



Development of Moodle-Based E-Learning Media in Workshop and Entrepreneurship Learning

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Abstract

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The rapid transition to online learning due to the Covid-19 pandemic presented challenges in ensuring effective student engagement and comprehension, particularly in subjects like Practical Work and Entrepreneurship. The problem identified is the lack of suitable digital tools to support interactive learning in these subjects, which often rely on hands-on experience and active participation. To solve this problem, this study developed and implemented Moodle-based e-learning media to enhance student understanding and engagement in Practical Work and Entrepreneurship education. The research objective was to assess the effectiveness of this e-learning media in improving students' learning outcomes compared to traditional learning methods. This study employed the Research and Development (R&D) method, involving two groups of students: an experimental group that used Moodle-based e-learning media and a control group that did not receive any additional digital learning support. Data were collected over a period of six months, using pretests and posttests, with statistical analysis conducted via Wilcoxon and Mann-Whitney tests. The results of the study showed significant improvements in the experimental group, with both statistical tests yielding significance values (sig) less than 0.05. These findings highlight the positive impact of Moodle-based e-learning media on students' comprehension of Practical Work and Entrepreneurship. In conclusion, the development and implementation of Moodle-based e-learning media proved to be an effective solution for enhancing student engagement and learning outcomes, particularly in the context of distance learning during the pandemic. This approach offers a scalable and flexible solution for improving education in similar contexts.

Keywords:

E-Learning, Moodle, Entrepreneurship Learning, Media Development

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INTRODUCTION

Moodle, presented as an interactive learning media software that is easy and enjoyable, aligns with the research conducted by Wanti Firdiana in her study that the results of the study show that the content experts gave a score of 4.61, which falls into the "Highly Suitable" category, the learning media experts gave a score of 4.36, which also falls into the "Highly Suitable" category, the economics learning practitioners gave a score of 4.19, which falls into the "Suitable" category, and from 37 students of Grade X MIPA 1 SMA Negeri 29 Jakarta, a positive response was obtained with a percentage of $\geq 65\%$. Based on this percentage, the Moodle learning media is considered suitable to be implemented in learning activities.



The development of interactive learning media using Moodle is very suitable for producing interactive learning media for a subject because it offers various features needed for learning, (Wang et al., 2020) such as content management, various types of practice questions, teleconferencing, assessment systems, and student attendance systems. This is also very helpful in the implementation of education, especially during the Covid-19 pandemic. (Chen et al., 2020) The Indonesian government is making efforts to prevent its spread, one of which is through the Circular of the Ministry of Education and Culture (Kemendikbud) No. 4 of 2020 concerning the implementation of education policies during the emergency period of the Covid-19 spread. Through this circular, the Kemendikbud provided instructions to conduct distance learning and suggested that students study from their respective homes. This is when educators need to innovate in designing learning so that it continues to run effectively and efficiently. (Siddikov et al., 2020)

SMA Negeri 1 Batam is one of the high schools in Batam, Riau Islands. SMA Negeri 1 Batam has been using Moodle-based e-learning media in its learning process, but its use has been limited to the implementation of Mid-Semester Assessments (PTS) and End-Semester Assessments (PAS). (Lohbeck & Frenzel, 2022) However, according to several studies that have been described above, Moodle-based e-learning media is highly suitable for supporting the organization of the learning process in schools. The limitations of classroom space and teaching staff make the organization of learning at SMAN 1 Batam less than optimal. (Maier et al., 2019)

According to Permendikbud No. 69 of 2013, the structure of the Secondary Education Curriculum (SMA/MA) states that one face-to-face lesson hour is 45 minutes per week. Subjects that have an allocation of 2 lesson hours per week mean a face-to-face learning load of 2 x 45 minutes per week; subjects with an allocation of 3 lesson hours per week mean a face-to-face learning load of 3 x 45 minutes per week; and so on. This cannot be implemented at SMAN 1 Batam, where one face-to-face lesson hour for Grade X is 30 minutes per week, and for the subjects of Practical Work and Entrepreneurship, which have an allocation of 2 lesson hours per week, it means a face-to-face learning load of 2 x 30 minutes per week. (Nofrianto et al., 2020)

Entrepreneurship education is a type of education that teaches people to create their own business activities. Such education is pursued in the following ways: a) building faith, spirit, and enthusiasm, b) building and developing entrepreneurial attitudes and character, c) developing entrepreneurial thinking and ways, d) promoting and developing self-driving forces, e) understanding and mastering techniques in facing risks, (Uyuni & Adnan, 2020) competition, and cooperation processes, f) understanding and mastering the ability to sell ideas, g) having management skills, and h) having certain expertise, including mastery of specific foreign languages for communication purposes (Indrawati, 2018). From the above explanation, it can be concluded that the results of learning Practical Work and Entrepreneurship are activities to gain knowledge, understanding, or skills (including mastery of cognitive, affective, and psychomotor domains) through study, teaching, or experience, thereby creating business opportunities. (Fernandez & Husein, 2022)

Teachers, as facilitators of classroom learning, must always improve the quality of education, one of which is by developing learning media that can increase students' interest in learning and their understanding of the subject matter (Hidayati et al., 2021). What sets this research apart from existing studies is its focus on applying Moodle-based e-learning specifically to Practical Work and Entrepreneurship education. While previous research, such as studies by Wanti Firdiana, has demonstrated the effectiveness of Moodle in various subjects during the Covid-19 pandemic, these studies generally focus on theoretical or less hands-on disciplines. In contrast, this research addresses the unique challenges of implementing e-learning for subjects that traditionally require face-to-face interaction and practical engagement. The novelty of this study lies in its customization of Moodle features to facilitate practical and entrepreneurial learning, incorporating multimedia tools and assessments designed to simulate real-world entrepreneurial activities.(Aldiab et al., 2019)

Additionally, this research includes a comparative analysis between an experimental group using Moodle and a control group without additional digital support, revealing statistically significant improvements in learning outcomes, a dimension not extensively covered in prior research.(Sefriani et al., 2021) Furthermore, the study offers valuable insights into the effectiveness of Moodle in both remote and blended learning environments, which is particularly important in regions like Indonesia, where digital infrastructure can vary. Thus, this study not only confirms Moodle's utility as a content delivery platform but also extends its applicability to developing practical skills in vocational education, contributing new findings to the existing body of knowledge.(Aldiab et al., 2019).

METHODS

The research method used in this study is the Research and Development (R&D) method. Research and Development is a research method used to produce a specific product and test the effectiveness of that product.(Hwang et al., 2019) The products referred to in this research and development include not only hardware, such as books, modules, classroom teaching aids, or similar hardware, but also software, such as computer programs for learning, training, guidance, evaluation, and more. The media developed from this research is learning media in the form of software using the Moodle application. (Darmawan & Jaedun, 2020).

The development procedure used in this study refers to the ADDIE development model which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. The development procedure for Moodle-based e-learning media consists of the following 5 stages:

1. Analysis: This stage involves identifying the learning needs, objectives, and target audience. It also includes analyzing the current educational context and the resources available for the development of the e-learning media.(Reigeluth & An, 2020)
2. Design: In this stage, the overall structure and design of the e-learning media are planned. This includes defining the learning objectives, creating a detailed design plan, selecting appropriate learning strategies, and designing the user

interface and instructional materials.(Nofrianto et al., 2020)

3. Development: During the development stage, the actual e-learning media is created based on the design plan. This involves developing content, creating multimedia elements, programming the Moodle platform, and integrating all components into a cohesive learning system.(Mulyatna et al., 2021)
4. Implementation: This stage involves deploying the developed e-learning media in the actual learning environment. It includes training educators and students on how to use the system, setting up the necessary technical infrastructure, and conducting initial trials or pilot testing.(Ranuharja et al., 2021)
5. Evaluation: The final stage is evaluating the effectiveness and impact of the e-learning media. This includes collecting feedback from users, assessing learning outcomes, and making necessary revisions to improve the system. Formative and summative evaluations are conducted to ensure that the learning objectives are met and to refine the media based on user experiences. (Azizah et al., 2020)

By following these stages, the study aims to systematically develop and evaluate Moodle-based e-learning media to enhance the teaching and learning process in Practical Work and Entrepreneurship education. The ability measured in this study is learning outcomes, and therefore the technique used to collect data for analyzing effectiveness is through tests. In this case, the researcher uses a quasi-experimental design, specifically a time series design, where the study groups cannot be randomly selected.(Haryoso Wicaksono, 2019) The groups are then given a pretest up to four times before the treatment, aiming to determine the stability and clarity of the group conditions before the treatment. The experimental test consists of two research groups: the experimental group, with pretest and posttest measurements for 46 students, and the control group, with pretest and posttest measurements for 46 students, using 40 objective questions. The testing is conducted using tests that include the normality test, the Wilcoxon test, and the Mann-Whitney test. (Maskar et al., 2020)

The data collection instrument used in this study was a questionnaire. Questionnaire is a data collection tool containing a series of questions or statements that must be answered by research subjects. The questionnaire was utilized to gather assessment data on the suitability of the media from content experts, media experts, as well as students' opinions regarding the use of the media.(Kim, 2019).

RESULTS

1. Analysis Stage

This stage is the initial phase of the research aimed at analyzing the need for media development. The activities carried out in this stage include:

- a. Student Analysis The researcher analyzes the needs, including the problems and characteristics of the students who will be the target users of the Moodle-based e-learning media.(Reigeluth & An, 2020)
- b. Competency Analysis : The researcher analyzes the Core Competencies (Kompetensi Inti - KI) and Basic Competencies (Kompetensi Dasar - KD) that will be included in the Moodle-based e-learning media.(Efendi et al., 2019)

2. Design Stage

Based on the analysis results, the next step is to design the Moodle-based e-learning

media. This stage includes the following activities:

- a. Creating a Design in Moodle : the design result of the moodle is presented in figure 1.



Figure 1. Moodle Design Result

- b. Compiling and Evaluating the Material The material to be presented in the course is compiled based on the syllabus of Practical Work and Entrepreneurship for Grade X, Semester I, at the senior high school level for the 2022/2023 academic year.

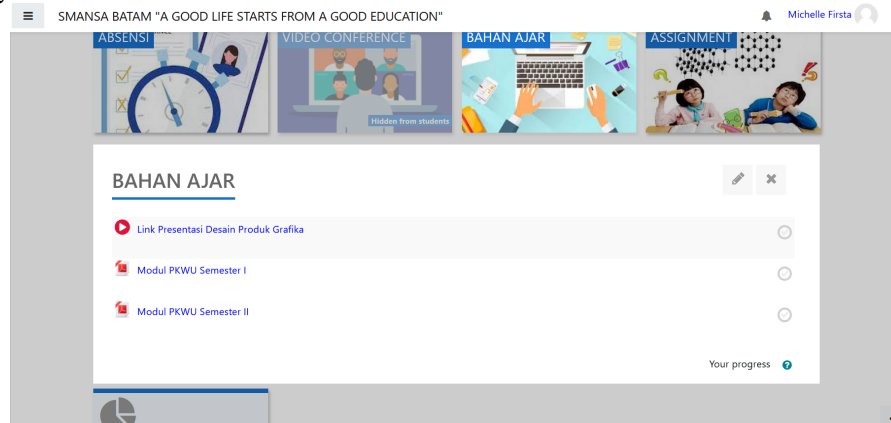


Figure 2. Material Menu Result

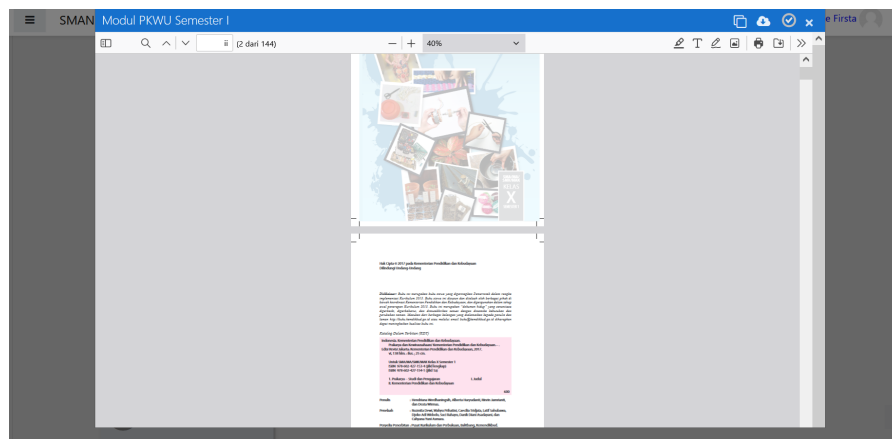


Figure 3. Material and Module View Result

3. Development Stage

- a. Product Development and Host : The product is created using a series of components that were prepared during the design stage, which have been designed to form a complete and cohesive unit like the material, module and design of the moodle. In development stage the E-Learning based moodle media is presented online with website host that show in figure 4.(Anwar et al., 2021)

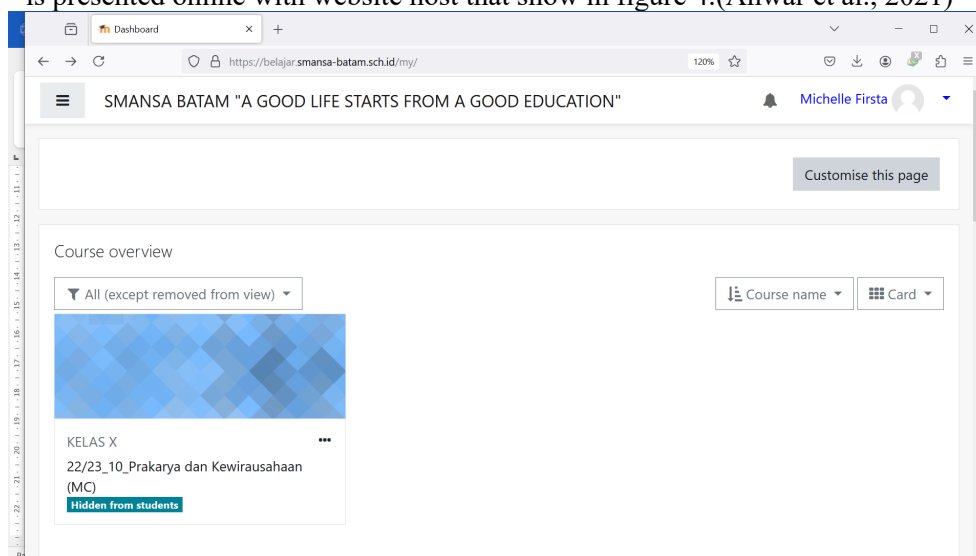


Figure 4. Website Host E-Learning Result

4. Implementation Stage

The developed product will be tested on students of Grade X Science 1 at SMA Negeri 1 Batam. Questionnaires will be distributed to the students to obtain their assessments and suggestions and will be statistically test with various testing method and counting.(Andri & Ambiyar, 2021)

The normality test is conducted using the Kolmogorov-Smirnov test on each data group because the sample size is greater than 30 respondents. The criterion is that if the significance value (sig) is greater than 0.05, it means the data is normally distributed. Based on Table 1, the results of the normality tests show that for each group, the significance value (sig) is greater than 0.05, indicating that each group's data is not normally distributed.(Ramadhani et al., 2020)

Table 1. Normality Test Result

Group	Sig	Desc
Pretest (Experiment)	0,001	Normal
Posttest (Experiment)	0,000	Normal
Pretest (Control)	0,001	Normal
Posttest (Control)	0,200	Normal

The following presents the research results from two different groups regarding respondents' knowledge of hand, foot, and nail care with the provision of Moodle-based e-learning media and without any learning media, with the following outcomes. Based on table 2, it was found that in both the experimental and control groups, the Wilcoxon test resulted in a significance value (sig) of 0.000, which is less than 0.05. This indicates a significant difference in students' understanding in Practical Work and Entrepreneurship learning using Moodle-based e-learning media development.(Santosa et al., 2019).

Table 2. Wilcoxon Test Result

Test Statistics ^a		
	Posttest (Kontrol) - Pretest (Kontrol)	Posttest (Eksperimen) - Pretest (Eksperimen)
Z	-5.311 ^b	-5.775 ^b
Asymp. Sig. (2-tailed)	.000	.000
a. Wilcoxon Signed Ranks Test		
b. Based on negative ranks.		

The following presents the research results from two different groups regarding respondents' understanding of Practical Work and Entrepreneurship learning with Moodle-based e-learning media and without any learning media, with the following outcomes. Based on table 3, in the experimental group, the Mann-Whitney test resulted in a significance value (sig) of 0.000, which is less than 0.05. This means there is a significant difference in students' understanding of Practical Work and Entrepreneurship learning using Moodle-based e-learning media. (Fauziah et al., 2018)

Table 3. Mann-Whitney Test Result

Test Statistics ^a	
	Hasil Belajar
Mann-Whitney U	489.000
Wilcoxon W	1570.000
Z	-4.474
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Groups	

5. Evaluation Stage

The evaluation stage is the final phase of the ADDIE development model. The purpose of the evaluation is to determine the results of the product that has been created or developed through the feedback provided by further discussion and interview with the students and some of the teachers involve. The review that conducted is to include assignment and assignment's submit menu, and also description about deadline of the assignment. (Stöhr et al., 2020)

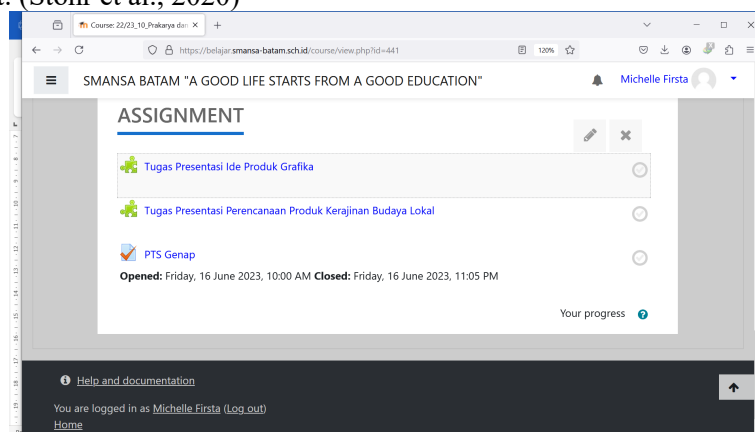


Figure 5. Assignment Menu and Description

DISCUSSION

1. **Meaning of the Main Research Results.** The results of this study demonstrate the positive influence of Moodle-based e-learning media in fostering better learning outcomes in the context of Practical Work and Entrepreneurship education. The enhanced performance of students in the experimental group suggests that Moodle's interactive tools, such as multimedia content, quizzes, and assignments, contribute to an enriched learning experience. This is especially relevant in the post-pandemic era, where blended or remote learning environments have become more prevalent. The integration of digital tools like Moodle supports both theoretical and practical aspects of learning by providing students with access to resources and interactive content outside the traditional classroom setting. (Surjono et al., 2019)
2. **Comparison with Previous Research.** The findings of this study align with prior research on the use of Moodle in educational settings, particularly in theoretical subjects. Studies by Wanti Firdiana and others demonstrated Moodle's effectiveness in enhancing student engagement and satisfaction in various learning environments during the Covid-19 pandemic. However, the current study adds a new dimension by applying Moodle in a more practical, hands-on educational context, such as entrepreneurship and practical work, which requires more interactive and participatory approaches. While previous studies, such as Chen et al. (2020), showed that Moodle is beneficial for remote learning in subjects like economics and sciences, this research extends those findings to a practical subject domain. The findings are consistent with those of Hwang et al. (2019), who emphasized the importance of multimedia tools in improving learning outcomes. However, the current study adds that the customized Moodle features specifically tailored for entrepreneurship education provide additional benefits in facilitating practical learning experiences.
3. **Implications for the Field.** The findings of this research contribute significantly to the development of educational technologies, particularly in the domain of entrepreneurship and practical work education. The successful implementation of Moodle-based e-learning media offers an example of how digital platforms can enhance student engagement and comprehension in subjects that traditionally rely on hands-on, face-to-face interaction. These findings imply that the use of digital platforms like Moodle can be scaled to other vocational and practical subjects, especially in contexts where classroom space and resources are limited. Furthermore, this study demonstrates the potential for Moodle to support blended learning approaches, enabling students to access learning materials and assessments at their convenience, which can contribute to lifelong learning. (Römgens et al., 2020)
4. **Limitations and Recommendations.** Despite the positive findings, the research does have some limitations. First, the study was conducted in a single educational context, involving only one school and a limited sample size. This may affect the generalizability of the results to other schools or educational settings. Future research should consider involving a larger and more diverse sample to validate the findings across different educational contexts. Second, the study only evaluated short-term learning outcomes immediately following the intervention. The long-term effects of using Moodle-based e-learning media on students' retention of knowledge and practical skills were not assessed. Future studies should investigate the long-term impact of such interventions to better understand their sustainability and effectiveness over time. Third, technical difficulties such as internet access and device availability could potentially limit the effectiveness of Moodle-based learning, especially in rural or underdeveloped regions. It is recommended that schools or educational institutions consider infrastructural support when implementing e-learning systems like Moodle.

Furthermore, the experimental design employed in this study, which involved both an experimental and a control group, provided strong evidence of the effectiveness of Moodle-based e-learning. However, one limitation of the development process was the lack of randomization in group assignment, which could have introduced bias. In future research, a fully randomized controlled trial would enhance the validity of the findings.

CONCLUSION

The development and implementation of Moodle-based e-learning media in Practical Work and Entrepreneurship education provide a transformative approach to addressing the challenges of engaging students in practical and theoretical learning within a blended or remote learning environment. By integrating interactive and flexible digital tools, this study demonstrates that e-learning platforms can effectively bridge the gap between hands-on learning and online education, fostering improved comprehension and engagement. The use of customized Moodle features not only supports the acquisition of practical skills but also enhances overall learning experiences by providing accessible, scalable solutions adaptable to various educational contexts. This research contributes to the broader discourse on the role of educational technology in enhancing learning outcomes.

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