And Y. Kreis. Parent’s Experience In Remote Learning During COVID-19 With Digital And Physical Mathematical Modelling Res Pract Technol Enhanc Learn **18** 013, 2022
- [4] C. Bilsland, H. Nagy And P. Smith. Planning The Journey To Best Practice In Developing Employability Skills: Transnational University Internships In Vietnam Asia-Pacific Journal Of Cooperative Education. 2014
- [5] J. Drummer, G. Hakimov, M. Joldoshev And T. Köhler. Vocational Teacher Education In Central Asia Developing Skills And Facilitating Success Vol 28, 2018.
- [6] E. Suprptono, U.M. Arief, F. Ekarini, P. K. Nashiroh, A. Setiyawan, Subiyanto, I.D. Ariyani, B.P. Abiyasa And A.F. Muslimah2022, Pelatihan peningkatan kompetensi evaluasi autentik dalam pembelajaran merdeka belajar kurikulum merdeka (MBKM) jenjang pendidikan SMK Jurnal Pengabdian Mandiri
- [7] A. Setiyawan. Development Of Learning Media For An Automotive Measuring Instrument Based On Android For An Introduction To Motorcycle Practice, 2023, P. 020119
- [8] S. Sunyoto And A. Setiyawan. Entrepreneurship Education In Vocational Schools In Indonesia Education At The Intersection Of Globalization And Technology (Intechopen), 2021 .
- [9] A. Setiyawan And A. Kurniawan. The Effect Of Pandemic Covid-19 Into Internship Activity Of Mojokerto Vocational High Schools Journal Of Vocational Education Studies 4. 2021
- [10] T. Bruri, Model edupreneurship pelopor SMK techno, teacher, and schoolpreneur (Yogyakarta: Universitas Negeri Yogyakarta), 2015.
- [11] A. Setiyawan. Internship Regulations In Vocational Education During The Covid-19 Pandemic VANOS

Journal Of Mechanical Engineering Education.
2021

- [12] Hadromi, K. Adhetya, S. Andri, F.B. Achmad, N.C.P. Khoerul, A Practicum Learning Management Model For Productive Materials Based On The Needs Of Industry 4.0 In Vocational School International Journal Of Innovation, Creativity And Change, 2020.
- [13] T.A. Prasetya, C. T. Harjanto And A. Setiyawan Analysis Of Student Satisfaction Of E-Learning Using The End-User Computing Satisfaction Method During The Covid-19 Pandemic J Phys Conf Ser **1700** 012012, 2020
- [14] M. Khumaedi, D. Widjanarko, R. Setiadi And A. Setiyawan. Evaluating The Impact Of Audio-Visual Media On Learning Outcomes Of Drawing Orthographic Projections International Journal Of Education And Practice, 2021, pp. 613–24
- [15] S.E. Smaldino, D. L. Lowther , and J. D. Russel. Instructional Technology & Media For Learning Teknologi Pembelajaran Dan Media Untuk Belajar (9thed) (Jakarta: Pearson Education, Inc), 2011.
- [16] P. Parikhin, Pembelajaran Kooperatif STAD Untuk Meningkatkan Kualitas Pembelajaran Praktik Kelistrikan SMK (Studi Pada SMK Sriwijaya Karangpucung) Automotive Experiences **1** ,2018, pp. 53–7
- [17] A. Setiyawan, L. C. Manggalasari, T.A. Prasetya, T. Towip And W. Noviansyah Development Of Hydraulic Cylinder Excavator Learning Media Based On Augmented Reality With Shapr 3D Journal Of Physics: Conference Series Vol 2111 (IOP Publishing), 2021, P 012008
- [18] A. Setiyawan, Priyanto, T. A. Prasetya And A. F. Hastawan .Usability Evaluation Of Assignment And Monitoring Information Learning System Of Internship Students Based On SMS Gateway With Raspberry Pi IOP Conf Ser Earth Environ Sci **700**, 2021, pp. 012021.
- [19] A. Setiyawan, S. Suwahyo, F.B Darsono. Asri S And Ekarini F 2023 Design Of Wireless Engine Diagnostic Tool With Raspberry Pi For Learning Media Vocational Education Teacher Candidates VANOS Journal Of Mechanical Engineering Education 106–17
- [20] Branch R M 2009 Instructional Design: The ADDIE Approach (Boston, MA: Springer US)

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